Fraser Ecological Consulting

abn 797 637 40114
665 Scenic Road
Macmasters Beach NSW 2257
telephone 042323 8193

APPROVED

Land and Environment Court of NSW

LEC No: 2024/00150241

DEVELOPMENT CONSENT NO: SF10955 **Dated: 22/10/2024**

Flora and Fauna Assessment

57 WANDEAN ROAD, WANDANDIAN

6th August 2024

EXECUTIVE SUMMARY

Fraser Ecological Consulting has been contracted by Mr. Adam Moore to prepare an impact assessment of the proposed development on the terrestrial ecology located at 57 WANDEAN ROAD, WANDANDIAN in the Shoalhaven Council LGA. This amended report forms part of the Land and Environment Court proceedings (2024/00150241) for the proposed two lot subdivision.

Commonwealth legislation (*Environment Protection and Biodiversity Conservation (EPBC) Act 1999*) requires that actions judged to significantly impact upon matters of National Environmental Significance are to be assessed via a formal referral process. This assessment report determines whether a referral to be made to the Department of the Environment, Water, Heritage and the Arts for further assessment is required.

State legislation (*Environmental Planning and Assessment Act 1979*) requires that actions judged to significantly impact upon threatened species, populations or ecological communities, or their habitats listed under the *Biodiversity Conservation Act (2016)* trigger the preparation of a Biodiversity Assessment Report (BDAR).

The proposed development impact area is below the 0.5ha Biodiversity Offsets Scheme (BOS). The property is not mapped on the NSW DPIE 'Sensitive Biodiversity Values Map'.

Characteristics of each proposed lot is as follows:

- Lot 1: A vacant lot with an area of 2.21 hectares and a primary frontage to Wandean Road to the north. This proposed lot contains an existing farm dam in the western part of the Site and a right of way access to lots 2. Building envelope and onsite sewage management areas have been nominated within an existing cleared area. Proposed screen plantings are proposed. No trees are proposed for removal.
- Lot 2: Has an existing dwelling with an area of 5.67 hectares. The legal road access is proposed by way of the right of way access through the neighbouring proposed Lot 1 from Wandean Road to the north. The proposal will include the construction of a new access driveway to service the proposed lot. Building envelope and onsite sewage management areas have also been nominated. Two locally native trees (*E.eugenioides*) are proposed for removal to achieve the APZ.

Building envelope impacts

No vegetation removal is required. There is an existing dwelling on proposed Lot 2. The indicative envelope within proposed Lot 1 will be within an existing cleared area dominated by introduced vegetation.

Installation and service impacts

No vegetation removal is required. All lots will utilise existing driveways that have services already installed within it. These same service routes will be used for any future development as a result of the proposed subdivision. Any services trenching will not have a significant incursion upon critical tree protection zones and can be undertaken under the supervision of a suitably qualified and experienced AQF Level 5 Project Arborist prior to the release of the Subdivision Certificate as a precautionary measure.

Bushfire APZ impacts

The bushfire assessment report prepared by Harris Environmental dated 1st August 2024 states that the bushfire Asset Protection Zones (APZs) shall be as follows:

- The proposed Lot 1 and Lot 2 can be constructed to **BAL 29** as specified by AS3959 - 2018 Construction for Buildings in Bushfire Prone Areas, *PBP 2019* and/or *NASH Standard Steel Framed Construction in Bushfire Areas* (2014).
- A BAL 29 APZ for the proposed Lots 1 and 2 should be established from the commencement of building works and maintained for perpetuity for the following dimensions:

