



# Preliminary Biodiversity Assessment Report

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Bega Valley Shire Council Water Treatment  
Facility, 43 Redgum Road, Yellow Pinch, NSW

Prepared for Bega Valley Shire Council

January 2023

The Environmental Factor





# Preliminary Biodiversity Assessment Report – Bega Valley Shire Council Water Treatment Facility

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This Report has been prepared by The Environmental Factor (TEF) at the request of Bega Valley Shire Council (The Client) in order to assess the ecological impacts arising from the proposed rezoning of a portion of land to enable the future construction of a Water Treatment Facility (WTF) at 43 Red Gum Road in Yellow Pinch, NSW (The Proposal). The purpose of this report is to document the biodiversity assets found within the Subject Land, to assess those that are likely to be impacted either directly or indirectly as a result of the Planning Proposal.

This document is not intended to be utilised or relied upon by any persons other than the Client and their appointed contractors nor to be used for any purpose other than that articulated above. Accordingly, TEF accepts no responsibility in any way whatsoever for the use of this report by any other persons or for any other purpose.

The information, statements, recommendations and commentary (together the “Information”) contained in this report have been prepared by TEF on the basis of information provided by the Client and from material provided by the NSW Department of Planning and Environment (DPE) and the Commonwealth Department of Climate Change, Environment, Energy and Water (DCCEEW) and through the survey process. TEF has not sought any independent confirmation of the reliability, accuracy or completeness of this information. It should not be construed that TEF has carried out any form of audit of the information which has been relied upon.

Information contained within the Report is current as at the date of the Report and may not reflect any event or circumstances which occur after the date of the Report.

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## Abbreviations

| Abbreviation    | Description  |
|-----------------|--|
| <b>AOBV</b>     | Areas of Outstanding Biodiversity Value                                |
| <b>BAM</b>      | Biodiversity Assessment Methodology                                    |
| <b>BC Act</b>   | <i>Biodiversity Conservation Act 2016</i>                              |
| <b>BOS</b>      | Biodiversity Offset Scheme   |
| <b>CEEC</b>     | Critically Endangered Ecological Community                             |
| <b>DCCEEW</b>   | Department of Climate Change, Energy, the Environment and Water        |
| <b>DPI</b>      | Department of Primary Industries                                       |
| <b>DPE</b>      | Department of Planning and Environment (formerly DPIE)                 |
| <b>EPA</b>      | Environmental Protection Agency  |
| <b>EPBC Act</b> | <i>Environmental Protection and Biodiversity Conservation Act 1999</i> |
| <b>FM Act</b>   | <i>Fisheries Management Act 1994</i>                                   |
| <b>HTE</b>      | High Threat Exotic   |
| <b>LEP</b>      | Local Environment Plan   |
| <b>MNES</b>     | Matters of National Environmental Significance                         |
| <b>OEH</b>      | Office of Environment and Heritage                                     |
| <b>POEO Act</b> | <i>Protection of the Environment Operations Act 1997</i>               |
| <b>TEC</b>      | Threatened Ecological Community  |
| <b>TEF</b>      | The Environmental Factor   |
| <b>WoNS</b>     | Weeds of National Significance   |

## EXECUTIVE SUMMARY

The Environmental Factor (TEF) was commissioned by Bega Valley Shire Council (herein 'the Client' or 'Council') to undertake a Preliminary Biodiversity Assessment Report (PBAR) to consider the potential future ecological impacts arising from the rezoning of land under Part 3 of the *Environmental Planning and Assessment Act 1979* (EP&A Act), for the purpose of enabling the future development of a Water Treatment Facility (WTF) for the Bega community on Lot 882 DP 789858 at 43 Red Gum Road, Yellow Pinch, NSW (Figure 1) (herein 'the Planning Proposal').

The Planning Proposal consists of the following key features:

- Rezoning of **4.68 ha** of land on Lot 882 DP 789858 from C3 Environmental Management, to SP2 Infrastructure, with potential for subsequent direct and indirect impacts to the Subject Land as a result of the rezoning the parcel of from high environmental conservation to low environmental conservation protection; and
- Retention of **3.34 ha** of native vegetation present on Lot 882 DP 789858 as C3 Environmental Management land use zone.

The re-zoning of the **4.68 ha** portion of the Subject Land, as described above, is required to allow for the future construction of a new WTF and associated infrastructure near the Yellow Pinch Dam, which is currently being designed by GHD. The construction of the WTF aims to ensure that treated water supply will meet future demand and stringent water quality requirements. Subsequently, in addition to the key features assessed within this PBAR relating to the re-zoning of land, the report has also considered the potential for future impacts to biodiversity, including threatened species and ecological communities (threatened biota) as a result of the proposed future development of a WTF on site<sup>1</sup>. These preliminary impact assessments have been made based on the concept designs received as of 13 January (GHD, 2023; Appendix A). Features of the proposed future development and their respective impact areas are as follows:

- Direct impacts to facilitate the construction of the WTF and associated infrastructure (i.e office etc) (**0.39 ha**)
- Direct impacts to allow for the construction of a new access track to the site (**0.44 ha**)
- Direct impacts for the construction of a solar array (**0.44 ha**)
- Direct impacts to native vegetation resulting in the loss of the canopy stratum to provide for Asset Protection Zones (APZs) for future infrastructure (**1.08 ha**)
- Potential modification of areas outside of the direct impact area within the Subject Site, including ongoing grounds maintenance such as mowing, with retention of canopy species (**2.34 ha**)
- Total potential impact areas for WTF (**4.68 ha**)

The Subject Land is located along Red Gum Road, south-east of Yellow Pinch Dam about fifteen (15) kms from Bega, and is surrounded by heavily vegetated large-lot residential properties (Figure 1). The site is bisected by an access road, electricity easements and infrastructure, as well as a number of private dwellings and other buildings. The electricity easement runs east-west through the centre of

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<sup>1</sup> It should be noted that WTF designs are preliminary, and this PBAR does not constitute an impact assessment for the future development of the site.



the site and branches into two (2) arms at the eastern extent. The existing driveways, residential buildings and garden areas are more heavily disturbed than the broader Subject Land; the majority of the future WTF would be located over these already disturbed areas, based on the preliminary advice provided by TEF to avoid impacts to biodiversity, and the subsequent concept design. In and around the existing disturbed areas and infrastructure, the Subject Land contains a mixture of good quality, remnant native woodland, and degraded and previously modified woodland and derived native grasslands (DNGs).

Several alternative locations for the proposed WTF were considered prior to the selection of the Subject Site. The alternative sites included:

- Three (3) residential sites, which landowners were willing to sell by agreement.
  - Two (2) of these did not have the required footprint size, or suitable environmental attributes
- A site within a National Park, which appeared to have suitable elevation, and was bordered by an electricity easement and was previously cleared
  - Which was ultimately discounted due to the acquisition complexity risk, and timing.

The location of the site for the proposed WTF development at the Red Gum Road site was selected as the optimal site based on the results of a Scoping Study completed (GHD 2021), which summarised that:

- The Subject Site contained an existing disturbed (by residential buildings) footprint of approximately the right dimensions for the WTF, and subsequently an anticipated lower environmental impact footprint
- The site is easily acquired, as it is already owned by Council
- The site is optimal as it easily links in with the existing water supply network, and
- It provides the required elevation for the facility to maximise gravity feed into the Tantawangalo-Kiah drinking water network and avoid excess pumping.

In addition, based on the biodiversity site assessment conducted, preliminary constraints were provided to the design team by TEF, and as a result the Planning Proposal boundaries and future Subject Site were amended so as to avoid and minimise impacts to biodiversity, through exclusion of the more intact areas of vegetation from the rezoning. As such, the resulting Subject Site for the proposed future location of the WTF, and the boundaries of the newly established SP2 area, were considered suitable from a biodiversity perspective based on the following:

- Infrastructure associated with the WTF would be located where existing residential buildings occur, to reduce additional biodiversity impacts,
- The Subject Site predominantly contains previously modified and disturbed native vegetation, and subsequently, minimal good quality vegetation would be impacted,
- The proposed future access road to the site is located within an area previously cleared of native vegetation to reduce the need to further remove canopy vegetation, and
- The existing disturbance and modification of the site, especially in the vicinity of the residential buildings lessens the likelihood that threatened flora occurs within the future impact zone.

During field investigations, the condition and habitat values of the vegetation present was assessed in accordance with the Biodiversity Assessment Method (BAM), including habitat identification, vegetation community mapping, confirmation of presence or absence of Threatened Ecological Communities (TECs), collection of floristic data, and opportunistic threatened flora and fauna surveys. A total of nine (9) BAM plots were completed to confirm the composition and structure of native vegetation present.

A total of fifty-five (55) fauna species were recorded during the surveys. This included twelve (12) native mammals, three (3) native amphibians and forty (40) native bird species. Three (3) threatened fauna species were recorded within the Subject Land during surveys:

- Gang-gang Cockatoo (*Callocephalon fimbriatum*) – listed as Vulnerable (BC Act) and Endangered (EPBC Act)
- Large Bent-winged Bat (*Miniopterus orianae oceanensis*) – listed as Vulnerable (BC Act)
- Scarlet Robin (*Petroica boodang*) – listed as Vulnerable (BC Act)

A total of one hundred and fourteen (114) species were recorded within vegetation survey plots and incidental observations, consisting of one hundred and seven (107) native species and thirty-three (33) exotic species, including nine (9) High-Threat Exotics (HTE).

The following threatened flora species were surveyed for during site surveys:

- *Leionema ralstonii* (Ralston's Leionema)- V, BC Act and V EPBC Act
- *Acacia georgensis* (Bega Wattle)- V, BC Act and V EPBC Act
- *Astrotricha crassifolia* (Thick-leaf Star-hair) - V, BC Act and V EPBC Act
- *Zieria buxijugum* (Box Range Zieria)- CE, BC Act and CE, EPBC Act
- *Zieria formosa* (Shapely Zieria)- CE, BC Act and E, EPBC Act

No threatened flora or TEC's were identified on site during surveys.

In addition to the threatened biota recorded on site, the species listed in Table 1 below have the potential to occur in the Subject Land, and are considered to have potential to be impacted as a result of the proposed future development of the site. Recommended mitigation measures, including the need for further assessment for specific species are outlined in this report; however, the significance of impacts to these threatened biota have not been assessed as part of the current Planning Proposal. Instead, conclusions have been drawn on the likelihood of occurrence and subsequent likelihood of impact to species with potential to occur on the site, based on the results of desktop surveys and site assessments, and the concept designs provided. Assessments of significance are required to be prepared in accordance with Section 1.7 of the EP&A Act and the EPBC Act Matters of National Environmental Significance – Significant Impact Criteria Guidelines (DEWHA, 2009) for these species as part of the next stage of development assessment, once the Planning Proposal and rezoning process has been concluded. Further site investigations, including seasonal, targeted surveys may be recommended to provide data to refine the number of species considered to have potential to be impacted by the construction of the WTF. If a significant impact were to be considered likely as a result of the construction and operation of the WTF, a Species Impact Statement or Biodiversity Development Assessment Report (BDAR), and / or Referral to the Environment Minister may be



required. Recommended mitigation measures, to reduce the likelihood of a significant impact to these species arising from the proposed future WTF development, have been provided in Section 7.

**Table 1 Threatened species with a moderate to high potential to be impacted by the future WTF development**

| Scientific Name                        | Common name                            | BC Act | EPBC Act |
|--|--|--------|----------|
| <b>Flora</b>                           |  |        |          |
| <i>Acacia georgensis</i>               | Bega Wattle                            | V      | V        |
| <i>Astrotricha crassifolia</i>         | Thick-leaf Star-hair                   | V      | V        |
| <i>Astrotricha sp. Wallagaraugh</i>    | Merimbula Star-hair                    | E      | -        |
| <i>Leionema ralstonii</i>              | Ralston's Leionema                     | V      | V        |
| <i>Pomaderris bodalla</i>              | Bodalla Pomaderris                     | V      | -        |
| <i>Pomaderris cotoneaster</i>          | Cotoneaster Pomaderris                 | E      | E        |
| <i>Pomaderris parrisiae</i>            | Parris' Pomaderris                     | V      | V        |
| <i>Pultanea pedunculata</i>            | Matted Bush-pea                        | E      | -        |
| <i>Thesium australe</i>                | Thesium Australe                       | V      | V        |
| <b>Birds of Prey</b>                   |  |        |          |
| <i>Circus assimilis</i>                | Spotted Harrier                        | V      | -        |
| <i>Falco subniger</i>                  | Black Falcon                           | V      | -        |
| <i>Hieaetus morphnoides</i>            | Little Eagle                           | V      | -        |
| <i>Lophoictinia isura</i>              | Square-tailed Kite                     | V      | -        |
| <b>Fruit-eating bats</b>               |  |        |          |
| <i>Pteropus poliocephalus</i>          | Grey-headed Flying Fox                 | V      | V        |
| <b>Woodland birds</b>                  |  |        |          |
| <i>Anthochaera phrygia</i>             | Regent Honeyeater                      | CE     | CE       |
| <i>Artamus cyanopterus cyanopterus</i> | Dusky Woodswallow                      | V      | -        |
| <i>Climacteris picumnus</i>            | Brown Treecreeper (eastern subspecies) | V      | -        |
| <i>Daphoenositta chrysoptera</i>       | Varied Sitella                         | V      | -        |
| <i>Epthianura albifrons</i>            | White-fronted Chat                     | V      | -        |
| <i>Lathamus discolor</i>               | Swift Parrot                           | E      | -        |
| <i>Melanodryas cucullata cucullata</i> | Hooded Robin (south-eastern form)      | V      | -        |

| Scientific Name                         | Common name                        | BC Act | EPBC Act |
|---|------------------------------------|--------|----------|
| <i>Pachycephala olivacea</i>            | Olive Whistler                     | V      | -        |
| <i>Petroica boodang</i>                 | Scarlet Robin                      | V      | -        |
| <i>Petroica phoenicea</i>               | Flame Robin                        | V      | -        |
| <i>Stagonopleura guttata</i>            | Diamond Firetail                   | V      | -        |
| <b>Hollow-dependent Birds</b>           |                                    |        |          |
| <i>Callocephalon fimbriatum</i>         | Gang-gang Cockatoo                 | V      | -        |
| <i>Calyptorhynchus lathami</i>          | Glossy Black-Cockatoo              | V      | -        |
| <i>Glossopsitta pusilla</i>             | Little Lorikeet                    | V      | -        |
| <i>Ninox connivens</i>                  | Barking Owl                        | V      | -        |
| <i>Ninox strenua</i>                    | Powerful Owl                       | V      | -        |
| <i>Tyto novaehollandiae</i>             | Masked Owl                         | V      | -        |
| <i>Tyto tenebricosa</i>                 | Sooty Owl                          | V      | -        |
| <b>Hollow-dependent Mammals</b>         |                                    |        |          |
| <i>Cercartetus nanus</i>                | Eastern Pygmy-possum               | V      | -        |
| <i>Dasyurus maculatus</i>               | Spotted-tailed Quoll               | V      | E        |
| <i>Petaurus australis</i>               | Yellow-bellied Glider              | V      | -        |
| <i>Petauroides volans</i>               | Greater Glider                     | V      | V        |
| <i>Phascogale tapoatafa</i>             | Brush-tailed Phascogale            | V      | -        |
| <b>Insectivorous Bats</b>               |                                    |        |          |
| <i>Micronomus norfolkensis</i>          | Eastern Coastal Free-tailed Bat    | V      | -        |
| <i>Falsistrellus tasmaniensis</i>       | Eastern False Pipistrelle          | V      | -        |
| <i>Scoteanax rueppellii</i>             | Greater Broad-nosed Bat            | V      | -        |
| <i>Miniopterus orianae oceanensis</i>   | Large Bent-winged Bat              | V      | -        |
| <b>Other Mammals</b>                    |                                    |        |          |
| <i>Phascolarctos cinereus</i>           | Koala                              | E      | E        |
| <i>Potorous tridactylus tridactylus</i> | Long-nosed Potoroo (SE Mainland)   | V      | V        |
| <i>Isodon obesulus obesulus</i>         | Southern Brown Bandicoot (Eastern) | E      | E        |



The analysis of floristic data collected during the site surveys completed assigned two (2) PCTs to the Subject Land:

- PCTID: 3660 - South Coast Hinterland Yellow Stringybark Forest – **0.42 ha**
- PCTID: 3663 - Southeast Foothills Stringybark Shrub Forest – **7.32 ha**
- PCTID 0: Non-native vegetation/ existing hardstands– **0.28 ha**

As indicated above, PCTs present within the Subject Land did not conform to known TECs. PCTs present within the Subject Land were further split into Vegetation Zones to reflect the differing conditions of the vegetation that occurred on site, as defined in Section 5.2.

To reflect the future intended use of the site, the site was also categorised into potential future management zones in line with the proposed construction and ongoing use of the WTF. Management zone areas are defined herein as follows:

- **Management Zone A (1.26 ha):** This zone encompasses areas where future infrastructure required for the construction of the WTF will be located (Development Area). It includes future buildings, WTF infrastructure (i.e sludge ponds, tanks, buildings etc.), road access and the proposed solar arrays. It has been assumed that complete removal of vegetation will occur in this area to facilitate construction of the required infrastructure.
- **Management Zone B (1.08 ha):** This area encompasses the proposed Asset Protection Zones, and allows for the retention of the ground-cover stratum. At worst, the canopy and shrub layer stratum would be removed entirely, however pending the finalised design of the WTF, and findings of the Bushfire Assessment, up to 15% of the canopy stratum may be retained
- **Management Zone C (2.34 ha):** this MZ encompasses the remaining area within the Subject Site not captured above, that will be retained as Woodland, with a managed / mown understorey; specifically, canopy species, including recorded hollow-bearing and habitat trees will be retained in this MZ.

The land does not contain any mapped Biodiversity Values (Appendix C) and is mapped as excluded from the LLS Act (Appendix B). And, as the Planning Proposal is not being assessed as a development under Part 4 of the EP&A Act, with the future development of the site for a WTF intended to be assessed later under Part 5 of the EP&A Act as critical regional water infrastructure, **participation in the Biodiversity Offset Scheme (BOS) is not required**, unless a significant impact to threatened biota is anticipated (refer Section 2.2.1 and Section 2.2.4). This will be determined as part of the next stages of development assessment, if the Planning Proposal proceeds for rezoning, the proposed future development can proceed and the designs are finalised, incorporating the recommended avoidance and mitigation measures outlined in this report.

The current Planning Proposal has considered the existing biodiversity values of the Subject Land through the Scoping Study, and surveys and constraints identification completed in accordance with the BAM, demonstrating that efforts have thereby been made to ensure the boundaries of the rezoning are limited to previously disturbed and lower quality areas of native vegetation within existing Lot 882 DP 789858. Placement of the proposed SP2 boundary over areas that contain existing buildings, access roads and electricity infrastructure and easements, thereby demonstrates that appropriate measures to avoid and minimize impacts to biodiversity have been implemented as part

of the Planning Proposal in accordance with the principles of the *Biodiversity Conservation Act 2016* (BC Act). While the site is currently zoned as C3, the portion of the Subject Land proposed for rezoning as part of the current Planning Proposal is heavily disturbed and degraded, and placement of the proposed future WTF in this location is not anticipated to result in significant impacts to biodiversity, based on the concept design (GHD, January 2023; Appendix A) and provided the recommended mitigation measures are implemented and maintained.

# 1 INTRODUCTION

The Environmental Factor (TEF) was commissioned by Bega Valley Shire Council (herein ‘the Client’ or ‘Council’) to undertake a Preliminary Biodiversity Assessment Report (PBAR) to consider the potential future ecological impacts arising from the rezoning of land under Part 3 of the *Environmental Planning and Assessment Act 1979* (EP&A Act), for the purpose of enabling the future development of a Water Treatment Facility (WTF) for the Bega Valley Shire community on Lot 882 DP 789858 at 43 Red Gum Road, Yellow Pinch, NSW (Figure 1) (herein ‘the Planning Proposal’).

The PBAR would accompany a Planning Proposal to be submitted to the NSW Department of Planning and Environment for the proposed re-zoning of a portion of Lot 882 DP 789858, and provides an assessment of biodiversity values present at the site at a level sufficient to inform the rezoning proposal. The proposed re-zoning of a portion of the site from C3 Environmental Management, to SP2 Infrastructure is required to allow for the future construction of a critical WTF to supply clean, potable water for the southern half of the shire.

The assessment has been conducted with respect to the requirements of the NSW *Biodiversity Conservation Act 2016* (BC Act) and the *Environmental Planning and Assessment Act 1979* (EP&A Act). The report classifies the vegetation on site in proximity to the Proposal, and describes the potential for occurrence of threatened species, populations and communities and associated habitat features within the Subject Land. The Subject Land is located within an area of partially cleared and disturbed remnant native vegetation in Yellow Pinch NSW within the Bega Valley Shire Council (BVSC) Local Government Area (LGA) and is subject to the planning provisions of the Bega Valley Local Environmental Plan (LEP) 2013.

The assessment and conclusions contained in this report are preliminary in nature, and are based on the concept designs provided by the January 2023 (GHD, 2023; Appendix A), in conjunction with information obtained through database searches and field surveys completed in late 2022. It is intended that the future development of the WTF at the site would be assessed as a separate development that is permitted without consent under Part 5 of the EP&A Act and the SEP (Transport and Infrastructure) 2021, after the rezoning of the site has been completed. The concept drawings and anticipated impacts arising from this proposed future development are considered herein for context only.

The Subject Land is currently zoned as C3 Environmental Management, and part of the proposed development on the site includes the re-zoning of the land to SP2 Infrastructure (Figure 2).

The land does not contain any mapped Biodiversity Values (Appendix C) and is mapped as excluded from the LLS Act (Appendix B).

The legislative context of the Proposal, methods used, and recommendations are included within this report.

## 1.1.1 Aim of the report and assessment principles

The purpose of this report is to:



- Provide an up to date understanding of the biodiversity assets present within the Subject Land (as of August 2022), which may act as constraints to the proposed rezoning and subsequent future development, or be impacted by delivery of the Proposal
- Assist Council in planning for future site usage while retaining important ecological/biodiversity features present, thereby avoiding and minimising impacts where possible, in accordance with the principles of the BC Act
- Provide advice on the likelihood or potential for significant impacts as a result of the future development of the site into a WTF, and
- Highlight areas of avoidance and minimisation of impacts necessary to ensure biodiversity values are retained wherever possible.

Specifically, the PBAR will:

- Describe the biodiversity values of the existing environment within the Subject Land, including vegetation types, fauna habitats and flora and fauna species known or likely to occur (as at August 2022)
- Assess the condition and conservation significance of native vegetation and habitats in the proposal site
- Compile a list of threatened biota previously recorded or predicted to occur in the locality and assess their potential to occur within the proposal site
- Assess the likely impacts on threatened biota as a result of the Planning Proposal and future proposed development
- Recommend mitigation measures to reduce impacts on biodiversity values
- Determine if the Planning Proposal will require participation the BOS, and
- Assess the potential for significant impacts arising from the proposed works on *Biodiversity Conservation Act 2016* (BC Act) listed threatened biota or *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) matters of national environmental significance (MNES) and propose measures to avoid and minimise impacts.

Field data was collected by TEF Senior Ecologists Skye Rivett (BAAS 22001) and Brianna Turner in accordance with the Biodiversity Assessment Method (BAM). Reporting and analyses were completed by Brianna Turner and Janet Sanderson with project management, review and sign-off undertaken by Director Emily Cotterill (BAAS 20011) as an accredited assessor.

### 1.1.2 Assumptions

The following assumptions pertain to this assessment:

- The PBAR does not constitute an impact assessment for the future development of a WTF upon the Subject Site. Details relating to the proposed impacts of the future development are preliminary, and are provided to give context for the basis of the re-zoning
- The preparation of this PBAR is based on the impact footprints presented in this report, and are subject to change as designs are finalised
- Assessments of significance pursuant to Section 1.7 of the EP&A Act and the EPBC Act Matters of National Environmental Significance – Significant Impact Criteria Guidelines (DEWHA, 2013) have **not** been prepared for the Planning Proposal. These would be required

to assess the development of the WTF, and should be completed for threatened biota known or likely to occur within the development footprint of the WTF and adjacent areas, following the finalisation of the detailed design of the WTF.

## 1.2 Terms and definitions

The terms used in this report are defined in Table 2 below.

**Table 2 Terms and definitions**

| Term                    | Definition   |
|-------------------------|--|
| <b>Development area</b> | <p>Within the Subject Site, the preliminary areas to be directly impacted by the proposed future development of the WTF, as follows:</p> <ul style="list-style-type: none"> <li>• Access roads (0.44 ha)</li> <li>• Ground mounted solar panel arrays (0.44 ha)</li> <li>• WTF infrastructure (e.g. Potable storage tanks, buildings, sludge ponds, etc) (0.39 ha)</li> <li>• Partial impacts via removal of canopy stratum to establish an asset protection zone (APZ) for the site (1.08 ha)</li> </ul> <p>For a total proposed future Development area of <b>2.34 ha</b></p> <p>The remaining <b>2.34 ha</b> present within the Subject Site (to be re-zoned to SP2) may be indirectly impacted via routine maintenance measures to the land, i.e mowing</p> <p><i>*Preliminary impact calculations are based on current proposed designs, and may change after detailed design of the proposed WTF development</i></p> |
| <b>Subject Site</b>     | The area to be directly affected by the Planning Proposal. The area to be re-zoned from C3: Environmental Management, to SP2 – Infrastructure - <b>4.68 ha</b>   |
| <b>Subject Land</b>     | <p>The entire Lot 882 DP 789858 (<b>8.02 ha</b>).</p> <p>Includes the Subject Site (as described above) and areas to as C3- Environmental Management zoning (<b>3.34ha</b>) and subsequently excluded from the Development area</p>  |
| <b>Assessment Area</b>  | Includes the Subject Land plus a 1.5 km buffer along either side of the center line; total area <b>893.36 ha</b> of which native vegetation comprises <b>829.93 ha</b> .   |
| <b>The Locality</b>     | The area within 10 kilometres of the Subject Land.   |

## 1.3 Context and Proposal description

The townships of Merimbula, Pambula, Tura Beach, Eden, Wolumla, Candelo and surrounding districts are supplied with drinking water from a combination of the Bega and Kiah Borefield, and Tantawangalo Creek Weir. The water reticulation network and treatment plants are managed by local Bega Valley Shire Council (Council).

Currently, source water is chlorinated and supplied to these townships via a network of storage tanks and pump stations, as well as the large Yellow Pinch Dam and smaller Ben Boyd Dam. Based on the elevation of the Yellow Pinch Dam and the connecting pipeline, water can currently flow via gravity from the dam through to Merimbula. A new water treatment facility (WTF) is planned to be developed

in future near the Yellow Pinch Dam to ensure treated water supply will meet demand through to 2048 (GHD 2021).

The Planning Proposal described herein is for the rezoning of Lot 882 DP 789858 from C3 Environmental Management, to SP2 Infrastructure, to allow for the said future construction of a new WTF and access road at 43 Red Gum Rd, Yellow Pinch, NSW. The site is located along Red Gum Road, south-east of Yellow Pinch Dam and is surrounded by heavily vegetated large residential properties in varying condition (Figure 1). The site supports areas that are heavily degraded, with an electricity easement running east-west through the centre of the site that branches into two (2) arms at the eastern extent of the site.

Several alternative locations for the proposed WTF were considered prior to the selection of the Subject Site. The alternative sites included:

- Three (3) residential sites, which landowners were willing to sell by agreement.
  - Two (2) of these did not have the required footprint size, or suitable environmental attributes
- A site within a National Park, which appeared to have suitable elevation, and was bordered by an electricity easement and was previously cleared
  - Which was ultimately discounted due to the acquisition complexity risk, and timing.

The location of the site for the proposed WTF development at the Red Gum Road site was selected as the optimal site based on the results of a Scoping Study completed (GHD 2021), which summarised that:

- The Subject Site contained an existing disturbed (by residential buildings) footprint of approximately the right dimensions for the WTF, and subsequently an anticipated lower environmental footprint
- The site is easily acquired, as it is owned by Council
- The site is optimal as it easily links in with the existing water supply network, and
- It provides the required elevation for the facility to maximise gravity feed into the Tantawangalo-Kiah drinking water network and avoid excess pumping

In addition, based on the biodiversity site assessment conducted, preliminary constraints were provided to the design team by TEF, and as a result the Planning Proposal boundaries and future Subject Site were amended so as to avoid and minimise impacts to biodiversity, through exclusion of the more intact areas of vegetation from the rezoning. As such, the resulting Subject Site for the proposed future location of the WTF, and the boundaries of the newly established SP2 area, were considered suitable from a biodiversity perspective based on the following:

- Infrastructure associated with the WTF would be located where existing residential buildings occur, to reduce additional biodiversity impacts,
- The selected site predominantly contains previously modified and disturbed native vegetation, and subsequently, minimal good quality vegetation would be impacted,
- The proposed future access road to the site is located within an area previously cleared of native vegetation to reduce the need to further remove canopy vegetation, and

- The existing disturbance and modification of the site, especially in the vicinity of the residential buildings lessens the likelihood that threatened flora occurs within the future impact zone.

The Planning Proposal consists of the following key features:

- Rezoning of **4.68 ha** of land on Lot 882 DP 789858 from C3 Environmental Management, to SP2 Infrastructure, with potential for subsequent direct and indirect impacts to the Subject Land as a result of the rezoning the parcel of from high environmental conservation to low environmental conservation protection; and
- Retention of **3.34 ha** of native vegetation present on Lot 882 DP 789858 as C3 Environmental Management land use zone.

In addition to the key features assessed within this PBAR, the report has also drawn conclusions on the potential for impact to biodiversity features, and threatened species and ecological communities (threatened biota) as a result of the future proposed WTF on the basis of designs received as of 13 February 2023 (Appendix A) and presented in Table 3 below.

**Table 3 Bega Water Treatment Facility potential impact areas**

| Development area  | Area (ha)   |
|---|-------------|
| <b>Direct impacts</b> to facilitate the construction of the WTF and associated infrastructure (i.e. office etc.)  | <b>0.39</b> |
| <b>Direct impacts</b> to allow for the construction of an access track to the site  | <b>0.44</b> |
| <b>Direct impacts</b> for the construction of a solar array   | <b>0.44</b> |
| <b>Direct impacts</b> to native vegetation resulting in the loss of the canopy stratum to provide for Asset Protection Zones (APZs) for future infrastructure | <b>1.08</b> |
| <b>Potential modification</b> of areas outside of the direct impact area within the Subject Site, including ongoing grounds maintenance such as mowing.       | <b>2.34</b> |
| <b>Total potential impact areas for WTF</b>   | <b>4.68</b> |

The above proposed areas (**1.27 ha**) are intended to be of sufficient size to provide a cleared area for the construction of the WTF, and the required movement of plant and machinery, provision for adequate water management (runoff, erosion and sediment controls), and required Asset Protection Zone (APZ). An APZ is required to mitigate against the potential bushfire risk to the Subject Site, due to its location within a highly vegetated area. The proposed potential impact areas above account for all foreseeable direct and indirect impacts. However, the proposed WTF will need to be re-assessed after the re-zoning of the Subject Site. Preliminary designs for the proposed WTF, off which the above impact calculations have been calculated, are provided in Appendix A.

In total, the Subject Site, which is located within Freehold land, and is currently zoned C3 Environmental Management, is comprised of **4.68 ha** of land subject to existing disturbance regimes, including houses, access roads and other infrastructure, with native vegetation present in various conditions. The boundaries of the proposed re-zoning works are provided in Figure 1.





Yellow Pinch WTF - Subject Land and Proposed Rezoning

**Legend**

|   |  |   |   |
|---|--|---|---|
| <span style="border: 1px solid red; display: inline-block; width: 20px; height: 10px;"></span> Subject Land | <b>Roads</b>   | <b>Waterway</b>   | <b>Proposed Rezoning</b>  |
| <span style="border: 1px dashed black; display: inline-block; width: 20px; height: 10px;"></span> Suburb    | <span style="border-bottom: 1px solid black; display: inline-block; width: 20px;"></span> Local Road | <span style="border-bottom: 1px solid black; display: inline-block; width: 20px;"></span> 1st & 2nd order unnamed waterways | <span style="background-color: brown; display: inline-block; width: 20px; height: 10px;"></span> Retain C3 Zoning |
| <span style="border-bottom: 1px solid black; display: inline-block; width: 20px;"></span> Lot Boundary      |  |   | <span style="background-color: green; display: inline-block; width: 20px; height: 10px;"></span> Rezone to SP2    |

Figure 1 Subject Land – proposed re-zoning





Yellow Pinch WTF - Subject Land and Proposed Developments

**Legend**

Subject Land

Retain C3 Zoning

**Proposed Developments**

Access Road

WTP Building Developments

Proposed Fence

Ground Mounted Solar Panel

Asset Protection Zone

Suburb

Roads

Local Road

**Waterway**

1st & 2nd order unnamed waterways

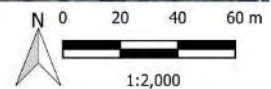


Figure 2 Proposed future Development area – Water Treatment Facility

## 2 LEGISLATIVE CONTEXT

The following legislation, policies and guidelines applicable to the Proposal have been reviewed, and the implications have been assessed accordingly as part of this Preliminary Biodiversity Assessment.

### 2.1 Commonwealth (Federal) Legislation

#### 2.1.1 *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) establishes a requirement for Commonwealth environmental assessment and approval for actions that are likely to have a significant impact on matters of national environmental significance (MNES), the environment on Commonwealth land, or actions taken on Commonwealth land MNES include:

- World heritage properties
- National heritage places
- Wetlands of international importance
- Listed threatened species and ecological communities
- Listed migratory species
- Commonwealth marine areas
- Nuclear actions

Commonwealth listed threatened species and ecological communities (biota) with the potential to occur in the locality have been identified in this PBAR. Conclusions on the significance of impacts on Commonwealth listed species or ecological communities has not been assessed as part of this PBAR, as this assessment is not intended to support the future development of the WTF. Impacts to Commonwealth listed biota would be assessed during the future development of the proposed WTF when the design is finalised. A summary of the likelihood of occurrence and impact of Commonwealth listed biota with the potential to occur in the locality has been provided in Appendix F.

### 2.2 State (NSW) Legislation, Policies and Guidelines

#### 2.2.1 *Environmental Planning and Assessment Act 1979 (EP&A Act)*

The *Environmental Planning and Assessment Act 1979* (EP&A Act) forms the legal and policy platform for the assessment and approval of works in NSW and aims to ensure that public authorities examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment. All development in NSW is assessed in accordance with the provisions of the EP&A Act and the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation).

The application for the Planning Proposal, which this PBAR supports, is being assessed in accordance with Division 3.4 of the EP&A Act.

The future development of the WTF does not anticipated to require development consent under Part 4 of the EP&A Act. The proposed works are likely to constitute a Division 5.1 activity under the EP&A Act, as the proposal is 'permissible without consent' by virtue of State Environmental Planning Policy (Infrastructure) 2007, once the land is rezoned as SP2. The determining authority for the project would be Bega Shire Council.

As part of the future consideration of impacts of the development of the WTF on the environment under Division 5.1 of the EP&A Act, the significance of impacts on threatened species, populations and endangered ecological communities listed under the *Biodiversity Conservation Act 2016* (BC Act) or *Fisheries Management Act 1994* (FM Act), if applicable, must be assessed as described below. Where a significant impact is likely to occur, a species impact statement (SIS) must be prepared in accordance with the Secretary's Environmental Assessment Requirements, or a biodiversity development assessment report (BDAR) developed in accordance with the requirement of the Biodiversity Offsets Scheme and Biodiversity Assessment Method. This would be determined by the NSW Environment Minister, if a significant impact is considered likely to occur.

### **2.2.2 Fisheries Management Act 1994 (FM Act)**

The *Fisheries Management Act 1994* (FM Act) aims to conserve threatened species, populations and ecological communities of fish and marine vegetation native to NSW and to promote ecologically sustainable development, including the conservation of biological diversity. It also aims to reduce the threats faced by native fish and marine vegetation in NSW.

Section 220ZZ of the FM Act states that the determining authority must consider the effect of an activity on:

- Areas of Outstanding Biodiversity Value (AOBV) as defined by the BC Act, and
- Species, populations or ecological communities, or their habitats as listed under the FM Act, and whether there is likely to be a 'significant effect' on those species, populations or ecological communities

If a planned development or activity is likely to have an impact on an aquatic threatened species, population or ecological community this must be taken into account in the development approval process. If the impact is likely to be significant, as determined through a Test of Significance, participation in the BOS is required.

Generally, projects will need a Part 7 Fisheries Management Act permit for activities involving dredging and reclamation work, activities temporarily or permanently obstructing fish passage, using explosives and other dangerous substances, and / or harming marine vegetation.

The Subject Land does not encompass any waterways marked as Key Fish Habitat, and at this stage the Proposal and future proposed development do not propose to conduct any activities involving dredging and reclamation works, or impacts to FM Act listed species.

### **2.2.3 Local Land Services Amendment Act 2016 (LLSA Act)**

The *Local Land Services Amendment Act 2016* (LLSA Act), which amended the *Local Land Services Act 2013*, authorised the making of the Land Management (Native Vegetation) Code 2018 (Div 5, Sch 1 of the LLSA Act). The aim of the Code is to authorise clearing of native vegetation on Category 2 regulated land under certain conditions and provide for the establishment and maintenance of set aside areas.

Review of the Native Vegetation Regulatory map confirmed that the Subject Land contains land excluded from the LLS Act. Consequently, the clearing regulations under Part 14 of the LLSA Act do not apply (Appendix B).



#### **2.2.4 Biodiversity Conservation Act 2016 (BC Act)**

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).

Sections 7.2 and 7.8 of the *Biodiversity Conservation Act 2016* (BC Act) state that the determining authority must consider the effect of an activity on:

- Areas of Outstanding Biodiversity Value (AOBV), and/or
- Species, populations or ecological communities, or their habitats and whether there is likely to be a ‘significant effect’ on those species, populations or ecological communities.

The ‘five part test’ or ‘assessment of significance’ is used to assist in the determination of whether a project is ‘likely’ to impose ‘a significant effect’ on threatened biota and thus whether a SIS or BDAR is required.

Impacts to NSW listed threatened species and ecological communities (threatened biota) as a result of the future development of the WTF would be assessed as part of the environmental assessment for the future development of the Subject Site.

Threatened biota considered likely to occur have been compiled and presented in Appendix F. Anticipated impact areas based on the current preliminary design have been used to discuss the likelihood of impacts to threatened species as a result of the development of the WTF. As impact areas are not finalised, and this PBAR is not an assessment for the providers of consent of the WTF, assessments of significance pursuant to Section 7.3 of the BC Act (5-part test) **have not** been prepared for threatened biota considered likely to occur at this stage of the assessment.

#### **2.2.5 Biodiversity Conservation Regulatory Act 2017 (BC Regulatory Act)**

The *Biodiversity Conservation Regulation 2017* (BCR Act) provides a number of considerations and practices to be implemented as part of the BC Act, as follows:

- Identifies clearing thresholds and the Biodiversity Values Map (BVM) for the application of the Biodiversity Offsets Scheme (BOS)
- Outlines principles for serious and irreversible impacts (SRI) to biodiversity
- Rules for meeting biodiversity offset obligations
- Biodiversity certification criteria

The BOS threshold is exceeded on land subject to clearing of native vegetation or other biodiversity impacts prescribed by clause 6.1 of the *Biodiversity Regulation 2017* on land identified on the Biodiversity Values Map (BVM), except where:

- the land is subject to a planning approval made up to 90 days after the land was added to the BVM; or
- If the land was already subject to planning approval when the land was added to the BVM.

The Planning Proposal **is not** being assessed under Part 4 of the EP&A Act, and the future development of the site is intended to be assessed under Part 5 of the EP&A Act, and subsequently the application of the BOS is not required except where a significant impact to threatened biota is anticipated as discussed in Section 2.2.1 and Section 2.2.4.

### Impacts to BVM

The BVM (Appendix C) shows no areas of mapped Biodiversity Values occurring within the Subject Land.

### Area Criteria Threshold

Native vegetation clearing thresholds as outlined in Part 7 of the *Biodiversity Conservation Regulation 2017* (Table 4) indicates when a project would need to enter the BOS according to the minimum lot sizes and the corresponding native clearing thresholds.

Field surveys confirmed that the site contains areas of native vegetation. The clearing threshold for the site, based on the minimum lot size, is **>1.0ha** based on a minimum lot size of 120 ha.

**Table 4 Area criteria – Biodiversity Offset Scheme threshold**

| Minimum lot size       | Threshold for clearing (ha) to enter BOS |
|------------------------|--|
| <1 ha                  | >0.25                                    |
| 1 ha < 40 ha           | >0.5                                     |
| <b>40 ha – 1000 ha</b> | <b>&gt;1</b>                             |
| >1000 ha               | >2                                       |

### Areas of Outstanding Biodiversity Value

The Subject Land is not listed as an Area of Outstanding Biodiversity Value.

### 2.2.6 NSW Biosecurity Act 2015 (Biosecurity Act)

The NSW *Biosecurity Act 2015* (Biosecurity Act) outlines mandatory measures that persons are to take with respect to biosecurity matters including the management of weeds (Part 2, Division 8 including Weeds of National Significance (WoNS)). Under the Biosecurity Act the responsibilities for weed management by public and private landholders are consistent reflecting that weed management is a shared community responsibility. The Act introduces the legally enforceable concept of a General Biosecurity Duty (GBD). Priority weeds are listed within Regional Strategic Weed Management Plans, however the GBD is not restricted to listed weeds.

The Biosecurity Act is administered by NSW Department of Primary Industries which determines the weed species covered by regulatory tools including Prohibited Matters, Control Orders and Biosecurity Zones. Existing Local Control Authorities (Councils) continue to be responsible for enforcing weed legislation.

Weeds identified on within the Subject Land are discussed in Section 5.3.1.

### **2.2.7 Bega Valley Local Environmental Plan 2013**

The Subject Land for the Planning Proposal is located on Council owned land in the Bega Valley Shire Council Local Government Area (LGA).

The Subject Site is located on land mapped within the Bega Valley Local Environmental Plan (LEP) 2013, and is located within the following land use zone:

- C3 – Environmental Management

The objectives of the zone C3 are to protect, manage and restore areas of ecological, scientific, cultural and aesthetic values, to provide a limited range of developments that do not adversely impact these developments, to limit residential development in sensitive areas, and to provide low density development and land use activities compatible with the primary environmental values of the zone.

As part of the Planning Proposal, the Subject Land would be rezoned to the following land use:

- SP2 - Infrastructure

The objectives of zone SP2 is to provide for infrastructure and related uses, and to prevent development that is not compatible with, or that may detract from the provision of infrastructure.

The re-zoning of the Subject Land is required to allow for the future construction and operation of a WTF, listed as critical infrastructure. The Planning Proposal would allow for the future development of the WTF to be permitted with consent under the future zoning of this Subject Site.

### **2.2.8 Koala Habitat Protection (SEPP (Biodiversity and Conservation) 2021)**

Chapters 3 and 4 of the State Environmental Planning Policy (SEPP) (Biodiversity and Conservation) 2021 aim to encourage the proper conservation and management of areas of natural vegetation that provide habitat for Koalas to ensure a permanent free-living population over their present range and reverse the current trend of Koala population decline.

Schedule 2 of the Koala Habitat Protection SEPP identifies local government areas (LGAs) to which SEPP applies. The Planning Proposal occurs in the LGA of Bega which is listed under Schedule 1 as the South Coast Koala management area, and the land is currently zoned as C3 – Environmental Management, and as such, the SEPP applies.

Section 3.2 of the SEPP applies to land in which a development application has been made, which has an area of more than 1 hectare, or has, together with adjoining land in the same ownership, an area of more than 1 hectare. The Subject Land (Lots 200 and 201 in DP 1009571) measures >1 ha in size, therefore the Planning Proposal falls under Section 3.2 of the SEPP.

Section 3.2 states that before a council may grant consent to a development application for consent to carry out development on land, the council must be satisfied as to whether or not the land in question constitutes a) potential Koala habitat and b) core Koala habitat.

The SEPP requires that before granting consent for development on land over 1 hectare in area, a consent authority must be satisfied as to whether or not the land contains “Potential Koala habitat” or ‘Core Koala habitat’.

- Core Koala habitat is defined as “an area of land with a resident population of koalas, evidenced by attributes such as breeding females, being females with young, and recent sightings of and historical records of a population”.
- Potential Koala habitat means areas of native vegetation where trees of the types listed in Schedule 2 constitute at least 15% of the total number of trees in the upper or lower strata of the tree component.

Where Core Koala habitat occurs, the Koala Habitat Protection SEPP requires that a Koala Plan of Management be prepared.

No feed trees listed under Schedule 2 were recorded in the Subject Land. No Koalas, or signs of recent habitation (e.g. scratchings or scats) were observed during the limited onsite survey. Therefore, it is considered that the Subject Site does not meet the criteria of “Potential Koala habitat’ or ‘Core Koala habitat’ as defined under the SEPP.

The Likelihood of Occurrence Assessment (Appendix F) concluded that the risk of impact to this species as a result of the proposed works is Low.



### 3 LANDSCAPE CONTEXT

The following chapters describe the current landscape features and condition of the Subject Land and broader locality, as observed on site and according to available resources accessed at the time of assessment.

#### 3.1 Bioregions and landscapes

The Subject Land occurs within the South Eastern Corner Interim Biogeographic Regionalisation for Australia (IBRA) Bioregion, and contains one (1) mapped NSW Soil Landscape (previously Mitchell Soil Landscape). Details on these are provided below.

##### 3.1.1 Bioregion

A detailed description of the Subject Land IBRA sub region is provided in Table 5 below; further information can be found at:

[Bioregions of New South Wales: South Eastern Corner \(nsw.gov.au\)](https://www.nsw.gov.au/bioregions/south-eastern-corner)

Table 5 Subject Land IBRA region and IBRA sub region

| Category        | Description   |
|-----------------|---|
| IBRA region     | South Eastern Corner  |
| IBRA sub region | South Eastern Coastal Ranges (based on Bateman IBRA Sub-region)   |
| Characteristics | <p><b>Geology</b></p> <p>Tightly folded fine grained Ordovician metamorphic rocks with several intrusions of granite. Western margin is a tight synclinal fold in Devonian sandstone and siltstone. Small areas of Tertiary basalt and quartz sands behind the coastal headlands. Quaternary alluvium on main valley floors and in the estuaries.</p> <p><b>Characteristic landforms</b></p> <p>Steep hills below the great escarpment oriented north-south and controlled by rock structure. Lines of hills become lower toward the coast with a slight up turn along the coastal margin. Coastal barrier system are small and estuarine fills limited.</p> <p><b>Typical soils</b></p> <p>Mostly textured contrast soils. Red clay subsoils with thin topsoil on metamorphic rocks, deeper coarser grained profiles on granite. Red brown structured loams on basalt and deep siliceous sands with some podsol development on Tertiary sands and coastal dunes.</p> <p><b>Vegetation</b></p> <p><i>Hakea</i>, <i>Melaleuca</i>, <i>Westringia</i> and Dwarf Red Bloodwood heath on headlands. Red Bloodwood and Spotted Gum forests to 300m asl, Yellow Stringybark, Grey Ironbrak and Woollybutt to 550m asl, Brown Barrel, Black Ash, Sydney Peppermint, Large-fruited Red Mahogany, Sydney Bluegum and Monkey Gum to 900m asl, then Snow Gum above 900m asl.</p> |

### 3.1.2 NSW Landscape (Mitchell Soil)

The Subject Land is mapped as occurring on one (1) NSW Landscape: *Nadgee Coastal Range* (Figure 3).

This soil landscape occurs on coastal ranges and hills at elevations between 0-550m. It is characterized by middle Devonian sandstone, quartzite, conglomerate and siltstone, and Ordovician sandstone, quartzite and phyllite with some granite. Soils are thin and stony on ridges and deeper red-yellow texture-contrast profiles on Ordovician rocks. Forest contain Silvertop Ash (*Eucalyptus sieberi*), Mountain Grey Gum (*Eucalyptus cypellocarpa*), Gully Gum (*Eucalyptus smithii*), White Ash (*Eucalyptus fraxinoides*), Messmate (*Eucalyptus obliqua*), Prickly Stringybark (*Eucalyptus consideniana*) and Red Bloodwood (*Corymbia gummifera*). Gullies contain cool temperate and sub-tropical rainforest species such as; Eastern Leatherwood (*Eucryphia moorei*), Prickly Tree-fern (*Cyathea leichardtiana*), Bolwarra (*Eupomatia laurina*), Lilly Pilly (*Acmena smithii*) and Sweet Pittosporum (*Pittosporum undulatum*). Open coastal headland heaths on shallow stony soil of Bushy Needlewood (*Hakea sericea*), Giant Honey-myrtle (*Melaleuca armillaris*), Coast Rosemary (*Westringia fruticosa*). Dwarfed red bloodwood occur on shallow soils subject to high salt spray input and frequent fire, and wet Button Grass (*Gymnoschoenus sphaerocephalus*) swamps occur on high peaks. (DECC 2002).

### 3.2 Waterways and wetlands

Three (3) first order streams abut the Subject Land, with runoff from the Subject Land feeding into these and other waterways occurring within close proximity to the Subject Land (Figure 4). Merimbula River and its tributaries, mapped as Key Fish Habitat (KFH), also occurs within close proximity to the Subject Land.

### 3.3 Native vegetation extent

The extent of native vegetation in the Subject Land was mapped using the Native Vegetation of Central Tablelands SVM\_v0p1\_PCT\_E\_4778 (OEH 2017), within a 1,500 m buffer as specified under the BAM. Vegetation was later verified.

A total area of approximately **8.02 ha** occurs within the Subject Land, most of which constitutes native vegetation (**0.28 ha** non-native vegetation).

A total area of approximately **893.36 ha** occurs within a 1,500 m radius of the Subject Land with approximately **829.93 ha** (or 93%) mapped native vegetation present.

### 3.4 Assessment of patch size and connectivity

According to the BAM, a layer of native vegetation cover (patch size) is required to be examined within a 500 m buffer (for linear proposals) around the Subject Land, to determine the vegetative context of the Subject Site. A patch, as defined by the BAM, is an area of native vegetation that:

- a) occurs on the development site or biodiversity stewardship site, and
- b) includes native vegetation that has a gap of less than 100 m from the next area of moderate to good condition native vegetation (or  $\leq 30$  m for non-woody ecosystems).

Patch size may extend onto adjoining land that is not part of the development site or biodiversity stewardship site.

Patch size for the Subject Land was calculated for the vegetation on the Subject Site using the field-validated map of vegetation types identified, and aerial photography interpretation for the 1,500 m buffer (based on OEH 2019) and broader locality (10 km). Patch size is required to be assessed as one (1) of four (4) classes per vegetation zone mapped, being <5 ha, 5-24 ha, 25-100 ha or >100 ha.

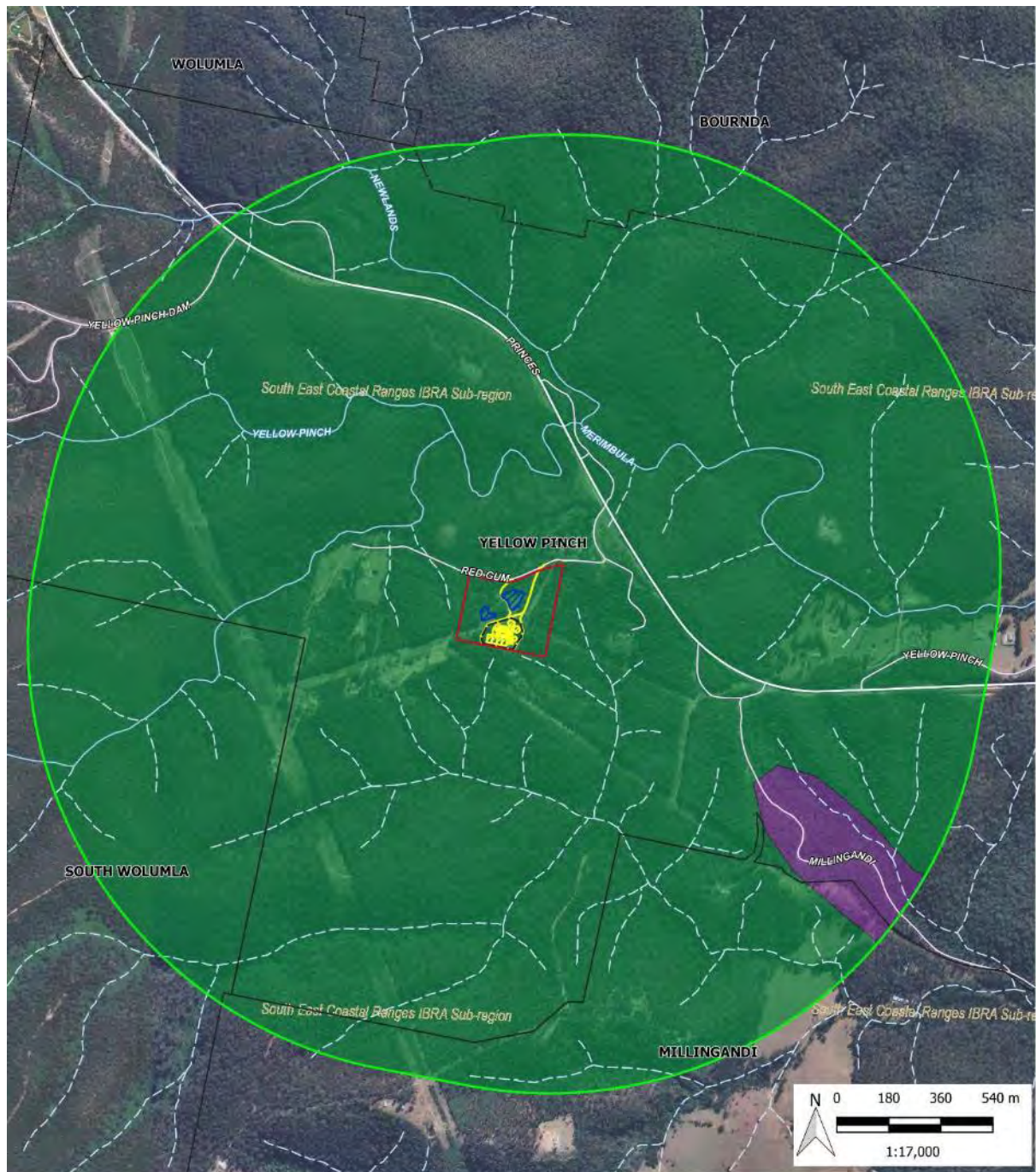
One (1) patch of native vegetation occurs within, and extend beyond, the Subject Land. This patch includes predominantly woodland and derived native grassland. Areas of woodland and derived native grassland continue beyond the Subject Land and into the locality in all directions.

A total area of approximately **893.36 ha** occurs within the Assessment Area (1,500 m) radius of the Subject Land with approximately **829.93 ha** (or 93%) mapped native vegetation present.

The total area of the 1,500 m buffer around the Subject Land is equivalent to a potential native vegetation cover of **93 %**, therefore falling in the **>70 %** class as defined under the BAM.

Overall, the patch extends beyond the 1,500 m area. However, for the purposes of this assessment, a patch size of **893.36 ha** has been used, to represent the continuous native vegetation cover within a 1,500 m radius.

Based upon vegetation mapping and aerial photography interpretation beyond the Subject Land, the total area of the patch of native vegetation was calculated as falling into the **>100 ha** bracket.



Yellow Pinch WTP, Bega Valley - Mitchell Landscape Soils within the Assessment Area

#### Legend

Assessment Area

Subject Land

#### Proposed Development Areas

WTP Building Developments

Proposed Fence

Ground Mounted Solar Panel

Suburb

Lot Boundary

#### Roads

Local Road

Primary Road

Sub Arterial Road

#### Waterway

1st & 2nd order unnamed waterways

Creek

#### Mitchell Landscape Soils

Bodalla - Nadgee Coastal Sands

Nadgee Coastal Range

the environmental factor

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Figure 3 Mitchell Landscape Soils





Yellow Pinch WTP - Waterways, Key Fish Habitat and Riparian Corridors

Legend

|   |   |  |   |
|---|---|--|---|
| <span style="border: 1px solid red; display: inline-block; width: 20px; height: 10px;"></span> Subject Land             | <span style="border: 1px solid black; display: inline-block; width: 20px; height: 10px;"></span> Lot Boundary | 1st & 2nd Order unnamed waterways  | <span style="background-color: cyan; border: 1px solid black; display: inline-block; width: 20px; height: 10px;"></span> 2nd order stream (20m buffer)        |
| <span style="border: 1px solid yellow; display: inline-block; width: 20px; height: 10px;"></span> Asset Protection Zone | <b>Waterway</b>   | <span style="background-color: blue; border: 1px solid black; display: inline-block; width: 20px; height: 10px;"></span> Key Fish Habitat              | <span style="background-color: blue; border: 1px solid black; display: inline-block; width: 20px; height: 10px;"></span> 3rd order stream (30m buffer)        |
| <span style="border: 1px dashed black; display: inline-block; width: 20px; height: 10px;"></span> Suburb                | <span style="border-bottom: 1px solid black; display: inline-block; width: 20px;"></span> Creek               | <b>Riparian Corridors</b>  | <span style="background-color: blue; border: 1px solid black; display: inline-block; width: 20px; height: 10px;"></span> 4th & 5th order streams (40m buffer) |
|   |   | <span style="background-color: cyan; border: 1px solid black; display: inline-block; width: 20px; height: 10px;"></span> 1st order stream (10m buffer) | <span style="background-color: blue; border: 1px solid black; display: inline-block; width: 20px; height: 10px;"></span> Wetland (20m buffer)                 |

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Figure 4 Waterways, Key Fish Habitat and wetlands mapped within the Subject Land



## 4 METHODOLOGY

The following chapters describe the desktop and onsite investigations completed in order to fully catalogue the predicted and actual biodiversity assets occurring within the Subject Land, in order to ascertain the potential impacts to biodiversity arising as a result of the Planning Proposal. The site assessment method and subsequent data analysis were conducted in accordance with Stage one of the BAM.

### 4.1 Desktop assessment

The following resources were accessed to inform the survey methodology used during field investigations, and to aid in the preparation of this BAR.

#### 4.1.1 Publications and databases

##### **Relevant State and Commonwealth Databases**

- Protected Matters Search Tool (Department Agriculture, Water and the Environment 2022)
- NSW Bionet. The website of the Atlas of NSW Wildlife (DPIE 2022)
- NSW Scientific Committee Final Determinations
- Priority Weeds for the Bega Valley Shire LGA (South East) (DPI 2022)

##### **State and Federal guidelines**

- Threatened Species Survey and Assessment: Guidelines for developments and activities. Working Draft (DEC 2004)
- NSW Survey Guide for Threatened Frogs (DPIE 2020)
- NSW Guideline to Surveying Threatened Plants and their Habitats (DPIE 2020)
- Survey guidelines for Australia's threatened birds: Guidelines for detecting birds listed as threatened under the *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth of Australia 2010)
- Survey guidelines for Australia's threatened bats: Guidelines for detecting bats listed as threatened under the *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth of Australia 2010)
- Survey guidelines for Australia's threatened mammals. Guidelines for detecting mammals listed as threatened under the *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth of Australia 2011)
- Draft survey guidelines for Australia's threatened orchids.

##### **Council and client documents**

- Bega Valley Local Environmental Plan (LEP) 2013
- Bushfire Report 43 Red Gum Road (G. Cooper 2022)
- BVSC Yellow Pinch WTP – Scoping Study Report (GHD 2021)

#### 4.1.2 Spatial data

- New South Wales Vegetation Information System (VIS) (DPIE 2021)
- Near Maps (2021)
- SIX Maps (LPI 2021)
- OEH Mitchell Landscape Soil v3.1
- CRS GDA 94 MGA zone 55

- OEH Bionet Atlas Threatened Species list, extracted July 2022.
- SE Local Land Services (SE LLS) Biometric Vegetation (OEH 2014),
- NSW State Vegetation Type Map V1.1 (OEH 2022) and ss-sds SIX Maps Satellite Imagery 2013 Google Satellite Imagery 2019

## 4.2 Onsite investigations and application of the Biodiversity Assessment Method

Site assessment was undertaken over five (5) days and four (4) nights in August 2022 by Senior Ecologist Skye Rivett (BAAS 22001) and Ecologist Brianna Turner. During the site assessment, the following activities were undertaken:

- Identification and mapping of plant community types (PCT's) present on the Subject Land, including the identification of threatened ecological communities (TECs).
- Random meander transect surveys (Cropper, S. 1993) across the Subject Site to record incidental flora, and determine the presence of detectable threatened species and high threat exotics (WoNS and NSW Priority Weeds)
- Ultrasonic call recording targeting microbats using two (2) Anabat recorders
- Diurnal bird surveys
- Targeted threatened flora transects
- Nocturnal fauna surveys
- Incidental recording of flora and fauna species within or adjacent to the Subject Land
- Identification of fauna habitat features (i.e. nesting, roosting or foraging microhabitats).
- Assessment of the presence and suitability of habitat of value to threatened and regionally significant fauna including, where applicable:
  - Tree hollows (habitat for threatened large forest owls, parrots, cockatoos, bats and arboreal mammals)
  - Caves and crevices (habitat for threatened reptiles, small mammals and microbats),
  - Termite mounds (habitat for threatened reptiles and the echidna)
  - Waterbodies (habitat for threatened fish, frogs and water birds)
  - Fruiting / flowering trees (food for threatened birds and mammals)
  - Rocky outcrops and overhangs (habitat for threatened microbats, herpetofauna and marsupials)
  - Trees and shrubs supporting nest structures (habitat for threatened birds and arboreal mammals)
  - Any other habitat features that may support fauna (particularly threatened) species
- Assessment of the connectivity and quality of the vegetation within the Subject Land and surrounding area

### 4.2.1 Survey of native vegetation

#### **Native Vegetation Assessment**

Assessment and on-ground mapping of PCTs was undertaken during field surveys. The Subject Land was traversed on foot to identify the vegetation structure, including identifying dominant species and native vegetation.

BAM plots were completed in each of the condition zones present within each PCT in the Subject Land. The number of plots surveyed within each vegetation zone is consistent with the requirements as outlined within the BAM (refer Table 6).

In total, **nine (9)** vegetation plots were completed using a 20 x 50 m functional, structural and floristic plot survey method, consistent with Section 4.3 of the BAM 2020 (Figure 5). The identification of PCTs was in accordance with the NSW PCT classification as described in the BioNet Vegetation Classification database (OEH 2019) and involved the use of the database to identify PCT types which matched the geographic distribution (based upon IBRA subregions), vegetation formation, and floristics of vegetation within the Subject Land and broader Assessment Area. The data for the potential PCT's were then reviewed to determine the most appropriate PCT for the vegetation communities sampled within the Subject Land. Observations of vegetation structure and composition made during surveys of the Subject Land, as well as reference to previous ecological surveys and mapping conducted within the Subject Land, also helped to inform the determination of appropriate PCTs.

Where areas outside the Subject Land were not ground-truthed as part of this survey effort, previous Biometric Vegetation Type assignment by the NSW State Vegetation Type Map V1.1 (OEH 2022) and ss-sds SIX Maps Satellite Imagery 2013 were used, to inform mapping only<sup>2</sup>.

**Table 6 Plant Community Type, vegetation zones and survey plots completed**

| Vegetation zone (condition)   | Plant Community Type                         | PCT ID   | Vegetation zone (ha) | Minimum number of plots required | Number of plots completed |
|---|--|----------|----------------------|----------------------------------|---------------------------|
| <b>Zone 1: PCTID: 3663 – Remnant</b><br><br>South East Dry Sclerophyll Forests      | Southeast Foothills Stringybark Shrub Forest | PCT 3663 | 1.88                 | 1                                | 2                         |
| <b>Zone 2: PCTID: 3663 – Modified</b><br><br>South East Dry Sclerophyll Forests     | Southeast Foothills Stringybark Shrub Forest | PCT 3663 | 0.58                 | 1                                | 1                         |
| <b>Zone 3: PCTID: 3663 – Regenerating</b><br><br>South East Dry Sclerophyll Forests | Southeast Foothills Stringybark Shrub Forest | PCT 3663 | 2.16                 | 2                                | 2                         |
| <b>Zone 4: PCTID: 3663 – Derived</b>  | Southeast Foothills Stringybark Shrub Forest | PCT 3663 | 1.83                 | 1                                | 2                         |

<sup>2</sup> Only verified vegetation within the Subject Land was used to inform Vegetation Integrity (VI) calculations in the Biodiversity Offset and Agreement Management System (BOAMS) and the BAM calculator.

| Vegetation zone (condition)   | Plant Community Type                                       | PCT ID   | Vegetation zone (ha) | Minimum number of plots required | Number of plots completed |
|---|--|----------|----------------------|----------------------------------|---------------------------|
| <b>Native Grassland (DNG)</b><br><br>South East Dry Sclerophyll Forests         |  |          |                      |                                  |                           |
| <b>Zone 5: PCTID: 3663 – Degraded</b><br><br>South East Dry Sclerophyll Forests | Southeast Foothills Stringybark Shrub Forest               | PCT 3663 | 0.52                 | 1                                | 1                         |
| <b>Zone 6: PCTID: 3663 – Good</b><br><br>South East Dry Sclerophyll Forests     | Southeast Foothills Stringybark Shrub Forest               | PCT 3663 | 0.84                 | 1                                | 1                         |
| <b>Zone 7: Non-Native</b>   | Existing hardstand areas including buildings, roadways etc |          | 0.20                 | 0                                | 0                         |
| <b>Total</b>  |  |          | <b>7.39</b>          | <b>8</b>                         | <b>9</b>                  |

#### 4.2.2 Threatened flora surveys

During site assessment the Subject Land was opportunistically surveyed for threatened flora species. Information on species with potential to occur along the trail was collated, to guide in-field identification if encountered. Locations of species found were intended to be recorded using handheld GPS units (mobile phones / tablets) equipped with the Avenza mapping software.

##### 4.2.2.1 Targeted threatened flora surveys

Targeted threatened flora surveys were conducted within the Development area for threatened flora species identified as having the potential to occur in the locality (Appendix F) and which detectable during the month of August (at the time of surveys).

Targeted threatened flora surveys were undertaken for threatened flora by systematically walking parallel traverses spaced 5m apart across the Development area, and some areas of the Subject Site, with reference to the DPIE (2020) threatened plant survey guidelines. Targeted threatened flora surveys were undertaken over four (4) days in August which is a suitable time of the year to identify these threatened flora species. The results of these surveys are provided in Section 5.4.2.

Seasonal, targeted, threatened flora surveys were not undertaken for all potentially occurring threatened flora species across the entirety of the Subject Site. Further targeted flora surveys should be undertaken in future areas of development on the Subject Site.

### 4.2.3 Terrestrial fauna surveys

#### Opportunistic observations

Opportunistic and incidental observations of fauna species were recorded at all times during field surveys; for instance, fallen timber was scanned for reptiles, rock fragments and logs were lifted (where possible) to check for sheltering fauna, and habitat trees and water bodies were scanned for active and roosting birds. All species observed or heard utilising the Subject Land during surveys were identified. Any evidence of faunal activity (tracks, scats, feathers, pellets) were noted and where applicable specimens collected and sent for analysis (Scats About 2020) and identification. Disturbance along tracks caused by animals including diggings and burrows were noted and any roadkill was recorded.

#### Habitat assessment

In addition to the targeted surveys and direct observations, the following general assessments were made throughout the time spent in the field by TEF ecologists.

Habitat assessments on site included active searches for the following habitat features:

- Trees with bird nests or other potential fauna roosts
- Burrows, dens and warrens, bridges, culverts and hollow-bearing trees for evidence (e.g. guano or bat droppings) of roosting microbats
- Hollow-bearing trees and logs which provide refuge, nest and den sites for a range of threatened fauna species
- Koala food trees and/or evidence of scratches or scats
- Distinctive scats or latrine sites, owl whitewash and regurgitated pellets under roost sites
- Tracks or animal remains
- Evidence of activity such as feeding scars, scratches and diggings
- Leaf litter and fallen timber were inspected for reptile habitat
- Presence of potential habitat for threatened frog species

Table 7 Survey Effort

| Survey method                                       | Description   |        |         |             |
|---|---|--------|---------|-------------|
| Survey Effort                                       | Date  | # Days | # Staff | Total hours |
|   | August 7 <sup>th</sup> – 11 <sup>th</sup>   | 5      | 2       | 80          |
| <b>BAM Plots, Rapid Data Points and PCT mapping</b> | BAM plots were strategically placed at nine (9) locations throughout the Subject Land to determine type and condition of PCT's present. PCT's were identified based on floristics present and mapped based on condition (extent of disturbance and weediness). Rapid data points were placed in areas of Planted Vegetation in residential areas to cross-check on-ground vegetation against BAM requirements and local PCTs. |        |         |             |
| <b>Opportunistic general surveys</b>                | Opportunistic and incidental observations of fauna species were recorded at all times during field surveys, with location and number of threatened species recorded. Any faunal evidence (tracks, scats, feathers, pellets) were noted. Disturbance along tracks including diggings and burrows were noted.   |        |         |             |

#### 4.2.4 Survey conditions and limitations

Survey conditions on site during the survey period of August 7<sup>th</sup>-11<sup>th</sup> 2022 were generally mild and occasionally windy. Overnight temperatures were low. Scattered showers occurred for the first two days of surveys.

Results from field investigations were influenced by the timing and duration of surveys, weather conditions prior to, and during the surveys. Survey conditions on site were consistent with those measured at the closest weather station located 8km east at Merimbula Airport and outlined in Table 8 below.

**Table 8 Weather conditions preceding and during field surveys (weather station: Merimbula Airport AWS 069147, Bureau of Meteorology 2022).**

| Date (2021)      | Temperature (°C) |             | Total Rain (mm) | Max Wind Speed km/hr | Wind Direction |
|------------------|------------------|-------------|-----------------|----------------------|----------------|
|                  | Minimum          | Maximum     |                 |                      |                |
| 1/8/2022         | 5.4              | 19.4        | 0.4             | 43                   | WNW            |
| 2/8/2022         | 3.2              | 17.5        | 0.0             | 26                   | NNW            |
| 3/8/2022         | 4.7              | <b>23.1</b> | 0.4             | <b>41</b>            | NW             |
| 4/8/2022         | 8.4              | 18.6        | <b>1.6</b>      | 24                   | NNE            |
| 5/8/2022         | 4.7              | 21.9        | 1.0             | 52                   | NW             |
| 6/8/2022         | 4.4              | 18.1        | 0.0             | 22                   | S              |
| <b>7/8/2022</b>  | 5.2              | 16.5        | 0.8             | 39                   | S              |
| <b>8/8/2022</b>  | 3.6              | 16.3        | 0.2             | 30                   | SE             |
| <b>9/8/2022</b>  | 2.8              | 16.0        | 0.0             | 31                   | SSW            |
| <b>10/8/2022</b> | <b>1.6</b>       | 15.3        | 0.0             | 19                   | ENE            |
| <b>11/8/2022</b> | 7.1              | 13.2        | 0.0             | 22                   | N              |

Given the nature and timing of the surveys undertaken, it is likely that some species that occur in the Subject Land either permanently, seasonally or transiently were not detected during the survey. These species may include annual, ephemeral or cryptic flora and fauna species; nocturnal fauna; birds and frogs which call at other times of year; and mobile or transient fauna in general. The habitat assessment conducted allows for identification of habitat resources for such species, in order to assess their likelihood of occurring within the Subject Land. As such, the survey was not designed to detect all species, rather to provide an overall assessment of the ecological values within the Study Area in accordance with the BAM. This information was used to predict potential impacts of the future development of the WTF on ecological values and to provide this as input to design development, so that impacts to native biota can be avoided, mitigated and / or offset through the BOS.



## 5 RESULTS

The following chapters describe the findings of the desktop and onsite investigations completed for the Planning Proposal, within the categories of vegetation types, vegetation zones, vegetation integrity, flora and fauna species, weeds and threatened species.

### 5.1 Native vegetation

Determination of the most appropriate PCTs for the vegetation communities within the Subject Land involved the use of the BioNet Vegetation Classification database to identify PCT types which matched the geographic distribution (based upon IBRA subregions) and the native vegetation mapped on within the Subject Land (Table 9); vegetation formation on site, including any canopy species present within and immediately outside the Subject Land; soils, elevation and location within the landscape; and, floristic (BAM) plots completed within the Subject Land (Appendix D). The data for the potential PCTs collected on site was then reviewed against the range of potential or likely PCTs for the area, to determine the most appropriate match for the vegetation communities sampled within the Subject Land.

The Subject Land is currently mapped as supporting eighteen (18) PCTs as outlined in Table 9 below.

**Table 9 Native Plant Community Types mapped within 1, 500 m of the Subject Land**

| Plant Community Types   | Area (ha) |
|---|-----------|
| PCTID: 0 - Not native vegetation                                | 63.43     |
| PCTID: 3045 - South Coast Temperate Gully Rainforest            | 20.17     |
| PCTID: 3046 - Southeast Warm Temperate Rainforest               | 8.08      |
| PCTID: 3108 - South Coast Scarp Wet Vine Forest                 | 17.36     |
| PCTID: 3181 - Bega Wet Shrub Forest                             | 29.16     |
| PCTID: 3185 - Far South Riverflat Wet Forest                    | 18.28     |
| PCTID: 3189 - South Coast Gully Shrub Forest                    | 109.42    |
| PCTID: 3190 - South Coast Hinterland Monkey Gum Wet Fern Forest | 0.62      |
| PCTID: 3193 - South Coast Stringybark-Monkey Gum Wet Forest     | 16.25     |
| PCTID: 3331 - Southeast Gorge Dry Forest                        | 0.19      |
| PCTID: 3655 - South Coast Escarpment Rocky Scrub                | 1.65      |
| PCTID: 3656 - South Coast Foothills Dry Shrub Forest            | 44.15     |
| PCTID: 3659 - South Coast Hinterland Silvertop Ash Forest       | 308.01    |
| PCTID: 3660 - South Coast Hinterland Yellow Stringybark Forest  | 179.46    |

| Plant Community Types   | Area (ha)     |
|---|---------------|
| PCTID: 3662 - South Coast Lowland Blackbutt Forest                | 18.58         |
| PCTID: 3663 - Southeast Foothills Stringybark Shrub Forest        | 7.59          |
| PCTID: 3664 - Southeast Foothills Woollybutt Dry Shrub Forest     | 35.89         |
| PCTID: 4112 - Southeast Dry Rainforest                            | 15.08         |
| <b>Total within 1,500 m buffer (ha):</b>                          | <b>893.36</b> |
| <b>Total Mapped Native Vegetation within 1,500 m buffer (ha):</b> | <b>829.93</b> |
| <b>Percent Native Vegetation within 1,500 m buffer (%):</b>       | <b>93 %</b>   |

Surveys confirmed that the following PCT's were present within the Subject Land:

- PCTID: 3660 - South Coast Hinterland Yellow Stringybark Forest – **0.42 ha**
- PCTID: 3663 - Southeast Foothills Stringybark Shrub Forest – **7.32 ha**
- PCTID 0: Non-native vegetation/ existing hardstands– **0.28 ha**

Further discussion on these conclusions is provided in Section 5.1.1 below. A map showing PCT distribution within the Subject Land is presented in Figure 6.

### 5.1.1 Plant Community Type descriptions

Detailed PCT descriptions are provided below, including information on vegetation formation, class and condition. The VI scores have not been calculated.

#### ***Dry Sclerophyll Forest (shrubby sub-formation)***

**3660 - South Coast Hinterland Yellow Stringybark Forest**

**Plate 1 PCT 3660, good condition**

|                             |  |
|-----------------------------|--|
| <b>Structure</b>            | A tall to very tall dry shrubby sclerophyll open forest with a sparse ground cover of graminoids and grasses associated with exposed slopes and crests on hinterland ranges and escarpment foothills.  |
| <b>Overstorey</b>           | Yellow Stringybark ( <i>Eucalyptus muelleriana</i> ), Mountain Grey Gum ( <i>Eucalyptus cypellocarpa</i> ), and Silvertop Ash ( <i>Eucalyptus sieberi</i> )  |
| <b>Mid Stratum</b>          | Large Mock-olive ( <i>Notelaea longifolia</i> ), Prickly Beard-heath ( <i>Leucopogon juniperinus</i> ), Austral Indigo ( <i>Indigofera australis</i> ), Common Correa ( <i>Correa reflexa</i> ), Slender Rice Flower ( <i>Pimelia linifolia</i> ) and Sweet Pittosporum ( <i>Pittosporum undulatum</i> ).  |
| <b>Ground Stratum</b>       | <p>A mixture of grasses, ferns and forbs including Cogon Grass (<i>Imperata cylindrica</i>), Hop Goodenia (<i>Goodenia ovata</i>), Wiry Panic (<i>Entolasia stricta</i>), Kangaroo Grass (<i>Themeda triandra</i>), Poa Tussock (<i>Poa labillardierei</i>), Wallaby Grasses (<i>Rytidosperma</i> spp.), Bracken Fern (<i>Pteridium esculentum</i>), Twining Glycine (<i>Glycine clandestina</i>), Pomax (<i>Pomax umbellata</i>), Mat-rushes (<i>Lomandra</i> spp.), Blue Flax-lily (<i>Dianella caerulea</i>).</p> <p>Exotic species present included <i>Agapanthus</i> sp., Cobbler's Pegs (<i>Bidens pilosa</i>) and Madagascar Ragwort (<i>Senecio madagascariensis</i>).</p> |
| <b>PCT number</b>           | PCT 3660   |
| <b>Vegetation formation</b> | Dry Sclerophyll Forests (Shrubby sub-formation)  |
| <b>Vegetation class</b>     | South East Dry Sclerophyll Forests   |
| <b>Condition</b>            | This PCT occurred in good to moderate condition, with moderate incursions of exotic species.   |
| <b>Conservation Status</b>  | This PCT is not associated with any threatened ecological communities.   |

| <b>3660 - South Coast Hinterland Yellow Stringybark Forest</b> |   |
|--|---|
| <b>PCT estimated remaining</b>                                 | Approximately 96% remaining   |
| <b>Threatened Species</b>                                      | Gang-gang Cockatoo ( <i>Callocephalon fimbriatum</i> ) (listed as vulnerable under the BC Act and Endangered under the EPBC Act) and Scarlet Robin ( <i>Petroica boodang</i> ) (listed as Vulnerable under the BC Act), are both associated with this PCT and were recorded within the Subject Land during surveys. These species are both highly mobile and are therefore likely to move throughout all habitats within the Subject Land. Other threatened species have been recorded within the Assessment Area (Appendix F) and are likely to use habitat present within the Subject Land, including this PCT. |
| <b>Comments</b>  | This PCT occurred within the northern section of the Subject Land adjacent to Red Gum Road. The community was present in good to moderate condition. Weed presence within this community was moderate.  |



**3663 - Southeast Foothills Stringybark Shrub Forest**



**Plate 2 PCT 3663, good condition**



**Plate 3 PCT 3663, derived grassland**

|                   |  |
|-------------------|--|
| <b>Structure</b>  | A tall to very tall dry shrubby sclerophyll open forest or woodland with a ground cover of grasses, graminoids and ferns on crests and hills of the coastal ranges.  |
| <b>Overstorey</b> | White Stringybark ( <i>Eucalyptus globoidea</i> ), Silvertop Ash ( <i>Eucalyptus sieberi</i> ) and Red Bloodwood ( <i>Corymbia gummerifera</i> ) with Black Sheoak ( <i>Allocasuarina littoralis</i> ) and <i>Acacia</i> sp. |

| <b>3663 - Southeast Foothills Stringybark Shrub Forest</b> |   |
|--|---|
| <b>Mid Stratum</b>   | Prickly Beard-heath ( <i>Leucopogon juniperinus</i> ), Austral Indigo ( <i>Indigofera australis</i> ), Common Correa ( <i>Correa reflexa</i> ), Slender Rice Flower ( <i>Pimelia linifolia</i> ) and Sweet Pittosporum ( <i>Pittosporum undulatum</i> ).  |
| <b>Ground Stratum</b>                                      | <p>A mixture of grasses, ferns and forbs including Wiry Panic (<i>Entolasia stricta</i>), Kangaroo Grass (<i>Themeda triandra</i>), Poa Tussock (<i>Poa labillardierei</i>), Wallaby Grasses (<i>Rytidosperma</i> spp.), Bracken Fern (<i>Pteridium esculentum</i>), Twining Glycine (<i>Glycine clandestina</i>), Pomax (<i>Pomax umbellata</i>), Mat-rushes (<i>Lomandra</i> spp.), Blue Flax-lily (<i>Dianella caerulea</i>).</p> <p>Exotic species present included Mexican Lovegrass (<i>Eragrostis mexicana</i>), African Lovegrass (<i>Eragrostis curvula</i>), Narrow-leaved Carpet Grass (<i>Axonopus fissifolius</i>), <i>Agapanthus</i> sp., Cobbler's Pegs (<i>Bidens pilosa</i>) and Madagascar Ragwort (<i>Senecio madagascariensis</i>).</p> |
| <b>PCT number</b>  | PCT 3663  |
| <b>Vegetation formation</b>                                | Dry Sclerophyll Forests (Shrubby sub-formation)   |
| <b>Vegetation class</b>                                    | South East Dry Sclerophyll Forests  |
| <b>Condition</b>   | This PCT occurred in a range of conditions; degraded, derived grassland, regenerating, modified and good/remnant condition  |
| <b>Conservation Status</b>                                 | This PCT is not associated with any threatened ecological communities.  |
| <b>PCT estimated remaining</b>                             | Approximately 95% remaining   |
| <b>Threatened Species</b>                                  | Gang-gang Cockatoo ( <i>Callocephalon fimbriatum</i> ) (listed as vulnerable under the BC Act and Endangered under the EPBC Act) and Scarlet Robin ( <i>Petroica boodang</i> ) (listed as Vulnerable under the BC Act), are both associated with this PCT and were recorded within the Subject Land during surveys. These species are both highly mobile and are therefore likely to move throughout all habitats within the Subject Land. Other threatened species have been recorded within the Assessment Area (Appendix F) and are likely to use habitat present within the Subject Land, including this PCT.   |
| <b>Comments</b>  | This PCT occurred in varying conditions throughout the majority of the Subject Land. Weed presence within this community ranged from very low to moderate. Degraded areas also contained notable amounts of dumped refuse.  |



## 5.2 Vegetation zones and management zones

Onsite surveys confirmed that there are six (6) vegetation zones occurring within the Subject Land Figure 6) as follows:

- Zone 1: PCTID: 3663 - Southeast Foothills Stringybark Shrub Forest – Remnant  
Areas in Zone 1 characterised as moderate quality remnant woodland patches
- Zone 2: PCTID: 3663 - Southeast Foothills Stringybark Shrub Forest – Modified  
Areas in Zone 2 were characterised by a modified composition associated with the residential use of the area surrounding the residential buildings. Clearing of the ground and shrub layer stratum had occurred for much of the area, to allow for the storage of timber, vehicles and other items. Large hollow-bearing trees remained
- Zone 3: PCTID: 3663 - Southeast Foothills Stringybark Shrub Forest – Regenerating  
Areas in Zone 3 were characterised by a predominantly juvenile overstory component comprised of young age classes of *Eucalyptus globoides* and *Corymbia gummifera* which have likely been previously removed or cleared and are currently regenerating
- Zone 4: PCTID: 3663 - Southeast Foothills Stringybark Shrub Forest - Derived native grassland (DNG) Zone 4 consisted of grasslands derived from PCT 3663. Within the Subject Land, DNG occurred in areas where canopy vegetation and most shrub vegetation had been cleared, leaving native grasses and regenerating groundcover species. This was predominantly mapped under the existing transmission lines crossing through the Subject Land.
- Zone 5: PCTID: 3663 - Southeast Foothills Stringybark Shrub Forest - Degraded condition  
consisted of woodland degraded by adjacent residential activities. Degradation included the removal of naturally occurring canopy, shrub and ground layers, and the replacement with common exotic grasses used for lawns, and garden plants. The Subject Site is routinely disturbed and managed (via mowing and residential activities)
- Zone 6: PCTID: 3660 - South Coast Hinterland Yellow Stringybark - Good condition  
Zone 6 consisted of remnant PCT 3660 in good condition located along Red Gun Road
- Zone 7: PCTID 0: This Zone is characterised as all areas containing no native vegetation. These areas include the existing roadways, residential buildings and associated cleared areas (i.e, driveway and parking areas) adjacent to the residential area.

Vegetation present within the Subject Site was further split into two (2) Management Zones, to reflect the proposed future land use of the site, and differing impacts as a result of variations in the proposed future use of the Subject Site.

Management Zones have been outlined to demonstrate the proposed future vegetation management measures to be adopted by the future development of the WTF.

Management Zones (MZ), within the newly defined SP2 zone, were defined as follows:

- **Management Zone A (1.26 ha):** This zone encompasses areas where future infrastructure required for the construction of the WTF will be located (Development Area). It includes future buildings, WTF infrastructure (i.e sludge ponds, tanks, buildings etc.), road access and the proposed solar arrays. It has been assumed that complete removal of vegetation will occur in this area to facilitate construction of the required infrastructure.

- **Management Zone B (1.08 ha):** This area encompasses the proposed Asset Protection Zones, and allows for the retention of the ground-cover stratum. At worst, the canopy and shrub layer stratum would be removed entirely, however pending the finalised design of the WTF, and findings of the Bushfire Assessment, up to 15% of the canopy stratum may be retained
- **Management Zone C (2.34 ha):** this MZ encompasses the remaining area within the Subject Site not captured above, that will be retained as Woodland, with a managed / mown understorey; specifically, canopy species, including recorded hollow-bearing and habitat trees will be retained in this MZ.

### 5.3 Species recorded

#### 5.3.1 Flora species

A total of one hundred and fourteen (114) species were recorded within vegetation survey plots and / or through incidental observations on site, consisting of one hundred and seven (107) native species and thirty-three (33) exotic species, including nine (9) High-Threat Exotics (HTE). The field data collected is available in Appendix D.

#### **Native vegetation**

The Subject Land supports two (2) remnant and regenerating types of Dry Sclerophyll Forest (shrubby sub-formation) and one (1) type of grassland derived from Dry Sclerophyll Forest (DSF), all in varying conditions. Distribution of these communities throughout the Subject Land was governed by topographic variation and by historic landuse, namely past clearing for transmission lines and residential buildings on site. Derived grasslands were typically present in areas under transmission lines and surrounding the residential buildings present, as canopy vegetation has been routinely removed from this area.

#### **Dry Sclerophyll Forest**

Dominant canopy species recorded throughout the majority of the Subject Land included White Stringybark (*Eucalyptus globoidea*), Silvertop Ash (*Eucalyptus sieberi*) and Red Bloodwood (*Corymbia gummerifera*) with Black Sheoak (*Allocasuarina littoralis*) and *Acacia* species. Along the northern margin of the Subject Land, Yellow Stringybark (*Eucalyptus muelleriana*), Mountain Grey Gum (*Eucalyptus cypellocarpa*), and Silvertop Ash (*Eucalyptus sieberi*) dominated the overstorey.

The dominant mid stratum species recorded throughout included Prickly Beard-heath (*Leucopogon juniperinus*), Austral Indigo (*Indigofera australis*), Common Correa (*Correa reflexa*), Slender Rice Flower (*Pimelia linifolia*) and Sweet Pittosporum (*Pittosporum undulatum*).

The ground stratum contained a mixture of grasses, forbs and ferns including Wiry Panic (*Entolasia stricta*), Kangaroo Grass (*Themeda triandra*), Poa Tussock (*Poa labillardierei*), Wallaby Grasses (*Rytidosperma* spp.), Bracken Fern (*Pteridium esculentum*), Twining Glycine (*Glycine clandestina*), Pomax (*Pomax umbellata*), Mat-rushes (*Lomandra* spp.), Blue Flax-lily (*Dianella caerulea*). Cogon Grass (*Imperata cylindrica*) and Hop Goodenia (*Goodenia ovata*) were present close to the northern boundary of the property.

Native vegetation occurred primarily as intact or regenerating dry sclerophyll forest (Plate 1, Plate 2), with varying levels of weed encroachment, planted species and disturbance in proximity to access

roads and residential yards. Areas of derived grassland were also present where overstorey and mid-stratum species had been cleared to make way for power line easements (Plate 3).

### Exotic vegetation

The Subject Land and surrounding areas have experienced a high proportion of disturbance from historic land clearing to make way for power line easements and residential dwellings, as well as ongoing disturbance through human activities (Plate 6) and incursion of some cultivated garden plants such as *Agapanthus* sp. This disturbance has likely encouraged the proliferation of common exotic species.

A number of exotic species were identified across the Subject Land including a number of listed HTE's as well as other common weeds. Weed cover and diversity ranged from low to moderate throughout the Subject Land. Weed presence included patches of invasive HTE grass African Lovegrass (*Eragrostis curvula*), as well as some occurrences of HTE species Common Lantana (*Lantana camara*) and Madagascar Ragwort (*Senecio madagascariensis*) both declared Weeds of National Significance.

Weeds listed as High Threat Exotics, WoNS, and/or Priority Weeds for the South East region are listed in Table 10.

**Table 10 High Threat Exotic, WoNS and Priority weed species identified on within the Subject Land**

| Scientific Name                 | Common Name                | Status | Regional/National Listing  |
|---------------------------------|----------------------------|--------|--|
| <i>Axonopus fissifolius</i>     | Narrow-leafed Carpet Grass | HTE    |  |
| <i>Bidens Pilosa</i>            | Cobbler's Pegs             | HTE    | -  |
| <i>Eragrostic curvula</i>       | African Lovegrass          | HTE    | Priority Weed – Regional Recommended Measure                             |
| <i>Lantana camara</i>           | Common Lantana             | HTE    | WONS, Declared weed NSW, Priority Weed – Prohibition on certain dealings |
| <i>Pinus patula</i>             | Patula Pine                | HTE    |  |
| <i>Pinus radiata</i>            | Radiata Pine               | HTE    |  |
| <i>Rumex acetosella</i>         | Sheep Sorrel               | HTE    | -  |
| <i>Senecio madagascariensis</i> | Madagascan Ragwort         | HTE    | WONS, Priority Weed – Prohibition on certain dealings                    |
| <i>Sporobolus indicus</i>       | Parramatta Grass           | HTE    | Priority Weed – Regional Recommended Measure                             |





**Plate 4 PCT 3663 Derived grassland within the Subject Site (left) and regenerating conditions to be retained within C3 (right)**



**Plate 5 PCT 3663 Intact forest within area to remain C3 (left) and degraded areas to be rezoned (right)**



**Plate 6 Disturbance within the Subject Site, including dumped refuse (left) and disturbed areas in proximity to residences (right)**





Plate 7 Existing residential dwellings (left) and associated hardstand areas and buildings (right)

### 5.3.2 Fauna species

A total of fifty-five (55) fauna species were recorded during the surveys. This included twelve (12) native mammals, three (3) native amphibians and forty (40) native bird species. A full list of species is provided in Appendix D.

The Subject Land contained an array of native fauna with evidence of abundant bird and mammal activity throughout the Subject Land (Plate 10, Plate 11).

#### **Fauna habitats**

The Subject Land contains a variety of habitat types and resources for fauna throughout (Plate 8 - Plate 11), including intact and regenerating dry sclerophyll forest with numerous hollow-bearing trees, shrubby understorey containing flowering nectar-producing species, open derived grassland areas, fallen logs, termite mounds, wombat burrows, large stick nests and mammal dreys.

Shrubby and open woodland areas provided suitable foraging and nesting habitat for a variety of woodland birds and nocturnal mammals observed within the Subject Land. Canopy species including *Eucalyptus sp.*, *Allocasuarina sp.* and *Acacia sp.* provide potential foraging, roosting and breeding habitat for a range of native birds such as threatened bird species Gang-gang Cockatoo (*Callocephalon fimbriatum*) and Scarlet Robin (*Petroica boodang*), both observed within the Subject Land, as well as for native microbats and arboreal mammals.

Cleared open native grasslands provided foraging opportunities for mammals such as the Eastern Grey Kangaroo (*Macropus giganteus*) and Common Wombat (*Vombatus ursinus*), grassland birds and birds of prey. Several native frog species were also heard calling within habitats throughout the Subject Land.





**Plate 8** Fallen timber habitat (left), remnant dry sclerophyll forest (right)



**Plate 9** Hollow stump and termite mound (left), basal hollow in tree (right)



**Plate 10** Large stick nest (left) and wombat burrow (right)





Plate 11 Fauna utilising habitats within the Subject Land: Eastern Grey Kangaroo (*Macropus giganteus*) (left) and Scarlet Robin (*Petrioca boodang*) (right)



Yellow Pinch WTF, Bega Valley - Survey Effort and Verified Plant Community Types within the Subject Land

#### Legend

- Subject Land
- Suburb

#### Roads

- Local Road

#### Waterway

- 1st & 2nd order unnamed waterways

#### Proposed Development Areas

- Access Road
- WTP Building Developments

- Proposed Fence

- Ground Mounted Solar Panel

#### Survey Effort

- Anabat 01
- Anabat 02
- Targeted Survey Tracks
- BAMPlots

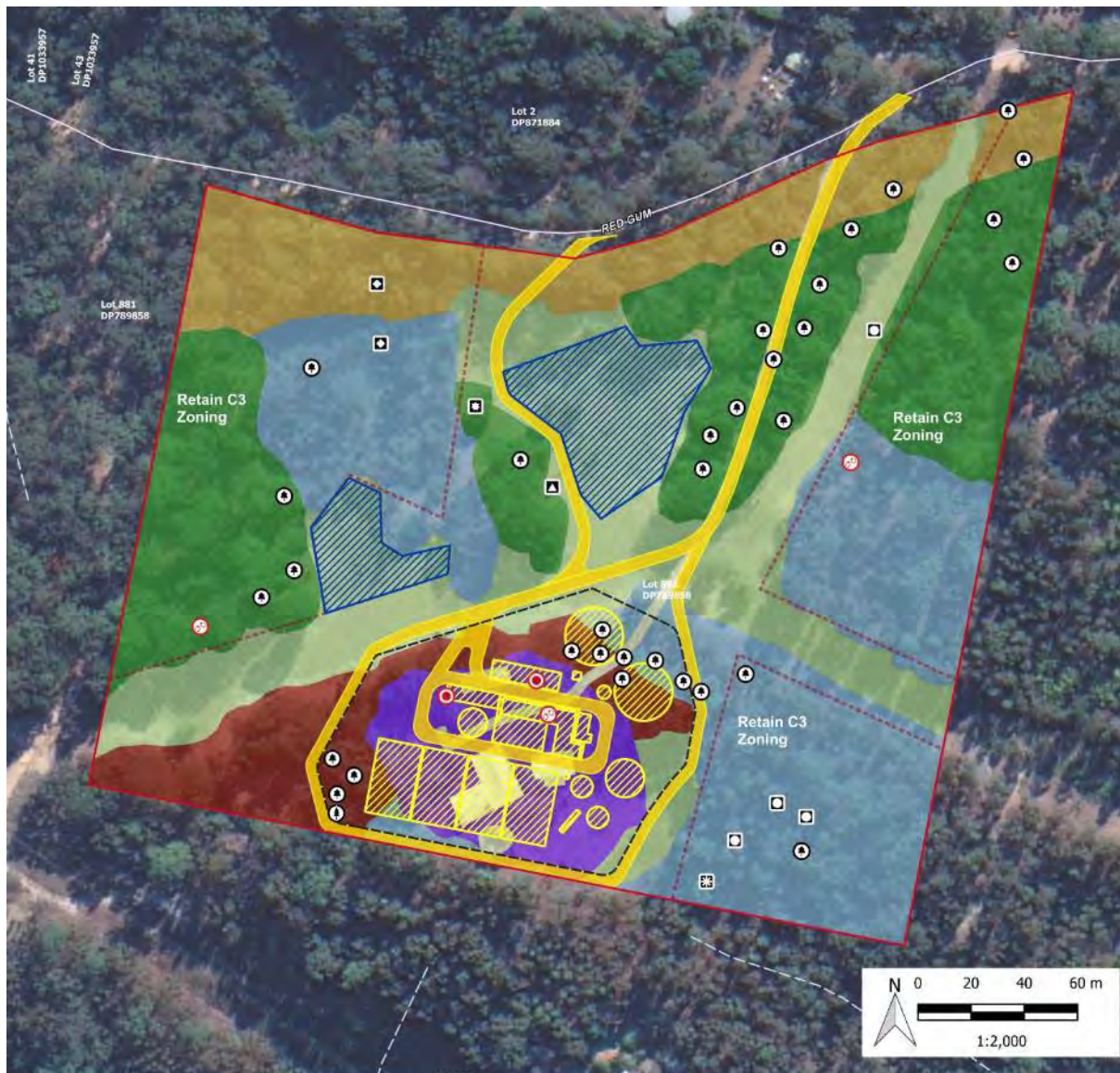
#### Verified PCTs

- Zone 1: PCTID: 3663 - Remnant Southeast Foothills Stringybark Shrub Forest

- Zone 2: PCTID: 3663 - Modified Southeast Foothills Stringybark Shrub Forest
- Zone 3: PCTID: 3663 - Regenerating Southeast Foothills Stringybark Shrub Forest
- Zone 4: PCTID: 3663 - Derived native grassland of Southeast Foothills Stringybark Shrub Forest
- Zone 5: PCTID: 3663 - Degraded condition, Southeast Foothills Stringybark Shrub Forest
- Zone 6: PCTID: 3660 - Good condition, South Coast Hinterland Yellow Stringybark Forest
- Zone 7: PCTID: 0 - Not Native Vegetation

Figure 5 Survey effort and verified PCTs





**Yellow Pinch WTF, Bega Valley - Habitat Features and Verified Plant Community Types within the Subject Land**

**Legend**

Subject Land

**Roads**

Local Road

**Waterway**

1st & 2nd order unnamed waterways

**Proposed Development Areas**

Access Road

WTP Building Developments

Proposed Fence

Ground Mounted Solar Panel

Retain C3 Zoning

**Habitat Features**

Drey

Habitat area

Habitat Tree

Nest

Stag

Termite mound

Wombat Burrow

Gang Gang Cockatoo

Scarlet Robin

**Verified PCTs**

Zone 1: PCTID: 3663 - Remnant Southeast Foothills Stringybark Shrub Forest

Zone 2: PCTID: 3663 - Modified Southeast Foothills Stringybark Shrub Forest

Zone 3: PCTID: 3663 - Regenerating Southeast Foothills Stringybark Shrub Forest

Zone 4: PCTID: 3663 - Derived native grassland of Southeast Foothills Stringybark Shrub Forest

Zone 5: PCTID: 3663 - Degraded condition, Southeast Foothills Stringybark Shrub Forest

Zone 6: PCTID: 3660 - Good condition, South Coast Hinterland Yellow Stringybark Forest

Zone 7: PCTID: 0 - Not Native Vegetation

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**Figure 6 Habitat features identified and verified PCTs and Zones**



## 5.4 Conservation significance

The following section describes the conservation significance of vegetation communities and species likely to be present within the Subject Land.

### 5.4.1 Threatened ecological communities

No threatened ecological communities (TECs) were located during surveys, and PCTs located within the Subject Land are not associated with any TECs. Therefore no impacts to TECs are anticipated as a result of the Planning Proposal or future development of the WTF, and Assessments of Significance for TECs are not required (Appendix F).

### 5.4.2 Threatened flora

Targeted threatened flora surveys were conducted within the Development area and areas of the Subject Site for threatened flora identified as having the potential to occur in the locality (Appendix F) and which detectable during the month of August (at the time of surveys), as follows:

- *Leionema ralstonii* (Ralston's Leionema)- V, BC Act and V EPBC Act
- *Acacia georgensis* (Bega Wattle)- V, BC Act and V EPBC Act
- *Astrotricha crassifolia* (Thick-leaf Star-hair) - V, BC Act and V EPBC Act
- *Zieria buxijugum* (Box Range Zieria)- CE, BC Act and CE, EPBC Act
- *Zieria formosa* (Shapely Zieria)- CE, BC Act and E, EPBC Act

No threatened flora species were recorded during targeted surveys, however seasonal, targeted, threatened flora surveys were not undertaken for all potentially occurring threatened flora species across the entirety of the Subject Land. Further targeted flora surveys should be undertaken in future areas of development within the Subject Land.

No previous records for threatened flora species occur within the Subject Land, however, a number of threatened species are recorded as occurring within the locality (BioNET 2022, Appendix F). Species identified as likely to occur in the locality and with the potential to be impacted by the future development of the WTF are highlighted in Table 1.

### 5.4.3 Threatened fauna

Three (3) species of threatened fauna were recorded as occurring within the Subject Land during surveys and are likely to be using habitat resources on the site for both foraging and breeding.:

- Gang-gang Cockatoo (*Callocephalon fimbriatum*) – listed as Vulnerable (BC Act) and Endangered (EPBC Act)
- Large Bent-winged Bat (*Miniopterus orianae oceanensis*) – listed as Vulnerable (BC Act)
- Scarlet Robin (*Petroica boodang*) – listed as Vulnerable (BC Act)

An additional one thousand one hundred and ninety-two (1192) threatened fauna records occur within the locality (BioNET 2022; Appendix F).

No previous records for threatened fauna species occur within the Subject Land, however, a number of threatened species are recorded as occurring within the locality (BioNET 2022, Appendix F). Species identified as likely to occur in the locality and with the potential to be impacted by the future development of the WTF are highlighted in Table 1.

A summary of threatened species with a moderate or higher likelihood of occurrence and impact is provided below in Table 1.

#### **5.4.4 Migratory species**

Of the listed terrestrial migratory species (Bionet and PMST 2022) with the potential to occur within the locality, none were considered likely to have the potential to regularly use resources within the Subject Land following the field survey and habitat assessment. Likelihood of impact to these species has been considered in Appendix F, concluding that Significant Impact Criteria assessments were not required for these species.

#### **5.5 Habitat connectivity**

The Subject Land is well connected to larger tracts of quality fauna habitat within the immediate Assessment area, with tracts of forest extending out within the locality, providing access and throughfare for fauna (Figure 4). Much of these forested areas consists of reserves and state forests.

The primary connectivity for terrestrial fauna is via remnant forest trees and shrubs. Terrestrial fauna movement is restricted in some areas by cleared land, residential development, roads and fencing within a 1.5 km radius, however, enough scattered and larger remnant vegetation patches remain to allow fauna movement between patches.

## 6 PRELIMINARY IMPACT ASSESSMENT

The following chapters detail the preliminary impact assessment completed for the Planning Proposal; the below information is intended to provide a broad overview of the expected impacts associated with the future development of the WTF, which may arise by reason of the Planning Proposal.

Impacts assessed include anticipated direct and indirect impacts arising from the future development of the WTF to native vegetation, threatened species, ecological communities and their habitats, and in relation to Key Threatening Processes (KTP).

### 6.1 Biodiversity Offset Scheme

Council has indicated that the future development of the WTF would be assessed under Part 5 of the EP&A Act, as water supply infrastructure is considered a permissible development without consent within the SP2 land use zone. Therefore, the assessment requirements of the BC Act 2016 and *Biodiversity Conservation Regulation 2017* are **not mandatory** for the future development of the site. However, as there are a number of triggers for entry into the BOS, these are considered below for completeness.

#### Area Threshold Criteria

Native vegetation clearing thresholds as outlined in Part 7 of the *Biodiversity Conservation Regulation 2017* (Table 11 below) indicate when a project would need to automatically enter the BOS.

The minimum lot size for the Subject Site is 120ha. The anticipated impacts would likely involve direct and indirect impacts, including vegetation clearing, to up to **2.38 ha** to facilitate the development; consequently, the BOS would apply to the proposed development were to be assessed under Part 4 of the EP&A Act.

**Table 11 Area criteria – Biodiversity Offset Scheme threshold**

| Minimum lot size       | Threshold for clearing (ha) to enter BOS |
|------------------------|--|
| <1 ha                  | >0.25                                    |
| 1 ha < 40 ha           | >0.5                                     |
| <b>40 ha – 1000 ha</b> | <b>&gt;1</b>                             |
| >1000 ha               | >2                                       |

#### Areas of Outstanding Biodiversity Value

No listed Areas of Outstanding Biodiversity Value (AOBV) occur within the Subject Land or will be impacted by the Planning Proposal or the proposed future development of the WTF.

#### Assessment of Significance Threshold

To inform the Planning Proposal, threatened species with potential to be impacted by the future proposed development which would be enabled by the rezoning have been nominated within this report (Appendix F). However, the significance of these impacts has not yet been assessed (i.e. Assessments of Significance have not been completed) for listed entities considered to have the potential to occur within the Subject Land, in accordance with Section 1.7 of the EP&A Act and the EPBC Act *Matters of National Environmental Significance – Significant Impact Criteria Guidelines*

(DEWHA, 2009). Rather, this PBAR functions to inform the Planning Proposal for the re-zoning of the Subject Site, and does not provide conclusions about the impacts of the future development of the WTF, as the design (and assessment pathway) has not been finalised. Future environmental assessment to support the development of the WTF would conclude whether it is likely to have a significant negative effect on the threatened biota present, and whether a Species Impact Statements and / or Referral to the Environment Minister, and participation in the BOS is required.

## 6.2 Direct impacts

The direct impacts discussed in the below chapter pertain to anticipated impacts of the future WTF, and do not constitute final impact calculations.

At present, a preliminary design for the proposed WTF (Appendix A) has been used to calculate the impacts discussed below, however these are subject to change based on the final design, and adoption of mitigation measures, for the development. The below preliminary assessments are intended to provide a basis for the consideration of biodiversity on the Subject Site to demonstrate the likely impacts of the proposed future WTF, and subsequently, the potential impacts arising as a result of the Planning Proposal.

### 6.2.1 Native vegetation loss and modification

Based on the current concept design, the total area of anticipated direct impacts arising from the rezoning and future proposed WTF development is **2.34 ha** within the Subject Land to facilitate the construction of the future WTP and associated infrastructure, solar array and access road. An additional **2.34 ha** present within the re-zoned portion of the Lot (Subject Site) would potentially be impacted by ongoing routine maintenance.

The anticipated impacts to each Management Zone within the Subject Site are as follows:

- **Management Zone A:** The complete removal of vegetation will occur to **1.26 ha** of the Subject Site to facilitate the construction of the WTF and associated infrastructure.
- **Management Zone B:** The partial removal of **1.08 ha** of canopy vegetation from the Subject Site to facilitate the establishment and maintenance of the required APZ around the future facility.
- **Management Zone C:** The modification of a further **2.34 ha** to account for potential management disturbances such as occasional mowing of groundcover vegetation.

Impacts to individual Vegetation Zones (VZ) and Management Zones (MZ) are summarised in Table 12 below.

**Table 12 Preliminary impacts to native vegetation as a result of the future proposed WTF**

| PCT   | Vegetation Zone | Management Zone | Anticipated impact area (ha) |
|---|-----------------|-----------------|------------------------------|
| PCTID: 3663 - Remnant Southeast Foothills Stringybark Shrub Forest  | VZ 1            | MZ A            | 0.01                         |
| PCTID: 3663 - Modified Southeast Foothills Stringybark Shrub Forest | VZ 2            | MZ A            | 0.12                         |



| PCT  | Vegetation Zone | Management Zone | Anticipated impact area (ha) |
|--|-----------------|-----------------|------------------------------|
| PCTID: 3663 - Regenerating Southeast Foothills Stringybark Shrub Forest                | VZ 3            | MZ A            | 0.07                         |
| PCTID: 3663 - Derived native grassland of Southeast Foothills Stringybark Shrub Forest | VZ 4            | MZ A            | 0.59                         |
| PCTID: 3663 - Degraded condition, Southeast Foothills Stringybark Shrub Forest         | VZ 5            | MZ A            | 0.30                         |
| PCTID: 3660 - Good condition, South Coast Hinterland Yellow Stringybark Forest         | VZ 6            | MZ A            | 0.02                         |
| PCTID: 0 - Not Native Vegetation   | VZ 7            | MZ A            | 0.15                         |
| PCTID: 3663 - Modified Southeast Foothills Stringybark Shrub Forest                    | VZ 2            | MZ B            | 0.27                         |
| PCTID: 3663 - Regenerating Southeast Foothills Stringybark Shrub Forest                | VZ 3            | MZ B            | 0.09                         |
| PCTID: 3663 - Derived native grassland of Southeast Foothills Stringybark Shrub Forest | VZ 4            | MZ B            | 0.09                         |
| PCTID: 3663 - Degraded condition, Southeast Foothills Stringybark Shrub Forest         | VZ 5            | MZ B            | 0.51                         |
| PCTID: 0 - Not Native Vegetation   | VZ 7            | MZ B            | 0.13                         |
| PCTID: 3663 - Remnant Southeast Foothills Stringybark Shrub Forest                     | VZ 1            | MZ C            | 0.74                         |
| PCTID: 3663 - Modified Southeast Foothills Stringybark Shrub Forest                    | VZ 2            | MZ C            | 0.28                         |
| PCTID: 3663 - Regenerating Southeast Foothills Stringybark Shrub Forest                | VZ 3            | MZ C            | 0.32                         |
| PCTID: 3663 - Derived native grassland of Southeast Foothills Stringybark Shrub Forest | VZ 4            | MZ C            | 1.11                         |
| PCTID: 3663 - Degraded condition, Southeast Foothills Stringybark Shrub Forest         | VZ 5            | MZ C            | 0.00                         |
| PCTID: 3660 - Good condition, South Coast Hinterland Yellow Stringybark Forest         | VZ 6            | MZ C            | 0.36                         |
| PCTID: 0 - Not Native Vegetation   | VZ 7            | MZ C            | 0.02                         |
| <b>Total</b>   |                 |                 | <b>4.68</b>                  |
| <b>Total Native Vegetation</b>   |                 |                 | <b>4.47</b>                  |

Vegetation impacts will include the permanent clearing of understory shrubs and groundcover from within the Subject Site for the construction of the infrastructure defined above.

Recommended future avoidance and mitigation measures to reduce the loss of native vegetation are presented in Section 7.

### **6.2.2 Fauna habitat loss and fragmentation**

The Subject Site has already experienced modification and subsequent loss and fragmentation of fauna habitat through the clearing of easements, and construction of residential buildings and infrastructure, such as access roads and powerlines. The location of the WTP and associated developments was selected based on the previous degradation and vegetation clearing that has occurred at the site, to minimise potential additional impacts on higher quality and better connected vegetation in the surrounding Subject Land.

However, any loss of vegetation for the purpose of constructing the additional access road to the WTP, and the WTP and associated infrastructure would be permanent. Clearing of understory, groundcover and disturbance to habitat resources including shrubs, logs, burrows, and rocks will occur within Subject Site. Vegetation loss of all strata for the purpose of constructing the solar array would likely be temporary as groundcover vegetation and low shrub vegetation would be allowed to regenerate after construction in this zone; canopy would not be able to regenerate in this area, due to shading of the solar panels.

The anticipated future impacts arising from the WTF development would result in a minor increase in the degree of fragmentation in the area, due to additional clearing needing to occur adjacent to already cleared areas within the Subject Site. For example, clearing of canopy vegetation would result in slight increases in the distances between canopy vegetation through sections of the Subject Land, though this is not in exceedance of gaps in canopy present at the site around existing disturbance areas. Given that the site already contains areas of wide vegetation clearing as a result of the existing transmission lines, and there will remain connectivity of vegetation surrounding the Subject Land within the Assessment Area, it is unlikely that species presently occurring on site would be deterred from traversing the area. A high degree of vegetation connectivity remains in remnant woodland surrounding the site, which species can traverse.

Given the high availability of alternate foraging resources available in the surrounding area, it is unlikely that the loss of a small component of foraging resources would significantly impact local species.

Recommended future avoidance and mitigation measures to reduce the risk of habitat loss and fragmentation are presented in Section 7.

### **6.2.3 Fauna injury and mortality**

As described above, the Subject Site supports a variety of habitat resources for native fauna species, including foraging, roosting and shelter resources for threatened species as well as common native fauna. Arboreal hollow-dependent fauna such as *Petaurus breviceps* (Sugar Glider) and *Trichosurus vulpecula* (Brush-tailed Possum) were observed on within the Subject Land during nocturnal surveys, and are known to be sheltering in hollow-bearing trees located in the Subject Land and likely the Subject Site. It is highly likely that a wide variety of threatened fauna including woodland birds occur, in addition to the Scarlet Robin and Gang Gang Cockatoo, recorded within the Subject Site and Subject Land.

The future development of the Subject Site could result in the injury or mortality of some individuals of these less mobile fauna species and other small terrestrial fauna that may be sheltering in

vegetation within the Subject Site during construction. Additionally, the removal of mature and hollow-bearing trees has the potential to impact on hollow-dependent fauna sheltering in hollows on site. The potential for impacts on fauna utilising hollows would be reduced through pre-clearance surveys of habitat trees and protocols for techniques for felling of habitat trees that result in fewer impacts to any fauna present.

Consideration should be given to future surveys to determine if species are occupying vegetation to be removed. Additionally, it is recommended that if the WTF proposal progresses in the future, an ecologist or fauna spotter should be present both prior to, and at the time of vegetation removal to identify species habitat on site, and to rescue any potentially resident fauna.

Recommended future avoidance and mitigation measures to reduce the risk of fauna injury and mortality are presented in Section 7.

### **6.3 Indirect impacts**

The indirect impacts discussed in the below chapters pertain to anticipated impacts arising from the future WTF, and do not constitute final impact calculations.

At present, a preliminary design for the proposed WTF has been used to calculate the impacts discussed below, however these are subject to change based on the final design for the development. The below impacts are intended to provide a basis for the biodiversity assessment to demonstrate the likely impacts of the proposed future WTF, and subsequently, the expected impacts as a result of the rezoning Planning Proposal.

Indirect impacts considered herein include potential impacts to up to **4.68 ha** of native vegetation located in the Subject Site that will be re-zoned from C3 Environmental Management to SP2 Infrastructure, as potential future impacts that may occur as a result of the change in land use.

Further indirect impacts to the Subject Land includes impacts to an area comprising **8.02 ha** of native vegetation which will remain as C3 zoning.

These are discussed in further detail below.

#### **6.3.1 Change of land-use**

The Planning Proposal will result in a change in land-use zone, and subsequently in the use and occupation of that land; specifically for **4.68 ha** of degraded native vegetation present within the Subject Site. The proposed change in land-use of the site would result in the downgrading of environmental and biodiversity protection facilitated by the C3 Environmental Management land-zone, and instead allow for a wider array of developments under the SP2 Infrastructure land zoning. While the indirect impacts of this are difficult to quantify, biodiversity features present within the Subject Site could be lost or degraded due to the change in land use. The proposed management zones outlined in Section 5.2 are designed to outline the future management of vegetation remaining in the Subject Site, and to reduce the impacts to key biodiversity features identified in the area, such as hollow-bearing trees.

#### **6.3.2 Invasion and spread of weeds**

The future development of the Subject Site has the potential to result in the introduction and spread of exotic plants throughout the Subject Land as a result of construction activities. The further

fragmentation of native vegetation and disturbance of soil for construction creates an environment conducive to the spread of weeds. Additionally, an increase in vehicle and machinery movements during construction, and inappropriate hygiene measures associated with the movement of construction materials and construction machinery increases the risk of introducing and spreading weeds. Weed invasion can decrease the quality and diversity of native vegetation, and result in reduced quality of native fauna habitat and compromised structural integrity of native vegetation communities.

Exotic and High Threat weeds already occur throughout the Subject Land. Two (2) NSW Priority Weeds and two (2) WONs were recorded within the Subject Land during the site assessment (Section 5.3.1). Although areas of the Subject Land and Subject Site have undergone degradation and weed incursion currently, these are predominantly restricted to the areas that have already undergone disturbance, such as surrounding the residential building, and under the existing transmission line easement. Care should be taken to prevent the introduction and spread of exotic weeds to areas of high-quality vegetation within undisturbed woodland vegetation on site.

Site specific safeguard and mitigation measures would be developed as part of the future environmental impact assessment for the development of the future WTF, to limit the spread of existing weeds to the site, and to minimise the likelihood of new exotic species being introduced.

### 6.3.3 Noise and vibration disturbance

The future development of the Subject Site would result in a minor increase in noise and vibration disturbance due to the use of machinery during construction. Noise and vibration levels during the construction period would result in an increase above existing background levels for the duration of construction period.

Noise and vibration disturbance can have a variety of impacts on fauna, including changing foraging behavior, impacting breeding success and changing species occurrences. Fauna most at risk would be those residing nearest to the Subject Site, within the broader Subject Land, and in particular any species that may be nesting or roosting in the area. Some fauna may vacate areas in proximity to the impact area during construction. Other more resilient fauna species are likely to become accustomed to the noise, and this increased impact is unlikely to result in a decrease in population numbers.

Given the temporary nature of the construction works and, in conjunction with the availability of alternate habitat in surrounding areas, it is unlikely the temporary increase in noise and vibration during construction of the future WTF would significantly disturb fauna that occur in the Subject Land.

Site specific safeguard and mitigation measures should be developed as part of the future environmental impact assessment for the development of the WTF, to reduce the magnitude of impacts of noise and vibration on fauna in the environment.

### 6.3.4 Introduction and spread of pathogens

Construction activities have the potential to introduce or spread pathogens such as *Phytophthora cinnamomi* (Phytophthora), *Uredo rangelii* (Myrtle Rust) and *Batrachochytrium dendrobatidis* (Chytrid fungus) throughout the study area through vegetation disturbance and increased visitation. There is little available information about the distribution of pathogens and diseases on site, and no evidence of these pathogens was observed during surveys. Phytophthora and Myrtle Rust may result in the



dieback or modification of native vegetation and damage to fauna habitats. Chytrid fungus affects both tadpoles and adult frogs and can result in significant mortality (sometimes of an entire population) if introduced into an area.

Site specific safeguard and mitigation measures should be developed as part of the future environmental impact assessment for the development of the WTF, to reduce the risk of the introduction and spread of pathogens during construction.

## 6.4 Key threatening processes

A key threatening process (KTP) is defined in the BC Act as an action, activity or Proposal that:

- Adversely affects two or more threatened species, populations or ecological communities
- Could cause species, populations or ecological communities that are not currently threatened to become threatened.

There are currently thirty-nine (39) KTPs listed under the BC Act (DPE 2022) eight (8) listed under the FM Act (DPI 2021) and twenty-one (21) under the EPBC Act (DCCEEW 2022). Several KTPs are listed under more than one Act. KTPs of relevance to the future development of the WTF are outlined and discussed in Table 13.

**Table 13 Key threatening process of relevance to the future development of the WTF**

| Key Threatening Process                               | Status           | Comment   |
|---|------------------|---|
| Clearing of native vegetation                         | BC Act; EPBC Act | <p>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 (OEH, 2020).</p> <p>Anticipated future construction impacts would result in the removal of native vegetation. Impacts would be further reduced via the application of measures outlined in Section 7.</p> |
| Invasion of native plants by exotic perennial grasses | BC Act           | <p>Exotic perennial grasses are those that are not native to NSW and have a life-span of more than one growing season. <i>Eragrostis curvula</i> (African lovegrass), is an exotic perennial grass of special concern, and was recorded during site surveys (OEH 2017)</p> <p>The future development at the Subject Site would manage the risk of further spread of this exotic perennial grass species would enhance conditions conducive to the introduction and further spread of invasive garden plants. The likelihood and impact of this KTP would be managed via the safeguards and management measures developed at the impact assessment stage of the development of the WTF.</p>                            |
| Loss of Hollow-bearing Trees                          | BC Act           | <p>Hollow-bearing trees provide critical habitat for hollow-dependent fauna, including arboreal fauna such as the Sugar Glider and Brush-tailed Possum recorded on within the Subject Site. The loss of hollow-</p>   |

| Key Threatening Process | Status | Comment  |
|-------------------------|--------|--|
|                         |        | <p>bearing trees is a critical limiting factor to the persistence of these hollow dependent fauna.</p> <p>The loss of a minor component of hollow-bearing trees is expected from within Management Zones A and B</p> |



## 7 RECOMMENDATIONS, AVOIDANCE AND MITIGATION

This section outlines efforts undertaken to avoid and minimise impacts on biodiversity values associated with the Planning Proposal, and the recommended measures to further mitigate impacts to biodiversity for the proposed future development of a WTF..

Avoidance and mitigation measures have been considered throughout the planning process and are described below.

### 7.1 Avoidance and minimisation of impacts through design and planning

Effort to reduce impacts to biodiversity has been demonstrated through development of a Scoping Assessment (GHD, 2021), early-stage site assessment to identify key areas and features of biodiversity importance on site, and the proposal planning and design process to deliberately avoid and reduce impacts to these areas containing biodiversity value..

The original selection of the Subject Site, based on preliminary environmental considerations and the Scoping Study (GHD, 2021) completed for the proposed future development of the WTF highlighted the following key reasons for the selection of the Subject Land:

- The Subject Site is optimal as it links in with the existing water supply network, and
- The Subject Site provides the required elevation for the facility.

Subsequent site surveys conducted in August 2022, determined that areas proposed for the future construction of the WTF are generally highly disturbed and modified, due to both the existing residential buildings and transmission towers. The areas surrounding the proposed future Subject Site were found to be of much higher quality and better-connected vegetation for threatened and non-threatened species known to occur, or potentially occurring within the Subject Land.

The area selected for the WTF was selected, and found to be suitable for the following reasons:

- The Subject Land is modified in the vicinity of the transmission towers (removal of canopy and shrub vegetation has occurred, leaving predominantly disturbed groundcover vegetation)
- The proposed Development area occurs over an area with existing disturbance residential buildings (native vegetation has been cleared and replaced with buildings, hardstand areas for vehicle access, garden beds and lawn containing exotic species)
- The Development area has a low likelihood of supporting threatened flora species due to existing and ongoing disturbance in the area, as described above
- Well-connected, high-quality vegetation adjacent to and surrounding the Subject Land to allow for threatened and non-threatened species to continually traverse the Subject Site
- The small impact footprint is unlikely to substantially increase fragmentation beyond what already occurs within the Subject Land (and that threatened species recorded during surveys already navigate)

The proposed future impacts at the Subject Site has also been catagorised in Management Zones, whereby vegetation with the potential to be retained (i.e, low shrub and groundcover vegetation) would remain within the APZ indicated, to allow for the retention of connectivity and the provision of habitat for small woodland species such as birds and small mammals, including the *Petroica boodang*



(Scarlet Robin), which was identified foraging in garden beds within the Development area during site surveys.

## 7.2 Recommended measures for further avoidance and minimisation

The following measures are proposed to further avoid and minimise impacts to biodiversity values recorded owithin the Subject Land:

- The impacts of future developments on native vegetation within the Subject Site (i.e., land to be re-zoned) should be considered cumulatively.
- Following detailed design and the confirmation of the design footprint, further targeted threatened flora surveys should be undertaken to determine if threatened flora species occur in the proposed development area
- Assessments of significance pursuant to Section 1.7 of the EP&A Act and the EPBC Act Matters of National Environmental Significance – Significant Impact Criteria Guidelines (DEWHA, 2013) should be completed for threatened biota known or likely to occur within the development footprint of the WTF, and adjacent areas following the finalisation of the detailed design of the WTF
- Further refinement of the design footprint during detailed design to avoid impacts to canopy vegetation should be completed
- Hollow-bearing trees identified within the development area and Subject Site should be retained wherever possible
- Consideration of removal of solar array or placement of solar panels atop proposed infrastructure to reduce direct impacts to native vegetation should be included
- Further refinement of Management Zones to retain canopy and shrub vegetation wherever possible
- Once the final design footprint is complete, including formalisation of vegetation to be removed, a suitably qualified ecologist will be required to undertake a pre-clearing survey and supervise all clearing activities.
- Planting of locally native species within management Zone B and C to increase native cover and biodiversity within the Subject Site.

The following mitigation measures presented in Table 14 below provide future recommended measures to ensure that impacts to threatened species with the potential to occur on site are minimised wherever possible.

**Table 14 Proposed mitigation measures for threatened species with a moderate to high potential to be impacted by the future WTF development**

| Scientific Name          | Common name | BC Act | EPBC Act | Future recommended measures   |
|--------------------------|-------------|--------|----------|---|
| <b>Flora</b>             |             |        |          |   |
| <i>Acacia georgensis</i> | Bega Wattle | V      | V        | Moderate potential to occur, however has been surveyed for. If future design impacts on areas outside of the proposed Development area in this assessment, further targeted surveys may be required |

| Scientific Name                     | Common name            | BC Act | EPBC Act | Future recommended measures   |
|-------------------------------------|------------------------|--------|----------|---|
| <i>Astrotricha crassifolia</i>      | Thick-leaf Star-hair   | V      | V        | Moderate potential to occur, however has been surveyed for. If future design impacts on areas outside of the proposed Development area in this assessment, further targeted surveys may be required   |
| <i>Astrotricha sp. Wallagaraugh</i> | Merimbula Star-hair    | E      |          | Species may occur in the Study Area, and targeted surveys in the correct survey period should be undertaken to ensure no impacts to the species   |
| <i>Leionema ralstonii</i>           | Ralston's Leionema     | V      | V        | Moderate potential to occur, however has been surveyed for. If future design impacts on areas outside of the proposed Development area in this assessment, further targeted surveys may be required   |
| <i>Pomaderris bodalla</i>           | Bodalla Pomaderris     | V      | -        | Species not detectable at the time of surveys, however no Pomaderris sp (including non-threatened species) identified within the Development area, or areas of the Subject Land surveyed. If future design impacts on areas outside of the proposed Development area in this assessment, further targeted surveys may be required |
| <i>Pomaderris cotoneaster</i>       | Cotoneaster Pomaderris | E      | E        | Species not detectable at the time of surveys, however no Pomaderris sp (including non-threatened species) identified within the Development area, or areas of the Subject Land surveyed. If future design impacts on areas outside of the proposed Development area in this assessment, further targeted surveys may be required |
| <i>Pomaderris parrisiae</i>         | Parris' Pomaderris     | V      | V        | Species not detectable at the time of surveys, however no Pomaderris sp (including non-threatened species) identified within the Development area, or areas of the Subject Land surveyed. If future design impacts on areas outside of the proposed Development area in this assessment, further targeted surveys may be required |
| <i>Pultanaea pedunculata</i>        | Matted Bush-pea        | E      | -        | Species may occur in the Study Area, and targeted surveys in the correct survey period should be undertaken to ensure no impacts to the species   |
| <i>Thesium australe</i>             | Thesium Australe       | V      | V        | Species may occur in the Study Area, and targeted surveys in the correct survey period should be undertaken to ensure no impacts to the species   |
| <b>Birds of Prey</b>                |                        |        |          |   |

| Scientific Name                        | Common name                            | BC Act | EPBC Act | Future recommended measures   |
|--|--|--------|----------|---|
| <i>Circus assimilis</i>                | Spotted Harrier                        | V      | -        | Species may be impacted by minor loss of foraging habitat. While no nest trees were observed in the study area, targeted surveys should be conducted prior to the development of the area to ensure the species has not constructed a nest in the area. |
| <i>Falco subniger</i>                  | Black Falcon                           | V      | -        | Species may be impacted by minor loss of foraging habitat. While no nest trees were observed in the study area, targeted surveys should be conducted prior to the development of the area to ensure the species has not constructed a nest in the area. |
| <i>Hieaetus morphnoides</i>            | Little Eagle                           | V      | -        | Species may be impacted by minor loss of foraging habitat. While no nest trees were observed in the study area, targeted surveys should be conducted prior to the development of the area to ensure the species has not constructed a nest in the area. |
| <i>Lophoictinia isura</i>              | Square-tailed Kite                     | V      | -        | Species may be impacted by minor loss of foraging habitat. While no nest trees were observed in the study area, targeted surveys should be conducted prior to the development of the area to ensure the species has not constructed a nest in the area. |
| <b>Fruit-eating bats</b>               |  |        |          |   |
| <i>Pteropus poliocephalus</i>          | Grey-headed Flying Fox                 | V      | V        | The anticipated impacts of the WTF would result in a minor loss in foraging habitat. Detailed design to retain vegetation wherever possible   |
| <b>Woodland birds</b>                  |  |        |          |   |
| <i>Anthochaera phrygia</i>             | Regent Honeyeater                      | CE     | CE       | The anticipated impacts of the WTF would result in a minor loss in foraging habitat. Detailed design to retain vegetation wherever possible   |
| <i>Artamus cyanopterus cyanopterus</i> | Dusky Woodswallow                      | V      |          | The anticipated impacts of the WTF could result in a minor loss in foraging habitat. Targeted surveys to be conducted to determine if the species is utilizing the area for breeding. Detailed design to retain vegetation wherever possible            |
| <i>Climacteris picumnus</i>            | Brown Treecreeper (eastern subspecies) | V      |          | The anticipated impacts of the WTF could result in a minor loss in foraging habitat. Targeted surveys to be conducted to determine if the species is utilizing the area for breeding. Detailed design to retain vegetation wherever possible            |

| Scientific Name                        | Common name                       | BC Act | EPBC Act | Future recommended measures  |
|--|-----------------------------------|--------|----------|--|
| <i>Daphoenositta chrysoptera</i>       | Varied Sitella                    | V      |          | The anticipated impacts of the WTF could result in a minor loss in foraging habitat. Targeted surveys to be conducted to determine if the species is utilizing the area for breeding. Detailed design to retain vegetation wherever possible         |
| <i>Epthianura albifrons</i>            | White-fronted Chat                | V      |          | The anticipated impacts of the WTF would result in a minor loss in foraging habitat. Detailed design to retain vegetation wherever possible  |
| <i>Lathamus discolor</i>               | Swift Parrot                      | E      |          | The anticipated impacts of the WTF would result in a minor loss in foraging habitat. Detailed design to retain vegetation wherever possible  |
| <i>Melanodryas cucullata cucullata</i> | Hooded Robin (south-eastern form) | V      |          | The anticipated impacts of the WTF could result in a minor loss in foraging habitat. Targeted surveys to be conducted to determine if the species is utilizing the area for breeding. Detailed design to retain vegetation wherever possible         |
| <i>Pachycephala olivacea</i>           | Olive Whistler                    | V      |          | The anticipated impacts of the WTF I would result in a minor loss in foraging habitat. Detailed design to retain vegetation wherever possible  |
| <i>Petroica boodang</i>                | Scarlet Robin                     | V      |          | Recorded during area surveys. The proposal would result in a minor loss in foraging habitat. Targeted surveys to be conducted to determine if the species is utilizing the area for breeding. Detailed design to retain vegetation wherever possible |
| <i>Petroica phoenicea</i>              | Flame Robin                       | V      |          | The anticipated impacts of the WTF could result in a minor loss in foraging habitat. Targeted surveys to be conducted to determine if the species is utilizing the area for breeding. Detailed design to retain vegetation wherever possible         |
| <i>Stagonopleura guttata</i>           | Diamond Firetail                  | V      |          | The anticipated impacts of the WTF could result in a minor loss in foraging habitat. Targeted surveys to be conducted to determine if the species is utilizing the area for breeding. Detailed design to retain vegetation wherever possible         |
| <b>Hollow-dependent Birds</b>          |                                   |        |          |  |
| <i>Callocephalon fimbriatum</i>        | Gang-gang Cockatoo                | V      |          | Species recorded foraging in the Study Area during area surveys. The anticipated impacts of the WTF could result in a minor loss in foraging habitat.  |



| Scientific Name                 | Common name           | BC Act | EPBC Act | Future recommended measures  |
|---------------------------------|-----------------------|--------|----------|--|
|                                 |                       |        |          | Detailed design to retain vegetation wherever possible   |
| <i>Calyptorhynchus lathamii</i> | Glossy Black-Cockatoo | V      |          | The development could result in a minor loss in foraging habitat. Detailed design to retain vegetation wherever possible   |
| <i>Glossopsitta pusilla</i>     | Little Lorikeet       | V      |          | The development could result in a minor loss in foraging habitat, and potential nesting habitat (hollo-bearing trees). Targeted surveys should be conducted to determine if the species breeds in the Study Area. Detailed design to retain vegetation and habitat trees wherever possible |
| <i>Ninox connivens</i>          | Barking Owl           | V      |          | The development could result in a loss of foraging habitat for the species. No hollows within the Development area were of suitable size to support the species. If the proposed development footprint changes surveys should be conducted to re-asses the potential for breeding habitat  |
| <i>Ninox strenua</i>            | Powerful Owl          | V      |          | The development could result in a loss of foraging habitat for the species. No hollows within the Development area were of suitable size to support the species. If the proposed development footprint changes surveys should be conducted to re-asses the potential for breeding habitat  |
| <i>Tyto novaehollandiae</i>     | Masked Owl            | V      |          | The development could result in a loss of foraging habitat for the species. No hollows within the Development area were of suitable size to support the species. If the proposed development footprint changes surveys should be conducted to re-asses the potential for breeding habitat  |
| <i>Tyto tenebricosa</i>         | Sooty Owl             | V      |          | The development could result in a loss of foraging habitat for the species. No hollows within the Development area were of suitable size to support the species. If the proposed development footprint changes surveys should be conducted to re-asses the potential for breeding habitat  |
| <b>Hollow-dependent Mammals</b> |                       |        |          |  |
| <i>Cercartetus nanus</i>        | Eastern Pygmy-possum  | V      | -        | The development would result in the loss of potential foraging habitat for the species. Targeted surveys should be conducted to determine if the species utilises habitat present  |

| Scientific Name                         | Common name                      | BC Act | EPBC Act | Future recommended measures   |
|---|----------------------------------|--------|----------|---|
| <i>Dasyurus maculatus</i>               | Spotted-tailed Quoll             | V      | E        | The species may occur, and the development could result in the loss of low quality foraging habitat   |
| <i>Petaurus australis</i>               | Yellow-bellied Glider            | V      | -        | Species not recorded during spotlighting surveys. May utilise hollows in the area, and the loss of hollow-bearing trees will reduce this resource for the species. Targeted surveys should be conducted prior to the development commencing to ensure hollows to be impacted do not support the species |
| <i>Petauroides volans</i>               | Greater Glider                   | V      | V        | Species not recorded during spotlighting surveys. May utilise hollows in the area, and the loss of hollow-bearing trees will reduce this resource for the species. Targeted surveys should be conducted prior to the development commencing to ensure hollows to be impacted do not support the species |
| <i>Phascogale tapoatafa</i>             | Brush-tailed Phascogale          | V      | -        | The species may occur, and the development could result in the loss of low quality foraging habitat   |
| <b>Insectivorous Bats</b>               |                                  |        |          |   |
| <i>Micronomus norfolkensis</i>          | Eastern Coastal Free-tailed Bat  | V      |          | The species may forage in the Subject Land and roost in hollows or large mature trees in the Subject Area. Mature Canopy vegetation removal should be minimised wherever possible   |
| <i>Falsistrellus tasmaniensis</i>       | Eastern False Pipistrelle        | V      |          | The species may forage in the Subject Land and roost in hollows or large mature trees in the Subject Area. Mature Canopy vegetation removal should be minimised wherever possible   |
| <i>Scoteanax rueppellii</i>             | Greater Broad-nosed Bat          | V      |          | The species may forage in the Subject Land and roost in hollows or large mature trees in the Subject Area. Mature Canopy vegetation removal should be minimised wherever possible   |
| <i>Miniopterus orianae oceanensis</i>   | Large Bent-winged Bat            | V      |          | The species may forage in the Subject Land and roost in hollows or large mature trees in the Subject Area. Mature Canopy vegetation removal should be minimised wherever possible   |
| <b>Other Mammals</b>                    |                                  |        |          |   |
| <i>Phascolarctos cinereus</i>           | Koala                            | E      | E        | The species may occur, and the development could result in a minor loss of low quality foraging habitat   |
| <i>Potorous tridactylus tridactylus</i> | Long-nosed Potoroo (SE Mainland) | V      | V        | The species may occur, and the development could result in a minor loss of low quality foraging habitat   |

| Scientific Name                 | Common name                        | BC Act | EPBC Act | Future recommended measures   |
|---------------------------------|------------------------------------|--------|----------|---|
| <i>Isodon obesulus obesulus</i> | Southern Brown Bandicoot (Eastern) | E      | E        | The species may occur, and the development could result in a minor loss of low quality foraging habitat |

## 8 CONCLUSION

TEF was commissioned by BVSC to undertake a PBAR to consider the potential future ecological impacts arising from the rezoning of land, for the purpose of the future development of a WTF on Lot 882 DP 789858 at 43 Red Gum Road, Yellow Pinch, NSW. The surveys undertaken to support this assessment included habitat identification, confirmation of vegetation community mapping, confirmation of presence or absence of TECs, collection of BAM data, as well as opportunistic threatened flora and fauna surveys.

The re-zoning of a portion of the Subject Land, as described above, is required to allow for the future construction of a new WTF and associated infrastructure near the Yellow Pinch Dam to ensure treated water supply will meet the demands of the surrounding townships. Subsequently, in addition to the key features assessed within this PBAR relating to the re-zoning of land, the report has also considered the potential for future impacts to biodiversity, including threatened species and ecological communities (threatened biota) as a result of the future development of a WTF.

The Subject Land is surrounded by heavily vegetated large-lot residential properties, and is bisected with access roads, electricity easements and infrastructure, as well as a number of private dwellings and other buildings. The existing driveways, residential buildings and garden areas are more heavily disturbed than the broader Subject Land, and the majority of the future WTF would be located over these already disturbed areas (Appendix A). In and around the existing disturbed areas and infrastructure, the Subject Land contains a mixture of good quality, remnant native woodland and degraded and previously modified woodland and derived native grasslands.

The location of the Subject Site was selected based on a range of factors, including that the Subject Site is optimally located as it links with the existing water supply network, and is suitably placed at the required elevation to provide gravity-fed potable water into said network. Additionally, based on the biodiversity assessment completed as documented herein, the concept design has considered avoidance of biodiversity assets within the Subject Land as part of the current Planning Proposal and to inform the future WTF development. Namely, the location of the future WTF has been proposed based on existing disturbance and areas of degraded vegetation within the Subject Site.

The site assessment identified two (2) Plant Communities within the Subject Land:

- PCTID: 3660 - South Coast Hinterland Yellow Stringybark Forest – **0.42 ha**
- PCTID: 3663 - Southeast Foothills Stringybark Shrub Forest – **7.32 ha**

A further **0.28 ha** was identified as PCTID 0: Non-native vegetation / existing hardstand areas.

No PCTs identified conform to listed TECs. Targeted flora transects conducted during site surveys for detectable species did not identify any threatened flora, however three (3) threatened fauna species were identified:

- Gang-gang Cockatoo (*Callocephalon fimbriatum*) – listed as Vulnerable (BC Act) and Endangered (EPBC Act)
- Large Bent-winged Bat (*Miniopterus orianae oceanensis*) – listed as Vulnerable (BC Act)
- Scarlet Robin (*Petroica boodang*) – listed as Vulnerable (BC Act)



To reflect the future intended use of the Subject Site, it was further split into potential future management zones inline with the proposed construction and ongoing use of the WTF. Management zone areas are defined as follows:

- **Management Zone A (1.26 ha):** This zone encompasses areas where future infrastructure required for the construction of the WTF will be located (Development Area). It includes future buildings, WTF infrastructure (i.e sludge ponds, tanks, buildings etc.), road access and the proposed solar arrays. It has been assumed that complete removal of vegetation will occur in this area to facilitate construction of the required infrastructure.
- **Management Zone B (1.08 ha):** This area encompasses the proposed Asset Protection Zones, and allows for the retention of the ground-cover stratum. At worst, the canopy and shrub layer stratum would be removed entirely, however pending the finalised design of the WTF, and findings of the Bushfire Assessment, up to 15% of the canopy stratum may be retained
- **Management Zone C (2.34 ha):** this MZ encompasses the remaining area within the Subject Site not captured above, that will be retained as Woodland, with a managed / mown understorey; specifically, canopy species, including recorded hollow-bearing and habitat trees will be retained in this MZ.

As the Planning Proposal is not being assessed as a development under Part 4 of the EP&A Act, and the future development of the Subject Site for a WTF is intended to be assessed under Part 5 of the EP&A Act as critical regional water infrastructure, participation in the Biodiversity Offset Scheme (BOS) is not required unless a significant impact to threatened biota is anticipated (refer Section 2.2.1 and Section 2.2.4). This will be determined in future, if the proposed future development can proceed and the designs are finalised, incorporating recommended avoidance and mitigation measures.

The current Planning Proposal has considered the existing biodiversity values of the Subject Land through the Scoping Study, and surveys and constraints identification completed in accordance with the BAM, demonstrating that efforts have thereby been made to ensure the boundaries of the rezoning are limited to previously disturbed and lower quality areas of native vegetation within existing Lot 882 DP 789858. Placement of the proposed SP2 boundary over areas that contain existing buildings, access roads and electricity infrastructure and easements, thereby demonstrates that appropriate measures to avoid and minimize impacts to biodiversity have been implemented as part of the Planning Proposal in accordance with the principles of the *Biodiversity Conservation Act 2016* (BC Act). While the Subject Site is currently zoned as C3, the portion of the Subject Land proposed for rezoning as part of the current Planning Proposal is heavily degraded, and placement of the proposed future WTF in this location is not anticipated to result in significant impacts to biodiversity, based on the concept design (GHD, January 2023; Appendix A) and provided the recommended mitigation measures are implemented and maintained.

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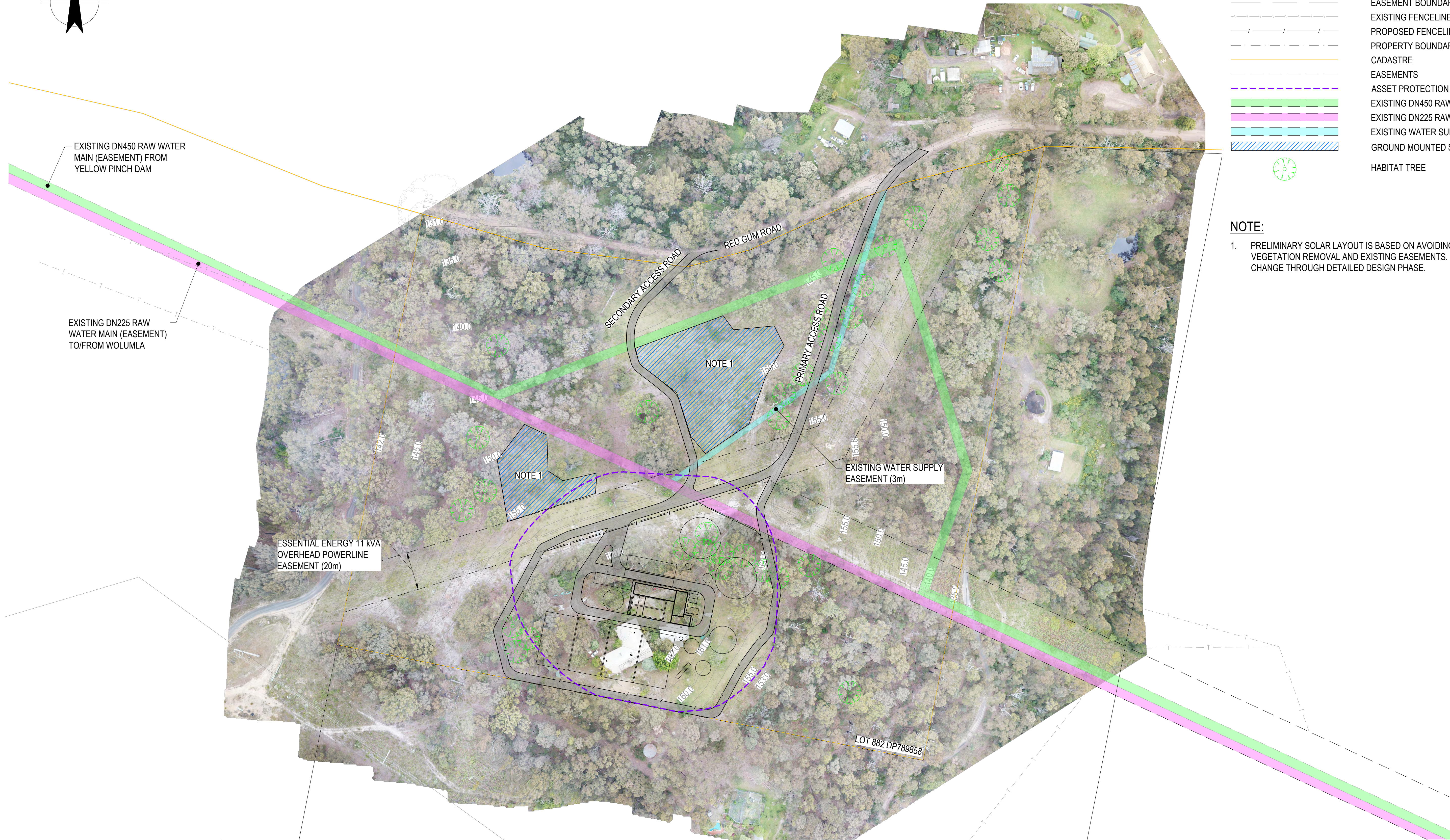
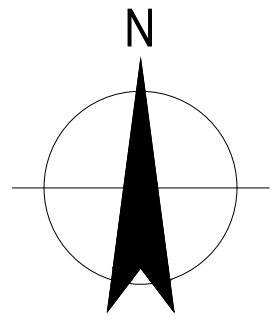
## 10 APPENDICES

| Appendix   | Item  |
|------------|---|
| Appendix A | Design Drawings – Preliminary Draft Concept       |
| Appendix B | Native Vegetation Regulatory Map                  |
| Appendix C | Biodiversity Values Map and Threshold Report      |
| Appendix D | Species Lists                                     |
| Appendix E | BAM Data sheets                                   |
| Appendix F | Threatened species likelihood of occurrence table |
| Appendix G | Climatology Data                                  |



## **Appendix A – Design Drawings**





LEGEND:

- EXISTING ELECTRICAL
- EXISTING TELECOMMUNICATION CABLE
- EASEMENT BOUNDARY
- EXISTING FENCELINE
- PROPOSED FENCELINE
- PROPERTY BOUNDARY
- CADASTRE
- EASEMENTS
- ASSET PROTECTION ZONE (APZ)
- EXISTING DN450 RAW WATER MAIN
- EXISTING DN225 RAW WATER MAIN
- EXISTING WATER SUPPLY
- GROUND MOUNTED SOLAR PANEL
- HABITAT TREE

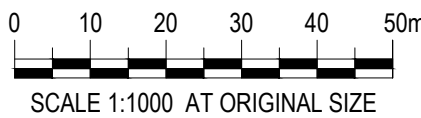
NOTE:

- PRELIMINARY SOLAR LAYOUT IS BASED ON AVOIDING EXCESSIVE VEGETATION REMOVAL AND EXISTING EASEMENTS. THIS MAY CHANGE THROUGH DETAILED DESIGN PHASE.

PLAN  
SCALE 1:1000

FOR INFORMATION

|          |                        |                |                |          |
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| A        | DRAFT REFERENCE DESIGN | CM             | CS             | 28/11/22 |
| Rev      | Description            | Checked        | Approved       | Date     |
| Author   | J. PORCALLA            | Drafting Check | E. ESTACIO JR. |          |
| Designer | N. KAROLY              | Design Check   | N. JOHNSTON    |          |



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Project No.  
12538990

Client BEGA VALLEY SHIRE COUNCIL

Project YELLOW PINCH WTP

Status DRAFT REFERENCE DESIGN

Status Code S2

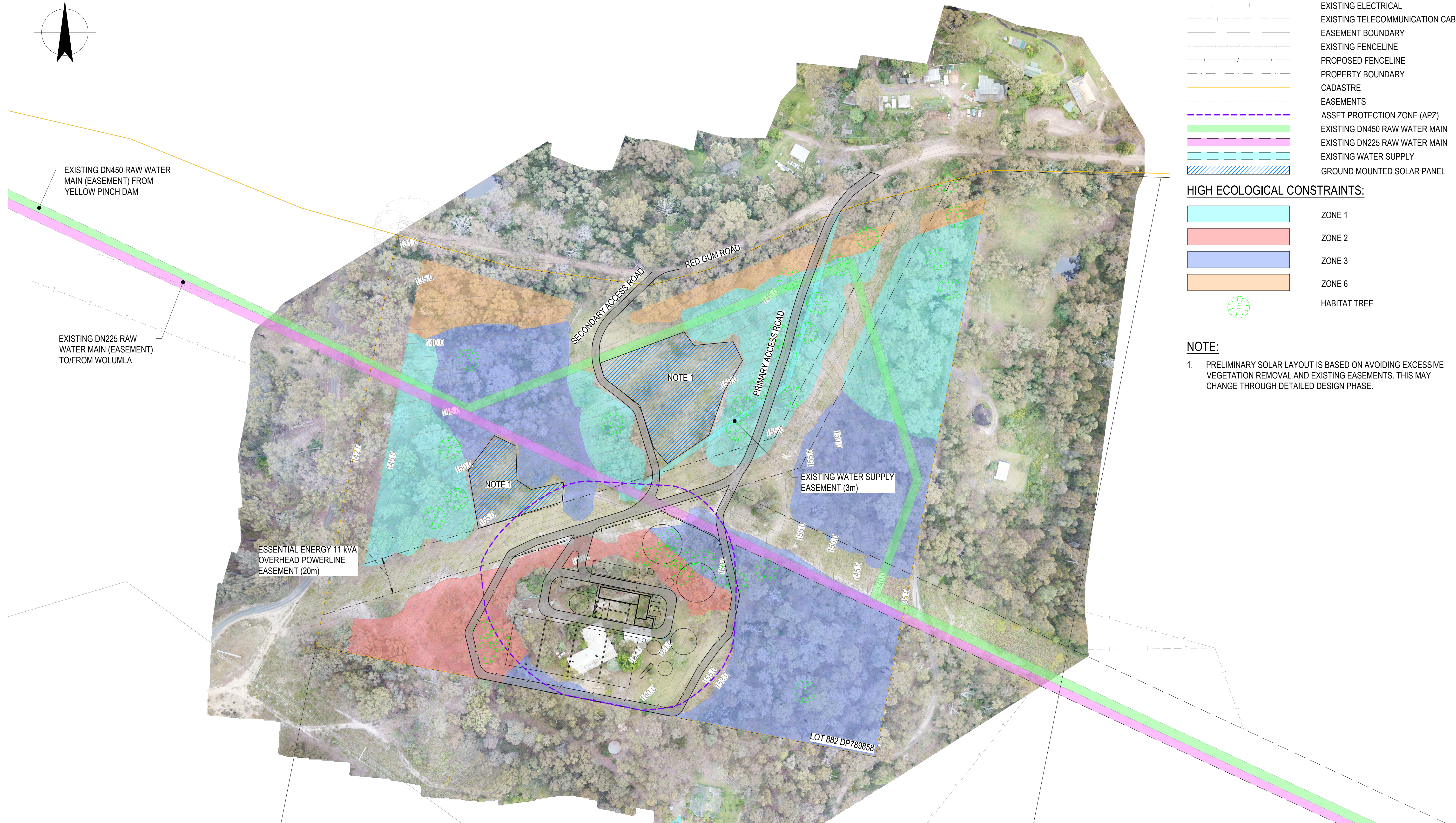
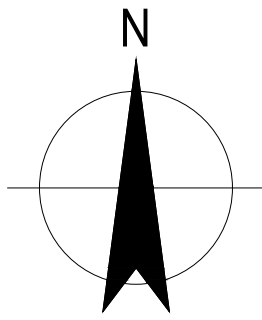
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Drawing No.  
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Size  
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Rev  
A





#### LEGEND:

|  |                                  |
|--|----------------------------------|
|  | EXISTING ELECTRICAL              |
|  | EXISTING TELECOMMUNICATION CABLE |
|  | EASEMENT BOUNDARY                |
|  | EXISTING FENCELINE               |
|  | PROPOSED FENCELINE               |
|  | PROPERTY BOUNDARY                |
|  | CADASTRE                         |
|  | EASEMENTS                        |
|  | ASSET PROTECTION ZONE (APZ)      |
|  | EXISTING DN450 RAW WATER MAIN    |
|  | EXISTING DN225 RAW WATER MAIN    |
|  | EXISTING WATER SUPPLY            |
|  | GROUND MOUNTED SOLAR PANEL       |

#### HIGH ECOLOGICAL CONSTRAINTS:

|  |              |
|--|--------------|
|  | ZONE 1       |
|  | ZONE 2       |
|  | ZONE 3       |
|  | ZONE 6       |
|  | HABITAT TREE |

#### NOTE:

- PRELIMINARY SOLAR LAYOUT IS BASED ON AVOIDING EXCESSIVE VEGETATION REMOVAL AND EXISTING EASEMENTS. THIS MAY CHANGE THROUGH DETAILED DESIGN PHASE.

PLAN  
SCALE 1:1000

FOR INFORMATION

| Rev      | Description            | Checked        | Approved       | Date     |
|----------|------------------------|----------------|----------------|----------|
| A        | DRAFT REFERENCE DESIGN | CM             | CS             | 28/11/22 |
| Author   | J. PORCALLA            | Drafting Check | E. ESTACIO JR. |          |
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Size  
A1

Drawing No.  
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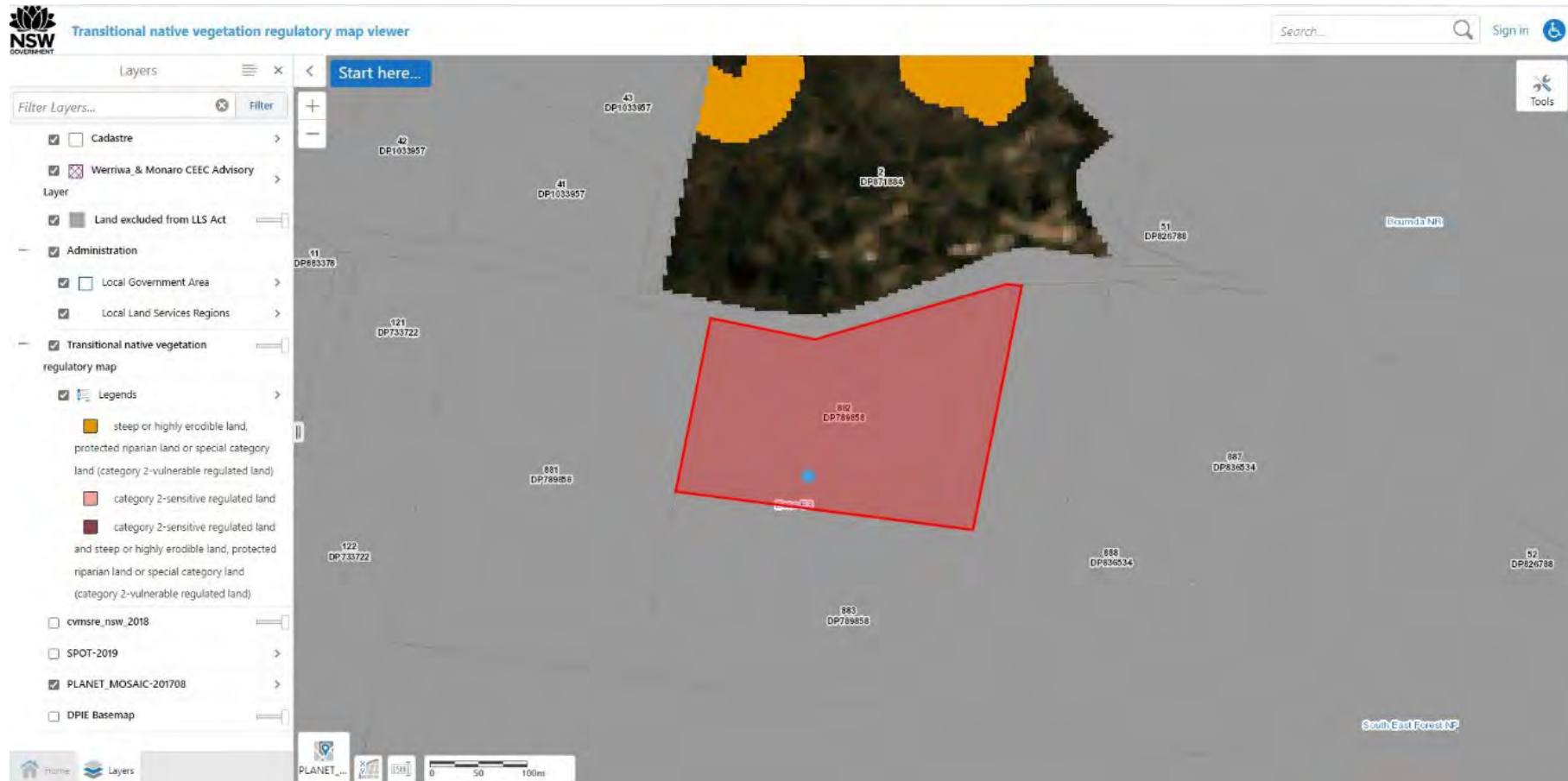
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## Appendix B – Native Vegetation Regulatory Map





## **Appendix C – Biodiversity Values Map and Threshold Tool**

## Appendix D – Species Lists

Table 15 Flora recorded during surveys

| Scientific Name                          | Common Name                | N, E, HTE | WoNS | Priority Listing |
|--|----------------------------|-----------|------|------------------|
| <i>Acacia falciformis</i>                | Broad-leaved Hickory       | N         | -    | -                |
| <i>Acacia floribunda</i>                 | White Sally                | N         | -    | -                |
| <i>Acacia longifolia subsp. Sophorae</i> | Coastal Wattle             | N         | -    | -                |
| <i>Acacia mearnsii</i>                   | Black Wattle               | N         | -    | -                |
| <i>Acacia spp.</i>                       | Wattle                     | N         | -    | -                |
| <i>Acacia suaveolens</i>                 | Sweet Wattle               | N         | -    | -                |
| <i>Acacia terminalis</i>                 | Sunshine Wattle            | N         | -    | -                |
| <i>Adiantum aethiopicum</i>              | Common Maidenhair          | N         | -    | -                |
| <i>Adiantum hispidulum</i>               | Rough Maidenhair           | N         | -    | -                |
| <i>Agapanthus spp.</i>                   | African Lily               | E         | -    | -                |
| <i>Allocasuarina littoralis</i>          | Black She-Oak              | N         | -    | -                |
| <i>Aristida ramosa</i>                   | Purple Wiregrass           | N         | -    | -                |
| <i>Austrostipa bigeniculata</i>          | Yanganbil                  | N         | -    | -                |
| <i>Axonopus fissifolius</i>              | Narrow-leafed Carpet Grass | HTE       | -    | -                |
| <i>Bidens pilosa</i>                     | Cobbler's Pegs             | HTE       | -    | -                |
| <i>Billardiera scandens</i>              | Hairy Apple Berry          | N         | -    | -                |
| <i>Blechnum spp.</i>                     | A Water Fern               | N         | -    | -                |
| <i>Bossiaea obcordata</i>                | Spiny Bossiaea             | N         | -    | -                |
| <i>Brachyscome spp.</i>                  | Cut-leaf Daisy             | N         | -    | -                |
| <i>Breynia oblongifolia</i>              | Coffee Bush                | N         | -    | -                |
| <i>Brunoniella pumilio</i>               | Dwarf Blue Trumpet         | N         | -    | -                |
| <i>Callistemon viminalis</i>             | Weeping Bottlebrush        | N         | -    | -                |
| <i>Camellia japonica</i>                 | Camellia                   | E         | -    | -                |
| <i>Cedrus deodora</i>                    | Himalayan Cedar            | E         | -    | -                |
| <i>Centaurium erythraea</i>              | Common Centaury            | E         | -    | -                |
| <i>Cerastium glomeratum</i>              | Mouse-ear Chickweed        | E         | -    | -                |
| <i>Cheilanthes sieberi</i>               | Rock Fern                  | N         | -    | -                |
| <i>Cirsium vulgare</i>                   | Spear Thistle              | E         | -    | -                |
| <i>Clematis aristata</i>                 | Old Man's Beard            | N         | -    | -                |
| <i>Coleonema album</i>                   | Diosma                     | E         | -    | -                |

| Scientific Name                     | Common Name          | N, E, HTE | WoNS | Priority Listing                             |
|-------------------------------------|----------------------|-----------|------|--|
| <i>Conyza bonariensis</i>           | Flaxleaf Fleabane    | E         | -    | -  |
| <i>Conyza spp.</i>                  | A Fleabane           | E         | -    | -  |
| <i>Coronidium spp.</i>              | Button Everlasting   | N         | -    | -  |
| <i>Correa reflexa var. speciosa</i> | Native Fuchsia       | N         | -    | -  |
| <i>Corymbia gummifera</i>           | Red Bloodwood        | N         | -    | -  |
| <i>Corymbia maculata</i>            | Spotted Gum          | N         | -    | -  |
| <i>Cymbopogon refractus</i>         | Barbed Wire Grass    | N         | -    | -  |
| <i>Cynodon dactylon</i>             | Common Couch         | N         | -    | -  |
| <i>Daucus carota</i>                | Wild Carrot          | E         | -    | -  |
| <i>Dianella caerulea</i>            | Blue Flax-lily       | N         | -    | -  |
| <i>Dichondra repens</i>             | Kidney Weed          | N         | -    | -  |
| <i>Echinopogon caespitosus</i>      | Bushy Hedgehog-grass | N         | -    | -  |
| <i>Elaeocarpus reticulatus</i>      | Blueberry Ash        | N         | -    | -  |
| <i>Entolasia stricta</i>            | Wiry Panic           | N         | -    | -  |
| <i>Epacris impressa</i>             | Common Heath         | N         | -    | -  |
| <i>Eragrostis brownii</i>           | Brown's Lovegrass    | N         | -    | -  |
| <i>Eragrostis curvula</i>           | African Lovegrass    | HTE       | -    | Priority Weed – Regional Recommended Measure |
| <i>Eragrostis mexicana</i>          | Mexican Lovegrass    | E         | -    | -  |
| <i>Eucalyptus botryoides</i>        | Bangalay             | N         | -    | -  |
| <i>Eucalyptus cypellocarpa</i>      | Monkey Gum           | N         | -    | -  |
| <i>Eucalyptus globoidea</i>         | White Stringybark    | N         | -    | -  |
| <i>Eucalyptus muelleriana</i>       | Yellow Stringybark   | N         | -    | -  |
| <i>Eucalyptus sieberi</i>           | Silvertop Ash        | N         | -    | -  |
| <i>Euchiton japonicus</i>           | Creeping Cudweed     | N         | -    | -  |
| <i>Eustrephus latifolius</i>        | Wombat Berry         | N         | -    | -  |
| <i>Exocarpos cupressiformis</i>     | Cherry Ballart       | N         | -    | -  |
| <i>Facelis retusa</i>               | Annual Trampweed     | E         | -    | -  |
| <i>Gahnia sieberiana</i>            | Red-fruit Saw-sedge  | N         | -    | -  |
| <i>Galium gaudichaudii</i>          | Rough Bedstraw       | N         | -    | -  |
| <i>Galium leptogonium</i>           | Bedstraw             | N         | -    | -  |
| <i>Gamochaeta americana</i>         | Cudweed              | E         | -    | -  |



| Scientific Name                              | Common Name              | N, E, HTE | WoNS | Priority Listing                                |
|--|--------------------------|-----------|------|---|
| <i>Geranium solanderi</i>                    | Native Geranium          | N         | -    | -   |
| <i>Glycine clandestina</i>                   | Twining glycine          | N         | -    | -   |
| <i>Glycine tabacina</i>                      | Variable Glycine         | N         | -    | -   |
| <i>Grevillea arenaria</i>                    | Hoary Grevillea          | N         | -    | -   |
| <i>Hakea dactyloides</i>                     | Finger Hakea             | N         | -    | -   |
| <i>Hakea spp.</i>                            | Hakea                    | N         | -    | -   |
| <i>Hardenbergia violacea</i>                 | False Sarsaparilla       | N         | -    | -   |
| <i>Hedychium gardnerianum</i>                | Ginger Lily              | E         | -    | -   |
| <i>Hibbertia aspera</i>                      | Rough Guinea Flower      | N         | -    | -   |
| <i>Hydrocotyle laxiflora</i>                 | Stinking Pennywort       | N         | -    | -   |
| <i>Hypericum gramineum</i>                   | Small St John's Wort     | N         | -    | -   |
| <i>Hypochaeris glabra</i>                    | Smooth Catsear           | E         | -    | -   |
| <i>Hypochaeris radicata</i>                  | Catsear                  | E         | -    | -   |
| <i>Imperata cylindrica</i>                   | Blady Grass              | N         | -    | -   |
| <i>Indigofera australis</i>                  | Australian Indigo        | N         | -    | -   |
| <i>Jacaranda mimosifolia</i>                 | Jacaranda                | E         | -    | -   |
| <i>Juncus pallidus</i>                       | Pale Rush                | N         | -    | -   |
| <i>Kennedia rubicunda</i>                    | Dusky Coral Pea          | N         | -    | -   |
| <i>Lantana camara</i>                        | Lantana                  | HTE       | Y    | Priority Weed – Prohibition on certain dealings |
| <i>Lepidosperma laterale</i>                 | Variable Sword-sedge     | N         | -    | -   |
| <i>Leptorhynchos nitidulus</i>               | Shiny Buttons            | N         | -    | -   |
| <i>Leptospermum polygalifolium</i>           | Tantoon                  | N         | -    | -   |
| <i>Leucopogon juniperinus</i>                | Prickly Beard-heath      | N         | -    | -   |
| <i>Leucopogon lanceolatus</i>                | Lance-leaved Beard-heath | N         | -    | -   |
| <i>Lilium formosanum</i>                     | Formosan Lily            | E         | -    | -   |
| <i>Lomandra filiformis</i>                   | Wattle Matt-rush         | N         | -    | -   |
| <i>Lomandra glauca</i>                       | Pale Mat-rush            | N         | -    | -   |
| <i>Lomandra longifolia</i>                   | Spiny-headed Mat-rush    | N         | -    | -   |
| <i>Lomandra micrantha subsp. Tuberculata</i> | Small-flowered Mat-rush  | N         | -    | -   |
| <i>Lomandra multiflora subsp. multiflora</i> | Many-flowered Mat-rush   | N         | -    | -   |

| Scientific Name                                      | Common Name                | N, E, HTE | WoNS | Priority Listing                                 |
|--|----------------------------|-----------|------|--|
| <i>Lysimachia arvensis</i>                           | Scarlet Pimpernel          | E         | -    | -  |
| <i>Melaleuca spp.</i>                                | -                          | N         | -    | -  |
| <i>Melaleuca spp.</i>                                | -                          | N         | -    | -  |
| <i>Melia azedarach</i>                               | White Cedar                | N         | -    | -  |
| <i>Metrosideros excelsa</i>                          | New Zealand Christmas Bush | E         | -    | -  |
| <i>Microlaena stipoides</i>                          | Weeping Grass              | N         | -    | -  |
| <i>Notelaea longifolia</i>                           | Large Mock-olive           | N         | -    | -  |
| <i>Nyssanthes erecta</i>                             | -                          | N         | -    | -  |
| <i>Oxalis perennans</i>                              | Grassland Wood-sorrel      | N         | -    | -  |
| <i>Ozothamnus diosmifolius</i>                       | White Dogwood              | N         | -    | -  |
| <i>Ozothamnus spp.</i>                               | -                          | N         | -    | -  |
| <i>Panicum effusum</i>                               | Hairy Panic                | N         | -    | -  |
| <i>Persoonia linearis</i>                            | Narrow-leaved Geebung      | N         | -    | -  |
| <i>Pimelea linifolia</i>                             | Slender Rice Flower        | N         | -    | -  |
| <i>Pinus patula</i>                                  | Patula Pine                | HTE       | -    | -  |
| <i>Pinus radiata</i>                                 | Radiata Pine               | HTE       | -    | -  |
| <i>Pittosporum revolutum</i>                         | Rough Fruit Pittosporum    | N         | -    | -  |
| <i>Pittosporum undulatum</i>                         | Sweet Pittosporum          | N         | -    | -  |
| <i>Platysace lanceolata</i>                          | Shrubby Platysace          | N         | -    | -  |
| <i>Poa labillardierei</i> var. <i>labillardierei</i> | Tussock                    | N         | -    | -  |
| <i>Pomax umbellata</i>                               | Pomax                      | N         | -    | -  |
| <i>Poranthera microphylla</i>                        | Small Poranthera           | N         | -    | -  |
| <i>Pratia purpurascens</i>                           | Whiteroot                  | N         | -    | -  |
| <i>Prostanthera incana</i>                           | Velvet Mint-bush           | N         | -    | -  |
| <i>Pteridium esculentum</i>                          | Bracken                    | N         | -    | -  |
| <i>Pterostylis nutans</i>                            | Nodding Greenhood          | N         | -    | -  |
| <i>Rumex acetosella</i>                              | Sheep Sorrel               | HTE       | -    | -  |
| <i>Rytidosperma spp.</i>                             | A Wallaby Grass            | N         | -    | -  |
| <i>Senecio linearifolius</i>                         | Fireweed Groundsel         | N         | -    | -  |
| <i>Senecio madagascariensis</i>                      | Fireweed                   | HTE       | Y    | Priority Weed – Prohibition on certain dealings. |

| Scientific Name   | Common Name              | N, E, HTE | WoNS | Priority Listing                                      |
|---|--------------------------|-----------|------|---|
| <i>Setaria pumila</i>   | Pale Pigeon Grass        | E         | -    | -   |
| <i>Sigesbeckia orientalis</i><br><i>subsp. Orientalis</i>       | Indian Weed              | N         | -    | -   |
| <i>Solanum cinereum</i>   | Narrawa Burr             | N         | -    | -   |
| <i>Solanum nigrum</i>   | Black-berry Nightshade   | E         | -    | -   |
| <i>Sporobolus creber</i>  | Slender Rat's Tail Grass | N         | -    | -   |
| <i>Sporobolus elongatus</i>                                     | Slender Rat's Tail Grass | N         | -    | -   |
| <i>Sporobolus indicus</i> (syn.<br><i>Sporobolus fertilis</i> ) | Parramatta Grass         | HTE       | -    | Priority Weed –<br>Regional<br>Recommended<br>Measure |
| <i>Stylidium graminifolium</i>                                  | Grass Triggerplant       | N         | -    | -   |
| <i>Tetradlea thymifolia</i>                                     | Black-eyed Susan         | N         | -    | -   |
| <i>Thelymitra</i> spp.  | -                        | N         | -    | -   |
| <i>Themeda triandra</i>   | Kangaroo Grass           | N         | -    | -   |
| <i>Trifolium repens</i>   | White Clover             | E         | -    | -   |
| <i>Unidentifiable shrub -<br/>fabaceae</i>                      | -                        | N         | -    | -   |
| <i>Veronica arvensis</i>  | Wall Speedwell           | E         | -    | -   |
| <i>Veronica calycina</i>  | Hairy Speedwell          | N         | -    | -   |
| <i>Viola betonicifolia</i>                                      | Native Violet            | N         | -    | -   |
| <i>Viola hederacea</i>  | Ivy-leaved Violet        | N         | -    | -   |
| <i>Westringia fruticosa</i>                                     | Coastal Rosemary         | N         | -    | -   |
| <i>Xerochrysum bracteatum</i>                                   | Golden Everlasting       | N         | -    | -   |



Table 16 Fauna recorded during surveys

| Class    | Scientific Name                     | Common Name               | Observation Type | Conservation Status |
|----------|-------------------------------------|---------------------------|------------------|---------------------|
| Amphibia | <i>Litoria peronii</i>              | Peron's Tree Frog         | O                | P                   |
| Amphibia | <i>Limnodynastes tasmaniensis</i>   | Spotted Grass Frog        | O                | P                   |
| Amphibia | <i>Litoria verreauxii</i>           | Verreaux's Frog           | O                | P                   |
| Aves     | <i>Alisterus scapularis</i>         | Australian King-Parrot    | O                | P                   |
| Aves     | <i>Cracticus tibicen</i>            | Australian Magpie         | OW               | P                   |
| Aves     | <i>Corvus coronoides</i>            | Australian Raven          | OW               | P                   |
| Aves     | <i>Chenonetta jubata</i>            | Australian Wood Duck      | O                | P                   |
| Aves     | <i>Manorina melanophrys</i>         | Bell Miner                | W                | P                   |
| Aves     | <i>Coracina novaehollandiae</i>     | Black-faced Cuckoo-shrike | W                | P                   |
| Aves     | <i>Macropygia amboinensis</i>       | Brown Cuckoo-Dove         | O                | P                   |
| Aves     | <i>Accipiter fasciatus</i>          | Brown Goshawk             | O                | P                   |
| Aves     | <i>Acanthiza pusilla</i>            | Brown Thornbill           | OW               | P                   |
| Aves     | <i>Platycercus elegans</i>          | Crimson Rosella           | OW               | P                   |
| Aves     | <i>Acanthorhynchus tenuirostris</i> | Eastern Spinebill         | O                | P                   |
| Aves     | <i>Psophodes olivaceus</i>          | Eastern Whipbird          | W                | P                   |
| Aves     | <i>Eopsaltria australis</i>         | Eastern Yellow Robin      | OW               | P                   |
| Aves     | <i>Callocephalon fimbriatum</i>     | Gang-Gang Cockatoo        | OW               | E2,V,P,3            |
| Aves     | <i>Pachycephala pectoralis</i>      | Golden Whistler           | OW               | P                   |
| Aves     | <i>Rhipidura albiscapa</i>          | Grey Fantail              | OW               | P                   |
| Aves     | <i>Colluricincla harmonica</i>      | Grey Shrike-thrush        | OW               | P                   |
| Aves     | <i>Dacelo novaeguineae</i>          | Laughing Kookaburra       | W                | P                   |
| Aves     | <i>Meliphaga lewinii</i>            | Lewin's Honeyeater        | OW               | P                   |
| Aves     | <i>Philemon corniculatus</i>        | Noisy Friarbird           | W                | P                   |

| Class    | Scientific Name                  | Common Name                  | Observation Type       | Conservation Status |
|----------|----------------------------------|------------------------------|------------------------|---------------------|
| Aves     | <i>Strepera graculina</i>        | Pied Currawong               | OW                     | P                   |
| Aves     | <i>Trichoglossus haematodus</i>  | Rainbow Lorikeet             | OW                     | P                   |
| Aves     | <i>Anthochaera carunculata</i>   | Red Wattlebird               | O                      | P                   |
| Aves     | <i>Myiagra inquieta</i>          | Restless Flycatcher          | OW                     | P                   |
| Aves     | <i>Petroica rosea</i>            | Rose Robin                   | OW                     | P                   |
| Aves     | <i>Ptilonorhynchus violaceus</i> | Satin Bowerbird              | OW                     | P                   |
| Aves     | <i>Petroica boodang</i>          | Scarlet Robin                | O                      | V,P                 |
| Aves     | <i>Zosterops lateralis</i>       | Silvereye                    | O                      | P                   |
| Aves     | <i>Pardalotus punctatus</i>      | Spotted Pardalote            | OW                     | P                   |
| Aves     | <i>Pardalotus striatus</i>       | Striated Pardalote           | OW                     | P                   |
| Aves     | <i>Acanthiza lineata</i>         | Striated Thornbill           | O                      | P                   |
| Aves     | <i>Cacatua galerita</i>          | Sulphur-crested Cockatoo     | OW                     | P                   |
| Aves     | <i>Malurus cyaneus</i>           | Superb Fairy-wren            | OW                     | P                   |
| Aves     | <i>Menura novaehollandiae</i>    | Superb Lyrebird              | W                      | P                   |
| Aves     | <i>Podargus strigoides</i>       | Tawny Frogmouth              | O                      | P                   |
| Aves     | <i>Hirundo neoxena</i>           | Welcome Swallow              | OW                     | P                   |
| Aves     | <i>Cormobates leucophaea</i>     | White-throated Treecreeper   | OW                     | P                   |
| Aves     | <i>Leucosarcia melanoleuca</i>   | Wonga Pigeon                 | W                      | P                   |
| Aves     | <i>Caligavis chrysops</i>        | Yellow-faced Honeyeater      | W                      | P                   |
| Aves     | <i>Calyptorhynchus funereus</i>  | Yellow-tailed Black-Cockatoo | OW                     | P                   |
| Mammalia | <i>Trichosurus sp.</i>           | Brushtail Possum             | O                      | P                   |
| Mammalia | <i>Chalinolobus morio</i>        | Chocolate Wattled Bat        | Species Group - Anabat | P                   |
| Mammalia | <i>Vombatus ursinus</i>          | Common Wombat                | O                      | P                   |

| Class    | Scientific Name                       | Common Name                | Observation Type       | Conservation Status |
|----------|---------------------------------------|----------------------------|------------------------|---------------------|
| Mammalia | <i>Macropus giganteus</i>             | Eastern Grey Kangaroo      | O                      | P                   |
| Mammalia | <i>Chalinolobus gouldii</i>           | Gould's Wattled Bat        | Probable - Anabat      | P                   |
| Mammalia | <i>Miniopterus orianae oceanensis</i> | Large Bent-winged Bat      | Species Group - Anabat | V                   |
| Mammalia | <i>Vespadelus darlingtoni</i>         | Large Forest Bat           | Species Group - Anabat | P                   |
| Mammalia | <i>Vespadelus vulturinus</i>          | Little Forest Bat          | Probable - Anabat      | P                   |
| Mammalia | <i>Vespadelus regulus</i>             | Southern Forest Bat        | Species Group - Anabat | P                   |
| Mammalia | <i>Petaurus breviceps</i>             | Sugar Glider               | O                      | P                   |
| Mammalia | <i>Antechinus sp.</i>                 | Unidentified Antechinus    | O                      | P                   |
| Mammalia | <i>Austronomus australis</i>          | White-Striped Freetail-Bat | W                      | P                   |



## **Appendix E - BAM datasheets**

| BAM Site – Field Survey Form |             |                      |  | Site Sheet no:1 of 3                     |  |                 |                              |
|------------------------------|-------------|----------------------|--|--|--|-----------------|------------------------------|
|                              |             | Survey Name          |  | Zone ID                                  |  | Recorders       |                              |
| Date                         | 08/08/2022  | Bega Council WTF     |  | -  |  | SR, BT          |                              |
| Zone 55                      | Datum GDA94 | Plot ID              |  | 1  |  | Plot dimensions | 20x50                        |
| Easting 752506               |             | Northing 5916783     |  | Midline bearing from 0 m (start) 242° SW |  | IBRA region     | South Eastern Coastal Ranges |
| Easting                      |             | Northing             |  | Midline bearing from 50 m (finish)       |  | IBRA sub-region | Bateman                      |
| Vegetation Class             |             | Tall Wet Sclerophyll |  |  |  |                 | Confidence:                  |
| Plant Community Type         |             | PCT3663 - Degraded   |  |  |  |                 | EEC: Confidence:             |

Record easting and northing at 0 m on midline. Dimensions (Shape of 0.04 ha base plot).

| BAM Attribute (400 m <sup>2</sup> plot)                     | Sum values |
|---|------------|
| T (Trees)   | 3          |
| S (Shrubs)  | 7          |
| G (Grasses)   | 5          |
| F (Forbs)   | 7          |
| E (Ferns)   | 2          |
| O (Other)   | 1          |
| Count of Native Richness                                    |            |
| T (Trees)   | 10.7       |
| S (Shrubs)  | 2.2        |
| G (Grasses)   | 25.2       |
| F (Forbs)   | 2.3        |
| E (Ferns)   | 5.1        |
| O (Other)   | 0.1        |
| Sum of Cover of native vascular plants by growth form group |            |
| High Threat Weed cover                                      | 3.4        |

| BAM Attribute (1000 m <sup>2</sup> plot)               |                    |                      |
|--|--------------------|----------------------|
| DBH  | # Tree Stems Count | # Stems with Hollows |
| 80 + cm  | -                  | -                    |
| 50 – 79 cm   | -                  | -                    |
| 30 – 49 cm   | Y                  | -                    |
| 20 – 29 cm   | -                  | -                    |
| 10 – 19 cm   | Y                  | -                    |
| 5 – 9 cm   | Y                  | -                    |
| < 5 cm   | Y                  | n/a                  |
| Length of logs (m) (≥10 cm diameter, >50 cm in length) | 0m                 | Total                |

Counts apply when the number of tree stems within a size class is ≤10. Estimates can be used when >10 (eg. 10, 20, 30, ..., 100, 200, 300, ...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.

For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

| BAM Attribute (1 x 1 m plots) | Litter cover (%) |   |   |   |   | Bare ground cover (%) |   |   |   |   | Cryptogam cover (%) |   |   |   |   | Rock cover (%) |   |   |   |   |   |   |   |   |  |  |
|-------------------------------|------------------|---|---|---|---|-----------------------|---|---|---|---|---------------------|---|---|---|---|----------------|---|---|---|---|---|---|---|---|--|--|
| Subplot score (% in each)     | 0                | 1 | 2 | 3 | 4 | 5                     | 0 | 1 | 2 | 3 | 4                   | 5 | 0 | 1 | 2 | 3              | 4 | 5 | 0 | 1 | 2 | 3 | 4 | 5 |  |  |
| Average of the 5 subplots     | 19.4             |   |   |   |   |                       |   |   |   |   |                     |   |   |   |   |                |   |   |   |   |   |   |   |   |  |  |

Litter cover is expressed as the average percentage ground cover of litter measured from five 1 m x 1 m plots sampled at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

## Physiography + site features that may help in determining PCT and Management Zone (optional)

|                    |   |                      |   |                  |   |                                    |   |
|--------------------|---|----------------------|---|------------------|---|------------------------------------|---|
| Morphological Type | - | Landform Element     | - | Landform Pattern | - | Microrelief                        | - |
| Lithology          | - | Soil Surface Texture | - | Soil Colour      | - | Soil Depth                         | - |
| Slope              | - | Aspect               | - | Site Drainage    | - | Distance to nearest water and type | - |

| Plot Disturbance               | Severity code | Age code | Observational evidence: |
|--------------------------------|---------------|----------|-------------------------|
| Clearing (inc. logging)        | 3             | O        | Cleared of overstorey   |
| Cultivation (inc. pasture)     | -             | -        | -                       |
| Soil erosion                   | -             | -        | -                       |
| Firewood / CWD removal         | -             | -        | -                       |
| Grazing (deciduous/rainforest) | 1             | R        | Native macropod         |
| Fire damage                    | -             | -        | -                       |
| Storm damage                   | -             | -        | -                       |
| Weediness                      | 2-3           | -        | Mix                     |
| Other                          | -             | -        | Garden, backyard        |

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

Age: O=recent (&lt;2yrs), M=moderate (3-10yrs), D=old (&gt;10yrs)

| 400 m <sup>2</sup> plot: Sheet 1 of 2 |   | Survey Name      | Plot Identifier | Recorders |         |         |  |
|---------------------------------------|---|------------------|-----------------|-----------|---------|---------|--|
| Date                                  | 08/08/2022  | Bega Council WTP | 1               | SR, BT    |         |         |  |
| GF Code                               | Top 3 native species in each growth form group. Full species name mandatory. All other native and exotic species. Full species name where practicable | N, E or HTE      | Cover           | Abund     | stratum | voucher |  |
| TG                                    | Corymbia gummiifera   | N                | 0.5             | 5         | -       | -       |  |
| TG                                    | Eucalyptus globoidea  | N                | 0.2             | 1         | -       | -       |  |
| TG                                    | Melia azedarach   | N                | 10              | 2         | -       | -       |  |
| SG                                    | Acacia longifolia subsp. Sophorae   | N                | 0.2             | 3         | -       | -       |  |
| SG                                    | Leptospermum polygalifolium   | N                | 0.5             | 2         | -       | -       |  |
| SG                                    | Leucopogon juniperinus  | N                | 1               | 6         | -       | -       |  |
| SG                                    | Persoonia linearis  | N                | 0.1             | 1         | -       | -       |  |
| SG                                    | Pimelea linifolia   | N                | 0.1             | 2         | -       | -       |  |
| SG                                    | Pittosporum revolutum   | N                | 0.2             | 1         | -       | -       |  |
| SG                                    | Unidentifiable shrub - fabaceae   | N                | 0.1             | 2         | -       | -       |  |
| OG                                    | Glycine clandestina   | N                | 0.1             | 1         | -       | -       |  |
| GG                                    | Cynodon dactylon  | N                | 10              | 1000      | -       | -       |  |
| GG                                    | Juncus pallidus   | N                | 0.1             | 1         | -       | -       |  |
| GG                                    | Lomandra longifolia   | N                | 0.1             | 2         | -       | -       |  |
| GG                                    | Sporobolus elongatus  | N                | 10              | 1000      | -       | -       |  |
| GG                                    | Themeda australis   | N                | 5               | 500       | -       | -       |  |
| FG                                    | Dichondra repens  | N                | 0.5             | 500       | -       | -       |  |
| FG                                    | Euchiton japonicus  | N                | 0.5             | 200       | -       | -       |  |
| FG                                    | Gallium leptogonium   | N                | 0.1             | 50        | -       | -       |  |
| FG                                    | Geranium solanderi  | N                | 0.5             | 500       | -       | -       |  |
| FG                                    | Oxalis perennans  | N                | 0.5             | 200       | -       | -       |  |
| FG                                    | Pratia purpurascens   | N                | 0.1             | 5         | -       | -       |  |
| FG                                    | Veronica calycina   | N                | 0.2             | 200       | -       | -       |  |
| EG                                    | Cheilanthes sieberi   | N                | 0.1             | 5         | -       | -       |  |
| EG                                    | Pteridium esculentum  | N                | 5               | 50        | -       | -       |  |
| -                                     | Agapanthus spp.   | E                | 10              | 30        | -       | -       |  |
| -                                     | Centaureum erythraea  | E                | 0.5             | 200       | -       | -       |  |
| -                                     | Cerastium glomeratum  | E                | 0.1             | 25        | -       | -       |  |
| -                                     | Cirsium vulgare   | E                | 0.1             | 10        | -       | -       |  |
| -                                     | Conyza bonariensis  | E                | 0.1             | 20        | -       | -       |  |
| -                                     | Daucus carota   | E                | 0.1             | 1         | -       | -       |  |
| -                                     | Eragrostis mexicana   | E                | 70              | 2000      | -       | -       |  |
| -                                     | Facelis retusa  | E                | 0.2             | 200       | -       | -       |  |
| -                                     | Gamochaeta americana  | E                | 0.5             | 200       | -       | -       |  |
| -                                     | Hedychium gardnerianum  | E                | 0.1             | 1         | -       | -       |  |
| -                                     | Hypochaeris radicata  | E                | 0.5             | 200       | -       | -       |  |
| -                                     | Lysimachia arvensis   | E                | 0.1             | 20        | -       | -       |  |
| -                                     | Setaria pumila  | E                | 0.1             | 50        | -       | -       |  |
| -                                     | Solanum nigrum  | E                | 0.1             | 1         | -       | -       |  |
| -                                     | Trifolium repens  | E                | 0.2             | 100       | -       | -       |  |
| -                                     | Veronica arvensis   | E                | 0.1             | 5         | -       | -       |  |

GF Code: see Growth Form definitions in Appendix 1

N: native, E: exotic, HTE: high threat exotic

GF - circle code if top 3

Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ..., 100% (foliage cover); Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m

Abundance: 1, 2, 3, ..., 10, 20, 30, ..., 100, 200, ..., 1000, ...

Stratum: E (emergent) T1, T2, T3, S1, S2, S3, G1, G2, G3 etc



GF Code: see Growth Form definitions in Appendix 1      N: native, E: exotic, HTE: high threat exotic      GF – circled code if 'top 3'.  
Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover). Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m  
Abundance: 1, 2, 3, ..., 10, 20, 30, ..., 100, 200, ..., 1000, ...  
Stratum: E (emergent) T1, T2, T3, S1, S2, S3, G1, G2, G3 etc

| BAM Site – Field Survey Form |  |                  |  | Site Sheet no:1 of 3               |  |                              |  |
|------------------------------|--|------------------|--|------------------------------------|--|------------------------------|--|
| Date                         |  | 08/08/2022       |  | Survey Name                        |  | Bega Council WTF             |  |
| Zone 55                      |  | Datum GDA94      |  | Zone ID                            |  | SR, BT                       |  |
| Plot ID                      |  | 2                |  | Plot dimensions                    |  | 20x50                        |  |
| Easting 752642               |  | Northing 5916969 |  | Midline bearing from 0 m (start)   |  | 181° S                       |  |
| Easting                      |  | Northing         |  | Midline bearing from 50 m (finish) |  | -                            |  |
| Vegetation Class             |  | Good             |  | IBRA region                        |  | South Eastern Coastal Ranges |  |
| Plant Community Type         |  | PCT3663          |  | IBRA sub-region                    |  | Bateman                      |  |
| Confidence:                  |  |                  |  | Confidence:                        |  |                              |  |
| EEC:                         |  |                  |  | Confidence:                        |  |                              |  |

Record easting and northing at 0 m on midline. Dimensions (Shape of 0.04 ha base plot).

| BAM Attribute (400 m <sup>2</sup> plot)                     | Sum values |
|---|------------|
| T (Trees)   | 3          |
| S (Shrubs)  | 15         |
| G (Grasses)   | 7          |
| F (Forbs)   | 9          |
| E (Ferns)   | 4          |
| O (Other)   | 5          |
| Count of Native Richness                                    |            |
| T (Trees)   | 35         |
| S (Shrubs)  | 28.1       |
| G (Grasses)   | 75.5       |
| F (Forbs)   | 11.6       |
| E (Ferns)   | 2.9        |
| O (Other)   | 0.5        |
| Sum of Cover of native vascular plants by growth form group |            |
| High Threat Weed cover                                      | 0.1        |

| BAM Attribute (1000 m <sup>2</sup> plot)               |                    |                      |
|--|--------------------|----------------------|
| DBH  | # Tree Stems Count | # Stems with Hollows |
| 80 + cm  | 7                  | 0                    |
| 50 – 79 cm   | 5                  | 0                    |
| 30 – 49 cm   | Y                  | -                    |
| 20 – 29 cm   | Y                  | -                    |
| 10 – 19 cm   | Y                  | -                    |
| 5 – 9 cm   | Y                  | -                    |
| < 5 cm   | Y                  | n/a                  |
| Length of logs (m) (≥10 cm diameter, >50 cm in length) | 14m                | Total                |

Counts apply when the number of tree stems within a size class is ≤10. Estimates can be used when >10 (eg. 10, 20, 30, ..., 100, 200, 300, ...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.  
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

| BAM Attribute (1 x 1 m plots) | Litter cover (%) |    |    |    |    | Bare ground cover (%) |   |   |   |   | Cryptogam cover (%) |    |   |   |   | Rock cover (%) |   |   |   |   |
|-------------------------------|------------------|----|----|----|----|-----------------------|---|---|---|---|---------------------|----|---|---|---|----------------|---|---|---|---|
| Subplot score (% in each)     | 45               | 52 | 20 | 85 | 10 | 0                     | 0 | 0 | 0 | 0 | 5                   | 10 | 2 | 0 | 0 | 0              | 0 | 0 | 0 | 0 |
| Average of the 5 subplots     | 42               |    |    |    |    | 0                     |   |   |   |   | 24                  |    |   |   |   | 0.5            |   |   |   |   |

Litter cover is expressed as the average percentage ground cover of litter measured from five 1 m x 1 m plots within at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of moss, bare ground and cryptogams.

#### Physiography + site features that may help in determining PCT and Management Zone (optional)

|                    |   |                      |   |                  |   |                                    |   |
|--------------------|---|----------------------|---|------------------|---|------------------------------------|---|
| Morphological Type | - | Landform Element     | - | Landform Pattern | - | Microrelief                        | - |
| Lithology          | - | Soil Surface Texture | - | Soil Colour      | - | Soil Depth                         | - |
| Slope              | - | Aspect               | - | Site Drainage    | - | Distance to nearest water and type | - |

| Plot Disturbance               | Severity code | Age code | Observational evidence: |
|--------------------------------|---------------|----------|-------------------------|
| Clearing (inc. logging)        | -             | -        | -                       |
| Cultivation (inc. pasture)     | -             | -        | -                       |
| Soil erosion                   | -             | -        | -                       |
| Firewood / CWD removal         | -             | -        | -                       |
| Grazing (deciduous/rainforest) | -             | -        | -                       |
| Fire damage                    | -             | -        | -                       |
| Storm damage                   | -             | -        | -                       |
| Weediness                      | -             | -        | -                       |
| Other                          | -             | -        | -                       |

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

Age: 0=recent (<2yrs), 1=recent (3-10yrs), 2=old (>10yrs)

| 400 m <sup>2</sup> plot: Sheet 1 of 2 |   | Survey Name      | Plot Identifier | Recorders |         |         |  |
|---------------------------------------|---|------------------|-----------------|-----------|---------|---------|--|
| Date                                  | 08/08/2022  | Bega Council WTP | 2               | SR, BT    |         |         |  |
| GF Code                               | Top 3 native species in each growth form group. Full species name mandatory. All other native and exotic species: Full species name where practicable | N, E or HTE      | Cover           | Abund     | stratum | voucher |  |
| TG                                    | Corymbia gummifera  | N                | 10              | 1         | -       | -       |  |
| TG                                    | Eucalyptus globoidea  | N                | 20              | 5         | -       | -       |  |
| TG                                    | Eucalyptus sieberi  | N                | 5               | 1         | -       | -       |  |
| SG                                    | Acacia falciformis  | N                | 20              | 30        | -       | -       |  |
| SG                                    | Acacia longifolia subsp. Sophorae   | N                | 0.1             | 1         | -       | -       |  |
| SG                                    | Acacia mearnsii   | N                | 0.5             | 1         | -       | -       |  |
| SG                                    | Acacia suaveolens   | N                | 0.1             | 1         | -       | -       |  |
| SG                                    | Breynia oblongifolia  | N                | 0.1             | 2         | -       | -       |  |
| SG                                    | Correa reflexa var. speciosa  | N                | 0.5             | 10        | -       | -       |  |
| SG                                    | Hibbertia aspera  | N                | 0.5             | 10        | -       | -       |  |
| SG                                    | Indigofera australis  | N                | 1               | 8         | -       | -       |  |
| SG                                    | Leptospermum polygalifolium   | N                | 0.5             | 2         | -       | -       |  |
| SG                                    | Leucopogon juniperinus  | N                | 1               | 10        | -       | -       |  |
| SG                                    | Leucopogon lanceolatus  | N                | 0.5             | 20        | -       | -       |  |
| SG                                    | Persoonia linearis  | N                | 2               | 10        | -       | -       |  |
| SG                                    | Pimelea linifolia   | N                | 1               | 50        | -       | -       |  |
| SG                                    | Pittosporum revolutum   | N                | 0.2             | 5         | -       | -       |  |
| SG                                    | Solanum cinereum  | N                | 0.1             | 5         | -       | -       |  |
| OG                                    | Billardiera scandens  | N                | 0.1             | 5         | -       | -       |  |
| OG                                    | Eustrephus latifolius   | N                | 0.1             | 1         | -       | -       |  |
| OG                                    | Glycine clandestine   | N                | 0.1             | 25        | -       | -       |  |
| OG                                    | Glycine tabacina  | N                | 0.1             | 30        | -       | -       |  |
| OG                                    | Kennedia rubicunda  | N                | 0.1             | 5         | -       | -       |  |
| GG                                    | Echinopogon caespitosus   | N                | 5               | 500       | -       | -       |  |
| GG                                    | Entolasia stricta   | N                | 10              | 1000      | -       | -       |  |
| GG                                    | Gahnia sieberiana   | N                | 0.5             | 25        | -       | -       |  |
| GG                                    | Lepidosperma laterale   | N                | 5               | 100       | -       | -       |  |
| GG                                    | Lomandra longifolia   | N                | 50              | 300       | -       | -       |  |
| GG                                    | Rytidosperma spp.   | N                | 0.2             | 50        | -       | -       |  |
| GG                                    | Themeda triandra  | N                | 5               | 500       | -       | -       |  |
| FG                                    | Brunoniella pumilio   | N                | 0.2             | 150       | -       | -       |  |
| FG                                    | Dianella caerulea   | N                | 0.1             | 1         | -       | -       |  |
| FG                                    | Galium gaudichaudii   | N                | 0.1             | 50        | -       | -       |  |
| FG                                    | Hydrocotyle laxiflora   | N                | 5               | 1000      | -       | -       |  |
| FG                                    | Pomax umbellata   | N                | 0.2             | 50        | -       | -       |  |
| FG                                    | Pratia purpurascens   | N                | 1               | 500       | -       | -       |  |
| FG                                    | Senecio linearifolius   | N                | 0.1             | 5         | -       | -       |  |
| FG                                    | Viola hederacea   | N                | 5               | 1000      | -       | -       |  |
| FG                                    | Xerochrysum bracteatum  | N                | 0.1             | 1         | -       | -       |  |
| EG                                    | Adiantum aethiopicum  | N                | 0.5             | 200       | -       | -       |  |
| EG                                    | Adiantum hispidulum   | N                | 0.2             | 10        | -       | -       |  |

GF Code: see Growth Form definitions in Appendix 1

N: native, E: exotic, HTE: high threat exotic

GF - circle code if top 3

Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ..., 100% (foliage cover); Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m

Abundance: 1, 2, 3, ..., 10, 20, 30, ..., 100, 200, ..., 1000, ...

Stratum: E (emergent) T1, T2, T3, S1, S2, S3, G1, G2, G3 etc



GF Code: see Growth Form definitions in Appendix 1      N: native, E: exotic, HTE: high threat exotic      GF – circled code if 'top 3'.  
Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover). Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m  
Abundance: 1, 2, 3, ..., 10, 20, 30, ..., 100, 200, ..., 1000, ...  
Stratum: E (emergent) T1, T2, T3, S1, S2, S3, G1, G2, G3 etc

| BAM Site – Field Survey Form |             |                                    |  | Site Sheet no:1 of 2 |  |                 |                              |
|------------------------------|-------------|------------------------------------|--|----------------------|--|-----------------|------------------------------|
|                              |             | Survey Name                        |  | Zone ID              |  | Recorders       |                              |
| Date                         | 09/08/2022  | Bega Council WTF                   |  | -                    |  | SR, BT          |                              |
| Zone 55                      | Datum GDA94 | Plot ID                            |  | 3                    |  | Plot dimensions | 20x50                        |
| Eastings                     | Northings   | Midline bearing from 0 m (start)   |  | 144° SSE             |  | IBRA region     | South Eastern Coastal Ranges |
| 752546                       | 5916813     | Midline bearing from 50 m (finish) |  | -                    |  | IBRA sub-region | Bateman                      |
| Vegetation Class             |             |                                    |  |                      |  |                 | Confidence:                  |
| Plant Community Type         |             | PCT3663 – Regen                    |  |                      |  |                 | EEC: Confidence:             |

Record easting and northing at 0 m on midline. Dimensions (Shape of 0.04 ha base plot).

| BAM Attribute (400 m <sup>2</sup> plot)                     |             | Sum values |
|---|-------------|------------|
| Count of Native Richness                                    | T (Trees)   | 3          |
|   | S (Shrubs)  | 15         |
|   | G (Grasses) | 6          |
|   | F (Forbs)   | 6          |
|   | E (Ferns)   | 1          |
|   | O (Other)   | 3          |
| Sum of Cover of native vascular plants by growth form group | T (Trees)   | 71.5       |
|   | S (Shrubs)  | 29.5       |
|   | G (Grasses) | 7.4        |
|   | F (Forbs)   | 1.7        |
|   | E (Ferns)   | 25         |
|   | O (Other)   | 1.2        |
| High Threat Weed cover                                      |             | 0.1        |

| BAM Attribute (1000 m <sup>2</sup> plot)               |                    |                      |
|--|--------------------|----------------------|
| DBH  | # Tree Stems Count | # Stems with Hollows |
| 80 + cm  | 2                  | 1                    |
| 50 – 79 cm   | 5                  | 0                    |
| 30 – 49 cm   | Y                  | -                    |
| 20 – 29 cm   | Y                  | -                    |
| 10 – 19 cm   | Y                  | -                    |
| 5 – 9 cm   | Y                  | -                    |
| < 5 cm   | Y                  | n/a                  |
| Length of logs (m) (≥10 cm diameter, >50 cm in length) | 27m                | Total                |

Counts apply when the number of tree stems within a size class is ≤10. Estimates can be used when >10 (eg. 10, 20, 30, ..., 100, 200, 300, ...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.

For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

| BAM Attribute (1 x 1 m plots) | Litter cover (%) |    |    |    |    | Bare ground cover (%) |   |   |    |   | Cryptogam cover (%) |   |   |   |   | Rock cover (%) |   |   |   |   |
|-------------------------------|------------------|----|----|----|----|-----------------------|---|---|----|---|---------------------|---|---|---|---|----------------|---|---|---|---|
| Subplot score (% in each)     | 50               | 80 | 90 | 75 | 85 | 1                     | 1 | 2 | 10 | 5 | 1                   | 0 | 0 | 3 | 1 | 0              | 0 | 0 | 0 | 1 |
| Average of the 5 subplots     | 72               |    |    |    |    | 7.8                   |   |   |    |   | 0.4                 |   |   |   |   | 0              |   |   |   |   |

Litter cover is expressed as the average percentage ground cover of litter measured from five 1 m x 1 m plots sampled at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

|                    |   |                      |   |                  |   |                                    |   |
|--------------------|---|----------------------|---|------------------|---|------------------------------------|---|
| Morphological Type | - | Landform Element     | - | Landform Pattern | - | Microrelief                        | - |
| Lithology          | - | Soil Surface Texture | - | Soil Colour      | - | Soil Depth                         | - |
| Slope              | - | Aspect               | - | Site Drainage    | - | Distance to nearest water and type | - |

| Plot Disturbance           | Severity code | Age code | Observational evidence:                    |
|----------------------------|---------------|----------|--|
| Clearing (inc. logging)    | -             | -        | -  |
| Cultivation (inc. pasture) | -             | -        | -  |
| Soil erosion               | -             | -        | -  |
| Firewood / CWD removal     | -             | -        | -  |
| Grazing (deciduous/stock)  | -             | -        | -  |
| Fire damage                | 2             | 0        | Burnt trees, dense regrowth in understorey |
| Storm damage               | -             | -        | -  |
| Weediness                  | -             | -        | -  |
| Other                      | -             | -        | -  |

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

Age: 0=recent (<2yrs), 1=recent (3-10yrs), 2=old (>10yrs)

| 400 m <sup>2</sup> plot: Sheet 1 of 1 |   | Survey Name      | Plot Identifier | Recorders |         |         |  |
|---------------------------------------|---|------------------|-----------------|-----------|---------|---------|--|
| Date                                  | 09/08/2022  | Bega Council WTP | 3               | SR, BT    |         |         |  |
| GF Code                               | Top 3 native species in each growth form group. Full species name mandatory. All other native and exotic species. Full species name where practicable | N, E or HTE      | Cover           | Abund     | stratum | voucher |  |
| TG                                    | Allocasuarina littoralis  | N                | 0.5             | 10        | -       | -       |  |
| TG                                    | Corymbia gummifera  | N                | 70              | 30        | -       | -       |  |
| TG                                    | Eucalyptus globoides  | N                | 1               | 1         | -       | -       |  |
| SG                                    | Acacia floribunda   | N                | 0.2             | 1         | -       | -       |  |
| SG                                    | Acacia longifolia subsp. Sophorae   | N                | 20              | 100       | -       | -       |  |
| SG                                    | Acacia mearnsii   | N                | 0.1             | 1         | -       | -       |  |
| SG                                    | Bossiaea obcordata  | N                | 5               | 60        | -       | -       |  |
| SG                                    | Correa reflexa var. speciosa  | N                | 0.5             | 25        | -       | -       |  |
| SG                                    | Hibbertia aspera  | N                | 0.5             | 25        | -       | -       |  |
| SG                                    | Leucopogon juniperinus  | N                | 0.2             | 1         | -       | -       |  |
| SG                                    | Leucopogon lanceolatus  | N                | 0.5             | 20        | -       | -       |  |
| SG                                    | Ozothamnus diosmifolius   | N                | 0.2             | 1         | -       | -       |  |
| SG                                    | Persoonia linearis  | N                | 1               | 4         | -       | -       |  |
| SG                                    | Pimelea linifolia   | N                | 0.5             | 25        | -       | -       |  |
| SG                                    | Pittosporum revolutum   | N                | 0.1             | 2         | -       | -       |  |
| SG                                    | Platysace lanceolata  | N                | 0.1             | 10        | -       | -       |  |
| SG                                    | Solanum cinereum  | N                | 0.1             | 2         | -       | -       |  |
| SG                                    | Tetratheca thymifolia   | N                | 0.5             | 50        | -       | -       |  |
| OG                                    | Billardiera scandens  | N                | 0.1             | 5         | -       | -       |  |
| OG                                    | Hardenbergia violacea   | N                | 0.1             | 5         | -       | -       |  |
| OG                                    | Kennedia rubicunda  | N                | 1               | 50        | -       | -       |  |
| GG                                    | Cynodon dactylon  | N                | 0.5             | 150       | -       | -       |  |
| GG                                    | Entolasia stricta   | N                | 0.5             | 100       | -       | -       |  |
| GG                                    | Lepidosperma laterale   | N                | 0.2             | 20        | -       | -       |  |
| GG                                    | Lomandra longifolia   | N                | 5               | 40        | -       | -       |  |
| GG                                    | Lomandra multiflora subsp. multiflora   | N                | 1               | 25        | -       | -       |  |
| GG                                    | Rytidosperma spp.   | N                | 0.2             | 50        | -       | -       |  |
| FG                                    | Brunoniella pumilio   | N                | 0.1             | 100       | -       | -       |  |
| FG                                    | Dianella caerulea   | N                | 0.1             | 5         | -       | -       |  |
| FG                                    | Hypericum gramineum   | N                | 0.1             | 2         | -       | -       |  |
| FG                                    | Pomax umbellata   | N                | 1               | 200       | -       | -       |  |
| FG                                    | Poranthera microphylla  | N                | 0.1             | 1         | -       | -       |  |
| FG                                    | Veronica calycina   | N                | 0.3             | 60        | -       | -       |  |
| EG                                    | Pteridium esculentum  | N                | 25              | 200       | -       | -       |  |
| -                                     | Bidens pilosa   | E                | 0.1             | 5         | -       | -       |  |
| -                                     | -   | -                | -               | -         | -       | -       |  |
| -                                     | -   | -                | -               | -         | -       | -       |  |
| -                                     | -   | -                | -               | -         | -       | -       |  |
| -                                     | -   | -                | -               | -         | -       | -       |  |
| -                                     | -   | -                | -               | -         | -       | -       |  |
| -                                     | -   | -                | -               | -         | -       | -       |  |
| -                                     | -   | -                | -               | -         | -       | -       |  |

GF Code: see Growth Form definitions in Appendix 1

N: native, E: exotic, HTE: high threat exotic

GF - circle code if top 3

Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ..., 100% (foliage cover); Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m

Abundance: 1, 2, 3, ..., 10, 20, 30, ..., 100, 200, ..., 1000, ...

Stratum: E (emergent) T1, T2, T3, S1, S2, S3, G1, G2, G3 etc



| BAM Site – Field Survey Form |  |                    |  | Site Sheet no:1 of 3               |  |                              |  |
|------------------------------|--|--------------------|--|------------------------------------|--|------------------------------|--|
| Date                         |  | 09/08/2022         |  | Survey Name                        |  | Bega Council WTF             |  |
| Zone 55                      |  | Datum GDA94        |  | Zone ID                            |  | SR, BT                       |  |
| Easting 752399               |  | Northing 5916807   |  | Plot ID                            |  | 4                            |  |
| Easting                      |  | Northing           |  | Midline bearing from 0 m (start)   |  | 221° SW                      |  |
| Easting                      |  | Northing           |  | Midline bearing from 50 m (finish) |  | -                            |  |
| Vegetation Class             |  | -                  |  | IBRA region                        |  | South Eastern Coastal Ranges |  |
| Plant Community Type         |  | PCT3663 – Modified |  | IBRA sub-region                    |  | Bateman                      |  |
| Confidence:                  |  |                    |  | Confidence:                        |  |                              |  |
| EEC:                         |  |                    |  | Confidence:                        |  |                              |  |

Record easting and northing at 0 m on midline. Dimensions (Shape of 0.04 ha base plot).

| BAM Attribute (400 m <sup>2</sup> plot)                     | Sum values |
|---|------------|
| T (Trees)   | 1          |
| S (Shrubs)  | 10         |
| G (Grasses)   | 9          |
| F (Forbs)   | 7          |
| E (Ferns)   | 2          |
| O (Other)   | 4          |
| Count of Native Richness                                    |            |
| T (Trees)   | 25         |
| S (Shrubs)  | 13.8       |
| G (Grasses)   | 45         |
| F (Forbs)   | 6.1        |
| E (Ferns)   | 5.1        |
| O (Other)   | 0.5        |
| Sum of Cover of native vascular plants by growth form group |            |
| High Threat Weed cover                                      | 0.2        |

| BAM Attribute (1000 m <sup>2</sup> plot)               |                    |                      |
|--|--------------------|----------------------|
| DBH  | # Tree Stems Count | # Stems with Hollows |
| 80 + cm  | 2                  | 1                    |
| 50 – 79 cm   | 3                  | 0                    |
| 30 – 49 cm   | Y                  | -                    |
| 20 – 29 cm   | Y                  | -                    |
| 10 – 19 cm   | Y                  | -                    |
| 5 – 9 cm   | Y                  | -                    |
| < 5 cm   | Y                  | n/a                  |
| Length of logs (m) (≥10 cm diameter, >50 cm in length) | 8m                 | Total                |

Counts apply when the number of tree stems within a size class is ≤10. Estimates can be used when >10 (eg. 10, 20, 30, ..., 100, 200, 300, ...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.  
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

| BAM Attribute (1 x 1 m plots) | Litter cover (%) |    |    |    |   | Bare ground cover (%) |   |   |   |   | Cryptogam cover (%) |    |   |   |   | Rock cover (%) |   |   |    |    |
|-------------------------------|------------------|----|----|----|---|-----------------------|---|---|---|---|---------------------|----|---|---|---|----------------|---|---|----|----|
| Subplot score (% in each)     | 35               | 32 | 35 | 75 | 2 | 0                     | 0 | 0 | 0 | 0 | 0                   | 15 | 2 | 0 | 0 | 5              | 3 | 1 | 15 | 50 |
| Average of the 5 subplots     | 75.4             |    |    |    |   | 0                     |   |   |   |   | 9.4                 |    |   |   |   | 90.8           |   |   |    |    |

Litter cover is expressed as the average percentage ground cover of litter measured from five 1 m x 1 m plots sampled at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

#### Physiography + site features that may help in determining PCT and Management Zone (optional)

|                    |   |                      |   |                  |   |                                    |   |
|--------------------|---|----------------------|---|------------------|---|------------------------------------|---|
| Morphological Type | - | Landform Element     | - | Landform Pattern | - | Microrelief                        | - |
| Lithology          | - | Soil Surface Texture | - | Soil Colour      | - | Soil Depth                         | - |
| Slope              | - | Aspect               | - | Site Drainage    | - | Distance to nearest water and type | - |

| Plot Disturbance           | Severity code | Age code | Observational evidence: |
|----------------------------|---------------|----------|-------------------------|
| Clearing (inc. logging)    | 3             | NR       | Cleared shrub layer.    |
| Cultivation (inc. pasture) | -             | -        | -                       |
| Soil erosion               | -             | -        | -                       |
| Firewood / CWD removal     | 2             | R        | Firewood collection.    |
| Grazing (deciduous/stock)  | -             | -        | -                       |
| Fire damage                | 2             | NR       | Burnt on edges.         |
| Storm damage               | -             | -        | -                       |
| Weediness                  | -             | -        | -                       |
| Other                      | -             | -        | -                       |

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

Age: R=recent (<2yrs), NR=not recent (3-10yrs), O=old (>10yrs)

| 400 m <sup>2</sup> plot: Sheet 1 of 2 |   | Survey Name      | Plot Identifier | Recorders |         |         |  |
|---------------------------------------|---|------------------|-----------------|-----------|---------|---------|--|
| Date                                  | 09/08/2022  | Bega Council WTP | 4               | SR, BT    |         |         |  |
| GF Code                               | Top 3 native species in each growth form group. Full species name mandatory. All other native and exotic species. Full species name where practicable | N, E or HTE      | Cover           | Abund.    | stratum | voucher |  |
| TG                                    | Corymbia gummifera  | N                | 25              | 4         | -       | -       |  |
| SG                                    | Acacia longifolia subsp. Sophorae   | N                | 1               | 7         | -       | -       |  |
| SG                                    | Acacia mearnsii   | N                | 10              | 4         | -       | -       |  |
| SG                                    | Acacia terminalis   | N                | 0.5             | 5         | -       | -       |  |
| SG                                    | Bossiaea obcordata  | N                | 1               | 25        | -       | -       |  |
| SG                                    | Breynia oblongifolia  | N                | 0.1             | 1         | -       | -       |  |
| SG                                    | Leucopogon juniperinus  | N                | 0.2             | 1         | -       | -       |  |
| SG                                    | Leucopogon lanceolatus  | N                | 0.2             | 2         | -       | -       |  |
| SG                                    | Ozothamnus diosmifolius   | N                | 0.1             | 5         | -       | -       |  |
| SG                                    | Persoonia linearis  | N                | 0.5             | 2         | -       | -       |  |
| SG                                    | Pittosporum revolutum   | N                | 0.2             | 4         | -       | -       |  |
| OG                                    | Billardiera scandens  | N                | 0.1             | 2         | -       | -       |  |
| OG                                    | Glycine clandestina   | N                | 0.1             | 50        | -       | -       |  |
| OG                                    | Hardenbergia violacea   | N                | 0.1             | 5         | -       | -       |  |
| OG                                    | Kennedia rubicunda  | N                | 0.2             | 5         | -       | -       |  |
| GG                                    | Echinopogon caespitosus   | N                | 0.2             | 50        | -       | -       |  |
| GG                                    | Entolasia stricta   | N                | 1               | 500       | -       | -       |  |
| GG                                    | Lepidosperma laterale   | N                | 0.2             | 5         | -       | -       |  |
| GG                                    | Lomandra filiformis   | N                | 0.5             | 30        | -       | -       |  |
| GG                                    | Lomandra glauca   | N                | 0.1             | 10        | -       | -       |  |
| GG                                    | Lomandra longifolia   | N                | 2               | 30        | -       | -       |  |
| GG                                    | Lomandra multiflora subsp. Multiflora   | N                | 0.5             | 20        | -       | -       |  |
| GG                                    | Microlaena stipoides  | N                | 40              | 2000      | -       | -       |  |
| GG                                    | Rytidosperma spp.   | N                | 0.5             | 100       | -       | -       |  |
| FG                                    | Brachyscome spp.  | N                | 0.1             | 50        | -       | -       |  |
| FG                                    | Euchiton japonicus  | N                | 0.1             | 30        | -       | -       |  |
| FG                                    | Oxalis perennans  | N                | 0.1             | 10        | -       | -       |  |
| FG                                    | Pomax umbellata   | N                | 5               | 1000      | -       | -       |  |
| FG                                    | Poranthera microphylla  | N                | 0.1             | 25        | -       | -       |  |
| FG                                    | Pratia purpurascens   | N                | 0.2             | 100       | -       | -       |  |
| FG                                    | Veronica calycina   | N                | 0.5             | 200       | -       | -       |  |
| EG                                    | Adiantum hispidulum   | N                | 0.1             | 3         | -       | -       |  |
| EG                                    | Pteridium esculentum  | N                | 5               | 100       | -       | -       |  |
| -                                     | Agapanthus spp.   | E                | 0.1             | 1         | -       | -       |  |
| -                                     | Cirsium vulgare   | E                | 0.1             | 2         | -       | -       |  |
| -                                     | Conyza spp.   | E                | 0.1             | 15        | -       | -       |  |
| -                                     | Facelis retusa  | E                | 0.1             | 100       | -       | -       |  |
| -                                     | Hypochaeris radicata  | E                | 0.1             | 1         | -       | -       |  |
| -                                     | Lysimachia arvensis   | E                | 0.1             | 5         | -       | -       |  |
| -                                     | Solanum nigrum  | E                | 0.1             | 1         | -       | -       |  |
| -                                     | Senecio madagascariensis  | HTE              | 0.1             | 5         | -       | -       |  |

GF Code: see Growth Form definitions in Appendix 1

N: native, E: exotic, HTE: high threat exotic

GF - circle code if top 3.

Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ..., 100% (foliage cover); Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m

Abundance: 1, 2, 3, ..., 10, 20, 30, ..., 100, 200, ..., 1000, ...

Stratum: E (emergent) T1, T2, T3, S1, S2, S3, G1, G2, G3 etc

GF Code: see Growth Form definitions in Appendix 1 N: native, E: exotic, HTE: high threat exotic GF – circled code if 'top 3'.  
 Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover). Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m  
 Abundance: 1, 2, 3, ..., 10, 20, 30, ..., 100, 200, ..., 1000, ...  
 Stratum: E (emergent) T1, T2, T3, S1, S2, S3, G1, G2, G3 etc



| BAM Site – Field Survey Form       |  |                  |  |                 | Site Sheet no:1 of 2         |                  |
|------------------------------------|--|------------------|--|-----------------|------------------------------|------------------|
| Date                               |  | 09/08/2022       |  | Survey Name     | Bega Council WTF             |                  |
| Zone 55                            |  | Datum GDA94      |  | Zone ID         | —                            |                  |
| Plot ID                            |  | 5                |  | Recorders       | SR, BT                       |                  |
| Easting 752500                     |  | Northing 5916889 |  | Plot dimensions | 20x50                        | Photo # —        |
| Midline bearing from 0 m (start)   |  | 352° NNW         |  | IBRA region     | South Eastern Coastal Ranges |                  |
| Midline bearing from 50 m (finish) |  | —                |  | IBRA sub-region | Bateman                      |                  |
| Vegetation Class                   |  |                  |  | —               |                              | Confidence:      |
| Plant Community Type               |  |                  |  | 3663 – degraded |                              | EEC: Confidence: |

Record easting and northing at 0 m on midline. Dimensions (Shape of 0.04 ha base plot).

| BAM Attribute (400 m <sup>2</sup> plot)                     | Sum values |
|---|------------|
| T (Trees)   | 3          |
| S (Shrubs)  | 9          |
| G (Grasses)   | 8          |
| F (Forbs)   | 3          |
| E (Ferns)   | 1          |
| O (Other)   | 1          |
| Sum of Cover of native vascular plants by growth form group |            |
| T (Trees)   | 22         |
| S (Shrubs)  | 2.1        |
| G (Grasses)   | 29.7       |
| F (Forbs)   | 0.6        |
| E (Ferns)   | 0.5        |
| O (Other)   | 0.1        |
| High Threat Weed cover                                      | 50.3       |

| BAM Attribute (1000 m <sup>2</sup> plot)               |                    |                      |
|--|--------------------|----------------------|
| DBH  | # Tree Stems Count | # Stems with Hollows |
| 80 + cm  | 0                  | 0                    |
| 50 – 79 cm   | 0                  | 0                    |
| 30 – 49 cm   | Y                  | —                    |
| 20 – 29 cm   | 0                  | —                    |
| 10 – 19 cm   | 0                  | —                    |
| 5 – 9 cm   | Y                  | —                    |
| < 5 cm   | Y                  | n/a                  |
| Length of logs (m) (≥10 cm diameter, >50 cm in length) | 0m                 | Total                |

Counts apply when the number of tree stems within a size class is ≤10. Estimates can be used when >10 (eg. 10, 20, 30, ..., 100, 200, 300, ...). For a multi-stemmed tree, only the largest living stem is included in the count estimate. Tree stems must be living.

For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count estimate. Stems may be dead and may be shrubs.

| BAM Attribute (1 x 1 m plots) | Litter cover (%) |   |    |    |   | Bare ground cover (%) |   |    |   |   | Cryptogam cover (%) |   |   |   |   | Rock cover (%) |   |   |   |   |
|-------------------------------|------------------|---|----|----|---|-----------------------|---|----|---|---|---------------------|---|---|---|---|----------------|---|---|---|---|
| Subplot score (% in each)     | 5                | 0 | 10 | 15 | 5 | 5                     | 2 | 20 | 5 | 5 | 5                   | 0 | 0 | 0 | 0 | 0              | 2 | 5 | 0 | 0 |
| Average of the 5 subplots     | 7%               |   |    |    |   | 7%                    |   |    |   |   | 18%                 |   |   |   |   | 1.7%           |   |   |   |   |

Litter cover is expressed as the average percentage ground cover of litter measured from five 1 m x 1 m plots within at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of moss, bare ground and cryptogams.

#### Physiography + site features that may help in determining PCT and Management Zone (optional)

|                    |   |                      |   |                  |   |                                    |   |
|--------------------|---|----------------------|---|------------------|---|------------------------------------|---|
| Morphological Type | — | Landform Element     | — | Landform Pattern | — | Microrelief                        | — |
| Lithology          | — | Soil Surface Texture | — | Soil Colour      | — | Soil Depth                         | — |
| Slope              | — | Aspect               | — | Site Drainage    | — | Distance to nearest water and type | — |

| Plot Disturbance               | Severity code | Age code | Observational evidence:         |
|--------------------------------|---------------|----------|---------------------------------|
| Clearing (inc. logging)        | 3             | Q        | Regen occurring, no overstorey. |
| Cultivation (inc. pasture)     | —             | —        | —                               |
| Soil erosion                   | —             | —        | —                               |
| Firewood / CWD removal         | —             | —        | —                               |
| Grazing (deciduous/rainforest) | 1             | R        | Macropod scat observed.         |
| Fire damage                    | —             | —        | —                               |
| Storm damage                   | —             | —        | —                               |
| Weediness                      | 1-2           | R        | Annuals and perennial grass.    |
| Other                          | —             | —        | —                               |

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

Age: Q=recent (<2yrs), M=moderately recent (3-10yrs), O=old (>10yrs)

| 400 m <sup>2</sup> plot: Sheet 1 of 1 |   | Survey Name      | Plot Identifier | Recorders |         |         |  |
|---------------------------------------|---|------------------|-----------------|-----------|---------|---------|--|
| Date                                  | 09/08/2022  | Bega Council WTP | 5               | SR, BT    |         |         |  |
| GF Code                               | Top 3 native species in each growth form group. Full species name mandatory. All other native and exotic species: Full species name where practicable | N, E or HTE      | Cover           | Abund     | stratum | voucher |  |
| TG                                    | Allocasuarina littoralis  | N                | 1               | 15        | -       | -       |  |
| TG                                    | Corymbia maculata   | N                | 1               | 25        | -       | -       |  |
| TG                                    | Eucalyptus globoides  | N                | 20              | 80        | -       | -       |  |
| SG                                    | Acacia mearnsii   | N                | 0.1             | 1         | -       | -       |  |
| SG                                    | Bossiaea obcordata  | N                | 0.2             | 1         | -       | -       |  |
| SG                                    | Grevillea arenaria  | N                | 0.5             | 2         | -       | -       |  |
| SG                                    | Leucopogon juniperinus  | N                | 0.5             | 4         | -       | -       |  |
| SG                                    | Melaleuca spp.  | N                | 0.2             | 10        | -       | -       |  |
| SG                                    | Ozothamnus diosmifolius   | N                | 0.1             | 2         | -       | -       |  |
| SG                                    | Persoonia linearis  | N                | 0.1             | 5         | -       | -       |  |
| SG                                    | Pimelea linifolia   | N                | 0.2             | 10        | -       | -       |  |
| SG                                    | Prostanthera incana   | N                | 0.2             | 10        | -       | -       |  |
| OG                                    | Kennedia rubicunda  | N                | 0.1             | 5         | -       | -       |  |
| GG                                    | Echinopogon caespitosus   | N                | 0.5             | 200       | -       | -       |  |
| GG                                    | Eragrostis brownii  | N                | 5               | 1000      | -       | -       |  |
| GG                                    | Lomandra glauca   | N                | 0.1             | 500       | -       | -       |  |
| GG                                    | Lomandra longifolia   | N                | 5               | 25        | -       | -       |  |
| GG                                    | Lomandra multiflora subsp. Multiflora   | N                | 0.1             | 1         | -       | -       |  |
| GG                                    | Rytidosperma spp.   | N                | 2               | 500       | -       | -       |  |
| GG                                    | Sporobolus creber   | N                | 2               | 500       | -       | -       |  |
| GG                                    | Themeda triandra  | N                | 15              | 400       | -       | -       |  |
| FG                                    | Euchiton japonicus  | N                | 0.2             | 200       | -       | -       |  |
| FG                                    | Pomax umbellata   | N                | 0.2             | 100       | -       | -       |  |
| FG                                    | Veronica calycina   | N                | 0.2             | 200       | -       | -       |  |
| EG                                    | Pteridium esculentum  | N                | 0.5             | 50        | -       | -       |  |
| -                                     | Facelis retusa  | E                | 0.1             | 60        | -       | -       |  |
| -                                     | Hypochaeris glabra  | E                | 0.2             | 500       | -       | -       |  |
| -                                     | Hypochaeris radicata  | E                | 0.1             | 50        | -       | -       |  |
| -                                     | Setaria pumila  | E                | 0.2             | 100       | -       | -       |  |
| -                                     | Axonopus fissifolius  | HTE              | 40              | 2000      | -       | -       |  |
| -                                     | Bidens pilosa   | HTE              | 0.1             | 20        | -       | -       |  |
| -                                     | Eragrostis curvula  | HTE              | 10              | 1000      | -       | -       |  |
| -                                     | Senecio madagascariensis  | HTE              | 0.2             | 300       | -       | -       |  |
| -                                     | -   | -                | -               | -         | -       | -       |  |
| -                                     | -   | -                | -               | -         | -       | -       |  |
| -                                     | -   | -                | -               | -         | -       | -       |  |
| -                                     | -   | -                | -               | -         | -       | -       |  |
| -                                     | -   | -                | -               | -         | -       | -       |  |
| -                                     | -   | -                | -               | -         | -       | -       |  |
| -                                     | -   | -                | -               | -         | -       | -       |  |
| -                                     | -   | -                | -               | -         | -       | -       |  |
| -                                     | -   | -                | -               | -         | -       | -       |  |

GF Code: see Growth Form definitions in Appendix 1. N: native, E: exotic, HTE: high threat exotic. GF - circle code if top 3.  
 Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ..., 100% (foliage cover). Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m.  
 Abundance: 1, 2, 3, ..., 10, 20, 30, ..., 100, 200, ..., 1000, ...  
 Stratum: E (emergent) T1, T2, T3, S1, S2, S3, G1, G2, G3 etc.

| BAM Site – Field Survey Form |                  |                                    |  | Site Sheet no:1 of 2 |  |                 |                              |
|------------------------------|------------------|------------------------------------|--|----------------------|--|-----------------|------------------------------|
|                              |                  | Survey Name                        |  | Zone ID              |  | Recorders       |                              |
| Date                         | 09/08/2022       | Bega Council WTF                   |  | -                    |  | SR, BT          |                              |
| Zone 55                      | Datum GDA94      | Plot ID                            |  | 6                    |  | Plot dimensions | 20x50                        |
| Easting 752587               | Northing 5917014 | Midline bearing from 0 m (start)   |  | 31° NNE              |  | IBRA region     | South Eastern Coastal Ranges |
| Easting                      | Northing         | Midline bearing from 50 m (finish) |  | -                    |  | IBRA sub-region | Bateman                      |
| Vegetation Class             |                  |                                    |  |                      |  | Confidence:     |                              |
| Plant Community Type         |                  |                                    |  |                      |  | EEC:            |                              |

Record easting and northing at 0 m on midline. Dimensions (Shape of 0.04 ha base plot).

| BAM Attribute (400 m <sup>2</sup> plot)                     | Sum values |
|---|------------|
| T (Trees)   | 5          |
| S (Shrubs)  | 9          |
| G (Grasses)   | 8          |
| F (Forbs)   | 8          |
| E (Ferns)   | 1          |
| O (Other)   | 7          |
| Count of Native Richness                                    |            |
| T (Trees)   | 47.1       |
| S (Shrubs)  | 8.6        |
| G (Grasses)   | 42.2       |
| F (Forbs)   | 33.7       |
| E (Ferns)   | 0.2        |
| O (Other)   | 0.7        |
| Sum of Cover of native vascular plants by growth form group |            |
| High Threat Weed cover                                      | 0.2        |

| BAM Attribute (1000 m <sup>2</sup> plot)               |                    |                      |
|--|--------------------|----------------------|
| DBH  | # Tree Stems Count | # Stems with Hollows |
| 80 + cm  | 4                  | 1                    |
| 50 – 79 cm   | 5                  | 0                    |
| 30 – 49 cm   | Y                  | -                    |
| 20 – 29 cm   | Y                  | -                    |
| 10 – 19 cm   | Y                  | -                    |
| 5 – 9 cm   | Y                  | -                    |
| < 5 cm   | Y                  | n/a                  |
| Length of logs (m) (≥10 cm diameter, >50 cm in length) | 15m                | Total                |

Counts apply when the number of tree stems within a size class is ≤10. Estimates can be used when >10 (eg. 10, 20, 30, ..., 100, 200, 300, ...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.

For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

| BAM Attribute (1 x 1 m plots) | Litter cover (%) |    |    |    |    | Bare ground cover (%) |   |   |   |   | Cryptogam cover (%) |   |   |   |   | Rock cover (%) |   |   |   |   |
|-------------------------------|------------------|----|----|----|----|-----------------------|---|---|---|---|---------------------|---|---|---|---|----------------|---|---|---|---|
| Subplot score (% in each)     | 50               | 40 | 30 | 20 | 10 | 1                     | 0 | 0 | 0 | 0 | 0                   | 5 | 0 | 0 | 0 | 0              | 0 | 0 | 0 | 0 |
| Average of the 5 subplots     | 0.1              |    |    |    |    | 1.8                   |   |   |   |   | 2.1                 |   |   |   |   | 0.1            |   |   |   |   |

Litter cover is expressed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots within at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). As assessors may also record the cover of rock, bare ground and cryptogams.

## Physiography + site features that may help in determining PCT and Management Zone (optional)

|                    |   |                      |   |                  |   |                                    |   |
|--------------------|---|----------------------|---|------------------|---|------------------------------------|---|
| Morphological Type | - | Landform Element     | - | Landform Pattern | - | Microrelief                        | - |
| Lithology          | - | Soil Surface Texture | - | Soil Colour      | - | Soil Depth                         | - |
| Slope              | - | Aspect               | - | Site Drainage    | - | Distance to nearest water and type | - |

| Plot Disturbance               | Severity code | Age code | Observational evidence: |
|--------------------------------|---------------|----------|-------------------------|
| Clearing (inc. logging)        | -             | -        | -                       |
| Cultivation (inc. pasture)     | -             | -        | -                       |
| Soil erosion                   | -             | -        | -                       |
| Firewood / CWD removal         | -             | -        | -                       |
| Grazing (deciduous/rainforest) | 1             | R        | Macropod.               |
| Fire damage                    | -             | -        | -                       |
| Storm damage                   | -             | -        | -                       |
| Weediness                      | 1             | R        | Annual and perennial.   |
| Other                          | -             | -        | -                       |

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

Age: R=recent (&lt;2yrs), MR=moderately recent (3-10yrs), O=old (&gt;10yrs)



| 400 m <sup>2</sup> plot: Sheet 1 of 1 |   | Survey Name      | Plot Identifier | Recorders |         |         |  |
|---------------------------------------|---|------------------|-----------------|-----------|---------|---------|--|
| Date                                  | 09/08/2022  | Bega Council WTP | 6               | SR, BT    |         |         |  |
| GF Code                               | Top 3 native species in each growth form group. Full species name mandatory. All other native and exotic species. Full species name where practicable | N, E or HTE      | Cover           | Abund     | stratum | voucher |  |
| TG                                    | Eucalyptus cypellocarpa   | N                | 1               | 2         | -       | -       |  |
| TG                                    | Eucalyptus globoidea  | N                | 1               | 1         | -       | -       |  |
| TG                                    | Eucalyptus muelleriana  | N                | 40              | 6         | -       | -       |  |
| TG                                    | Eucalyptus sieberi  | N                | 5               | 1         | -       | -       |  |
| TG                                    | Notelaea longifolia   | N                | 0.1             | 2         | -       | -       |  |
| SG                                    | Acacia falciformis  | N                | 1               | 8         | -       | -       |  |
| SG                                    | Acacia longifolia subsp. Sophorae   | N                | 0.1             | 1         | -       | -       |  |
| SG                                    | Acacia mearnsii   | N                | 1               | 4         | -       | -       |  |
| SG                                    | Leucopogon juniperinus  | N                | 0.2             | 1         | -       | -       |  |
| SG                                    | Ozothamnus diosmifolius   | N                | 0.1             | 3         | -       | -       |  |
| SG                                    | Persoonia linearis  | N                | 0.1             | 1         | -       | -       |  |
| SG                                    | Pimelea linifolia   | N                | 5               | 40        | -       | -       |  |
| SG                                    | Pittosporum undulatum   | N                | 1               | 3         | -       | -       |  |
| SG                                    | Solanum cinereum  | N                | 0.1             | 1         | -       | -       |  |
| OG                                    | Billardiera scandens  | N                | 0.1             | 1         | -       | -       |  |
| OG                                    | Clematis aristata   | N                | 0.1             | 2         | -       | -       |  |
| OG                                    | Eustrephus latifolius   | N                | 0.1             | 10        | -       | -       |  |
| OG                                    | Glycine clandestina   | N                | 0.1             | 25        | -       | -       |  |
| OG                                    | Glycine tabacina  | N                | 0.1             | 20        | -       | -       |  |
| OG                                    | Hardenbergia violacea   | N                | 0.1             | 5         | -       | -       |  |
| OG                                    | Kennedia rubicunda  | N                | 0.1             | 1         | -       | -       |  |
| GG                                    | Austrostipa bigeniculata  | N                | 0.2             | 20        | -       | -       |  |
| GG                                    | Echinopogon caespitosus   | N                | 0.2             | 50        | -       | -       |  |
| GG                                    | Entolasia stricta   | N                | 1               | 500       | -       | -       |  |
| GG                                    | Imperata cylindrica   | N                | 0.2             | 100       | -       | -       |  |
| GG                                    | Lomandra longifolia   | N                | 15              | 100       | -       | -       |  |
| GG                                    | Lomandra multiflora subsp. Multiflora   | N                | 0.1             | 20        | -       | -       |  |
| GG                                    | Rytidosperma spp.   | N                | 25              | 1000      | -       | -       |  |
| GG                                    | Rytidosperma spp.   | N                | 0.5             | 40        | -       | -       |  |
| FG                                    | Brunoniella pumilio   | N                | 0.5             | 200       | -       | -       |  |
| FG                                    | Dianella caerulea   | N                | 0.2             | 20        | -       | -       |  |
| FG                                    | Dichondra repens  | N                | 30              | 2000      | -       | -       |  |
| FG                                    | Hydrocotyle laxiflora   | N                | 0.2             | 200       | -       | -       |  |
| FG                                    | Nyssanthus erecta   | N                | 0.2             | 200       | -       | -       |  |
| FG                                    | Pomax umbellata   | N                | 2               | 500       | -       | -       |  |
| FG                                    | Pratia purpurascens   | N                | 0.5             | 200       | -       | -       |  |
| FG                                    | Senecio linearifolius   | N                | 0.1             | 5         | -       | -       |  |
| EG                                    | Cheilanthes sieberi   | N                | 0.2             | 150       | -       | -       |  |
| -                                     | Agapanthus spp.   | E                | 0.5             | 5         | -       | -       |  |
| -                                     | Bidens pilosa   | HTE              | 0.1             | 50        | -       | -       |  |
| -                                     | Senecio madagascariensis  | HTE              | 0.1             | 50        | -       | -       |  |

GF Code: see Growth Form definitions in Appendix 1 N: native, E: exotic, HTE: high threat exotic GF - circle code if top 3.  
 Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ..., 100% (foliage cover); Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m  
 Abundance: 1, 2, 3, ..., 10, 20, 30, ..., 100, 200, ..., 1000, ...  
 Stratum: E (emergent) T1, T2, T3, S1, S2, S3, G1, G2, G3 etc

| BAM Site – Field Survey Form       |  |                  |  | Site Sheet no:1 of 3 |  |                              |  |
|------------------------------------|--|------------------|--|----------------------|--|------------------------------|--|
| Date                               |  | 09/08/2022       |  | Survey Name          |  | Bega Council WTF             |  |
| Zone 55                            |  | Datum GDA94      |  | Zone ID              |  | SR, BT                       |  |
| Easting 752592                     |  | Northing 5916960 |  | Plot ID              |  | 7                            |  |
| Midline bearing from 0 m (start)   |  | 11° N            |  | Plot dimensions      |  | 20x50                        |  |
| Midline bearing from 50 m (finish) |  | -                |  | IBRA region          |  | South Eastern Coastal Ranges |  |
| IBRA sub-region                    |  | Bateman          |  | Photo #              |  | -                            |  |
| Vegetation Class                   |  |                  |  | -                    |  |                              |  |
| Plant Community Type               |  |                  |  | 3663 - derived       |  |                              |  |
| Confidence:                        |  |                  |  | EEC:                 |  |                              |  |

Record easting and northing at 0 m on midline. Dimensions (Shape of 0.04 ha base plot).

| BAM Attribute (400 m <sup>2</sup> plot)                     | Sum values |
|---|------------|
| T (Trees)   | 4          |
| S (Shrubs)  | 8          |
| G (Grasses)   | 13         |
| F (Forbs)   | 11         |
| E (Ferns)   | 3          |
| O (Other)   | 1          |
| Sum of Cover of native vascular plants by growth form group |            |
| T (Trees)   | 0.8        |
| S (Shrubs)  | 1.4        |
| G (Grasses)   | 83.4       |
| F (Forbs)   | 6.5        |
| E (Ferns)   | 0.3        |
| O (Other)   | 0.1        |
| High Threat Weed cover                                      | 0.1        |

| BAM Attribute (1000 m <sup>2</sup> plot)               |                    |                      |
|--|--------------------|----------------------|
| DBH  | # Tree Stems Count | # Stems with Hollows |
| 80 + cm  | -                  | -                    |
| 50 – 79 cm   | -                  | -                    |
| 30 – 49 cm   | -                  | -                    |
| 20 – 29 cm   | -                  | -                    |
| 10 – 19 cm   | -                  | -                    |
| 5 – 9 cm   | -                  | -                    |
| < 5 cm   | Y                  | n/a                  |
| Length of logs (m) (≥10 cm diameter, >50 cm in length) | 2m                 | Total                |

Counts apply when the number of tree stems within a size class is ≤10. Estimates can be used when >10 (eg. 10, 20, 30, ..., 100, 200, 300, ...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living. For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

| BAM Attribute (1 x 1 m plots) | Litter cover (%) | Bare ground cover (%) | Cryptogam cover (%) | Rock cover (%) |
|-------------------------------|------------------|-----------------------|---------------------|----------------|
| Subplot score (% in each)     | 30 15 10 25 20   | 2 5 10 2 0            | 2 0 15 0 0          | 0 0 0 0 0      |
| Average of the 5 subplots     | 18               | 7.8                   | 3.4                 | 0              |

Litter cover is expressed as the average percentage ground cover of litter measured from five 1 m x 1 m plots sampled at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). As assessors may also record the cover of moss, bare ground and cryptogams.

#### Physiography + site features that may help in determining PCT and Management Zone (optional)

|                    |   |                      |   |                  |   |                                    |   |
|--------------------|---|----------------------|---|------------------|---|------------------------------------|---|
| Morphological Type | - | Landform Element     | - | Landform Pattern | - | Microrelief                        | - |
| Lithology          | - | Soil Surface Texture | - | Soil Colour      | - | Soil Depth                         | - |
| Slope              | - | Aspect               | - | Site Drainage    | - | Distance to nearest water and type | - |

| Plot Disturbance           | Severity code | Age code | Observational evidence: |
|----------------------------|---------------|----------|-------------------------|
| Clearing (inc. logging)    | 3             | O        | No canopy, regen only.  |
| Cultivation (inc. pasture) | -             | -        | -                       |
| Soil erosion               | -             | -        | -                       |
| Firewood / CWD removal     | -             | -        | -                       |
| Grazing (deciduous/stock)  | 1             | R        | Macropod.               |
| Fire damage                | -             | -        | -                       |
| Storm damage               | -             | -        | -                       |
| Weediness                  | 1             | R        | Annuals.                |
| Other                      | -             | -        | -                       |

Severity: 0=none, 1=light, 2=moderate, 3=severe

Age: O=recent (<2yrs), M=moderately recent (3-10yrs), R=old (>10yrs)

| 400 m <sup>2</sup> plot: Sheet 1 of 2 |   | Survey Name      | Plot Identifier | Recorders |         |         |  |
|---------------------------------------|---|------------------|-----------------|-----------|---------|---------|--|
| Date                                  | 09/08/2022  | Bega Council WTP | 7               | SR, BT    |         |         |  |
| GF Code                               | Top 3 native species in each growth form group. Full species name mandatory. All other native and exotic species. Full species name where practicable | N, E or HTE      | Cover           | Abund     | stratum | voucher |  |
| TG                                    | Allocasuarina littoralis  | N                | 0.1             | 2         | -       | -       |  |
| TG                                    | Corymbia gummifera  | N                | 0.5             | 5         | -       | -       |  |
| TG                                    | Eucalyptus globoides  | N                | 0.1             | 10        | -       | -       |  |
| TG                                    | Eucalyptus sieberi  | N                | 0.1             | 2         | -       | -       |  |
| SG                                    | Acacia falciformis  | N                | 0.5             | 5         | -       | -       |  |
| SG                                    | Correa reflexa var. speciosa  | N                | 0.1             | 1         | -       | -       |  |
| SG                                    | Leucopogon juniperinus  | N                | 0.2             | 3         | -       | -       |  |
| SG                                    | Ozothamnus diosmifolius   | N                | 0.1             | 2         | -       | -       |  |
| SG                                    | Ozothamnus spp.   | N                | 0.1             | 1         | -       | -       |  |
| SG                                    | Persoonia linearis  | N                | 0.1             | 1         | -       | -       |  |
| SG                                    | Pimelea linifolia   | N                | 0.2             | 3         | -       | -       |  |
| SG                                    | Pittosporum undulatum   | N                | 0.1             | 2         | -       | -       |  |
| OG                                    | Eustrephus latifolius   | N                | 0.1             | 2         | -       | -       |  |
| GG                                    | Austrostipa bigeniculata  | N                | 0.5             | 100       | -       | -       |  |
| GG                                    | Cymbopogon refractus  | N                | 0.1             | 2         | -       | -       |  |
| GG                                    | Echinopogon caespitosus   | N                | 10              | 1000      | -       | -       |  |
| GG                                    | Entolasia stricta   | N                | 10              | 1000      | -       | -       |  |
| GG                                    | Imperata cylindrica   | N                | 2               | 300       | -       | -       |  |
| GG                                    | Lepidosperma laterale   | N                | 10              | 120       | -       | -       |  |
| GG                                    | Lomandra longifolia   | N                | 15              | 120       | -       | -       |  |
| GG                                    | Lomandra multiflora subsp. Multiflora   | N                | 0.2             | 10        | -       | -       |  |
| GG                                    | Panicum effusum   | N                | 5               | 500       | -       | -       |  |
| GG                                    | Poa labillardierei var. labillardierei  | N                | 0.5             | 100       | -       | -       |  |
| GG                                    | Rytidosperma spp.   | N                | 20              | 1000      | -       | -       |  |
| GG                                    | Rytidosperma spp.   | N                | 0.1             | 50        | -       | -       |  |
| GG                                    | Themeda triandra  | N                | 10              | 500       | -       | -       |  |
| FG                                    | Coronidium spp.   | N                | 0.1             | 20        | -       | -       |  |
| FG                                    | Dianella caerulea   | N                | 0.1             | 2         | -       | -       |  |
| FG                                    | Dichondra repens  | N                | 0.2             | 200       | -       | -       |  |
| FG                                    | Hydrocotyle laxiflora   | N                | 0.1             | 100       | -       | -       |  |
| FG                                    | Leptorhynchos nitidulus   | N                | 0.1             | 2         | -       | -       |  |
| FG                                    | Nyssanthus erecta   | N                | 0.2             | 50        | -       | -       |  |
| FG                                    | Pomax umbellata   | N                | 5               | 500       | -       | -       |  |
| FG                                    | Poranthera microphylla  | N                | 0.1             | 20        | -       | -       |  |
| FG                                    | Pratia purpurascens   | N                | 0.2             | 200       | -       | -       |  |
| FG                                    | Veronica calycina   | N                | 0.2             | 100       | -       | -       |  |
| FG                                    | Viola betonicifolia   | N                | 0.2             | 200       | -       | -       |  |
| EG                                    | Adiantum aethiopicum  | N                | 0.1             | 100       | -       | -       |  |
| EG                                    | Cheilanthes sieberi   | N                | 0.1             | 100       | -       | -       |  |
| EG                                    | Pteridium esculentum  | N                | 0.1             | 5         | -       | -       |  |
| -                                     | Facelis retusa  | E                | 0.1             | 20        | -       | -       |  |

GF Code: see Growth Form definitions in Appendix 1

N: native, E: exotic, HTE: high threat exotic

GF - circle code if top 3.

Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ..., 100% (foliage cover); Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m

Abundance: 1, 2, 3, ..., 10, 20, 30, ..., 100, 200, ..., 1000, ...

Stratum: E (emergent) T1, T2, T3, S1, S2, S3, G1, G2, G3 etc



GF Code: see Growth Form definitions in Appendix 1      N: native, E: exotic, HTE: high threat exotic      GF – circle code if 'top 3'.  
Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover). Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m  
Abundance: 1, 2, 3, ..., 10, 20, 30, ..., 100, 200, 1000, ...  
Stratum: E (emerging) T1, T2, T3, S1, S2, S3, G1, G2, G3 etc

| BAM Site – Field Survey Form       |        |            |         |                 |                              | Site Sheet no:1 of 2 |             |
|------------------------------------|--------|------------|---------|-----------------|------------------------------|----------------------|-------------|
| Date                               |        | 10/08/2022 |         | Survey Name     | Bega Council WTF             |                      |             |
| Zone                               | 55     | Datum      | GDA94   | Zone ID         | —                            |                      |             |
| Plot ID                            |        | 8          |         | Recorders       | SR, BT                       |                      |             |
| Eastings                           | 752362 | Northings  | 5916866 | Plot dimensions | 20x50                        | Photo #              | —           |
| Midline bearing from 0 m (start)   |        | 318° NNW   |         | IBRA region     | South Eastern Coastal Ranges |                      |             |
| Midline bearing from 50 m (finish) |        | —          |         | IBRA sub-region | Bateman                      |                      |             |
| Vegetation Class                   |        |            |         | —               |                              | Confidence:          |             |
| Plant Community Type               |        |            |         | 3663 – Good     |                              | EEC:                 | Confidence: |

Record easting and northing at 0 m on midline. Dimensions (Shape of 0.04 ha base plot).

| BAM Attribute (400 m <sup>2</sup> plot)                     |             | Sum values |
|---|-------------|------------|
| Count of Native Richness                                    | T (Trees)   | 4          |
|   | S (Shrubs)  | 15         |
|   | G (Grasses) | 10         |
|   | F (Forbs)   | 4          |
|   | E (Ferns)   | 1          |
|   | O (Other)   | 1          |
| Sum of Cover of native vascular plants by growth form group | T (Trees)   | 16.1       |
|   | S (Shrubs)  | 5.5        |
|   | G (Grasses) | 58.3       |
|   | F (Forbs)   | 1.3        |
|   | E (Ferns)   | 2          |
|   | O (Other)   | 0.1        |
| High Threat Weed cover                                      |             | 0          |

| BAM Attribute (1000 m <sup>2</sup> plot)               |                    |                      |
|--|--------------------|----------------------|
| DBH  | # Tree Stems Count | # Stems with Hollows |
| 80 + cm  | 2                  | 1                    |
| 50 – 79 cm   | 3                  | 0                    |
| 30 – 49 cm   | Y                  | —                    |
| 20 – 29 cm   | Y                  | —                    |
| 10 – 19 cm   | Y                  | —                    |
| 5 – 9 cm   | Y                  | —                    |
| < 5 cm   | Y                  | n/a                  |
| Length of logs (m) (≥10 cm diameter, >50 cm in length) | 19m                | Total                |

Counts apply when the number of tree stems within a size class is ≤10. Estimates can be used when >10 (eg. 10, 20, 30, ..., 100, 200, 300, ...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.

For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

| BAM Attribute (1 x 1 m plots) | Litter cover (%) |    |    |    |    | Bare ground cover (%) |   |   |   |   | Cryptogam cover (%) |   |   |   |   | Rock cover (%) |   |   |   |  |
|-------------------------------|------------------|----|----|----|----|-----------------------|---|---|---|---|---------------------|---|---|---|---|----------------|---|---|---|--|
| Subplot score (% in each)     | 50               | 75 | 95 | 80 | 85 | 0                     | 5 | 0 | 0 | 5 | 0                   | 0 | 0 | 0 | 0 | 0              | 0 | 0 | 0 |  |
| Average of the 5 subplots     | 80               |    |    |    |    | 2                     |   |   |   |   | 0                   |   |   |   |   | 0              |   |   |   |  |

Litter cover is expressed as the average percentage ground cover of litter measured from five 1 m x 1 m plots sampled at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of moss, bare ground and cryptogams.

#### Physiography + site features that may help in determining PCT and Management Zone (optional)

|                    |   |                      |   |                  |   |                                    |   |
|--------------------|---|----------------------|---|------------------|---|------------------------------------|---|
| Morphological Type | — | Landform Element     | — | Landform Pattern | — | Microrelief                        | — |
| Lithology          | — | Soil Surface Texture | — | Soil Colour      | — | Soil Depth                         | — |
| Slope              | — | Aspect               | — | Site Drainage    | — | Distance to nearest water and type | — |

| Plot Disturbance               | Severity code | Age code | Observational evidence: |
|--------------------------------|---------------|----------|-------------------------|
| Clearing (inc. logging)        | —             | —        | —                       |
| Cultivation (inc. pasture)     | —             | —        | —                       |
| Soil erosion                   | —             | —        | —                       |
| Firewood / CWD removal         | —             | —        | —                       |
| Grazing (deciduous/rainforest) | —             | —        | —                       |
| Fire damage                    | —             | —        | —                       |
| Storm damage                   | —             | —        | —                       |
| Weediness                      | —             | —        | —                       |
| Other                          | —             | —        | —                       |

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

Age: 0=recent (<2yrs), 1=recent (3-10yrs), 2=old (>10yrs)

| 400 m <sup>2</sup> plot: Sheet 1 of 1 |   | Survey Name      | Plot Identifier | Recorders |         |         |  |
|---------------------------------------|---|------------------|-----------------|-----------|---------|---------|--|
| Date                                  | 10/08/2022  | Bega Council WTP | 8               | SR, BT    |         |         |  |
| GF Code                               | Top 3 native species in each growth form group. Full species name mandatory. All other native and exotic species. Full species name where practicable | N, E or HTE      | Cover           | Abund     | stratum | voucher |  |
| TG                                    | Allocasuarina littoralis  | N                | 0.5             | 2         | -       | -       |  |
| TG                                    | Corymbia maculata   | N                | 0.5             | 10        | -       | -       |  |
| TG                                    | Eucalyptus globoides  | N                | 15              | 17        | -       | -       |  |
| TG                                    | Notelaea longifolia   | N                | 0.1             | 2         | -       | -       |  |
| SG                                    | Acacia falciformis  | N                | 0.2             | 5         | -       | -       |  |
| SG                                    | Acacia floribunda   | N                | 0.5             | 2         | -       | -       |  |
| SG                                    | Acacia longifolia subsp. sophorae   | N                | 1               | 10        | -       | -       |  |
| SG                                    | Acacia mearnsii   | N                | 1               | 2         | -       | -       |  |
| SG                                    | Bossiaea obcordata  | N                | 0.5             | 20        | -       | -       |  |
| SG                                    | Elaeocarpus reticulatus   | N                | 0.5             | 1         | -       | -       |  |
| SG                                    | Hibbertia aspera  | N                | 0.1             | 1         | -       | -       |  |
| SG                                    | Leucopogon juniperinus  | N                | 0.5             | 5         | -       | -       |  |
| SG                                    | Leucopogon lanceolatus  | N                | 0.1             | 1         | -       | -       |  |
| SG                                    | Ozothamnus diosmifolius   | N                | 0.1             | 1         | -       | -       |  |
| SG                                    | Persoonia linearis  | N                | 0.5             | 2         | -       | -       |  |
| SG                                    | Pittosporum undulatum   | N                | 0.2             | 2         | -       | -       |  |
| SG                                    | Platysace lanceolata  | N                | 0.1             | 3         | -       | -       |  |
| SG                                    | Prostanthera incana   | N                | 0.1             | 20        | -       | -       |  |
| SG                                    | Tetradlea thymifolia  | N                | 0.1             | 1         | -       | -       |  |
| OG                                    | Billardiera scandens  | N                | 0.1             | 2         | -       | -       |  |
| GG                                    | Austrostipa bigeniculata  | N                | 0.5             | 20        | -       | -       |  |
| GG                                    | Echinopogon caespitosus   | N                | 5               | 500       | -       | -       |  |
| GG                                    | Entolasia stricta   | N                | 30              | 1000      | -       | -       |  |
| GG                                    | Lepidosperma laterale   | N                | 0.5             | 25        | -       | -       |  |
| GG                                    | Lomandra filiformis   | N                | 0.2             | 20        | -       | -       |  |
| GG                                    | Lomandra longifolia   | N                | 0.1             | 2         | -       | -       |  |
| GG                                    | Lomandra micrantha subsp. Tuberculata   | N                | 0.5             | 20        | -       | -       |  |
| GG                                    | Lomandra multiflora subsp. Multiflora   | N                | 0.5             | 50        | -       | -       |  |
| GG                                    | Panicum effusum   | N                | 1               | 200       | -       | -       |  |
| GG                                    | Rytidosperma spp.   | N                | 20              | 500       | -       | -       |  |
| FG                                    | Dianella caerulea   | N                | 0.1             | 1         | -       | -       |  |
| FG                                    | Oxalis perennans  | N                | 0.1             | 2         | -       | -       |  |
| FG                                    | Pomax umbellata   | N                | 1               | 500       | -       | -       |  |
| FG                                    | Stylidium graminifolium   | N                | 0.1             | 10        | -       | -       |  |
| EG                                    | Pteridium esculentum  | N                | 2               | 100       | -       | -       |  |
| -                                     | Hypochaeris glabra  | E                | 0.1             | 10        | -       | -       |  |
| -                                     | Hypochaeris radicata  | E                | 0.1             | 10        | -       | -       |  |
| -                                     | -   | -                | -               | -         | -       | -       |  |
| -                                     | -   | -                | -               | -         | -       | -       |  |
| -                                     | -   | -                | -               | -         | -       | -       |  |
| -                                     | -   | -                | -               | -         | -       | -       |  |

GF Code: see Growth Form definitions in Appendix 1

N: native, E: exotic, HTE: high threat exotic

GF - circle code if top 3

Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ..., 100% (foliage cover); Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m

Abundance: 1, 2, 3, ..., 10, 20, 30, ..., 100, 200, ..., 1000, ...

Stratum: E (emergent) T1, T2, T3, S1, S2, S3, G1, G2, G3 etc



| BAM Site – Field Survey Form |              |                                    |  |          | Site Sheet no:1 of 2 |                 |                              |
|------------------------------|--------------|------------------------------------|--|----------|----------------------|-----------------|------------------------------|
|                              |              | Survey Name                        |  | Zone ID  |                      | Recorders       |                              |
| Date                         | 10/08/2022   | Bega Council WTF                   |  | -        |                      | SR, BT          |                              |
| Zone 55                      | Datum GDA94  | Plot ID                            |  | 9        |                      | Plot dimensions | 20x50                        |
| Eastings                     | Northings    | Midline bearing from 0 m (start)   |  | 248° WSW |                      | IBRA region     | South Eastern Coastal Ranges |
| 752428                       | 5916942      | Midline bearing from 50 m (finish) |  | -        |                      | IBRA sub-region | Bateman                      |
| Vegetation Class             | -            |                                    |  |          |                      |                 | Confidence:                  |
| Plant Community Type         | 3663 – regen |                                    |  |          |                      |                 | EEC: Confidence:             |

Record easting and northing at 0 m on midline. Dimensions (Shape of 0.04 ha base plot).

| BAM Attribute (400 m <sup>2</sup> plot)                     | Sum values |
|---|------------|
| T (Trees)   | 4          |
| S (Shrubs)  | 10         |
| G (Grasses)   | 11         |
| F (Forbs)   | 6          |
| E (Ferns)   | 1          |
| O (Other)   | 3          |
| Count of Native Richness                                    |            |
| T (Trees)   | 55.5       |
| S (Shrubs)  | 2.4        |
| G (Grasses)   | 76.4       |
| F (Forbs)   | 1.1        |
| E (Ferns)   | 0.5        |
| O (Other)   | 0.3        |
| Sum of Cover of native vascular plants by growth form group |            |
| High Threat Weed cover                                      | 0.1        |

| BAM Attribute (1000 m <sup>2</sup> plot)               |                    |                      |
|--|--------------------|----------------------|
| DBH  | # Tree Stems Count | # Stems with Hollows |
| 80 + cm  | 1                  | -                    |
| 50 – 79 cm   | 1                  | -                    |
| 30 – 49 cm   | -                  | -                    |
| 20 – 29 cm   | Y                  | -                    |
| 10 – 19 cm   | Y                  | -                    |
| 5 – 9 cm   | Y                  | -                    |
| < 5 cm   | Y                  | n/a                  |
| Length of logs (m) (≥10 cm diameter, >50 cm in length) | 8m                 | Total                |

Counts apply when the number of tree stems within a size class is ≤10. Estimates can be used when >10 (eg. 10, 20, 30, ..., 100, 200, 300, ...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.

For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

| BAM Attribute (1 x 1 m plots) | Litter cover (%) |    |    |    |    | Bare ground cover (%) |   |   |   |   | Cryptogam cover (%) |   |   |   |   | Rock cover (%) |   |   |   |   |
|-------------------------------|------------------|----|----|----|----|-----------------------|---|---|---|---|---------------------|---|---|---|---|----------------|---|---|---|---|
| Subplot score (% in each)     | 50               | 50 | 50 | 50 | 50 | 0                     | 0 | 0 | 0 | 0 | 0                   | 0 | 0 | 0 | 0 | 0              | 0 | 0 | 0 | 0 |
| Average of the 5 subplots     | 50               |    |    |    |    | 0                     |   |   |   |   | 0.5                 |   |   |   |   | 0              |   |   |   |   |

Litter cover is expressed as the average percentage ground cover of litter measured from five 1 m x 1 m plots centered at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of moss, bare ground and cryptogams.

## Physiography + site features that may help in determining PCT and Management Zone (optional)

|                    |   |                      |   |                  |   |                                    |   |
|--------------------|---|----------------------|---|------------------|---|------------------------------------|---|
| Morphological Type | - | Landform Element     | - | Landform Pattern | - | Microrelief                        | - |
| Lithology          | - | Soil Surface Texture | - | Soil Colour      | - | Soil Depth                         | - |
| Slope              | - | Aspect               | - | Site Drainage    | - | Distance to nearest water and type | - |

| Plot Disturbance           | Severity code | Age code | Observational evidence:     |
|----------------------------|---------------|----------|-----------------------------|
| Clearing (inc. logging)    | 2             | 0        | Regrowth with sparse canopy |
| Cultivation (inc. pasture) | -             | -        | -                           |
| Soil erosion               | -             | -        | -                           |
| Firewood / CWD removal     | -             | -        | -                           |
| Grazing (deciduous/stock)  | -             | -        | -                           |
| Fire damage                | -             | -        | -                           |
| Storm damage               | -             | -        | -                           |
| Weediness                  | 1             | -        | Minor weeds                 |
| Other                      | -             | -        | -                           |

Severity: 0=no evidence, 1=dist, 2=moderate, 3=severe

Age: 0=recent (&lt;2yrs), 1=recent (3-10yrs), 0=old (&gt;10yrs)

| 400 m <sup>2</sup> plot: Sheet 1 of 1 |   | Survey Name      | Plot Identifier | Recorders |         |         |  |
|---------------------------------------|---|------------------|-----------------|-----------|---------|---------|--|
| Date                                  | 10/08/2022  | Bega Council WTP | 9               | SR, BT    |         |         |  |
| GF Code                               | Top 3 native species in each growth form group. Full species name mandatory. All other native and exotic species. Full species name where practicable | N, E or HTE      | Cover           | Abund     | stratum | voucher |  |
| TG                                    | Allocastrum littoralis  | N                | 15              | 20        | -       | -       |  |
| TG                                    | Corymbia gummifera  | N                | 20              | 40        | -       | -       |  |
| TG                                    | Eucalyptus globoides  | N                | 20              | 20        | -       | -       |  |
| TG                                    | Eucalyptus sieberi  | N                | 0.5             | 5         | -       | -       |  |
| SG                                    | Acacia falciformis  | N                | 0.1             | 1         | -       | -       |  |
| SG                                    | Acacia floribunda   | N                | 0.5             | 2         | -       | -       |  |
| SG                                    | Acacia mearnsii   | N                | 1               | 5         | -       | -       |  |
| SG                                    | Elaeocarpus reticulatus   | N                | 0.1             | 1         | -       | -       |  |
| SG                                    | Hibbertia aspera  | N                | 0.2             | 2         | -       | -       |  |
| SG                                    | Leucopogon juniperinus  | N                | 0.1             | 1         | -       | -       |  |
| SG                                    | Ozothamnus diosmifolius   | N                | 0.1             | 1         | -       | -       |  |
| SG                                    | Persoonia linearis  | N                | 0.1             | 1         | -       | -       |  |
| SG                                    | Pittosporum undulatum   | N                | 0.1             | 3         | -       | -       |  |
| SG                                    | Prostanthera incana   | N                | 0.1             | 20        | -       | -       |  |
| OG                                    | Glycine clandestine   | N                | 0.1             | 1         | -       | -       |  |
| OG                                    | Glycine tabacina  | N                | 0.1             | 2         | -       | -       |  |
| OG                                    | Hardenbergia violacea   | N                | 0.1             | 20        | -       | -       |  |
| GG                                    | Aristida ramosa   | N                | 0.1             | 50        | -       | -       |  |
| GG                                    | Austrostipa bigeniculata  | N                | 0.2             | 50        | -       | -       |  |
| GG                                    | Echinopogon caespitosus   | N                | 0.1             | 1         | -       | -       |  |
| GG                                    | Entolasia stricta   | N                | 25              | 1000      | -       | -       |  |
| GG                                    | Gahnia sieberiana   | N                | 20              | 200       | -       | -       |  |
| GG                                    | Lepidosperma laterale   | N                | 0.5             | 20        | -       | -       |  |
| GG                                    | Lomandra longifolia   | N                | 25              | 200       | -       | -       |  |
| GG                                    | Lomandra multiflora subsp. Multiflora   | N                | 5               | 50        | -       | -       |  |
| GG                                    | Panicum effusum   | N                | 0.2             | 50        | -       | -       |  |
| GG                                    | Poa labillardierei var. labillardierei  | N                | 0.2             | 100       | -       | -       |  |
| GG                                    | Themeda triandra  | N                | 0.1             | 50        | -       | -       |  |
| FG                                    | Brachyscome spp.  | N                | 0.1             | 50        | -       | -       |  |
| FG                                    | Dianella caerulea   | N                | 0.1             | 20        | -       | -       |  |
| FG                                    | Pomax umbellata   | N                | 0.1             | 20        | -       | -       |  |
| FG                                    | Pratia purpurascens   | N                | 0.5             | 200       | -       | -       |  |
| FG                                    | Sigesbeckia orientalis subsp. Orientalis  | N                | 0.1             | 1         | -       | -       |  |
| FG                                    | Veronica calycina   | N                | 0.2             | 200       | -       | -       |  |
| EG                                    | Pteridium esculentum  | N                | 0.5             | 20        | -       | -       |  |
| -                                     | Conyza spp.   | E                | 0.1             | 1         | -       | -       |  |
| -                                     | Hypochaeris glabra  | E                | 0.1             | 10        | -       | -       |  |
| -                                     | Bidens pilosa   | HTE              | 0.1             | 25        | -       | -       |  |
| -                                     | -   | -                | -               | -         | -       | -       |  |
| -                                     | -   | -                | -               | -         | -       | -       |  |
| -                                     | -   | -                | -               | -         | -       | -       |  |

GF Code: see Growth Form definitions in Appendix 1

N: native, E: exotic, HTE: high threat exotic

GF - circle code if top 3

Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ..., 100% (foliage cover); Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m

Abundance: 1, 2, 3, ..., 10, 20, 30, ..., 100, 200, ..., 1000, ...

Stratum: E (emergent) T1, T2, T3, S1, S2, S3, G1, G2, G3 etc

## Appendix F – Threatened species likelihood of occurrence

The below map (Figure 7) and assessment includes national and state significant species from the following sources:

- DAWE database (PMST accessed July 2022).
- Search area is 10 km radius.
- Not considered further pelagic seabirds, shorebirds, sandpipers, turtles, whales, sharks - no preferred marine or coastal habitat in Subject Land.

All habitat information is taken from NSW OEH and Commonwealth DEE Threatened Species profiles (DPIE 2020 DEE 2020) unless otherwise stated. The codes used in this table are:

- CE – Critically Endangered
- E – Endangered
- V – Vulnerable
- EP – Endangered Population
- C – CAMBA
- J – JAMBA
- R – ROKAMBA
- CEEC – Critically Endangered Ecological Community
- EEC – Endangered Ecological Community

The Likelihood of Occurrence (Table 19) below includes migratory species not captured in the BAM. It is assumed that all other threatened species with the potential to occur on the site have been captured through the BAM process.

**Table 17 Likelihood of occurrence definitions**

| Likelihood of occurrence | Definition  |
|--------------------------|---|
| <b>Known</b>             | Species recorded in the subject site or Subject Land  |
| <b>High</b>              | Species previously recorded within a 10 kilometre radius of the subject site and suitable habitat occurs within the subject site.   |
| <b>Moderate</b>          | Species previously recorded within a 10 kilometre radius of the subject site but only marginal suitable habitat recorded.<br><br>OR<br><br>Species not previously recorded within a 10 kilometre radius of the subject site, but the Proposal footprint is within the species known distribution and suitable habitat occurs within the Subject Land. |
| <b>Low</b>               | Species previously recorded within a 10 kilometre radius of the subject site but no suitable habitat recorded.  |



| Likelihood of occurrence | Definition   |
|--------------------------|--|
| <b>Unlikely</b>          | Species not previously recorded within a 10 kilometre radius of the subject site and no suitable habitat occurs in the area. |

**Table 18 Likelihood of impact definitions**

| Likelihood of impact | Species/ community will not be impacted by the Proposal.   |
|----------------------|--|
| <b>Unlikely</b>      | Species/ community will not be impacted by the Proposal.   |
| <b>Low</b>           | Species / community has been determined as 'known', 'high' or 'moderate' to occur within the Subject Land/Study Area, but is unlikely to be impacted by the Proposal due to avoidance of individuals and / or their broad habitats within the Subject Site. Impact to important habitat resources will not occur or has been avoided through the design process. |
| <b>Moderate</b>      | Species / community is 'known' or 'likely' to occur within the Subject Land/Study Area and the Proposal will impact on an area of habitat / resources. Impact to individuals / important habitat resources is unlikely or has been avoided / reduced through the design process but may be subject to direct or indirect impacts.                                |
| <b>High</b>          | Species / community is known or likely to occur within the Subject Land/Study Area and the Proposal will impact on important habitat resources or individuals.   |

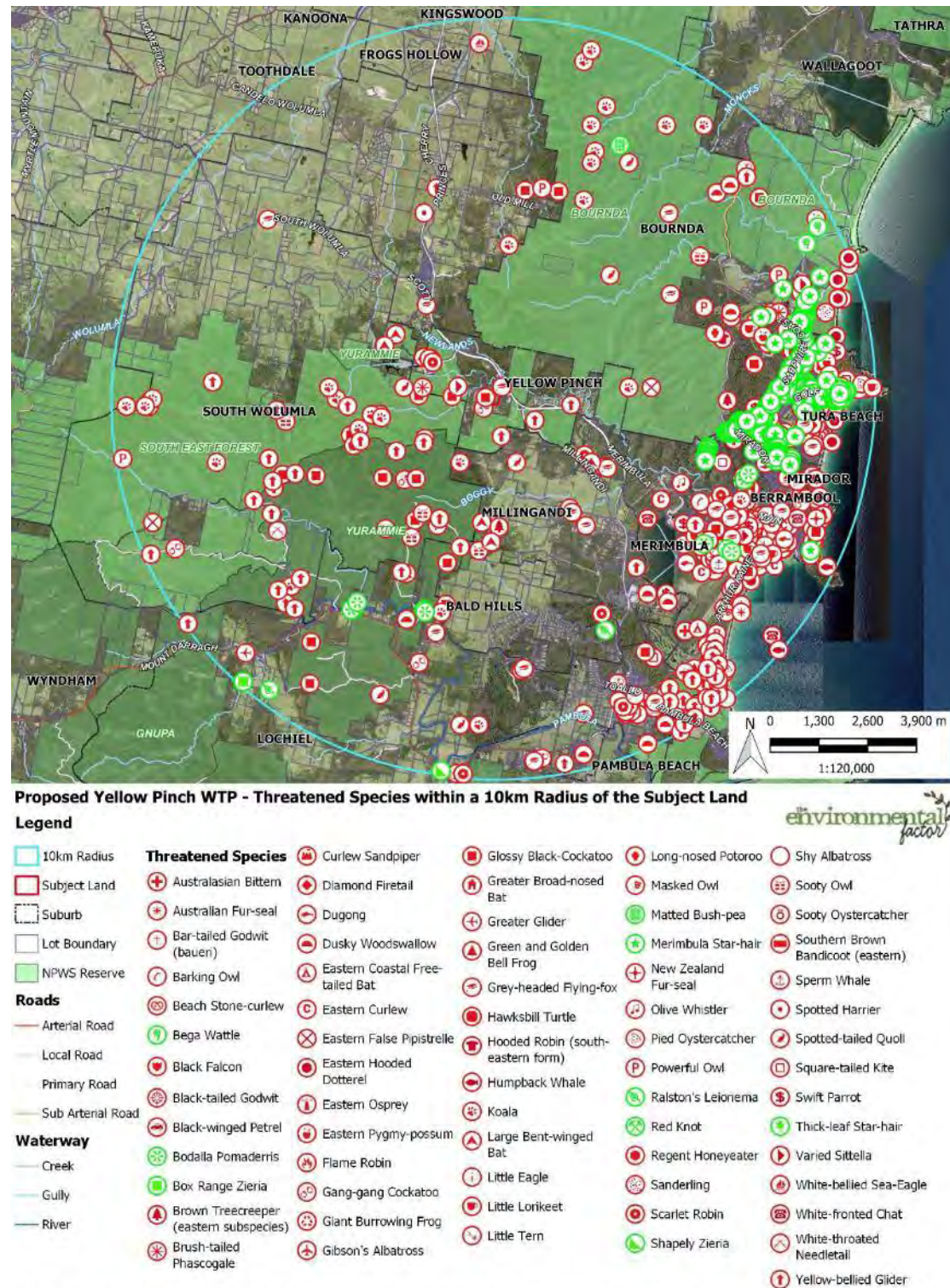


Figure 7 Threatened species recorded within 10km of the Subject Land

**Table 19 Threatened species likelihood of occurrence table**

| Scientific name                 | Common name                | BC Act | EPBC Act | Habitat   | Record        | Likelihood of occurrence  | Likelihood of impact  |
|---------------------------------|----------------------------|--------|----------|---|---------------|---|---|
| <b>Amphibia</b>                 |                            |        |          |   |               |   |   |
| <i>Heleioporus australiacus</i> | Giant Burrowing Frog       | V      | V        | Found in heath and woodland in a variety of soils – except clay based soils. In non-breeding season it may be found over 300 m from the breeding site, buried beneath the leaf litter. Breeding habitat is in first or second order streams. This species is long-lived.  | Bionet / PMST | <b>Moderate</b><br><br>May occur in the wider Study Area and Locality. No streams present in Subject Site or Development area | <b>Low</b><br><br>No impacts anticipated near waterways or in habitat likely to support the species |
| <i>Litoria aurea</i>            | Green and Golden Bell Frog | E      | V        | There are records of occurrence of <i>Litoria aurea</i> from west to Bathurst, Tumut and the ACT region. Since 1990 there have been approximately 50 recorded locations in NSW, most of which are small, coastal, or near coastal populations. These locations occur over the species' former range, however they are widely separated and isolated. Large populations in NSW are located around the metropolitan areas of Sydney, Shoalhaven and mid north coast (one an island population). There is only one known population on the NSW Southern Tablelands. Inhabits marshes, dams and stream-sides, particularly those containing bullrushes ( <i>Typha</i> spp.) or spikerushes ( <i>Eleocharis</i> spp.). Optimum habitat includes water-bodies that are unshaded, free of predatory fish | Bionet / PMST | <b>Low</b><br><br>May occur in the locality. No suitable waterways to support the species in the Subject Land                 | <b>Unlikely</b>   |



| Scientific name           | Common name        | BC Act | EPBC Act | Habitat   | Record | Likelihood of occurrence   | Likelihood of impact |
|---------------------------|--------------------|--------|----------|---|--------|--|----------------------|
|                           |                    |        |          | such as Plague Minnow ( <i>Gambusia holbrooki</i> ), have a grassy area nearby and diurnal sheltering sites available. Some sites occur in highly disturbed areas. This species is active by day and usually breeds in summer when conditions are warm and wet.(Sourced from NSW Office of Environment - Threatened species profile 2022)   |        |  |                      |
| <i>Litoria raniformis</i> | Southern Bell Frog | E      | V        | In NSW the Southern Bell Frog was once distributed along the Murray and Murrumbidgee Rivers and their tributaries, the southern slopes of the Monaro district and the central southern tablelands as far north as Tarana, near Bathurst. Currently, the species is known to exist only in isolated populations in the Coleambally Irrigation Area, the Lowbidgee floodplain and around Lake Victoria. A few yet unconfirmed records have also been made in the Murray Irrigation Area in recent years. Usually found in or around permanent or ephemeral Black Box/Lignum/Nitre Goosefoot swamps, Lignum/Typha swamps and River Red Gum swamps or billabongs along floodplains and river valleys. They are also found in irrigated rice crops, particularly where there is no available natural habitat. Breeding occurs during the warmer months and is triggered by flooding or a significant rise in water levels. Outside the breeding season animals disperse away from the water and take shelter beneath ground debris such as fallen timber and bark, rocks, grass clumps and in deep soil cracks. (Sourced from NSW Office of Environment - Threatened species profile 2022) | PMST   | <b>Unlikely</b><br><br>No records within 10km, and no suitable habitat present | <b>Unlikely</b>      |

| Scientific name              | Common name          | BC Act | EPBC Act | Habitat   | Record | Likelihood of occurrence   | Likelihood of impact |
|------------------------------|----------------------|--------|----------|---|--------|--|----------------------|
| <i>Mixophyes balbus</i>      | Stuttering Frog      | E      | V        | This species is found in wet, tall open forest and rainforest and in the foothills and escarpment on the eastern side of the Great Dividing Range. Breed in streams during summer after heavy rain.   | PMST   | <b>Low</b><br><br>May occur in the locality.<br>No suitable waterways to support the species in the Subject Land | <b>Unlikely</b>      |
| <i>Litoria watsoni</i>       | Watson's Tree Frog   | -      | E        | Watson's Tree Frog is a forest-dependent species, recorded from wet and dry forest, woodland, bushland, and heathland at low to high elevations. Watson's Tree Frog prefers moister areas, with most records from wet forest, followed by damp forest, and warm temperate rainforest (Martin & Littlejohn 1966; Chesterfield et al. 1988; Opie et al. 1990, all cited in Gillespie et al. 2016; Lemckert & Mahony 2018; Mahony et al. 2020). In Victoria, tall moist forest habitats are usually nearby breeding sites, suggesting that these may be important refuges during drought or fire. Watson's Tree Frog has never been recorded from areas of cleared native forest, such as farmland or forest plantations (Gillespie et al. 2016)(DCCEEW 2022). | PMST   | <b>Low</b><br><br>May occur in the locality.<br>No suitable waterways to support the species in the Subject Land | <b>Unlikely</b>      |
| <b>Birds</b>                 |                      |        |          |   |        |  |                      |
| <i>Diomedea antipodensis</i> | Antipodean Albatross | V      | V        | Does not breed in Australia, however small numbers can occur off the NSW south coast from Green Cape to Newcastle during  | PMST   | <b>Low</b>   | <b>Unlikely</b>      |

| Scientific name               | Common name           | BC Act | EPBC Act | Habitat   | Record        | Likelihood of occurrence   | Likelihood of impact |
|-------------------------------|-----------------------|--------|----------|---|---------------|--|----------------------|
|                               |                       |        |          | winter. Foraging of cuttlefish off the NSW coast is considered significant for the species.   |               | May occur in the locality.<br>No suitable habitat to support the species in the Subject Land                   |                      |
| <i>Botaurus poiciloptilus</i> | Australasian Bittern  | E      | E        | Australasian Bitterns are widespread but uncommon over south-eastern Australia. In NSW they may be found over most of the state except for the far north-west. Preferred habitat is comprised of wetlands with tall dense vegetation, where it forages in still, shallow water up to 0.3 m deep, often at the edges of pools or waterways, or from platforms or mats of vegetation over deep water. It favours permanent and seasonal freshwater habitats, particularly those dominated by sedges, rushes and reeds (e.g. Phragmites, Cyperus, Eleocharis, Juncus, Typha, Baumea, Bolboschoenus) or cutting grass (Gahnia) growing over a muddy or peaty substrate. | Bionet / PMST | <b>Low</b><br><br>May occur in the locality.<br>No suitable habitat to support the species in the Subject Land | <b>Unlikely</b>      |
| <i>Sternula nereis nereis</i> | Australian Fairy Tern | -      | V        | This species occurs along the coasts of NSW, VIC, TAS, SA and WA. Fairy Terns utilise a variety of habitats including offshore, estuarine or lacustrine (lake) islands, wetlands, beaches and spits. They nest above the high-water mark often in clear view of the water and on sites where the substrate is sandy and the vegetation low and sparse. Nests typically consist of a shallow   | PMST          | <b>Low</b><br><br>May occur in the locality.<br>No suitable habitat to support the                             | <b>Unlikely</b>      |



| Scientific name             | Common name              | BC Act | EPBC Act | Habitat  | Record | Likelihood of occurrence  | Likelihood of impact   |
|-----------------------------|--------------------------|--------|----------|--|--------|---|--|
|                             |                          |        |          | scrape in the sand which is often lined with small shells and vegetation.  |        | species in the Subject Land   |  |
| <i>Rostratula australis</i> | Australian Painted Snipe | E      | E        | The Australian Painted Snipe is restricted to Australia. Most records are from the south east, particularly the Murray Darling Basin. This species occupies wetland and swamp habitats, preferring the fringes of swamps and dams with a cover of grasses, reeds, scrub or woodland. Breeding occurs anytime during spring and summer when conditions are favourable. It nests on the ground amongst tall vegetation.  | PMST   | <b>Low</b><br><br>May occur in the locality. No suitable habitat to support the species in the Subject Land | <b>Unlikely</b>  |
| <i>Ninox connivens</i>      | Barking Owl              | V      | -        | Found throughout continental Australia except for central arid regions. The Barking Owl requires large tree hollows in order to roost and breed. It occupies open forests and woodlands including partially cleared farmland. They often roost in densely formed Acacia and Casuarina species. Known to successfully breed along timbered watercourses in heavily cleared habitats, where a higher density of prey is found around fertile riparian soils. A large portion of its diet consists of arboreal mammals but can adapt to ground dwelling species where the habitat cannot sustain preferred prey. Requires very large permanent territories in most habitats due to sparse prey densities. | Bionet | <b>High</b><br><br>Suitable habitat present in the Study Area and Locality                                  | <b>Moderate</b><br><br>May utilise resources as foraging habitat |

| Scientific name            | Common name        | BC Act | EPBC Act              | Habitat  | Record | Likelihood of occurrence   | Likelihood of impact |
|----------------------------|--------------------|--------|-----------------------|--|--------|--|----------------------|
| <i>Limosa lapponica</i>    | Bar-tailed Godwit  | -      | V - Migratory Wetland | The Bar-tailed Godwit is found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It is rarely found on inland wetlands or in areas of short grass, such as farmland. The Bar-tailed Godwit usually forages near the edge of water or in shallow water, mainly in tidal estuaries and harbours. (Sourced from Australian Government Department of Agriculture, Water and the Environment - Species Profile - 2022)   | Bionet | <b>Low</b><br><br>May occur in the locality.<br>No suitable habitat to support the species in the Subject Land | <b>Unlikely</b>      |
| <i>Esacus magnirostris</i> | Beach Stone-curlew | CE     | -                     | Beach Stone-curlews are found exclusively along the coast, on a wide range of beaches, islands, reefs and in estuaries, and may often be seen at the edges of or near mangroves. They forage in the intertidal zone of beaches and estuaries, on islands, flats, banks and spits of sand, mud, gravel or rock, and among mangroves. Beach Stone-curlews breed above the littoral zone, at the backs of beaches, or on sandbanks and islands, among low vegetation of grass, scattered shrubs or low trees; also among open mangroves. Birds forage by stalking slowly like a heron or with quicker dashes after prey. The diet consists of crabs and other marine invertebrates. They are mainly active at dawn, dusk and at night, but birds are often seen when they shift or move about sedately during the day. Less strictly nocturnal than the related Bush Stone-curlew ( <i>Burhinus grallarius</i> ). In NSW, clutches have been recorded from early October to late March, but elsewhere in temperate Australia, breeding has been recorded from September. Their nests are just a shallow scrape in sand or | Bionet | <b>Low</b><br><br>May occur in the locality.<br>No suitable habitat to support the species in the Subject Land | <b>Unlikely</b>      |

| Scientific name                 | Common name            | BC Act | EPBC Act | Habitat  | Record | Likelihood of occurrence  | Likelihood of impact   |
|---------------------------------|------------------------|--------|----------|--|--------|---|--|
|                                 |                        |        |          | gravel, above the tidal zone at the backs of beaches, or on sandbanks and islands or among open mangroves. Both parents defend the nest and care for the young. The young are precocial but appear not to be independent until they are 7-12 months old (OEH 2022).  |        |   |  |
| <i>Falco subniger</i>           | Black Falcon           | V      | -        | The Black Falcon is widely, but sparsely, distributed in New South Wales, mostly occurring in inland regions. Tree lined watercourses and isolated woodlands in arid and semi-arid areas are preferred nesting and roosting habitat. Large old trees are a resource that is critical for nesting and hunting.  | Bionet | <b>Moderate</b><br><br>Records in the locality, suitable foraging habitat present in the Study Area. No potential nest trees observed | <b>Moderate</b><br><br>The species could utilise the site as foraging habitat and future breeding habitat (none observed at time of surveys) |
| <i>Thalassarche melanophris</i> | Black-browed Albatross | V      | V        | This species breeds within Australian jurisdiction on Heard Island, McDonald Islands, Macquarie Island, and Bishop and Clerk Islets. A marine species that inhabits Antarctic, subantarctic and temperate waters that sometimes enters the tropics, the Black-browed Albatross forages around the breaks of continental and island shelves and across nearby underwater banks. | PMST   | <b>Low</b><br><br>May occur in the locality. No suitable habitat to support the   | <b>Unlikely</b>  |



| Scientific name               | Common name         | BC Act | EPBC Act | Habitat  | Record | Likelihood of occurrence  | Likelihood of impact |
|-------------------------------|---------------------|--------|----------|--|--------|---|----------------------|
|                               |                     |        |          |  |        | species in the Subject Land   |                      |
| <i>Limosa limosa</i>          | Black-tailed Godwit | V      | -        | The Black-tailed Godwit is a migratory species primarily found on the coast. It is a wading species that breeds in Mongolia and Eastern Siberia and flies to Australia for the southern summer, arriving in August and leaving in March. Usually found in sheltered bays, estuaries and lagoons with large intertidal mudflats and/or sandflats. Further inland, it can also be found on mudflats and in water less than 10 cm deep, around muddy lakes and swamps. Individuals have been recorded in wet fields and sewerage treatment works. Forages for insects, crustaceans, molluscs, worms, larvae, spiders, fish eggs, frog eggs and tadpoles in soft mud or shallow water. Roosts and loafs on low banks of mud, sand and shell bars (OEH 2022). | Bionet | <b>Low</b><br><br>May occur in the locality. No suitable habitat to support the species in the Subject Land | <b>Unlikely</b>      |
| <i>Pterodroma nigripennis</i> | Black-winged Petrel | V      | -        | The Black-winged Petrel is a marine bird which ranges throughout the Tasman Sea and Central Pacific Ocean, breeding at various island groups including Lord Howe Island though in recent years they have expanded their range. They nest in a burrow, up to a metre long in sandy soil but shorter in stony volcanic soil. The burrow is located on higher ground, and the entrance is usually hidden amongst bushes (OEH 2022).   | Bionet | <b>Low</b><br><br>May occur in the locality. No suitable habitat to support the species in the Subject Land | <b>Unlikely</b>      |

| Scientific name                       | Common name                             | BC Act | EPBC Act             | Habitat  | Record | Likelihood of occurrence  | Likelihood of impact   |
|---------------------------------------|---|--------|----------------------|--|--------|---|--|
| <i>Halobaena caerulea</i>             | Blue Petrel                             | -      | V                    | The Blue Petrel has a global distribution throughout the southern oceans from the pack ice edge up to about 30 degrees south. Its breeding site within Australia is Macquarie Island. In NSW it is a rare eruptive visitor between June and September. It tends to occur as a result of severe cyclonic conditions to the south west of Australia which force the birds northwards. Individuals are rarely encountered inshore and offshore over the continental shelf and in pelagic waters off the shelf break. It forages in Antarctic and subantarctic waters mainly on pelagic crustaceans, fish, cephalopods and insects (DPE 2022).                           | PMST   | <b>Low</b><br><br>May occur in the locality. No suitable habitat to support the species in the Subject Land | <b>Unlikely</b>  |
| <i>Climacteris picumnus victoriae</i> | Brown Treecreeper (eastern sub-species) | V      | -                    | The eastern subspecies of Brown Treecreeper lives in eastern NSW in eucalypt woodlands through central NSW and in coastal areas with drier open woodlands such as the Snowy River Valley, Cumberland Plains, Hunter Valley and parts of the Richmond and Clarence Valleys with its western boundary of the range running approximately through Corowa, Wagga Wagga, Temora, Forbes, Dubbo and Inverell. This species territory is in open woodland habitats (including Box-Gum Woodland), preferring woodlands dominated by stringybarks and rough barked eucalypts with a grassy understory. It requires tree hollows in live and dead trees or stumps for nesting. | Bionet | <b>Moderate</b><br><br>Suitable habitat present within the Subject Land                                     | <b>Moderate</b><br><br>Potential foraging habitat would likely be impacted |
| <i>Thalassarche bulleri</i>           | Buller's Albatross                      | -      | V - Migratory Marine | Large, migratory bird, endemic to and breeding solely on New Zealand's islands. After breeding this species migrates to the seas off Peru and Chile. In NSW waters it is a relatively common visitor between March and October. Occurs in both inshore and   | PMST   | <b>Low</b><br><br>May occur in the locality.  | <b>Unlikely</b>  |

| Scientific name              | Common name        | BC Act | EPBC Act             | Habitat   | Record | Likelihood of occurrence  | Likelihood of impact |
|------------------------------|--------------------|--------|----------------------|---|--------|---|----------------------|
|                              |                    |        |                      | offshore waters, including the continental shelf break and pelagic waters.  |        | No suitable habitat to support the species in the Subject Land  |                      |
| <i>Thalassarche impavida</i> | Campbell Albatross | -      | V - Migratory Marine | The Campbell Albatross is a non-breeding visitor to Australian waters, where it appears to be a regular visitor occurring in most months of the year with peaks in winter during the non-breeding season.. A marine sea bird inhabiting sub-Antarctic and subtropical waters from pelagic to shelf-break water habitats, they tolerate sea surface-temperatures from 0–24 °C but are mainly found in the sub-Antarctic. Campbell Albatross feeds on krill and fish, with some cephalopods, salps and jellyfish. | PMST   | <b>Low</b><br><br>May occur in the locality. No suitable habitat to support the species in the Subject Land | <b>Unlikely</b>      |
| <i>Thalassarche eremita</i>  | Chatham Albatross  | -      | E                    | Large, migratory marine bird, endemic to New Zealand. The main foraging range is in coastal waters off eastern and southern New Zealand, and Tasmania .It is however a rare occurrence for this species to be found in southeast Australian waters.   | PMST   | <b>Low</b><br><br>May occur in the locality. No suitable habitat to support the species in the Subject Land | <b>Unlikely</b>      |



| Scientific name                        | Common name       | BC Act | EPBC Act               | Habitat  | Record        | Likelihood of occurrence  | Likelihood of impact   |
|--|-------------------|--------|------------------------|--|---------------|---|--|
| <i>Calidris ferruginea</i>             | Curlew Sandpiper  | E      | CE - Migratory Wetland | Mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. Inland records are probably mainly of birds pausing for a few days during migration. | Bionet / PMST | <b>Low</b><br><br>May occur in the locality. No suitable habitat to support the species in the Subject Land | <b>Unlikely</b>  |
| <i>Stagonopleura guttata</i>           | Diamond firetail  | V      | -                      | The Diamond Firetail tends to occur in proximity to watercourses building small dome nests in shrubs and dense foliage. It is found within Box-Gum Woodlands, Snow Gum Woodlands, open forests, mallee, Natural Temperate Grassland and in secondary grasslands derived from other communities. This species forages on grasses, forbs and insects along the ground.   | Bionet        | <b>Moderate</b><br><br>Suitable habitat present within the Subject Land                                     | <b>Moderate</b><br><br>Potential foraging habitat would likely be impacted |
| <i>Artamus cyanopterus cyanopterus</i> | Dusky Woodswallow | V      | -                      | Dry, open eucalypt forests and woodland are the preferred habitat. Mallee associations with a sparse understorey of eucalypt saplings, acacias and other shrubs and ground cover of grasses or sedges and woody debris are also inhabited. Farmland, particularly forest or woodland edges are also inhabited and very occasionally, moist forest or rainforest.   | Bionet        | <b>Moderate</b><br><br>Suitable habitat present within the Subject Land                                     | <b>Moderate</b><br><br>Potential foraging habitat would likely be impacted |

| Scientific name                        | Common name             | BC Act | EPBC Act               | Habitat  | Record        | Likelihood of occurrence  | Likelihood of impact  |
|--|-------------------------|--------|------------------------|--|---------------|---|---|
| <i>Dasyornis brachypterus</i>          | Eastern Bristlebird     | E      | E                      | The distribution of the Eastern Bristlebird has contracted to three disjunct areas of south-eastern Australia in Northern - southern Queensland/northern NSW, Central - Barren Ground NR, Budderoo NR, Woronora Plateau, Jervis Bay NP, Booderee NP and Beecroft Peninsula and Southern - Nadgee NR and Croajingalong NP in the vicinity of the NSW/Victorian border. Habitat is characterised by dense, low vegetation including heath and open woodland, fire age of the habitat is important. In northern NSW habitat is open forest with dense tussocky grass understorey. | PMST          | <b>Moderate</b><br><br>Potential habitat present in the Study Area  | <b>Low</b><br><br>Potential habitat unlikely to be impacted by the Proposal |
| <i>Numenius madagascariensis</i>       | Eastern Curlew          | -      | CE - Migratory Wetland | The Eastern Curlew is found on intertidal mudflats and sandflats, often with beds of seagrass, on sheltered coasts, especially estuaries, mangrove swamps, bays, harbours, lagoons and occasionally on wooden oyster leases or other similar structures. It is rarely found inland. The Eastern Curlew occurs only in our flyway, and about 75 per cent of the world's curlews winter in Australia.  | Bionet / PMST | <b>Low</b><br><br>May occur in the locality. No suitable habitat to support the species in the Subject Land | <b>Unlikely</b>   |
| <i>Thinornis cucullatus cucullatus</i> | Eastern Hooded Dotterel | CE     | V                      | The Hooded Plover is endemic to southern Australia and is nowadays found mainly along the coast from south of Jervis Bay, NSW, south through Victoria and Tasmania to the western side of the Eyre Peninsula (South Australia). Presently the Hooded Plover occurs in NSW north to Sussex Inlet. In south-eastern Australia Hooded Plovers prefer sandy ocean beaches, especially  | Bionet / PMST | <b>Low</b><br><br>May occur in the locality. No suitable habitat to   | <b>Unlikely</b>   |

| Scientific name          | Common name    | BC Act | EPBC Act | Habitat   | Record | Likelihood of occurrence  | Likelihood of impact |
|--------------------------|----------------|--------|----------|---|--------|---|----------------------|
|                          |                |        |          | those that are broad and flat, with a wide wave-wash zone for feeding, much beachcast seaweed, and backed by sparsely vegetated sand-dunes for shelter and nesting. Occasionally Hooded Plovers are found on tidal bays and estuaries, rock platforms and rocky or sand-covered reefs near sandy beaches, and small beaches in lines of cliffs. At night they favour the upper zones of beaches for roosting. The Hooded Plover diet consists mainly of marine worms, molluscs, crustaceans, insects, water plants and seeds. In eastern Australia, Hooded Plovers usually breed from August to March on sandy ocean beaches strewn with beachcast seaweed, and often nest within 6 m of the fore-dune, mostly within 5 m of the high-water mark, but occasionally among or behind dunes. The nest is a scrape in the sand near debris, making it vulnerable to predators and beach disturbance (OEH 2022). |        | support the species in the Subject Land   |                      |
| <i>Pandion cristatus</i> | Eastern Osprey | V      | -        | Water dependent bird of prey found right around the Australian coastline except Victoria and Tasmania. The species is uncommon to rare or absent from closely settled parts of south-eastern Australia. There are a handful of records from inland areas. These birds favour coastal areas, especially the mouths of large rivers, lakes and lagoons. Breed within 1 km of the sea, high up in dead trees or the crowns of live trees.  | Bionet | <b>Low</b><br><br>May occur in the locality. No suitable habitat to support the species in the Subject Land | <b>Unlikely</b>      |



| Scientific name                 | Common name            | BC Act | EPBC Act | Habitat  | Record        | Likelihood of occurrence  | Likelihood of impact   |
|---------------------------------|------------------------|--------|----------|--|---------------|---|--|
| <i>Pachyptila turtur</i>        | Fairy Prion (southern) | -      | V        | The Fairy Prion (southern) breeds on a few remote islands in the Southern Ocean. The species as a whole has a circumpolar distribution, and probably frequents subtropical waters during the non-breeding period. It has been recorded breeding on subantarctic and cool temperate islands in the Southern Hemisphere (DCCEEW 2022).   | PMST          | <b>Low</b><br><br>May occur in the locality. No suitable habitat to support the species in the Subject Land | <b>Unlikely</b>  |
| <i>Petroica phoenicea</i>       | Flame Robin            | V      | -        | Breeds in upland tall moist eucalypt forests and woodlands, often on ridges and slopes. Prefers clearings or areas with open understoreys. Occasionally occurs in temperate rainforest, and also in herbfields, heathlands, shrublands and sedgelands at high altitudes. In winter, birds migrate to drier more open habitats in the lowlands (i.e. valleys below the ranges, and to the western slopes and plains). Nests are often near the ground and are built in sheltered sites, such as shallow cavities in trees, stumps or banks. | Bionet        | <b>Moderate</b><br><br>Suitable habitat present within the Subject Land                                     | <b>Moderate</b><br><br>Potential foraging habitat would likely be impacted |
| <i>Callocephalon fimbriatum</i> | Gang-gang Cockatoo     | V      | -        | This species is nomadic, spending summer in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests and winter at lower altitudes in drier more open eucalypt forest and woodlands, particularly in coastal areas. This species nests in hollow-bearing trees close to water with breeding taking place between October and January. Favours old growth forest and woodland attributes with dense   | Bionet / PMST | <b>Moderate</b><br><br>Suitable habitat present within the Subject Land                                     | <b>Moderate</b><br><br>Potential foraging habitat would likely be impacted |

| Scientific name                | Common name           | BC Act | EPBC Act | Habitat  | Record        | Likelihood of occurrence  | Likelihood of impact   |
|--------------------------------|-----------------------|--------|----------|--|---------------|---|--|
|                                |                       |        |          | understoreys, for nesting and roosting. Nests are located in hollows that are 10 cm in diameter or larger and at least 9 m above the ground in eucalypts.  |               |   |  |
| <i>Diomedea gibsoni</i>        | Gibson's Albatross    | V      | V        | Breeding restricted to New Zealand, non-breeding range extends off the NSW Coast. Feeds pelagically and waters off NSW considered significant.   | Bionet / PMST | <b>Low</b><br>May occur in the locality. No suitable habitat to support the species in the Subject Land | <b>Unlikely</b>  |
| <i>Calyptorhynchus lathami</i> | Glossy Black-Cockatoo | V      | -        | This species predominantly nests in eucalypts and feeds on casuarinas. It nests in both living and dead trees. Glossy Black Cockatoos prefer to live in untouched, rugged country, especially that containing Brigalow scrub or rocky hilly country. Other habitat includes where she-oaks are common, coastal woodlands and drier forest areas as well as timbered watercourses. The species is uncommon although widespread throughout suitable forest and woodland habitats, from the central Queensland coast to East Gippsland in Victoria, and inland to the southern tablelands and central western plains of NSW, with a small population in the Riverina. | Bionet        | <b>Moderate</b><br>Suitable foraging habitat (Allocasuarina/ Casuarina) species present                 | <b>Moderate</b><br>Potential foraging habitat would likely be impacted |

| Scientific name                         | Common name         | BC Act | EPBC Act             | Habitat  | Record | Likelihood of occurrence  | Likelihood of impact |
|---|---------------------|--------|----------------------|--|--------|---|----------------------|
| <i>Pterodroma leucoptera leucoptera</i> | Gould's Petrel      | V      | E                    | Gould's Petrel breeds on both Cabbage Tree Island, 1.4 km offshore from Port Stephens and on nearby Boondelbah island. The range and feeding areas of non-breeding petrels are unknown they usually arrive on cabbage tree Island from mid to late September. Principal nesting habitat is located within two gullies which are characterised by steeply, sloping rock scree with a canopy of Cabbage Tree Palms. They nest predominantly in natural rock crevices among the rock scree and also in hollow fallen palm trunks, under mats of fallen palm fronds and in cavities among the buttresses of fig trees. They breed colonially and the nests are clumped and often less than 1 m apart. Egg laying takes place over a six week period commencing in early November (DPE 2022). | PMST   | <b>Low</b><br><br>May occur in the locality. No suitable habitat to support the species in the Subject Land | <b>Unlikely</b>      |
| <i>Charadrius leschenaultii</i>         | Greater Sand-plover | V      | V - Migratory Marine | Apparently rare on the east coast, usually found singly. Has been recorded between Illawarra and the Northern Rivers along the NSW east coast. Almost entirely restricted to coastal areas in NSW, occurring mainly on sheltered sandy, shelly or muddy beaches or estuaries with large intertidal mudflats or sandbanks. Roosts during high tide on sandy beaches and rocky shores; begin foraging activity on wet ground at low tide, usually away from the edge of the water; individuals may forage and roost with other waders.   | PMST   | <b>Low</b><br><br>May occur in the locality. No suitable habitat to support the species in the Subject Land | <b>Unlikely</b>      |
| <i>Falco hypoleucos</i>                 | Grey Falcon         | E      | -                    | Restricted to shrubland, grassland and wooded watercourses and sometimes near wetlands where surface water attracts prey.  | PMST   | <b>Low</b>  | <b>Unlikely</b>      |



| Scientific name                        | Common name                       | BC Act | EPBC Act | Habitat   | Record | Likelihood of occurrence  | Likelihood of impact   |
|--|-----------------------------------|--------|----------|---|--------|---|--|
|  |                                   |        |          | Occasionally found in open woodlands near the coast. Nests are constructed in high living eucalypts near a watercourse.   |        | May occur in the locality. No suitable habitat to support the species in the Subject Land                   |  |
| <i>Melanodryas cucullata cucullata</i> | Hooded Robin (south-eastern form) | V      | -        | The Hooded Robin is considered a sedentary species, but local seasonal movements are possible. Prefers lightly wooded country, usually open eucalypt woodland, wattle scrub and mallee, often in or near clearings or open areas. The species requires structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses. Territories range from around 10 ha during the breeding season, to 30 ha in the non-breeding season. | Bionet | <b>Moderate</b><br><br>Suitable habitat present within the Subject Land                                     | <b>Moderate</b><br><br>Potential foraging habitat would likely be impacted |
| <i>Thalassarche carteri</i>            | Indian Yellow-nosed Albatross     | -      | V        | Indian yellow-nosed albatrosses return to the breeding colonies in late August. Indian yellow-nosed albatross feeds on fish, crustaceans and cephalopods, snatching prey from the surface and by diving into the water (ALA 2022).  | PMST   | <b>Low</b><br><br>May occur in the locality. No suitable habitat to support the species in the Subject Land | <b>Unlikely</b>  |

| Scientific name               | Common name     | BC Act | EPBC Act | Habitat  | Record | Likelihood of occurrence  | Likelihood of impact   |
|-------------------------------|-----------------|--------|----------|--|--------|---|--|
| <i>Hieraaetus morphnoides</i> | Little Eagle    | V      | -        | The Little Eagle occupies habitats rich in prey within open eucalypt forest, woodland or open woodland. Sheoak or acacia woodlands and riparian woodlands of interior NSW are also used. For nest sites it requires a tall living tree within a remnant patch, where pairs build a large stick nest in winter and lay in early spring.   | Bionet | <b>Moderate</b><br><br>Records in the locality, suitable foraging habitat present in the Study Area. No potential nest trees observed | <b>Moderate</b><br><br>The species could utilise the site as foraging habitat and future breeding habitat (none observed at time of surveys) |
| <i>Glossopsitta pusilla</i>   | Little Lorikeet | V      | -        | In NSW Little Lorikeets are distributed in forests and woodlands from the coast to the western slopes of the Great Dividing Range, extending westwards to the vicinity of Albury, Parkes, Dubbo and Narrabri. They are considered nomadic responding to food availability and highly gregarious often foraging in mixed flocks. They occur in dry, open eucalypt forests and woodlands using roadside vegetation. They rely on nectar and pollen, particularly on profusely-flowering eucalypts, melaleucas and mistletoes. On the western slopes and tablelands White Box E. albens and Yellow Box E. melliodora are particularly important food sources for pollen and nectar respectively. They often | Bionet | <b>Moderate</b><br><br>Suitable habitat present within the Subject Land   | <b>Moderate</b><br><br>Potential foraging habitat would likely be impacted   |

| Scientific name             | Common name | BC Act | EPBC Act | Habitat  | Record | Likelihood of occurrence  | Likelihood of impact   |
|-----------------------------|-------------|--------|----------|--|--------|---|--|
|                             |             |        |          | return to the same nest hollow annually preferring smooth barked Eucalypts with small hollows (3 cm entrance diameter).  |        |   |  |
| <i>Sternula albifrons</i>   | Little Tern | E      | -        | The Little Tern migrates from eastern Asia, and can be found on the north, east and south-east Australian coasts. It is almost exclusively coastal, preferring sheltered environments, though can occur several kilometres from the sea in harbours, inlets and rivers. Nests in small, scattered colonies in low dunes or on sandy beaches just above high tide mark near estuary mouths or adjacent to coastal lakes and islands. This species forages for small fish, crustaceans, insects, worms and molluscs by plunging in the shallow water of channels and estuaries. The nest is a scrape in the sand, which may be lined with shell grit, seaweed or small pebbles. Both parents aggressively defend the nest against intruders until the young fledge at 17 - 19 days (OEH 2022). | Bionet | <b>Low</b><br><br>May occur in the locality. No suitable habitat to support the species in the Subject Land | <b>Unlikely</b>  |
| <i>Tyto novaehollandiae</i> | Masked Owl  | V      | -        | The Masked Owl distribution extends across eastern Australia occupying forest and open woodland with adjacent clearings. Lives in dry eucalypt forests and woodlands to 1100 m. The typical diet consists of tree-dwelling and ground mammals, particularly rats. Pairs have a large home-range of 500 to 1000 ha. This species roosts in large tree hollows, dense foliage, caves. Similarly nesting requires large tree hollows or caves.  | Bionet | <b>High</b><br><br>Suitable habitat present in the Study Area and Locality                                  | <b>Moderate</b><br><br>May utilise resources as foraging habitat |



| Scientific name                    | Common name                 | BC Act | EPBC Act | Habitat   | Record | Likelihood of occurrence   | Likelihood of impact |
|------------------------------------|-----------------------------|--------|----------|---|--------|--|----------------------|
| <i>Thalassarche bulleri platei</i> | Northern Buller's Albatross | -      | V        | Large, migratory bird, endemic to New Zealand. Migrates to the seas off Peru and Chile after breeding. In NSW waters it is a relatively common visitor between March and October occurring in both inshore and offshore waters, including the continental shelf break and pelagic waters. | PMST   | <b>Low</b><br>May occur in the locality.<br>No suitable habitat to support the species in the Subject Land | <b>Unlikely</b>      |
| <i>Macronectes halli</i>           | Northern Giant Petrel       | V      | V        | Common visitor to NSW waters – mostly immature. Breed as dispersed pairs in tussocks of dense vegetation and broken terrain. In Australia, breeding is restricted to Macquarie Island.  | PMST   | <b>Low</b><br>May occur in the locality.<br>No suitable habitat to support the species in the Subject Land | <b>Unlikely</b>      |
| <i>Diomedea sanfordi</i>           | Northern Royal Albatross    | -      | E        | Breeds in NZ waters. A rare visitor to NSW waters, predominantly visiting southern waters in the winter and early spring period. Primarily forages inshore and offshore waters, feeding on cephalopods, crustacea, carrion and salps.   | PMST   | <b>Low</b><br>May occur in the locality.<br>No suitable habitat to support the                             | <b>Unlikely</b>      |

| Scientific name                | Common name  | BC Act | EPBC Act              | Habitat   | Record | Likelihood of occurrence  | Likelihood of impact   |
|--------------------------------|--|--------|-----------------------|---|--------|---|--|
|                                |  |        |                       |   |        | species in the Subject Land   |  |
| <i>Limosa lapponica baueri</i> | Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit | -      | V - Migratory Wetland | In NSW is rarely found on inland wetlands or in areas of short grass such as farmland, paddocks and airstrips. Found mainly in coastal habitats, estuaries, coastal lagoons and bays, occasionally in salt lakes and brackish wetlands, sandy ocean beaches and rock platforms. They arrive in NSW between August and October and then leave between February and April, with a small number of individuals overwintering.  | PMST   | <b>Low</b><br>May occur in the locality. No suitable habitat to support the species in the Subject Land | <b>Unlikely</b>  |
| <i>Pachycephala olivacea</i>   | Olive Whistler   | V      | -                     | The Olive Whistler inhabits the wet forests on the ranges of the east coast, chiefly occupying the beech forests around Barrington Tops and the MacPherson Ranges in the north and wet forests from Illawarra south to Victoria. In the south it is found inland to the Snowy Mountains and the Brindabella Range. Mostly inhabit wet forests above about 500m. During the winter months they may move to lower altitudes. Forage in trees and shrubs and on the ground, feeding on berries and insects. Make nests of twigs and grass in low forks of shrubs (OEH 2022). | Bionet | <b>Moderate</b><br>Suitable habitat present within the Subject Land                                     | <b>Moderate</b><br>Potential foraging habitat would likely be impacted |
| <i>Neophema chrysogaster</i>   | Orange-bellied Parrot  | CE     | CE                    | The Orange-bellied Parrot breeds in the south-west of Tasmania and migrates in autumn to spend the winter on the mainland coast of south-eastern South Australia and southern Victoria. Spits and islands are favoured with typical winter habitat is   | PMST   | <b>Low</b><br>May occur in the locality.  | <b>Unlikely</b>  |

| Scientific name                | Common name        | BC Act | EPBC Act | Habitat   | Record | Likelihood of occurrence   | Likelihood of impact  |
|--------------------------------|--------------------|--------|----------|---|--------|--|---|
|                                |                    |        |          | saltmarsh and strandline/foredune vegetation communities either on coastlines or coastal lagoons. Forages in weedy areas associated with these coastal habitats or even in totally modified landscapes such as pastures, seed crops and golf courses. Diet mainly comprises seeds and fruits of sedges and salt-tolerant coastal and saltmarsh plants, and occasionally flowers and stems are eaten (DPE 2022).   |        | No suitable habitat to support the species in the Subject Land   |   |
| <i>Grantiella picta</i>        | Painted Honeyeater | V      | V        | A nomadic species inhabiting Boree/ Weeping Myall ( <i>Acacia pendula</i> ), Brigalow ( <i>A. harpophylla</i> ) and Box-Gum Woodlands and Box-Ironbark Forests. A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus <i>Amyema</i> . Insects and nectar from mistletoe or eucalypts are occasionally eaten. Nest from spring to autumn in a small, delicate nest hanging within the outer canopy of drooping eucalypts, she-oak, paperbark or mistletoe branches. | PMST   | <b>Low</b><br><br>May occur in the locality.<br>No suitable habitat to support the species in the Subject Land | <b>Unlikely</b><br><br>No suitable foraging habitat (mistletoe) likely to be impacted |
| <i>Haematopus longirostris</i> | Pied Oystercatcher | E      | -        | Distributed around the entire Australian coastline and thinly scattered along the NSW coastline with fewer than 200 pairs estimated to occur in the state. They favour intertidal flats of inlets and bays, open beaches and sandbanks where they can forage on exposed sand, mud and rock at low tide.   | Bionet | <b>Low</b><br><br>May occur in the locality.<br>No suitable habitat to support the                             | <b>Unlikely</b>   |



| Scientific name              | Common name  | BC Act | EPBC Act | Habitat   | Record | Likelihood of occurrence  | Likelihood of impact   |
|------------------------------|--------------|--------|----------|---|--------|---|--|
|                              |              |        |          |   |        | species in the Subject Land   |  |
| <i>Pycnoptilus floccosus</i> | Pilotbird    | -      | V        | The Pilotbird is found in wet forested areas and heathland in eastern Victoria and southeastern New South Wales. It forages on the ground, turning over leaf litter using strong legs.  | PMST   | <b>Low</b><br><br>May occur in the locality. No suitable habitat to support the species in the Subject Land | <b>Unlikely</b>  |
| <i>Ninox strenua</i>         | Powerful Owl | V      | -        | The Powerful Owl is the largest owl in Australasia. It is a typical hawk-owl, with large yellow eyes and no facial-disc. In NSW, it is widely distributed throughout the eastern forests from the coast inland to tablelands, with scattered records on the western slopes and plains. The species breeds and hunts in open or closed sclerophyll forest or woodlands and occasionally hunts in open habitats. It roosts by day in dense vegetation comprising species such as Turpentine Syncarpia glomulifera, Black She-oak Allocasuarina littoralis, Blackwood Acacia melanoxylon, Rough-barked Apple Angophora floribunda, Cherry Ballart Exocarpus cupressiformis and a number of eucalypt species. | Bionet | <b>High</b><br><br>Suitable habitat present in the Study Area and Locality                                  | <b>Moderate</b><br><br>May utilise resources as foraging habitat |

| Scientific name             | Common name        | BC Act | EPBC Act                   | Habitat   | Record           | Likelihood of occurrence  | Likelihood of impact   |
|-----------------------------|--------------------|--------|----------------------------|---|------------------|---|--|
| <i>Calidris canutus</i>     | Red Knot           | -      | E -<br>Migratory<br>Marine | In NSW it is recorded in small numbers along some of the major river estuaries and sheltered embayments of the coastline, in particular the Hunter River estuary. This bird is rarely seen away from the coast. Occurs in small numbers on intertidal mudflats, bays, lagoons, inlets and estuaries and sandy beaches of sheltered coasts.  | Bionet /<br>PMST | <b>Low</b><br><br>May occur in the locality. No suitable habitat to support the species in the Subject Land | <b>Unlikely</b>  |
| <i>Anthochaera phrygia</i>  | Regent Honeyeater  | CE     | CE                         | The Regent Honeyeater is a migratory woodland bird moving across the landscape in response to climatic conditions and food availability. This species prefers Box-Ironbark woodland and riparian forests particularly habitats with mature trees, high canopy cover and abundance of mistletoes. Nonbreeding flocks occasionally seen in coastal areas foraging in flowering Spotted Gum and Swamp Mahogany forests, presumably in response to drought. | Bionet /<br>PMST | <b>Moderate</b><br><br>Suitable habitat present within the Subject Land                                     | <b>Moderate</b><br><br>Potential foraging habitat would likely be impacted |
| <i>Thalassarche salvini</i> | Salvin's Albatross | -      | V -<br>Migratory<br>Marine | Salvin's Albatross is a marine species occurring in subantarctic and subtropical waters, reaching the tropics in the cool Humboldt Current, off South America. Salvin's Albatross is a non-breeding visitor to Australian waters.   | PMST             | <b>Low</b><br><br>May occur in the locality. No suitable habitat to support the                             | <b>Unlikely</b>  |

| Scientific name         | Common name   | BC Act | EPBC Act | Habitat   | Record | Likelihood of occurrence  | Likelihood of impact  |
|-------------------------|---------------|--------|----------|---|--------|---|---|
|                         |               |        |          |   |        | species in the Subject Land   |   |
| <i>Calidris alba</i>    | Sanderling    | V      | -        | The Sanderling is a regular summer migrant from Siberia and other Arctic breeding grounds to most of the Australian coastline. It arrives from September and leaves by May, though some may overwinter in Australia. Sanderlings occur along the NSW coast, with occasional inland sightings. Often found in coastal areas on low beaches of firm sand, near reefs and inlets, along tidal mudflats and bare open coastal lagoons; individuals are rarely recorded in near-coastal wetlands. Individuals run behind receding waves, darting after insects, larvae and other small invertebrates in the sand though also feeds on plants, seeds, worms, crustaceans, spiders, jellyfish and fish, foraging around rotting heaps of kelp. Roosts on bare sand, behind clumps of beach-cast kelp or in coastal dunes (OEH 2022). | Bionet | <b>Low</b><br><br>May occur in the locality. No suitable habitat to support the species in the Subject Land | <b>Unlikely</b>   |
| <i>Petroica boodang</i> | Scarlet Robin | V      | -        | In NSW, this species occupies open forests and woodlands from the coast to the inland slopes. It breeds in drier eucalypt forests and temperate woodlands, often on ridges and slopes, within an open understorey of shrubs and grasses and sometimes in open areas. Abundant logs and coarse woody debris are important structural components of its habitat. In autumn and winter it migrates to more open habitats such as grassy open woodland or paddocks with scattered trees.  | Bionet | <b>Recorded</b><br><br>Species recorded during site surveys foraging within                                 | <b>High</b><br><br>Known habitat would be removed as a result of the proposed development |

| Scientific name                 | Common name         | BC Act | EPBC Act | Habitat   | Record        | Likelihood of occurrence  | Likelihood of impact   |
|---------------------------------|---------------------|--------|----------|---|---------------|---|--|
|                                 |                     |        |          |   |               | Development area  |  |
| <i>Thalassarche cauta cauta</i> | Shy Albatross       | V      | E        | This pelagic or ocean-going species inhabits subantarctic and subtropical marine waters, spending the majority of its time at sea. This species is circumpolar in distribution, occurring widely in the southern oceans. Islands off Australia and New Zealand provide breeding habitat. In Australian waters, the Shy Albatross occurs along the east coast from Stradbroke Island in Queensland along the entire south coast of the continent to Carnarvon in Western Australia.  | Bionet / PMST | <b>Low</b><br><br>May occur in the locality. No suitable habitat to support the species in the Subject Land | <b>Unlikely</b>  |
| <i>Tyto tenebricosa</i>         | Sooty Owl           | V      | -        | The Sooty Owl occurs around the east coast of Australia around coastal escarpment, and also along the eastern tablelands. This species occupies permanent territories in rainforests, including dry rainforests, subtropical and warm temperate rainforests, as well as moist eucalypt forests. The species roosts by day in the hollow of a tall forest tree or in heavy vegetation and hunts by night for small ground and tree-dwelling mammals. The Sooty Owl require very large tree-hollows for nesting (OEH 2022). | Bionet / PMST | <b>High</b><br><br>Suitable habitat present in the Study Area and Locality                                  | <b>Moderate</b><br><br>May utilise resources as foraging habitat |
| <i>Haematopus fuliginosus</i>   | Sooty Oystercatcher | V      | -        | Sooty Oystercatchers are found around the entire Australian coast, including offshore islands, favouring rocky headlands, rocky shelves, exposed reefs with rock pools, beaches and muddy estuaries. This species forages on exposed rock or coral at low tide for foods such as limpets and mussels. Breeding  | Bionet        | <b>Low</b><br><br>May occur in the locality. No suitable  | <b>Unlikely</b>  |



| Scientific name              | Common name              | BC Act | EPBC Act             | Habitat   | Record | Likelihood of occurrence  | Likelihood of impact |
|------------------------------|--------------------------|--------|----------------------|---|--------|---|----------------------|
|                              |                          |        |                      | occurs in spring and summer almost exclusively on offshore islands, nesting is a shallow scrape on the ground, or small mounds of pebbles, shells or seaweed when nesting among rocks (OEH 2022).   |        | habitat to support the species in the Subject Land  |                      |
| <i>Macronectes giganteus</i> | Southern Giant-Petrel    | E      | E - Migratory Marine | The Southern Giant-Petrel breeds on six subantarctic and Antarctic islands in Australian territory and is a common visitor off the NSW coast.   | PMST   | <b>Low</b><br><br>May occur in the locality. No suitable habitat to support the species in the Subject Land | <b>Unlikely</b>      |
| <i>Diomedea epomophora</i>   | Southern Royal Albatross | -      | E                    | The Northern Royal Albatross breeds in New Zealand waters. Away from its nesting sites this Albatross is circumpolar between 30 and 45 degrees south. It is a rare visitor to NSW waters, predominantly visiting southern waters in the winter and early spring period. The Northern Royal Albatross primarily forages in inshore and offshore waters over the continental shelf to the shelf edge, feeding mainly on cephalopods and fish, but also salps, crustacea and carrion (DPE 2022). | PMST   | <b>Low</b><br><br>May occur in the locality. No suitable habitat to support the species in the Subject Land | <b>Unlikely</b>      |
| <i>Circus assimilis</i>      | Spotted Harrier          | V      | -                    | Occurs in grassy open woodland including Acacia and mallee remnants, inland riparian woodland, grassland and shrub steppe.  | Bionet | <b>Moderate</b>   | <b>Moderate</b>      |

| Scientific name           | Common name        | BC Act | EPBC Act | Habitat   | Record | Likelihood of occurrence  | Likelihood of impact   |
|---------------------------|--------------------|--------|----------|---|--------|---|--|
|                           |                    |        |          | Found most commonly in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands on terrestrial mammals (eg bandicoots, bettongs, and rodents), birds and reptiles. They build a stick nest in a tree and lays eggs in spring (or sometimes autumn), with young remaining in the nest for several months.  |        | Records in the locality, suitable foraging habitat present in the Study Area. No potential nest trees observed                        | The species could utilise the site as foraging habitat and future breeding habitat (none observed at time of surveys)                        |
| <i>Lophoictinia isura</i> | Square-tailed Kite | V      | -        | The Square-tailed Kite ranges along coastal and subcoastal areas in NSW and Victoria. They're a regular resident in the north, north-east of NSW and along the major west-flowing river systems. It is a summer breeding migrant to the south-east, including the NSW south coast, arriving in September and leaving by March. Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses. In arid north-western NSW, the species has been observed in stony country with a ground cover of chenopods and grasses, open acacia scrub and patches of low open eucalypt woodland. Appears to occupy large hunting ranges of more than 100km <sup>2</sup> . Breeding is from July to February, with nest sites generally located along or near watercourses, in a | Bionet | <b>Moderate</b><br><br>Records in the locality, suitable foraging habitat present in the Study Area. No potential nest trees observed | <b>Moderate</b><br><br>The species could utilise the site as foraging habitat and future breeding habitat (none observed at time of surveys) |

| Scientific name                  | Common name         | BC Act | EPBC Act             | Habitat  | Record        | Likelihood of occurrence   | Likelihood of impact   |
|----------------------------------|---------------------|--------|----------------------|--|---------------|--|--|
|                                  |                     |        |                      | fork or on large horizontal limbs. (Sourced from NSW Office of Environment - Threatened species profile 2022)  |               |  |  |
| <i>Lathamus discolor</i>         | Swift Parrot        | E      | CE                   | In NSW, the Swift Parrot mostly occurs mostly on the coast and south west slopes. It breeds in Tasmania and returns to the south-eastern mainland to forage over the cooler months (March – October). They move across the landscape to forage on lerp infestations or an abundance of eucalypt flowers. Preferred feed trees include Eucalyptus robusta, Corymbia maculata, C. gummifera, E. sideroxylon and E. albens. | Bionet / PMST | <b>Moderate</b><br><br>Suitable foraging habitat present within the Subject Land | <b>Moderate</b><br><br>Potential foraging habitat would likely be impacted |
| <i>Daphoenositta chrysoptera</i> | Varied Sittella     | V      | -                    | The Varied Sittella is sedentary and inhabits most of mainland Australia except the treeless deserts and open grasslands, with a nearly continuous distribution in NSW from the coast to the far west. It prefers open Eucalypt and Acacia woodlands with Stringybark Eucalypts from which to glean insects. They are territorial preferring to use the same tree fork to construct nests for breeding.                  | Bionet        | <b>Moderate</b><br><br>Suitable foraging habitat present within the Subject Land | <b>Moderate</b><br><br>Potential foraging habitat would likely be impacted |
| <i>Diomedea exulans</i>          | Wandering Albatross | E      | V - Migratory Marine | The Wandering Albatross visits waters extending the entire length of the NSW coast between June and September, spending the majority of their time in flight. Breeding takes place on exposed hills and rocky edges amongst open and patchy vegetation. Feeding takes place in pelagic offshore and inshore waters.  | PMST          | <b>Low</b><br><br>May occur in the locality. No suitable habitat to support the  | <b>Unlikely</b>  |

| Scientific name                     | Common name                | BC Act | EPBC Act | Habitat  | Record | Likelihood of occurrence  | Likelihood of impact |
|-------------------------------------|----------------------------|--------|----------|--|--------|---|----------------------|
|                                     |                            |        |          |  |        | species in the Subject Land   |                      |
| <i>Haliaeetus leucogaster</i>       | White-bellied Sea-eagle    | V      | -        | The White-bellied Sea-eagle is distributed around the Australian coastline, including Tasmania, and well inland along rivers and wetlands of the Murray Darling Basin. Habitats are characterised by the presence of large areas of open water including larger rivers. Terrestrial habitats include grassland, heathland, woodland and forests. Breeding habitat consists of mature tall open forest, open forest, tall woodland, and swamp sclerophyll forest close to foraging habitat. Nest trees are typically large emergent eucalypts and often have emergent dead branches or large dead trees nearby which are used as 'guard roosts'. Typically lays two eggs between June and September with young birds remaining in the nest for 65-70 days. (Sourced from NSW Office of Environment - Threatened species profile - 2022) | Bionet | <b>Low</b><br><br>May occur in the locality. No suitable habitat to support the species in the Subject Land | <b>Unlikely</b>      |
| <i>Fregetta grallaria grallaria</i> | White-bellied Storm Petrel | V      | V        | The White-bellied Storm Petrel has a wide oceanic distribution in the south Pacific and Atlantic Oceans, ranging into tropical waters from various breeding grounds, with vagrant birds occur in coastal NSW waters, particularly after storm events. Known to breed at various island groups including Lord Howe Island. Nests consist of a chamber usually located amongst large rocks (DPE 2022).   | PMST   | <b>Low</b><br><br>May occur in the locality. No suitable habitat to support the species in the Subject Land | <b>Unlikely</b>      |



| Scientific name                  | Common name               | BC Act | EPBC Act             | Habitat   | Record        | Likelihood of occurrence  | Likelihood of impact   |
|----------------------------------|---------------------------|--------|----------------------|---|---------------|---|--|
| <i>Thalassarche cauta steadi</i> | White-capped Albatross    | -      | V                    | The White-capped Albatross is probably common off the coast of south-east Australia throughout the year. This species is similar to the Shy Albatross and can be difficult to identify, especially at sea and as a juvenile. It has been observed that juveniles are rare in New Zealand waters, being more common off south-east Australia and South Africa; breeding colonies occur on islands south of New Zealand.                                  | PMST          | <b>Low</b><br><br>May occur in the locality. No suitable habitat to support the species in the Subject Land | <b>Unlikely</b>  |
| <i>Epthianura albifrons</i>      | White-fronted Chat        | V      | -                    | Found across the southern half of Australia in mostly temperate to arid climates and rarely sub-tropical areas. It occupies foothills and lowlands up to 1000m above sea level, mostly in damp open habitats along the coast and near waterways. The species can be seen foraging on bare or grassy ground in wetland areas for insects.  | Bionet        | <b>Moderate</b><br><br>Suitable foraging habitat present within the Subject Land                            | <b>Moderate</b><br><br>Potential foraging habitat would likely be impacted   |
| <i>Hirundapus caudacutus</i>     | White-throated Needletail | -      | V - Migratory Marine | In eastern Australia, the species is recorded in all coastal regions of Queensland and NSW, extending inland to the western slopes of the Great Dividing Range and occasionally onto the adjacent inland plains. This species is mostly aerial. Although they occur over most types of habitat, they are recorded most often above wooded areas, including open forest and rainforest, and may also fly below the canopy between trees or in clearings. | Bionet / PMST | <b>Moderate</b><br><br>The species may occur aurally over the site  | <b>Low</b><br><br>No habitat likely to support the species would be impacted |

| Scientific name            | Common name         | BC Act | EPBC Act | Habitat  | Record | Likelihood of occurrence                     | Likelihood of impact |
|----------------------------|---------------------|--------|----------|--|--------|--|----------------------|
| <b>Fish</b>                |                     |        |          |  |        |  |                      |
| <i>Proctroctes maraena</i> | Australian Grayling | E      | V        | It is a migratory species that spawns in the lower freshwaters of coastal rivers and spends approximately 6 months in coastal seas as larvae/juveniles before migrating back into freshwater rivers and streams where they remain for the rest of their lives. During the freshwater phase of the life cycle, Australian Grayling inhabit lower altitude reaches of both large rivers and smaller streams. Very little is known about the specific environmental requirements or habitats occupied during the estuarine or marine phase of the life-cycle as very few specimens have been collected. | PMST   | <b>N/A</b><br><br>No aquatic habitat present | <b>N/A</b>           |
| <i>Epinephelus daemeli</i> | Black Rockcod       | V      | V        | Adult Black Rockcod are usually found in caves, gutters and under bommies on rocky reefs from near shore environments to up to 50 m depths. Small juveniles inhabit coastal rock pools and larger juveniles occur in estuaries, around rocky shores.   | PMST   | <b>N/A</b><br><br>No aquatic habitat present | <b>N/A</b>           |
| <i>Seriotelella brama</i>  | Blue Warehou        | -      | CE       | Blue warehou is confined to Australian and New Zealand waters where it occurs predominantly in coastal shelf, upper continental slope and seamount waters offshore from New South Wales, Tasmania, Victoria and South Australia. The known distribution extends into waters off south eastern Western Australia (DCCEEW 2022).   | PMST   | <b>N/A</b><br><br>No aquatic habitat present | <b>N/A</b>           |

| Scientific name          | Common name                              | BC Act | EPBC Act | Habitat   | Record | Likelihood of occurrence              | Likelihood of impact |
|--------------------------|--|--------|----------|---|--------|---------------------------------------|----------------------|
| <i>Carcharias taurus</i> | Grey Nurse Shark (East coast population) |        |          | Grey nurse sharks are a large shark native to subtropical to cool temperate waters. In NSW, Grey nurse sharks are typically found in coastal inshore waters, around rocky reefs and boulders or sand filled gutters in water depths of 15 – 40 m but also spend some time in deeper waters. They consistently occupy a relatively small number of locations along the NSW coast to feed, mate and pup termed. This species has been recorded migrating over 800 km between aggregation sites in relatively short periods of time, and have shown to return to the same sites in consecutive years (DPI 2022). | PMST   | N/A<br><br>No aquatic habitat present | N/A                  |
| <i>Thunnus maccoyii</i>  | Southern Bluefin Tuna                    | E      | E        | Southern Bluefin Tuna are found in oceanic waters normally on the seaward side of the continental shelf. Southern Bluefin Tuna spawn at only one location in the tropical waters between Java and north-west Australia (DPI 2022).  | PMST   | N/A<br><br>No aquatic habitat present | N/A                  |
| <i>Rhincodon typus</i>   | Whale Shark                              | -      | V        | Whale sharks have a broad distribution in tropical and warm temperate seas, usually between latitudes 30°N and 35°S. They are known to inhabit both deep and shallow coastal waters and the lagoons of coral atolls and reefs. Australia is one of the most reliable locations to find whale sharks. This species is widely distributed in Australian waters. Although most common at Ningaloo Marine Park, sightings have been confirmed at Eden on the New South Wales south coast. These sharks appear at  | PMST   | N/A<br><br>No aquatic habitat present | N/A                  |

| Scientific name               | Common name                    | BC Act | EPBC Act | Habitat   | Record        | Likelihood of occurrence   | Likelihood of impact |
|-------------------------------|--------------------------------|--------|----------|---|---------------|--|----------------------|
|                               |                                |        |          | locations where seasonal food 'pulses' are known to occur (DCCEEW 2022).  |               |  |                      |
| <i>Carcharodon carcharias</i> | White Shark, Great White Shark | V      | V        | White sharks are large, rare, warm-blooded apex marine predators widely distributed throughout temperate and sub-tropical regions in the northern and southern hemispheres. In Australian waters the white shark's range extends primarily from southern Queensland, around the southern coastline and to the North West Cape in Western Australia (DCCEEW 2022).   | PMST          | <b>N/A</b><br>No aquatic habitat present   | <b>N/A</b>           |
| <b>Flora</b>                  |                                |        |          |   |               |  |                      |
| <i>Acacia georgensis</i>      | Bega Wattle                    | V      | V        | The Bega Wattle only occurs in the far South East of NSW with known sites in Bournda National Park, on Dr George Mountain, Wadbilliga National Park and in Bemboka and Coolangubra Sections of the South East Forests National Park. Typically occurs on well-drained, shallow soils at sites with considerable exposed rock. Individuals are evidentially very long-lived, highly drought-tolerant, though are fire-sensitive trees. Reproduction is exclusively from seed and the plants are not capable of suckering (DPE 2022). | Bionet / PMST | <b>Moderate</b><br>Species known to occur in locality however not recorded during targeted surveys in Subject Site | <b>Unlikely</b>      |
| <i>Amphibromus fluitans</i>   | River Swamp Wallaby-grass,     | V      | V        | There are many historic collections in the City of Greater Albury. It has been recorded recently in lagoons beside the Murray River near Cooks Lagoon (Shire of Greater Hume), Mungabarina  | PMST          | <b>Low</b><br>No suitable habitat to   | <b>Unlikely</b>      |



| Scientific name                | Common name                  | BC Act | EPBC Act | Habitat   | Record        | Likelihood of occurrence   | Likelihood of impact |
|--------------------------------|------------------------------|--------|----------|---|---------------|--|----------------------|
|                                | Floating Swamp Wallaby-grass |        |          | Reserve, East Albury, at Ettamogah, Thurgoona (Charles Sturt University Campus), near Narranderra, and also further west along the Murray River (near Mathoura) and in Victoria. There is a recent record of this species near Laggan in Upper Lachlan Shire. It is also found in Victoria and in Tasmania. Amphibromus fluitans grows mostly in permanent swamps. The species needs wetlands which are at least moderately fertile and which have some bare ground, conditions which are produced by seasonally-fluctuating water levels. Habitats in south-western NSW include swamp margins in mud, dam and tank beds in hard clay and in semi-dry mud of lagoons with Potamogeton and Chamaeraphis species. |               | support the species in the Subject Land  |                      |
| <i>Astrotricha crassifolia</i> | Thick-leaf Star-hair         | V      | V        | The Thick-leaf Star-hair occurs near Patonga (Gosford LGA), and in Royal NP and on the Woronora Plateau (Sutherland and Campbelltown LGAs). There is also a record from near Glen Davis (Lithgow LGA). Occuring in dry sclerophyll woodland on sandstone, the species flowers in spring and can resprout from root suckers or basal stem buds after fire (DPE 2022).  | Bionet / PMST | <b>Moderate</b><br><br>Species known to occur in locality however not recorded during targeted surveys in Subject Site | <b>Unlikely</b>      |

| Scientific name                     | Common name                | BC Act | EPBC Act | Habitat  | Record | Likelihood of occurrence   | Likelihood of impact  |
|-------------------------------------|----------------------------|--------|----------|--|--------|--|---|
| <i>Astrotricha sp. Wallagaraugh</i> | Merimbula Star-hair        | E      | -        | The Merimbula Star-hair has a highly restricted and severely fragmented distribution in NSW. It is currently known from only three localities, the upper reaches of the Wallagaraugh River, a small population near Middle Beach in Merimbula, and the largest population is centred on the township of Tura Beach within Bournda National Park. Occurs on shallow gravelly granitic soils in fairly dry open forests, and deep grey-white sands in rough-barked eucalypt forest ( <i>Eucalyptus sieberi</i> and <i>E. globoidea</i> dominant) with <i>Banksia serrata</i> , <i>Acacia longifolia</i> and <i>Grevillea mucronulata</i> (DPE 2022). | Bionet | <b>Moderate</b><br><br>The species is known from the locality and suitable habitat occurs in the Subject Land                | <b>Moderate</b><br><br>The species may be impacted by the proposal. Targeted surveys to confirm the presence of the species are recommended |
| <i>Caladenia tessellata</i>         | Thick-lipped Spider-orchid | E      | V        | The Thick Lip Spider Orchid is known from the Sydney area (old records), Wyong, Ulladulla and Braidwood in NSW, and is generally found in grassy sclerophyll woodland on clay loam or sandy soils.   | PMST   | <b>Low</b><br><br>No records in the locality for the species, no suitable habitat to support the species in the Subject Land | <b>Unlikely</b>   |
| <i>Correa baeuerlenii</i>           | Chef's Cap                 | V      | V        | Chef's Cap Correa has been recorded between Nelligen and Mimosa Rocks National Park, occurring in riparian sites within forests of various eucalypts, including Silvertop Ash ( <i>Eucalyptus</i>  | PMST   | <b>Low</b><br><br>No records in the locality for   | <b>Unlikely</b>   |

| Scientific name                | Common name            | BC Act | EPBC Act | Habitat  | Record | Likelihood of occurrence   | Likelihood of impact |
|--------------------------------|------------------------|--------|----------|--|--------|--|----------------------|
|                                |                        |        |          | sieberi), Yellow Stringybark ( <i>E. muelleriana</i> ), Blue-leafed Stringybark ( <i>E. agglomerata</i> ) and Spotted Gum ( <i>Corymbia maculata</i> ), or she-oak woodland. It may also be found in near-coastal rocky sites (DPE 2022).  |        | the species, no suitable habitat to support the species in the Subject Land  |                      |
| <i>Cryptostylis hunteriana</i> | Leafless Tongue-orchid | V      | V        | Scattered, coastal distribution. Known historically from a number of locations on the NSW South coast. Does not have specific or well defined habitat preferences. Occurs in a variety of communities including swamp heath and woodland. Larger populations occur in scribbly gum woodland. prefer open areas in the understorey of this community and is often found in association with the Large Tongue Orchid ( <i>C. subulata</i> ) and the Tartan Tongue Orchid ( <i>C. erecta</i> ). | PMST   | <b>Low</b><br><br>No records in the locality for the species, no suitable habitat to support the species in the Subject Land | <b>Unlikely</b>      |
| <i>Genoplesium rhyoliticum</i> | Pambula Midge-orchid   | E      | E        | The Rhyolite Midge Orchid is endemic to a narrow strip of NSW south coast, occurring on very shallow soil overlying rhyolite rock. This species is a long-lived tuberous geophyte which is only in evidence during the relatively brief period in late spring/early summer when it flowers (DPE 2022).   | PMST   | <b>Low</b><br><br>No records in the locality for the species, no suitable habitat to support the                             | <b>Unlikely</b>      |

| Scientific name           | Common name        | BC Act | EPBC Act | Habitat   | Record        | Likelihood of occurrence   | Likelihood of impact |
|---------------------------|--------------------|--------|----------|---|---------------|--|----------------------|
|                           |                    |        |          |   |               | species in the Subject Land  |                      |
| <i>Glycine latrobeana</i> | Clover glycine     | CE     | V        | The Clover Glycine occurs mainly in grassland and grassy woodland habitats, less often in dry forests, and only rarely in heathland. Populations occur from sea level to c. 1,200 m altitude 6 (900 m in Tasmania). In Victoria, plants grow in a range of soil types including alluvial soils, and those derived from sandstones, mudstones, granite and basalt. Soils are usually clay, but may also have high loam content. Tasmanian populations occur on a well-drained basalt, dolerite or sandstone substrates (Lynch 1994). The NSW population is in subalpine grassland (at about 1300 m asl). | PMST          | <b>Low</b><br><br>No records in the locality for the species, no suitable habitat to support the species in the Subject Land | <b>Unlikely</b>      |
| <i>Leionema ralstonii</i> | Ralston's Leionema | V      | V        | Ralston's Leionema is endemic to the coastal ranges of south-east NSW between Eden and Pambula and is largely confined to dry, rocky habitats. It is most likely to be found in dry shrub communities but can also occur in open forest. It flowers mainly in winter and can withstand low intensity fires, infrequently burnt areas appear to provide the most suitable habitat (DPE 2022).  | Bionet / PMST | <b>Moderate</b><br><br>Species known to occur in locality however not recorded during targeted surveys in Subject Site       | <b>Unlikely</b>      |



| Scientific name           | Common name        | BC Act | EPBC Act | Habitat   | Record | Likelihood of occurrence   | Likelihood of impact |
|---------------------------|--------------------|--------|----------|---|--------|--|----------------------|
| <i>Persicaria elatior</i> | Knotweed           | V      | V        | Normally growing in damp places, beside lakes and streams, Knotweed is also associated with swamp forests and occasionally disturbed areas. This species is recorded in south-eastern NSW, Moruya State Forest near Turlinjah, the Upper Avon River catchment north of Robertson, Bermagui, and Picton Lakes.   | PMST   | <b>Low</b><br><br>No records in the locality for the species, no suitable habitat to support the species in the Subject Land   | <b>Unlikely</b>      |
| <i>Pomaderris bodalla</i> | Bodalla Pomaderris | V      | -        | Bodalla Pomaderris is endemic to NSW and is currently known to occur on the south coast between Bodalla and Merimbula, and in the upper Hunter Valley near Muswellbrook. On the south coast Pomaderris bodalla occurs in moist open forest along sheltered gullies or along stream banks. In the upper Hunter valley, it occurs in open forest or woodland on open slopes (DPE 2022). | Bionet | <b>Moderate</b><br><br>While the species was not detectable at the time of surveys, no <i>Pomaderris sp</i> (including non-threatened species) were identified within the Development area, or areas | <b>Unlikely</b>      |

| Scientific name               | Common name            | BC Act | EPBC Act | Habitat   | Record | Likelihood of occurrence  | Likelihood of impact |
|-------------------------------|------------------------|--------|----------|---|--------|---|----------------------|
|                               |                        |        |          |   |        | of the Subject Land surveyed  |                      |
| <i>Pomaderris cotoneaster</i> | Cotoneaster Pomaderris | E      | E        | Cotoneaster Pomaderris has a very disjunct distribution, being known from the Nungatta area, northern Kosciuszko National Park (near Tumut), the Tantawangalo area in South-East Forests National Park and adjoining freehold land, Badgery's Lookout near Tallong, Bungonia State Conservation Area, the Yerranderie area, Kanangra-Boyd National Park, the Canyonleigh area and Ettrema Gorge in Morton National Park. The species has also been recorded along the Genoa River in Victoria. Cotoneaster Pomaderris has been recorded in a range of habitats in predominantly forested country. The habitats include forest with deep, friable soil, amongst rock beside a creek, on rocky forested slopes and in steep gullies between sandstone cliffs. | PMST   | <b>Moderate</b><br><br>While the species was not detectable at the time of surveys, no <i>Pomaderris sp</i> (including non-threatened species) were identified within the Development area, or areas of the Subject Land surveyed | <b>Unlikely</b>      |
| <i>Pomaderris parrisiae</i>   | Parris' Pomaderris     | V      | V        | Parris' Pomaderris has been recorded in Egan Peaks Nature Reserve, Wadbilliga National Park (near Wadbilliga Trig.) and South East Forests National Park (Brown Mountain / Cochrane Dam area), with a questionable record in Ben Boyd National Park. Parris' Pomaderris is found on skeletal soils in rocky   | PMST   | <b>Moderate</b><br><br>While the species was not detectable at the time of  | <b>Unlikely</b>      |

| Scientific name              | Common name     | BC Act | EPBC Act | Habitat  | Record | Likelihood of occurrence   | Likelihood of impact  |
|------------------------------|-----------------|--------|----------|--|--------|--|---|
|                              |                 |        |          | shrubland or tall open forest chiefly on escarpment ranges (DPE 2022).   |        | surveys, no <i>Pomaderris</i> sp (including non-threatened species) were identified within the Development area, or areas of the Subject Land surveyed |   |
| <i>Pultanaea pedunculata</i> | Matted Bush-pea | E      | -        | Matted Bush-pea is widespread in Victoria, Tasmania, and south-eastern South Australia. In NSW however, it is represented by just three disjunct populations, in the Cumberland Plains in Sydney, the coast between Tathra and Bermagui and the Windellama area south of Goulburn. The Matted Bush-pea occurs in a range of habitats in NSW, with populations generally among woodland vegetation but plants have also been found on road batters and coastal cliffs. It is largely confined to loamy soils in dry gullies in populations in the Windellama area (DPE 2022). | Bionet | <b>Moderate</b><br><br>The species is known from the locality and suitable habitat occurs in the Subject Land  | <b>Moderate</b><br><br>The species may be impacted by the proposal. Targeted surveys to confirm the presence of the species are recommended |

| Scientific name             | Common name        | BC Act | EPBC Act | Habitat  | Record | Likelihood of occurrence   | Likelihood of impact  |
|-----------------------------|--------------------|--------|----------|--|--------|--|---|
| <i>Thesium australe</i>     | Australe Toadflax  | V      | V        | Austral Toad-flax is found in very small populations scattered across eastern NSW, along the coast, and from the Northern to Southern Tablelands in grassland on coastal headlands or grassland and grassy woodland away from the coast. Australe Toadflax has been recorded from the Lithgow area to the east of Bathurst. This species does not tolerate high intensity grazing or dominate weeds such as Blackberry well. It occurs along coastal headlands or grassy woodland habitats inland. It is a root parasite plant with a strong association with Kangaroo Grass ( <i>Themeda australis</i> ). | PMST   | <b>Moderate</b><br><br>The species is known from the locality and suitable habitat occurs in the Subject Land                | <b>Moderate</b><br><br>The species may be impacted by the proposal. Targeted surveys to confirm the presence of the species are recommended |
| <i>Westringia davidii</i>   | David's Westringia | V      | V        | David's Westringia is endemic to rocky outcrops above 250 m in elevation in the coastal ranges to the west of Eden and Pambula in NSW. David's Westringia is largely restricted to shallow organic loam soils fringing rocky outcrops in an ecotone between open forest dominated by Silvertop Ash ( <i>Eucalyptus sieberi</i> ) and the rocky outcrops which support a mosaic of shrubland, scattered herbs and shrubs and bare rock (DPE 2022).  | PMST   | <b>Low</b><br><br>No records in the locality for the species, no suitable habitat to support the species in the Subject Land | <b>Unlikely</b>   |
| <i>Xerochrysum palustre</i> | Swamp Everlasting, | -      | V        | Found in swamps and bogs which are dominated by heaths. Also found in peaty soils on the edges of bog margins with a shrub or grass cover.   | PMST   | <b>Low</b><br><br>No records in the locality for   | <b>Unlikely</b>   |



| Scientific name         | Common name       | BC Act | EPBC Act | Habitat   | Record        | Likelihood of occurrence   | Likelihood of impact |
|-------------------------|-------------------|--------|----------|---|---------------|--|----------------------|
|                         | Swamp Paper-daisy |        |          |   |               | the species, no suitable habitat to support the species in the Subject Land  |                      |
| <i>Zieria buxijugum</i> | Box Range Zieria  | CE     | E        | The Box Range Zieria is known from only one population which was about 125 plants in an area of about 0.25 hectares on private property about 15 km west of Pambula on the NSW far south coast. This population occurs near the summit of a steep rhyolite rocky outcrop on a slope with an easterly aspect. The site has much exposed rock with pockets of skeletal humus rich loam amongst the rocks and on rock ledges. Grows in a shrub plant community dominated by Melaleuca armillaris (Bracelet Honey Myrtle) and below the outcrop is open forest dominated by Eucalyptus sieberi. The groundcover is very sparse and includes scattered sedges, shrubs, forbs and orchids (DPE 2022). | Bionet / PMST | <b>Moderate</b><br><br>Species known to occur in locality however not recorded during targeted surveys in Subject Site | <b>Unlikely</b>      |
| <i>Zieria formosa</i>   | Shapely Zieria    | CE     | E        | Shapely Zieria is known from one single population occupying an area of about 1 hectare on private land located about 5 km west of Pambula on the NSW far south coast. The site occurs on the north-east aspect of an upper, moderately steep slope of a 'break-away' area above a small valley. The soil is skeletal, grey sandy loam and there is much exposed surface rock. Associated vegetation includes Acacia mearnsii, Commersonia fraseri,   | Bionet / PMST | <b>Moderate</b><br><br>Species known to occur in locality however not recorded during                                  | <b>Unlikely</b>      |

| Scientific name                         | Common name         | BC Act | EPBC Act | Habitat   | Record | Likelihood of occurrence   | Likelihood of impact |
|---|---------------------|--------|----------|---|--------|--|----------------------|
|   |                     |        |          | Dodonea triquetra, Prostanthera nivea, Pittosporum undulatum, Kunzea ambigua and Leptospermum flavescens (DPE 2022).  |        | targeted surveys in Subject Site   |                      |
| <i>Zieria parrisiae</i>                 | Parris' Zieria      | CE     | CE       | Parris' Zieria is known from only one population in a gully on private property about 15 km west of Pambula on the NSW far south coast. This species occurs in a gully on a north east facing mid-slope on skeletal grey loam soil overlying rhyolite rock. The site is scattered with broken rhyolite rocks and boulders. The main flowering period is in August and September, but flowering may commence as early as late July (DPE 2022). | PMST   | <b>Low</b><br><br>No records in the locality for the species, no suitable habitat to support the species in the Subject Land | <b>Unlikely</b>      |
| <b>Mammals</b>                          |                     |        |          |   |        |  |                      |
| <i>Arctocephalus pusillus doriferus</i> | Australian Fur-seal | V      | -        | Reported to have bred at Seal Rocks, near Port Stephens and Montague Island in southern NSW. Haul outs are observed at isolated places along the NSW coast. Prefers rocky parts of islands with flat, open terrain. They occupy flatter areas than do New Zealand Fur-seals where they occur together.  | Bionet | <b>N/A</b><br><br>No aquatic habitat present   | <b>N/A</b>           |
| <i>Balaenoptera musculus</i>            | Blue Whale          | E      | E        | The Blue Whale is oceanic within Southern Hemisphere between 20 degrees to 70 degrees South including NSW waters. It breeds in warm water at low latitudes, preferring open seas rather than coastal waters (DPE 2022).   | PMST   | <b>N/A</b>   | <b>N/A</b>           |

| Scientific name              | Common name               | BC Act | EPBC Act | Habitat  | Record | Likelihood of occurrence  | Likelihood of impact  |
|------------------------------|---------------------------|--------|----------|--|--------|---|---|
|                              |                           |        |          |  |        | No aquatic habitat present  |   |
| <i>Phascogale tapoatafa</i>  | Brush-tailed Phascogale   | V      | -        | The Brush-tailed Phascogale has a patchy distribution around the coast of Australia. In NSW it is mainly found east of the Great Dividing Range although there are occasional records west of the divide. Prefer dry sclerophyll open forest with sparse groundcover of herbs, grasses, shrubs or leaf litter though also inhabit heath, swamps, rainforest and wet sclerophyll forest. Preferentially forages in rough barked trees of 25 cm DBH or greater. Feeds mostly on arthropods but will also eat other invertebrates, nectar and sometimes small vertebrates. Females have exclusive territories of approximately 20 - 40 ha, while males have overlapping territories often greater than 100 ha. Nest and shelter in tree hollows with entrances 2.5 - 4 cm wide. Mating occurs May - July. | Bionet | <b>Moderate</b><br><br>Suitable habitat present for the species in the Study Area | <b>Moderate</b><br><br>Foraging habitat may be impacted as a result of the proposed development on site |
| <i>Petrogale penicillata</i> | Brush-tailed Rock Wallaby | E      | V        | The Brush-tailed Rock Wallaby is found in fragmented populations throughout the Great Dividing Range. They live on rocky escarpments, granite outcrops and cliffs, which have caves and ledges facing north for warmth. They graze on native grasses, foliage, fruits of shrubs, roots and bark found in surrounding habitat.  | PMST   | <b>Unlikely</b><br><br>No suitable rocky habitat present for the species          | <b>Unlikely</b>   |
| <i>Dugong dugon</i>          | Dugong                    | E      | -        | The Dugong population distribution extends south from warmer coastal and island waters of the Indo-West Pacific to northern  | Bionet | <b>N/A</b>  | <b>N/A</b>  |

| Scientific name                   | Common name                     | BC Act | EPBC Act | Habitat   | Record | Likelihood of occurrence   | Likelihood of impact   |
|-----------------------------------|---------------------------------|--------|----------|---|--------|--|--|
|                                   |                                 |        |          | NSW, where its known from incidental records only. Major concentrations of Dugongs occur in wide shallow protected bays, wide shallow mangrove channels and in the lee of large inshore islands. This species will also occupy deeper waters if their sea grass food is available. The Dugong has a low reproductive rate. Shallow waters such as tidal sandbanks and estuaries have been reported as sites for calving (OEH 2022). |        | No aquatic habitat present   |  |
| <i>Micronomus norfolkensis</i>    | Eastern Coastal Free-tailed Bat | V      | -        | Occurring in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range, this species is found along the east coast from south QLD to southern NSW. Likely insectivorous, the Eastern Coastal Free-tailed Bat is usually solitary, and roosts mainly in tree hollows, but will also roost under bark or in man-made structures.  | Bionet | <b>Moderate</b><br><br>Species may roost in hollow-bearing trees or the bark of large trees and forage across the site | <b>Moderate</b><br><br>Potential roosting and foraging habitat will likely be impacted |
| <i>Falsistrellus tasmaniensis</i> | Eastern False Pipistrelle       | V      | -        | This species of bat inhabits moist forest generally with trees larger than 20 m and roosts in eucalypt hollows, underneath bark or in buildings. Diet consists of moths, beetles and other insects, which it collects within or just below the tree canopy. This species hibernates during winter and breeding takes place in late spring.  | Bionet | <b>Moderate</b><br><br>Species may roost in hollow-bearing trees or the bark of large trees and                        | <b>Moderate</b><br><br>Potential roosting and foraging habitat will likely be impacted |



| Scientific name             | Common name             | BC Act | EPBC Act | Habitat   | Record | Likelihood of occurrence  | Likelihood of impact  |
|-----------------------------|-------------------------|--------|----------|---|--------|---|---|
|                             |                         |        |          |   |        | forage across the site  |   |
| <i>Cercartetus nanus</i>    | Eastern Pygmy-possum    | V      | -        | This species is distributed along the coast of southern QLD, NSW, and Victoria, southeastern SA, and is present throughout Tasmania. Banksia species and myrtaceous shrubs and trees are favoured food sources and nesting sites in drier habitats, except in NE NSW where rainforest is preferred habitat. The eastern Pygmy-possum's diet consists largely of pollen and nectar from Banksia species, Eucalypts, Bottlebrushes and insects. It nests in hollows in trees but its small size allows it to nest in a variety of places including under the bark of Eucalypts, forks of tea-trees, and in abandoned bird nests.  | Bionet | <b>Moderate</b><br><br>Species may nest in hollow-bearing trees and dense vegetation and forage across the site | <b>Moderate</b><br><br>Potential nesting and foraging habitat will likely be impacted |
| <i>Scoteanax rueppellii</i> | Greater Broad-nosed Bat | V      | -        | The Greater Broad-nosed Bat is a large powerful bat, up to 95 mm long, with a broad head and a short square muzzle that is found mainly in the gullies and river systems that drain the Great Dividing Range, from north-eastern Victoria to the Atherton Tableland. It extends to the coast over much of its range. Utilises a variety of habitats from woodland through to moist and dry eucalypt forest and rainforest, though it is most commonly found in tall wet forest. Roosts in tree hollows, but also found in buildings. Open woodland habitat and dry open forest suits the direct flight of this species as it searches for beetles and other large, slow-flying insects; this species has been known to eat other bat species. | Bionet | <b>Moderate</b><br><br>Species may nest in hollow-bearing trees and dense vegetation and forage across the site | <b>Moderate</b><br><br>Potential nest and foraging habitat will likely be impacted    |

| Scientific name               | Common name            | BC Act | EPBC Act | Habitat  | Record        | Likelihood of occurrence  | Likelihood of impact  |
|-------------------------------|------------------------|--------|----------|--|---------------|---|---|
| <i>Petauroides volans</i>     | Greater Glider         | V      | V        | The Greater Glider has low mobility and a typically small home range (1 – 4ha). Found in tall eucalypt forests and woodlands this species is dependent on large tracts of undisturbed tall forest with suitably large nesting hollows. The species is solitary, with populations ranging from 0.6 to 2.8 individuals per hectare and are unlikely to disperse this patch. Modelling suggests at least 160 km <sup>2</sup> of native forest patches is required to support a viable population.                               | Bionet / PMST | <b>Moderate</b><br><br>The species is known from the locality, and may utilise the site for foraging and nesting. The species was not recorded utilizing the site during targeted surveys | <b>Moderate</b><br><br>Potential foraging habitat will likely be impacted |
| <i>Pteropus poliocephalus</i> | Grey-headed Flying-fox | V      | V        | This species roosts in camps generally located within 20 km of a regular food source and are commonly found in gullies, close to water and in vegetation with a dense canopy. This species is known to forage in areas supporting subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps on the nectar and pollen of native trees, in particular eucalypts, Melaleucas and Banksias. This species will also forage in urban gardens and cultivated fruit crops. Typically found on | Bionet / PMST | <b>Moderate</b><br><br>The species is known from the locality, and may utilise the site for foraging.   | <b>Moderate</b><br><br>Potential foraging habitat will likely be impacted |

| Scientific name               | Common name    | BC Act | EPBC Act | Habitat   | Record        | Likelihood of occurrence   | Likelihood of impact  |
|-------------------------------|----------------|--------|----------|---|---------------|--|---|
|                               |                |        |          | the coastal plain and eastern slopes of NSW, only making regular movements to the western slopes in northern NSW.   |               |  |   |
| <i>Megaptera novaeangliae</i> | Humpback Whale | V      | V        | The Humpback Whale population of Australia's east coast migrates from summer cold-water feeding grounds in Subantarctic waters to warm-water winter breeding grounds in the central Great Barrier Reef. They are regularly observed in NSW waters in June and July, on northward migration and October and November, on southward migration (OEH 2022). | Bionet        | <b>N/A</b><br><br>No aquatic habitat present   | <b>N/A</b>  |
| <i>Phascolarctos cinereus</i> | Koala          | V      | V        | The Koala has a fragmented distribution throughout eastern Australia. It is limited to areas of preferred feed trees in eucalypt woodlands and forests. The size of their home range varies depending on the quality of habitat, ranging from less than 2 ha to several hundred ha in size.   | Bionet / PMST | <b>Moderate</b><br><br>The species is known from the locality, and may utilise the site for foraging. and nesting. No signs of the species were observed on site during site surveys, and preferred feed | <b>Moderate</b><br><br>Potential foraging habitat will likely be impacted |

| Scientific name                         | Common name                      | BC Act | EPBC Act | Habitat  | Record        | Likelihood of occurrence   | Likelihood of impact  |
|---|----------------------------------|--------|----------|--|---------------|--|---|
|   |                                  |        |          |  |               | trees were not present   |   |
| <i>Miniopterus orianae oceanensis</i>   | Large Bent-winged Bat            | V      | -        | Caves are the primary roosting habitat for this species, but they may also use mines, stormwater outlets or tunnels and other man-made infrastructure. Eastern Bentwing-bats occur along the east and north-west coasts of Australia, hunting in forested areas, catching moths and other flying insects above the tree tops.  | Bionet        | <b>Moderate</b><br>Species may roost in hollow-bearing trees or the bark of large trees and forage across the site | <b>Moderate</b><br>Potential roosting and foraging habitat will likely be impacted                  |
| <i>Potorous tridactylus tridactylus</i> | Long-nosed Potoroo (SE Mainland) | V      | V        | The long-nosed potoroo is found on the south-eastern coast of Australia, from Queensland to eastern Victoria and Tasmania. It is generally restricted to coastal heaths and forests east of the Great Dividing Range, with an annual rainfall exceeding 760 mm, 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. The fruit-bodies of hypogeous (underground-fruited) fungi are a large component of the diet of the Long-nosed Potoroo. They also eat roots, tubers, insects and their larvae and other soft-bodied animals in the soil. Mainly nocturnal however during the winter months animals may forage during daylight | Bionet / PMST | <b>Moderate</b><br>Suitable habitat present for the species in the Study Area                                      | <b>Moderate</b><br>Foraging habitat may be impacted as a result of the proposed development on site |



| Scientific name                 | Common name                        | BC Act | EPBC Act | Habitat  | Record        | Likelihood of occurrence   | Likelihood of impact                                |
|---------------------------------|------------------------------------|--------|----------|--|---------------|--|---|
|                                 |                                    |        |          | hours. Their home range size is between 2-5 ha. Breeding peaks typically occur in late winter to early summer.   |               |  |   |
| <i>Arctocephalus forsteri</i>   | New Zealand Fur-seal               | V      | -        | Feeding principally on cephalopods and fish, but also seabirds and occasionally penguins, the New Zealand Fur Seal prefers rocky parts of islands with jumbled terrain and boulders. This species occurs in Australia and New Zealand; non-breeding animals have been sighted along southern NSW coast particularly on Montague Island, but also at other isolated locations to north of Sydney.   | Bionet        | <b>N/A</b><br>No aquatic habitat present   | <b>N/A</b>  |
| <i>Pseudomys fumeus</i>         | Smoky Mouse                        | CE     | E        | The Smoky Mouse is currently limited to a small number of sites in western, southern and eastern Victoria, south-east NSW and the ACT. In NSW there are 3 records from Kosciuszko National Park and 2 records adjacent to the park in Bondo and Ingbyra State Forests; the remainder are centred around Mt Poole, Nullica State Forest and the adjoining South East Forests National Park. The Smoky Mouse appears to prefer heath habitat on ridge tops and slopes in sclerophyll forest, heathland and open-forest from the coast (in Victoria) to sub-alpine regions of up to 1800 metres, but sometimes occurs in ferny gullies. | PMST          | <b>Low</b><br>Species is not known from the locality, and suitable habitat was not present | <b>Unlikely</b>                                     |
| <i>Isodon obesulus obesulus</i> | Southern Brown Bandicoot (Eastern) | E      | E        | Occurs mainly in 2 areas: Ku-ring-gai Chase and Garigal National Parks North of Sydney, and far South East NSW including Ben Boyd National Park, East Boyd State Forest, Nadgee Nature Reserve, Nadgee State Forest, South East Forest and Yambulla State Forest but also occurs between these areas. Inhabits   | Bionet / PMST | <b>Moderate</b><br>Suitable habitat present for the  | <b>Moderate</b><br>Foraging habitat may be impacted |

| Scientific name               | Common name          | BC Act | EPBC Act | Habitat   | Record        | Likelihood of occurrence                     | Likelihood of impact  |
|-------------------------------|----------------------|--------|----------|---|---------------|--|---|
|                               |                      |        |          | scrubby vegetation, including heath, shrubland, and heathy forest and woodland. Often associated with well-drained soils and dry heathland communities, and prefers periodically burnt areas as this increases insect abundance.  |               | species in the Study Area                    | as a result of the proposed development on site             |
| <i>Eubalaena australis</i>    | Southern Right Whale | E      | E        | This large marine mammal species occurs in temperate and subpolar waters of the Southern Hemisphere. Migrating between summer feeding grounds in Antarctica and winter breeding grounds around the coasts of Southern Australia, New Zealand, South Africa and South America, the Southern Right Whale feed on krill and copepods by filtering water through their baleen; this species may not feed at all in Australian waters, however may move inshore for calving and mater in winter. | PMST          | N/A<br>No aquatic habitat present            | N/A   |
| <i>Physeter macrocephalus</i> | Sperm Whale          | V      | -        | The Sperm Whale has a wide, but patchy distribution from the tropics to the edge of the polar pack-ice in both hemispheres. Concentrations of Sperm Whales tend to occur where the seabed rises steeply from a greater depth, beyond the continental shelf. This species is known to feed on squid, and likely octopus and fish (OEI 2022).   | Bionet        | N/A<br>No aquatic habitat present            | N/A   |
| <i>Dasyurus maculatus</i>     | Spotted-tailed Quoll | V      | E        | The Spotted Tailed Quoll inhabits a range of environments in NSW including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Den subject sites are in hollow-bearing trees, fallen logs, small caves, rock crevices, boulder fields and rocky-cliff faces. Females occupy home ranges of up to 750 ha and males   | Bionet / PMST | Moderate<br>Suitable habitat present for the | Moderate<br>Foraging habitat may be impacted as a result of |

| Scientific name           | Common name           | BC Act | EPBC Act             | Habitat  | Record        | Likelihood of occurrence  | Likelihood of impact  |
|---------------------------|-----------------------|--------|----------------------|--|---------------|---|---|
|                           |                       |        |                      | up to 3,500 ha, which are usually traversed along densely vegetated creek lines.   |               | species in the Study Area   | the proposed development on site  |
| <i>Petaurus australis</i> | Yellow-bellied Glider | V      | -                    | The Yellow-bellied Glider is found along the eastern coast to the western slopes of the Great Dividing Range, from southern Queensland to Victoria. The species requires tall mature forests with an abundance of tree hollows to shelter and breed. | Bionet / PMST | <b>Moderate</b><br><br>The species is known from the locality, and may utilise the site for foraging and nesting. The species was not recorded utilizing the site during targeted surveys | <b>Moderate</b><br><br>Potential foraging habitat will likely be impacted |
| <b>Reptiles</b>           |                       |        |                      |  |               |   |   |
| <i>Natator depressus</i>  | Flatback Turtle       | -      | V - Migratory Marine | Endemic to Australia, all known breeding sites of this species occur only in Australia. This species have a preference for shallow, soft-bottomed sea bed habitats away from reefs and   | PMST          | <b>N/A</b>  | <b>N/A</b>  |

| Scientific name               | Common name        | BC Act | EPBC Act             | Habitat   | Record        | Likelihood of occurrence                 | Likelihood of impact |
|-------------------------------|--------------------|--------|----------------------|---|---------------|--|----------------------|
|                               |                    |        |                      | feed in the northern coastal regions to as far south as the Tropic of Capricorn.  |               | No aquatic habitat present               |                      |
| <i>Chelonia mydas</i>         | Green Turtle       | V      | V                    | Ocean dwelling species with nesting records along the NSW Coast. Juveniles are carnivorous and adults are vegetarian.   | PMST          | <b>N/A</b><br>No aquatic habitat present | <b>N/A</b>           |
| <i>Eretmochelys imbricata</i> | Hawksbill Turtle   | -      | V - Migratory Marine | Occur in tidal and sub-tidal coral and rocky reef habitats throughout tropical waters and extend as far south as northern NSW.  | Bionet / PMST | <b>N/A</b><br>No aquatic habitat present | <b>N/A</b>           |
| <i>Dermochelys coriacea</i>   | Leatherback Turtle | E      | E                    | This species occurs in inshore and offshore marine waters and in all coastal waters of Australia. Feeds in coastal waters from southern Qld to central coast of NSW however rarely breeds in Australia. Feed on jellyfish.        | PMST          | <b>N/A</b><br>No aquatic habitat present | <b>N/A</b>           |
| <i>Caretta caretta</i>        | Loggerhead Turtle  | E      | E                    | Loggerhead Turtles are ocean-dwellers, foraging in deeper water for fish, jellyfish and bottom-dwelling animals. The female comes ashore to lay her eggs in a hole dug on the beach in tropical regions during the warmer months. | PMST          | <b>N/A</b><br>No aquatic habitat present | <b>N/A</b>           |



| Scientific name  | Common name | BC Act | EPBC Act | Habitat   | Record | Likelihood of occurrence  | Likelihood of impact |
|--|-------------|--------|----------|---|--------|---|----------------------|
| <b>Threatened Ecological Communities</b>                           |             |        |          |   |        |   |                      |
| Brogo Vine Forest of the South East Corner Bioregion               |             | E      | -        | Brogo Wet Vine Forest is a tall forest with a sparse small tree layer, open shrub layer and grassy ground layer. Forest Red Gum ( <i>Eucalyptus tereticornis</i> ) and Rough-barked Apple ( <i>Angophora floribunda</i> ) are the dominant tree species. Occurs mostly on steep, north-facing slopes on granites. Large outcrops of granite are common throughout occurrences of the community (DPE 2022)   | PMST   | <b>Unlikely</b><br><br>TEC was not recorded within the Subject Land | <b>Unlikely</b>      |
| Littoral Rainforest and Coastal Vine Thickets of Eastern Australia |             | -      | CE       | This community occurs along the length of the NSW coastline from the Victorian to the Queensland border, typically occurring within two kilometres of the coast or adjacent to a large salt water body, such as an estuary and, thus, is influenced by the sea. This ecological community is not associated with a particular soil type and can occur on a variety of geological substrata. The unifying feature of its habitat is the salinity, derived from the ecological community's proximity to the sea (DPE 2022). | PMST   | <b>Unlikely</b><br><br>TEC was not recorded within the Subject Land | <b>Unlikely</b>      |
| Lowland Grassy Woodland in the South East Corner Bioregion         |             | E      | CE       | Lowland Grassy Woodland communities in the South East Corner bioregion are located in rainshadow areas receiving less rainfall than more elevated terrain that partially surrounds them, with mean annual rainfall typically in the range of 700-1100 mm. The community typically occurs in undulating terrain up to 500 m in elevation on granitic substrates (e.g. adamellites, granites, granodiorites, gabbros, etc.) but may also occur on locally steep   | PMST   | <b>Unlikely</b><br><br>TEC was not recorded within the Subject Land | <b>Unlikely</b>      |

[illegible]

| Scientific name                 | Common name            | BC Act | EPBC Act              | Habitat  | Record | Likelihood of occurrence  | Likelihood of impact |
|---------------------------------|------------------------|--------|-----------------------|--|--------|---|----------------------|
| <i>Diomedea antipodensis</i>    | Antipodean Albatross   | V      | V                     | Does not breed in Australia, however small numbers can occur off the NSW south coast from Green Cape to Newcastle during winter. Foraging of cuttlefish off the NSW coast is considered significant for the species.   | PMST   | <b>Low</b><br>May occur in the locality. No suitable habitat to support the species in the Subject Land | <b>Unlikely</b>      |
| <i>Limosa lapponica</i>         | Bar-tailed Godwit      | -      | V - Migratory Wetland | The Bar-tailed Godwit is found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It is rarely found on inland wetlands or in areas of short grass, such as farmland. The Bar-tailed Godwit usually forages near the edge of water or in shallow water, mainly in tidal estuaries and harbours. (Sourced from Australian Government Department of Agriculture, Water and the Environment - Species Profile - 2022) | PMST   | <b>Low</b><br>May occur in the locality. No suitable habitat to support the species in the Subject Land | <b>Unlikely</b>      |
| <i>Thalassarche melanophris</i> | Black-browed Albatross | V      | V                     | This species breeds within Australian jurisdiction on Heard Island, McDonald Islands, Macquarie Island, and Bishop and Clerk Islets. A marine species that inhabits Antarctic, subantarctic and temperate waters that sometimes enters the tropics, the Black-browed Albatross forages around the breaks of continental and island shelves and across nearby underwater banks.   | PMST   | <b>Low</b><br>May occur in the locality. No suitable habitat to support the                             | <b>Unlikely</b>      |

| Scientific name              | Common name         | BC Act | EPBC Act             | Habitat   | Record | Likelihood of occurrence   | Likelihood of impact |
|------------------------------|---------------------|--------|----------------------|---|--------|--|----------------------|
|                              |                     |        |                      |   |        | species in the Subject Land  |                      |
| <i>Monarcha melanopsis</i>   | Black-faced Monarch | -      | Migratory Marine     | This species of bird usually inhabits dense gullies of rainforest, sclerophyll forests and eucalypt woodlands along the coastal regions from Victoria to Cape York and is migratory over much of its range.   | PMST   | <b>Low</b><br><br>May occur in the locality.<br>No suitable habitat to support the species in the Subject Land | <b>Unlikely</b>      |
| <i>Thalassarche bulleri</i>  | Buller's Albatross  | -      | V - Migratory Marine | Large, migratory bird, endemic to and breeding solely on New Zealand's islands. After breeding this species migrates to the seas off Peru and Chile. In NSW waters it is a relatively common visitor between March and October. Occurs in both inshore and offshore waters, including the continental shelf break and pelagic waters. | PMST   | <b>Low</b><br><br>May occur in the locality.<br>No suitable habitat to support the species in the Subject Land | <b>Unlikely</b>      |
| <i>Thalassarche impavida</i> | Campbell Albatross  | -      | V - Migratory Marine | The Campbell Albatross is a non-breeding visitor to Australian waters, where it appears to be a regular visitor occurring in most months of the year with peaks in winter during the non-breeding season.. A marine sea bird inhabiting sub-Antarctic and   | PMST   | <b>Low</b><br><br>May occur in the locality.<br>No suitable  | <b>Unlikely</b>      |



| Scientific name             | Common name       | BC Act | EPBC Act          | Habitat   | Record | Likelihood of occurrence   | Likelihood of impact |
|-----------------------------|-------------------|--------|-------------------|---|--------|--|----------------------|
|                             |                   |        |                   | subtropical waters from pelagic to shelf-break water habitats, they tolerate sea surface-temperatures from 0–24 °C but are mainly found in the sub-Antarctic. Campbell Albatross feeds on krill and fish, with some cephalopods, salps and jellyfish. |        | habitat to support the species in the Subject Land   |                      |
| <i>Thalassarche eremita</i> | Chatham Albatross | -      | E                 | Large, migratory marine bird, endemic to New Zealand. The main foraging range is in coastal waters off eastern and southern New Zealand, and Tasmania .It is however a rare occurrence for this species to be found in southeast Australian waters.   | PMST   | <b>Low</b><br><br>May occur in the locality.<br>No suitable habitat to support the species in the Subject Land | <b>Unlikely</b>      |
| <i>Tringa nebularia</i>     | Common Greenshank | -      | Migratory Wetland | Common Greenshanks are common throughout Australia in the summer, found both on the coast and inland, in estuaries and mudflats, mangrove swamps and lagoons, and in billabongs, swamps, sewage farms and flooded crops.                              | PMST   | <b>Low</b><br><br>May occur in the locality.<br>No suitable habitat to support the species in the Subject Land | <b>Unlikely</b>      |
| <i>Actitis hypoleucos</i>   | Common Sandpiper  | -      | Migratory Wetland | In Australia, the Common Sandpiper is found in coastal or inland wetlands, both saline or fresh. It is found mainly on muddy edges  | PMST   | <b>Low</b>   | <b>Unlikely</b>      |

| Scientific name                  | Common name      | BC Act | EPBC Act               | Habitat  | Record | Likelihood of occurrence   | Likelihood of impact |
|----------------------------------|------------------|--------|------------------------|--|--------|--|----------------------|
|                                  |                  |        |                        | or rocky shores. When in Australia, the population is concentrated in northern and western Australia .   |        | May occur in the locality.<br>No suitable habitat to support the species in the Subject Land                   |                      |
| <i>Calidris ferruginea</i>       | Curlew Sandpiper | E      | CE - Migratory Wetland | Mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. Inland records are probably mainly of birds pausing for a few days during migration. | PMST   | <b>Low</b><br><br>May occur in the locality.<br>No suitable habitat to support the species in the Subject Land | <b>Unlikely</b>      |
| <i>Numenius madagascariensis</i> | Eastern Curlew   | -      | CE - Migratory Wetland | The Eastern Curlew is found on intertidal mudflats and sandflats, often with beds of seagrass, on sheltered coasts, especially estuaries, mangrove swamps, bays, harbours, lagoons and occasionally on wooden oyster leases or other similar structures. It is rarely found inland. The Eastern Curlew occurs only in our flyway, and about 75 per cent of the world's curlews winter in Australia.  | PMST   | <b>Low</b><br><br>May occur in the locality.<br>No suitable habitat to support the species in the Subject Land | <b>Unlikely</b>      |

| Scientific name                 | Common name                                       | BC Act | EPBC Act             | Habitat   | Record | Likelihood of occurrence  | Likelihood of impact |
|---------------------------------|---|--------|----------------------|---|--------|---|----------------------|
| <i>Ardenna carneipes</i>        | Flesh-footed Shearwater, Fleshy-footed Shearwater | V      | -                    | The Flesh-footed Shearwater ranges throughout the Pacific and Indian Oceans. There are two main breeding areas in the world: one in the South West Pacific includes Lord Howe Island and New Zealand; the other along the coast of Western Australia. This species is a marine bird which nests on Lord Howe Island in forests on sandy soils from Ned's Beach to Clear Place, with smaller colonies below Transit Hill and at Old Settlement Beach. Eggs are laid at the end of a burrow 1 - 2 metres in length. | PMST   | <b>Low</b><br><br>May occur in the locality. No suitable habitat to support the species in the Subject Land | <b>Unlikely</b>      |
| <i>Apus pacificus</i>           | Fork-tailed Swift                                 | -      | Migratory Marine     | Spends most of their time in the air and roosts on cliffs or walls.   | PMST   | <b>Low</b><br><br>May occur in the locality. No suitable habitat to support the species in the Subject Land | <b>Unlikely</b>      |
| <i>Charadrius leschenaultii</i> | Greater Sand-plover                               | V      | V - Migratory Marine | Apparently rare on the east coast, usually found singly. Has been recorded between Illawarra and the Northern Rivers along the NSW east coast. Almost entirely restricted to coastal areas in NSW, occurring mainly on sheltered sandy, shelly or muddy beaches or estuaries with large intertidal mudflats or sandbanks. Roosts during high tide on sandy beaches and rocky shores; begin foraging activity on wet ground at low tide, usually away  | PMST   | <b>Low</b><br><br>May occur in the locality. No suitable habitat to support the                             | <b>Unlikely</b>      |

| Scientific name             | Common name                   | BC Act | EPBC Act          | Habitat   | Record | Likelihood of occurrence  | Likelihood of impact |
|-----------------------------|-------------------------------|--------|-------------------|---|--------|---|----------------------|
|                             |                               |        |                   | from the edge of the water; individuals may forage and roost with other waders.   |        | species in the Subject Land   |                      |
| <i>Thalassarche carteri</i> | Indian Yellow-nosed Albatross | -      | V                 | Indian yellow-nosed albatrosses return to the breeding colonies in late August. Indian yellow-nosed albatross feeds on fish, crustaceans and cephalopods, snatching prey from the surface and by diving into the water (ALA 2022).  | PMST   | <b>Low</b><br><br>May occur in the locality. No suitable habitat to support the species in the Subject Land | <b>Unlikely</b>      |
| <i>Gallinago hardwickii</i> | Latham's Snipe                | -      | Migratory Wetland | Latham's Snipe are seen in small groups or singly in freshwater wetlands on or near the coast, generally among dense cover. They are found in any vegetation around wetlands, in sedges, grasses, lignum, reeds and rushes and also in saltmarsh and creek edges on migration. They also use crops and pasture (DCCEEW 2022). | PMST   | <b>Low</b><br><br>May occur in the locality. No suitable habitat to support the species in the Subject Land | <b>Unlikely</b>      |
| <i>Numenius minutus</i>     | Little Curlew                 | -      | Migratory Marine  | Often found feeding in short dry floodplains and blacksoil plains including dry grassland and sedgeland affected by seasonal inundation. They have also been found to occur in open   | PMST   | <b>Low</b><br><br>May occur in the locality. No suitable  | <b>Unlikely</b>      |



| Scientific name           | Common name           | BC Act | EPBC Act         | Habitat   | Record | Likelihood of occurrence  | Likelihood of impact |
|---------------------------|-----------------------|--------|------------------|---|--------|---|----------------------|
|                           |                       |        |                  | woodlands, mown lawns, gardens including verges of roads and airstrips.   |        | habitat to support the species in the Subject Land  |                      |
| <i>Sternula albifrons</i> | Little Tern           | E      | Migratory Marine | Almost exclusively coastal, preferring sheltered environments; however may occur several kilometres from the sea in harbours, inlets and rivers (with occasional offshore islands or coral cay records). Nests in small, scattered colonies in low dunes or on sandy beaches just above high tide mark near estuary mouths or adjacent to coastal lakes and islands. The nest is a scrape in the sand, which may be lined with shell grit, seaweed or small pebbles.  | PMST   | <b>Low</b><br><br>May occur in the locality. No suitable habitat to support the species in the Subject Land | <b>Unlikely</b>      |
| <i>Macronectes halli</i>  | Northern Giant Petrel | -      | V                | The Northern Giant-Petrel is marine and oceanic. It mainly occurs in sub-Antarctic waters, but regularly occurs in Antarctic waters of the southwestern Indian Ocean, the Drake Passage and west of the Antarctic Peninsula (Marchant & Higgins 1990). The range of the Northern Giant-Petrel extends into subtropical waters mainly between winter and spring. It frequents both oceanic and inshore waters near breeding islands and in the non-breeding range. Its breeding range extends into the Antarctic zone at South Georgia. It nests in coastal areas where vegetation or broken terrain offers shelter, on sea-facing slopes, headlands, in the lee of banks, under or against vegetation clumps, below cliffs or overhanging rocks, or in hollows. Tussock-grass ( <i>Poa</i> ) is | PMST   | <b>Low</b><br><br>May occur in the locality. No suitable habitat to support the species in the Subject Land | <b>Unlikely</b>      |

| Scientific name          | Common name              | BC Act | EPBC Act              | Habitat   | Record | Likelihood of occurrence   | Likelihood of impact |
|--------------------------|--------------------------|--------|-----------------------|---|--------|--|----------------------|
|                          |                          |        |                       | widespread at many breeding sites. Its nests are built in secluded, coastal sites, sheltered by heavy vegetation (DCCEEW 2022).   |        |  |                      |
| <i>Diomedea sanfordi</i> | Northern Royal Albatross | -      | E                     | Breeds in NZ waters. A rare visitor to NSW waters, predominantly visiting southern waters in the winter and early spring period. Primarily forages inshore and offshore waters, feeding on cephalopods, crustacea, carrion and salps (DCCEEW 2022). | PMST   | <b>Low</b><br>May occur in the locality.<br>No suitable habitat to support the species in the Subject Land | <b>Unlikely</b>      |
| <i>Cuculus optatus</i>   | Oriental Cuckoo          | -      | Migratory terrestrial | The Oriental cuckoo is reported to breed in the northern hemisphere occasionally witnessed on the Australian continent during migration.  | PMST   | <b>Low</b><br>May occur in the locality.<br>No suitable habitat to support the species in the Subject Land | <b>Unlikely</b>      |
| <i>Pandion haliaetus</i> | Osprey                   | -      | Migratory Wetland     | This species has an extremely large range predominantly around coastal regions though some areas of inland Australia are key habitats for this species.   | PMST   | <b>Low</b><br>May occur in the locality.   | <b>Unlikely</b>      |

| Scientific name           | Common name        | BC Act | EPBC Act          | Habitat  | Record | Likelihood of occurrence  | Likelihood of impact |
|---------------------------|--------------------|--------|-------------------|--|--------|---|----------------------|
|                           |                    |        |                   |  |        | No suitable habitat to support the species in the Subject Land  |                      |
| <i>Calidris melanotos</i> | Pectoral Sandpiper | -      | Migratory Wetland | These birds forage on grasslands and mudflats, picking up food by sight, sometimes by probing. They mainly eat arthropods and other invertebrates. Some Asian breeders winter in southern Australia and NZ.  | PMST   | <b>Low</b><br><br>May occur in the locality. No suitable habitat to support the species in the Subject Land | <b>Unlikely</b>      |
| <i>Gallinago stenura</i>  | Pin-tailed Snipe   | -      | Migratory Wetland | The Pin-tailed Snipe has confirmed records from NSW, south-west Western Australia, Pilbara and the Top End. In NSW a single banded bird was reported near West Wyalong. In Western Australia the species was reported at Pilbara, Port Headland, Myaree Pool, Maitland River and near Karratha. The Pin-tailed Snipe breeds in Russia. During non-breeding period the Pin-tailed Snipe occurs most often in or at the edges of shallow freshwater swamps, ponds and lakes with emergent, sparse to dense cover of grass/sedge or other vegetation. The species is also found in drier, more open wetlands such as claypans in more arid parts of species' range. It is also commonly seen at sewage ponds; not | PMST   | <b>Low</b><br><br>May occur in the locality. No suitable habitat to support the species in the Subject Land | <b>Unlikely</b>      |

| Scientific name             | Common name        | BC Act | EPBC Act                   | Habitat  | Record | Likelihood of occurrence   | Likelihood of impact |
|-----------------------------|--------------------|--------|----------------------------|--|--------|--|----------------------|
|                             |                    |        |                            | normally in saline or inter-tidal wetlands (Higgins & Davies 1996) (DCCEEW 2022).  |        |  |                      |
| <i>Calidris canutus</i>     | Red Knot           | -      | E -<br>Migratory<br>Marine | In NSW it is recorded in small numbers along some of the major river estuaries and sheltered embayments of the coastline, in particular the Hunter River estuary. This bird is rarely seen away from the coast. Occurs in small numbers on intertidal mudflats, bays, lagoons, inlets and estuaries and sandy beaches of sheltered coasts. | PMST   | <b>Low</b><br><br>May occur in the locality.<br>No suitable habitat to support the species in the Subject Land | <b>Unlikely</b>      |
| <i>Rhipidura rufifrons</i>  | Rufous Fantail     | -      | Migratory<br>Marine        | 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.   | PMST   | <b>Low</b><br><br>May occur in the locality.<br>No suitable habitat to support the species in the Subject Land | <b>Unlikely</b>      |
| <i>Thalassarche salvini</i> | Salvin's Albatross | -      | V -<br>Migratory<br>Marine | Salvin's Albatross is a marine species occurring in subantarctic and subtropical waters, reaching the tropics in the cool Humboldt Current, off South America. Salvin's Albatross is a non-breeding visitor to Australian waters.  | PMST   | <b>Low</b><br><br>May occur in the locality.<br>No suitable  | <b>Unlikely</b>      |



| Scientific name                 | Common name            | BC Act | EPBC Act          | Habitat   | Record        | Likelihood of occurrence   | Likelihood of impact  |
|---------------------------------|------------------------|--------|-------------------|---|---------------|--|---|
|                                 |                        |        |                   |   |               | habitat to support the species in the Subject Land   |   |
| <i>Myiagra cyanoleuca</i>       | Satin Flycatcher       | -      | Migratory Marine  | In NSW widespread on and east of the Great Divide, sparsely scattered on the western slopes, very occasional records on the western plains. Inhabit heavily vegetated gullies in eucalypt-dominated forests and taller woodlands, often near wetlands and watercourses. On migration, occur in coastal forests, woodlands, mangroves and drier woodlands and open forests. Generally, not in rainforests. | PMST          | <b>Moderate</b><br><br>May occur in the locality. Some suitable habitat to support the species in the Subject Land | <b>Low</b><br><br>No habitat suitable for the species would be impacted |
| <i>Calidris acuminata</i>       | Sharp-tailed Sandpiper | -      | Migratory Wetland | The Sharp-tailed Sandpiper prefers the grassy edges of shallow inland freshwater wetlands. It is also found around sewage farms, flooded fields, mudflats, mangroves, rocky shores and beaches. Its breeding habitat in Siberia is the peat-hummock and lichen tundra of the high Arctic.   | PMST          | <b>Low</b><br><br>May occur in the locality. No suitable habitat to support the species in the Subject Land        | <b>Unlikely</b>   |
| <i>Thalassarche cauta cauta</i> | Shy Albatross          | V      | E                 | This pelagic or ocean-going species inhabits subantarctic and subtropical marine waters, spending the majority of its time at   | Bionet / PMST | <b>Low</b>   | <b>Unlikely</b>   |

| Scientific name          | Common name      | BC Act | EPBC Act             | Habitat  | Record | Likelihood of occurrence   | Likelihood of impact |
|--------------------------|------------------|--------|----------------------|--|--------|--|----------------------|
|                          |                  |        |                      | sea. This species is circumpolar in distribution, occurring widely in the southern oceans. Islands off Australia and New Zealand provide breeding habitat. In Australian waters, the Shy Albatross occurs along the east coast from Stradbroke Island in Queensland along the entire south coast of the continent to Carnarvon in Western Australia.   |        | May occur in the locality.<br>No suitable habitat to support the species in the Subject Land                   |                      |
| <i>Phoebastria fusca</i> | Sooty Albatross  | -      | V - Marine Migratory | The Sooty Albatross is marine and pelagic. In summer, the species occurs mainly south of 35° S in subtropical and subantarctic waters, but it is most abundant near the Subtropical Convergence (Falla 1937a; Tickell & Woods 1972; Weimerskirch et al. 1986). During both the breeding and non-breeding seasons, the species occurs widely over pelagic waters, exploiting dispersed sources of food (Weimerskirch et al. 1986). It forages over coastal kelp beds around Tristan da Cunha (Richardson 1984). The species breeds on subtropical and subantarctic islands in the Indian and Atlantic Oceans, on vegetated cliffs and steep slopes that are sheltered from prevailing winds, often amongst tussock grass (Weimerskirch et al. 1986). (DCCEEW 2022). | PMST   | <b>Low</b><br><br>May occur in the locality.<br>No suitable habitat to support the species in the Subject Land | <b>Unlikely</b>      |
| <i>Ardenna grisea</i>    | Sooty Shearwater | -      | Marine Migratory     | In Australia, the Sooty Shearwater breeds on islands off New South Wales and Tasmania. The species occurs off the coast of south-east Queensland in small numbers and is a moderately common migrant and visitor to Victoria and South Australia. Birds nest in burrows or rock crevices on coastal slopes, ridges   | PMST   | <b>Low</b><br><br>May occur in the locality.<br>No suitable  | <b>Unlikely</b>      |

| Scientific name                  | Common name              | BC Act | EPBC Act             | Habitat   | Record | Likelihood of occurrence  | Likelihood of impact |
|----------------------------------|--------------------------|--------|----------------------|---|--------|---|----------------------|
|                                  |                          |        |                      | and cliff tops, in herbfields, tussock grassland or forest. Areas with waterlogged or shallow soils and/or dense vegetation are avoided (DCCEEW 2022).  |        | habitat to support the species in the Subject Land  |                      |
| <i>Macronectes giganteus</i>     | Southern Giant-Petrel    | E      | E - Migratory Marine | The Southern Giant-Petrel breeds on six subantarctic and Antarctic islands in Australian territory and is a common visitor off the NSW coast.   | PMST   | <b>Low</b><br><br>May occur in the locality. No suitable habitat to support the species in the Subject Land | <b>Unlikely</b>      |
| <i>Diomedea epomophora</i>       | Southern Royal Albatross | -      | E                    | The Northern Royal Albatross breeds in New Zealand waters. Away from its nesting sites this Albatross is circumpolar between 30 and 45 degrees south. It is a rare visitor to NSW waters, predominantly visiting southern waters in the winter and early spring period. The Northern Royal Albatross primarily forages in inshore and offshore waters over the continental shelf to the shelf edge, feeding mainly on cephalopods and fish, but also salps, crustacea and carrion (DPE 2022). | PMST   | <b>Low</b><br><br>May occur in the locality. No suitable habitat to support the species in the Subject Land | <b>Unlikely</b>      |
| <i>Symposiachrus trivirgatus</i> | Speckled Monarch         | -      | Marine Migratory     | Usually considered a denizen of the dense rainforests and moist eucalypt forests of eastern and north-eastern Australia, the  | PMST   | <b>Low</b>  | <b>Unlikely</b>      |

| Scientific name         | Common name         | BC Act | EPBC Act             | Habitat   | Record | Likelihood of occurrence   | Likelihood of impact |
|-------------------------|---------------------|--------|----------------------|---|--------|--|----------------------|
|                         |                     |        |                      | Spectacled Monarch sometimes also inhabits mangroves and other densely vegetated habitats. The species occurs at all strata of the forest, but stays mostly in the middle to lower levels, where it gleans, sallies and flutter-chases insect prey among the inner foliage of the trees and shrubs. Spectacled Monarchs call persistently while they forage, and may stop feeding to inquisitively investigate imitated whistles or squeaks (Birdlife.org, 2022). |        | May occur in the locality.<br>No suitable habitat to support the species in the Subject Land                   |                      |
| <i>Gallinago megala</i> | Swinhoe's Snipe     | -      | Marine Migratory     | Swinhoe's Snipe breeds in central and southern Siberia. During non-breeding it migrates south to habitat specific to Australia including the dense clumps of grass and rushes round the edges of fresh and brackish wetlands. This includes swamps, billabongs, river pools, small streams and sewage ponds. They are also found in drying claypans and inundated plains pitted with crab holes (DCCEW 2022).   | PMST   | <b>Low</b><br><br>May occur in the locality.<br>No suitable habitat to support the species in the Subject Land | <b>Unlikely</b>      |
| <i>Diomedea exulans</i> | Wandering Albatross | E      | V - Migratory Marine | The Wandering Albatross visits waters extending the entire length of the NSW coast between June and September, spending the majority of their time in flight. Breeding takes place on exposed hills and rocky edges amongst open and patchy vegetation. Feeding takes place in pelagic offshore and inshore waters.   | PMST   | <b>Low</b><br><br>May occur in the locality.<br>No suitable habitat to support the                             | <b>Unlikely</b>      |



| Scientific name                  | Common name                    | BC Act | EPBC Act         | Habitat  | Record | Likelihood of occurrence  | Likelihood of impact |
|----------------------------------|--------------------------------|--------|------------------|--|--------|---|----------------------|
|                                  |                                |        |                  |  |        | species in the Subject Land   |                      |
| <i>Thalassarche cauta steadi</i> | White-capped Albatross         | -      | V                | The White-capped Albatross is probably common off the coast of south-east Australia throughout the year. This species is similar to the Shy Albatross and can be difficult to identify, especially at sea and as a juvenile. It has been observed that juveniles are rare in New Zealand waters, being more common off south-east Australia and South Africa; breeding colonies occur on islands south of New Zealand. | PMST   | <b>Low</b><br><br>May occur in the locality. No suitable habitat to support the species in the Subject Land | <b>Unlikely</b>      |
| <i>Lamna nasus</i>               | Porbeagle, Mackerel Shark      | -      | Marine Migratory | In Australia, the Porbeagle occurs in waters from southern Queensland to south-west Australia (Last & Stevens 2009). This species primarily inhabits oceanic waters and areas around the edge of the continental shelf. They occasionally move into coastal waters, but these movements are temporary (DCCEEW 2022).   | PMST   | <b>N/A</b><br><br>No aquatic habitat present  | <b>N/A</b>           |
| <i>Carcharodon carcharias</i>    | White Shark, Great White Shark | V      | V                | White sharks are large, rare, warm-blooded apex marine predators widely distributed throughout temperate and sub-tropical regions in the northern and southern hemispheres. In Australian waters the white shark's range extends primarily from southern Queensland, around the southern coastline and to the North West Cape in Western Australia (DCCEEW 2022).  | PMST   | <b>N/A</b><br><br>No aquatic habitat present  | <b>N/A</b>           |

| Scientific name               | Common name    | BC Act | EPBC Act         | Habitat  | Record | Likelihood of occurrence          | Likelihood of impact |
|-------------------------------|----------------|--------|------------------|--|--------|-----------------------------------|----------------------|
| <i>Balaenoptera musculus</i>  | Blue Whale     | E      | E                | The Blue Whale is oceanic within Southern Hemisphere between 20 degrees to 70 degrees South including NSW waters. It breeds in warm water at low latitudes, preferring open seas rather than coastal waters (DPE 2022).  | PMST   | N/A<br>No aquatic habitat present | N/A                  |
| <i>Balaenoptera edeni</i>     | Byrde's Whale  | -      | Migratory Marine | Bryde's Whales occur in temperate to tropical waters, both oceanic and inshore. The coastal form of Bryde's Whale appears to be limited to the 200 m depth isobar, moving along the coast in response to availability of suitable prey (Best et al. 1984). The offshore form is found in deeper water (500 m to 1000 m). The inshore form appears to be resident in waters containing suitable prey stocks of pelagic shoaling fishes, while the offshore form appears to undergo extensive migrations between subtropical and tropical waters during the winter months (Best 1977)(DCCEE 2022). | PMST   | N/A<br>No aquatic habitat present | N/A                  |
| <i>Megaptera novaeangliae</i> | Humpback Whale | V      | V                | The Humpback Whale population of Australia's east coast migrates from summer cold-water feeding grounds in Subantarctic waters to warm-water winter breeding grounds in the central Great Barrier Reef. They are regularly observed in NSW waters in June and July, on northward migration and October and November, on southward migration (DPE 2022).  | PMST   | N/A<br>No aquatic habitat present | N/A                  |
| <i>Orcinus orca</i>           | Killer Whale   | -      | Migratory Marine | The preferred habitat of Killer Whales includes oceanic, pelagic and neritic (relatively shallow waters over the continental shelf) regions, in both warm and cold waters. They may be more  | PMST   | N/A                               | N/A                  |

| Scientific name            | Common name          | BC Act | EPBC Act         | Habitat  | Record | Likelihood of occurrence                     | Likelihood of impact |
|----------------------------|----------------------|--------|------------------|--|--------|--|----------------------|
|                            |                      |        |                  | common in cold, deep waters, but off Australia, Killer Whales are most often seen along the continental slope and on the shelf, particularly near seal colonies. Killer Whales have regularly been observed within the Australian territorial waters along the ice edge in summer (Thiele & Gill 1999). Although Killer Whales tend to be found at the ice edge during the Antarctic summer (Gill & Thiele 1997; Thiele et al. 2000), family groups (including calves) have been seen within the ice during winter (Thiele & Gill 1999) (DCCEEW 2022).   |        | No aquatic habitat present                   |                      |
| <i>Caperea marginata</i>   | Pygmy Right Whale    | -      | Marine Migratory | Records of Pygmy Right Whales in Australian waters are distributed between 32° S and 47° S, but are not uniformly spread around the coast. Pygmy Right Whales have primarily been recorded in areas associated with upwellings and with high zooplankton abundance, particularly copepods and small euphausiids which constitute their main prey (Kemper 2002a; Sekiguchi et al. 1992). There is some evidence to indicate that the area south of 41° S is important for weaned Pygmy Right Whales, possibly because of the higher prey abundance in these waters (Kemper 2002a). Pygmy Right Whales have been seen in sheltered shallow bays, but it appears that these are predominantly juveniles and sub-adults (DCCEEW 2022). | PMST   | <b>N/A</b><br><br>No aquatic habitat present | <b>N/A</b>           |
| <i>Eubalaena australis</i> | Southern Right Whale | E      | E                | This large marine mammal species occurs in temperate and subpolar waters of the Southern Hemisphere. Migrating between summer feeding grounds in Antarctica and winter breeding grounds around the coasts of Southern Australia, New   | PMST   | <b>N/A</b>                                   | <b>N/A</b>           |

| Scientific name                | Common name   | BC Act | EPBC Act         | Habitat   | Record | Likelihood of occurrence                     | Likelihood of impact |
|--------------------------------|---------------|--------|------------------|---|--------|--|----------------------|
|                                |               |        |                  | Zealand, South Africa and South America, the Southern Right Whale feed on krill and copepods by filtering water through their baleen; this species may not feed at all in Australian waters, however may move inshore for calving and mater in winter.  |        | No aquatic habitat present                   |                      |
| <i>Rhincodon typus</i>         | Whale Shark   | -      | V                | Whale sharks have a broad distribution in tropical and warm temperate seas, usually between latitudes 30°N and 35°S. They are known to inhabit both deep and shallow coastal waters and the lagoons of coral atolls and reefs. Australia is one of the most reliable locations to find whale sharks. This species is widely distributed in Australian waters. Although most common at Ningaloo Marine Park, sightings have been confirmed at Eden on the New South Wales south coast. These sharks appear at locations where seasonal food 'pulses' are known to occur (DCCEEW 2022). | PMST   | <b>N/A</b><br><br>No aquatic habitat present | <b>N/A</b>           |
| <i>Lagenorhynchus obscurus</i> | Dusky Dolphin | -      | Migratory Marine | Dusky Dolphins occur mostly in temperate and sub-Antarctic waters. They are considered to primarily inhabit inshore waters but may also be pelagic at times (Ross 2006) (DCCEEW 2022).  | PMST   | <b>N/A</b><br><br>No aquatic habitat present | <b>N/A</b>           |



## Appendix G – Climatology data

### Merimbula, New South Wales August 2022 Daily Weather Observations



| Date                       | Day | Temps |      | Rain | Evap | Sun | Max wind gust |      |       | 9am  |    |         |      |      |        | 3pm  |    |         |      |      |        |  |  |  |  |
|----------------------------|-----|-------|------|------|------|-----|---------------|------|-------|------|----|---------|------|------|--------|------|----|---------|------|------|--------|--|--|--|--|
|                            |     | Min   | Max  |      |      |     | Dirn          | Spd  | Time  | Temp | RH | Cld     | Dirn | Spd  | MSLP   | Temp | RH | Cld     | Dirn | Spd  | MSLP   |  |  |  |  |
|                            |     | °C    | °C   |      |      |     |               | km/h | local | °C   | %  | eighths |      | km/h | hPa    | °C   | %  | eighths |      | km/h | hPa    |  |  |  |  |
| 1                          | Mo  | 5.4   | 19.4 | 0.4  |      |     | WNW           | 43   | 11:00 | 10.8 | 84 |         | SSW  | 6    | 1011.1 | 19.2 | 27 |         | WSW  | 17   | 1010.5 |  |  |  |  |
| 2                          | Tu  | 3.2   | 17.5 | 0    |      |     | NNW           | 26   | 01:19 | 12.5 | 62 |         | ENE  | 11   | 1017.3 | 16.5 | 54 |         | NE   | 13   | 1014.4 |  |  |  |  |
| 3                          | We  | 4.7   | 23.1 | 0.4  |      |     | NW            | 41   | 14:12 | 10.6 | 81 | 8       | WSW  | 7    | 1008.9 | 22.7 | 46 | 1       | NW   | 19   | 1004.9 |  |  |  |  |
| 4                          | Th  | 8.4   | 18.6 | 1.6  |      |     | NNE           | 24   | 04:28 | 12.5 | 99 | 7       | NW   | 7    | 1001.6 | 17.3 | 84 | 8       | NE   | 11   | 998.1  |  |  |  |  |
| 5                          | Fr  | 4.7   | 21.9 | 1.0  |      |     | NW            | 52   | 11:45 | 10.6 | 98 |         | S    | 6    | 1000.6 | 21.0 | 28 |         | NW   | 22   | 998.3  |  |  |  |  |
| 6                          | Sa  | 4.4   | 18.1 | 0    |      |     | S             | 22   | 15:02 | 13.8 | 64 | 8       | Calm |      | 1005.5 | 17.5 | 46 |         | SSW  | 13   | 1005.5 |  |  |  |  |
| 7                          | Su  | 5.2   | 16.5 | 0.8  |      |     | S             | 39   | 14:24 | 9.6  | 95 | 8       | SSW  | 7    | 1016.4 | 13.6 | 73 | 8       | SSE  | 11   | 1017.3 |  |  |  |  |
| 8                          | Mo  | 3.6   | 16.3 | 0.2  |      |     | SE            | 30   | 14:24 | 10.9 | 74 |         | WSW  | 11   | 1024.5 | 13.8 | 71 | 5       | SE   | 15   | 1022.7 |  |  |  |  |
| 9                          | Tu  | 2.8   | 16.0 | 0    |      |     | SSW           | 31   | 09:56 | 11.1 | 71 |         | WSW  | 11   | 1026.9 | 13.3 | 65 | 8       | SSW  | 13   | 1026.0 |  |  |  |  |
| 10                         | We  | 1.6   | 15.3 | 0    |      |     | ENE           | 19   | 14:16 | 9.5  | 77 |         | NW   | 11   | 1030.2 | 13.5 | 63 | 7       | ENE  | 13   | 1026.7 |  |  |  |  |
| 11                         | Th  | 7.1   | 13.2 | 0    |      |     | N             | 22   | 20:26 | 10.6 | 86 |         | Calm |      | 1022.1 | 12.8 | 76 | 8       | Calm |      | 1017.5 |  |  |  |  |
| 12                         | Fr  | 6.3   | 17.5 | 0    |      |     | SE            | 28   | 13:47 | 13.1 | 69 | 1       | WNW  | 7    | 1016.0 | 16.3 | 66 |         | SE   | 15   | 1014.4 |  |  |  |  |
| 13                         | Sa  | 6.4   | 14.3 | 17.0 |      |     | WSW           | 26   | 06:28 | 10.7 | 99 | 8       | WSW  | 7    | 1012.7 | 12.4 | 93 | 8       | Calm |      | 1007.9 |  |  |  |  |
| 14                         | Su  | 5.1   | 19.0 | 2.6  |      |     | NW            | 30   | 16:04 | 14.3 | 62 | 7       | NNE  | 7    | 1004.3 | 16.8 | 42 | 8       | WNW  | 13   | 1000.9 |  |  |  |  |
| 15                         | Mo  | 5.6   | 21.0 | 0.2  |      |     | WNW           | 30   | 16:00 | 14.7 | 59 |         | NNW  | 9    | 1002.9 | 20.0 | 28 |         | WNW  | 17   | 1000.9 |  |  |  |  |
| 16                         | Tu  | 2.2   | 18.2 | 0    |      |     | SW            | 33   | 14:27 | 11.1 | 73 | 8       | N    | 6    | 1008.2 | 17.6 | 45 |         | WSW  | 20   | 1009.6 |  |  |  |  |
| 17                         | We  | 6.3   | 17.7 | 0    |      |     | WSW           | 31   | 01:32 | 14.0 | 64 |         | WNW  | 13   | 1019.9 | 16.0 | 67 | 2       | ENE  | 11   | 1017.2 |  |  |  |  |
| 18                         | Th  | 8.3   | 17.6 | 0    |      |     | NNW           | 30   | 22:53 | 10.7 | 96 | 7       | S    | 2    | 1012.1 | 12.6 | 97 | 8       | NW   | 6    | 1008.6 |  |  |  |  |
| 19                         | Fr  | 8.5   | 16.5 | 2.2  |      |     | SW            | 33   | 15:12 | 11.1 | 87 | 8       | SW   | 11   | 1012.2 | 16.2 | 47 | 3       | SW   | 17   | 1012.6 |  |  |  |  |
| 20                         | Sa  | 1.9   | 19.9 | 0.4  |      |     | SSW           | 48   | 13:38 | 8.0  | 96 | 8       | SSE  | 2    | 1016.6 | 14.0 | 61 | 4       | SW   | 28   | 1018.0 |  |  |  |  |
| 21                         | Su  | 2.9   | 14.9 | 0    |      |     | NE            | 28   | 13:25 | 10.0 | 64 |         | NW   | 9    | 1027.0 | 13.9 | 54 |         | NNE  | 13   | 1023.3 |  |  |  |  |
| 22                         | Mo  | 1.9   | 20.5 | 0    |      |     | NW            | 39   | 15:41 | 10.7 | 75 |         | Calm |      | 1015.8 | 17.8 | 58 |         | NE   | 11   | 1009.4 |  |  |  |  |
| 23                         | Tu  | 6.3   | 12.4 | 5.6  |      |     | SW            | 46   | 15:56 | 7.1  | 99 |         | W    | 4    | 1012.6 | 11.4 | 64 |         | SSW  | 15   | 1013.8 |  |  |  |  |
| 24                         | We  | 4.3   | 17.2 | 0.2  |      |     | SSW           | 30   | 12:02 | 11.8 | 60 |         | W    | 13   | 1020.9 | 15.7 | 45 | 8       | W    | 7    | 1018.1 |  |  |  |  |
| 25                         | Th  | 7.9   | 18.4 | 0.2  |      |     | SW            | 41   | 11:50 | 15.0 | 65 |         | SW   | 19   | 1020.9 | 16.9 | 56 | 8       | SSW  | 20   | 1022.5 |  |  |  |  |
| 26                         | Fr  | 4.9   | 18.0 | 0    |      |     | ESE           | 30   | 12:29 | 14.2 | 61 |         | W    | 9    | 1029.1 | 16.0 | 74 |         | SE   | 15   | 1027.7 |  |  |  |  |
| 27                         | Sa  | 9.8   | 18.1 | 0.4  |      |     | E             | 22   | 13:24 | 15.1 | 75 |         | Calm |      | 1031.4 | 16.6 | 68 |         | ENE  | 15   | 1028.5 |  |  |  |  |
| 28                         | Su  | 5.7   | 18.4 | 0.2  |      |     | NE            | 33   | 12:03 | 13.8 | 91 |         | Calm |      | 1029.2 | 16.3 | 78 |         | NE   | 17   | 1025.6 |  |  |  |  |
| 29                         | Mo  | 5.8   | 19.1 | 0    |      |     | NNE           | 39   | 16:24 | 15.3 | 97 |         | NNE  | 2    | 1024.2 | 17.0 | 82 |         | NNE  | 15   | 1019.3 |  |  |  |  |
| 30                         | Tu  | 8.6   | 22.2 | 0    |      |     | NW            | 52   | 11:11 | 18.5 | 75 |         | NW   | 11   | 1011.6 | 20.7 | 36 |         | NW   | 19   | 1010.8 |  |  |  |  |
| 31                         | We  | 4.7   | 17.3 | 0.2  |      |     | ESE           | 24   | 11:07 | 13.1 | 67 |         | SSW  | 6    | 1025.1 | 15.5 | 62 |         | ESE  | 13   | 1024.0 |  |  |  |  |
| Statistics for August 2022 |     |       |      |      |      |     |               |      |       |      |    |         |      |      |        |      |    |         |      |      |        |  |  |  |  |
| Mean                       |     | 5.3   | 17.9 |      |      |     |               |      |       | 12.1 | 78 | 7       |      | 6    | 1016.7 | 16.2 | 59 | 6       |      | 14   | 1014.7 |  |  |  |  |
| Lowest                     |     | 1.6   | 12.4 |      |      |     |               |      |       | 7.1  | 59 | 1       |      | Calm | 1000.6 | 11.4 | 27 | 1       |      | Calm | 998.1  |  |  |  |  |
| Highest                    |     | 9.8   | 23.1 | 17.0 |      |     | NW            | 52   |       | 18.5 | 99 | 8       | SW   | 19   | 1031.4 | 22.7 | 97 | 8       | SW   | 28   | 1028.5 |  |  |  |  |
| Total                      |     |       |      | 33.6 |      |     |               |      |       |      |    |         |      |      |        |      |    |         |      |      |        |  |  |  |  |

Observations were drawn from Merimbula Airport AWS (station 069147)

Some cloud observations are from automated equipment; these are somewhat different to those made by a human observer and may not appear every day.

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