Aspect	Vegetation Classification & Slope	Distance from hazard to façade
Lot 1 (Proposed Building Envelope)		
North	0-5° Downslope Forest	74.2 m
	0-5° Downslope Grassland	29 m
Northeast	0-5° Downslope Remnant Vegetation	30.2 m
East	0-5° Downslope Forest	75.4 m
	0-5° Downslope Grassland	29 m
South	Upslope Grassland	10 m
West	Upslope Grassland	10 m
Lot 2 (Existing Dwelling)		
North	0-5° Downslope Forest	30.4 m
	0-5° Downslope Grassland	29 m
East	0-5° Downslope Forest	29 m
South	Upslope Grassland	10 m
West	Flatland Grassland	10 m
Northwest	Flatland Remnant Vegetation	55.4 m

In terms of vegetation removal, only two (2) trees require removal to establish the APZs on proposed Lot 2 (surrounding existing dwelling). These two (2) locally native trees comprise of 1 x *Eucalyptus eugenoides* and 1 x *Eucalyptus sclerophylla*. They are not hollow bearing trees providing fauna habitat and are not considered ecologically significant. The understorey is already maintained in a fuel reduced state. The remaining trees within the bushfire asset protection zone may require some maintenance pruning of limbs but the trees can be retained. These impacts are not considered ecologically significant.

Vegetation conservation significance

The vegetation communities occurring on the property include 'Stringybark - Scribbly Gum Woodland' and 'Scribbly Gum – Red Bloodwood – Black She-Oak Woodland' vegetation community occurring north- east of the existing dwelling. None of this vegetation requires removal to establish the bushfire asset protection zone.

Stringybark - Scribbly Gum Woodland' is consistent with 'Currambene-Batemans Lowlands Forest' that has been mapped as the dominant vegetation community within the study area within statewide vegetation mapping. The NSW State Vegetation Type Map maps the area north of the existing dwelling as 'PCT 4019 Coastal Alluvial Bangalay Forest' and the Tea Tree Shrub land as 'PCT 4056 Southern Estuarine Swamp Paperbark Creekflat Scrub'.

This vegetation type is not listed, or currently being considered for listing, as endangered or threatened on the Schedules to either the EPBC or BC Acts. The vegetation occurring on site is locally common and not consistent with a threatened ecological community listed under NSW *Biodiversity Conservation Act 2016 and Commonwealth EPBC Act 1999.*

In summary, the following vegetation communities occur on-site:

- Scribbly Gum – Red Bloodwood – Black She-Oak Woodland
- Stringybark - Scribbly Gum Woodland
- Tea tree shrubland
- Exotic grassland

The subject site for the construction envelope and bushfire asset protection zone does not require the removal of hollow-bearing trees. Whilst hollow bearing trees do occur on the property, no hollow bearing trees or significant rocky habitat features are proposed for removal.

The SOFC – Biodiversity - Land and Environment Court proceedings (2024/00150241) -Insufficient Information regarding Biodiversity have been addressed in Section 1.3 and form the basis our SoFC in reply.

Assessments of Significance (5-part test) are required when a developer/proponent is submitting a Development Application (DA) to determine whether impacts associated with the development will have a 'significant impact' on biodiversity (in particular, threatened species or threatened vegetation communities). This test is pursuant to section 7.3 of the *Biodiversity Conservation Act 2016.*

Five part tests were undertaken for the following species:

1. *Mormopterus norfolkensis* Eastern Freetail-bat (foraging)
2. *Miniopterus schreibersii oceanensis* Eastern Bent-wing Bat (foraging)
3. *Saccolaimus flaviventris* Yellow-bellied Sheathtail-bat (foraging)
4. *Scoteanax rueppellii* Greater Broad-nosed bat (foraging)
5. *Falsistrellus tasmaniensis* Eastern False Pipistrelle (foraging)
6. *Chalinolobus dwyeri* Large-eared Pied Bat (foraging)
7. *Calyptorhynchus lathami* Glossy Black Cockatoo (foraging)
8. *Hieraaetus morphnoides* Little Eagle (foraging/ potential breeding);
9. *Cryptostylis hunteriana* Leafless Tongue Orchid

Assessments of significance ('5 part test') were undertaken in accordance with Section 7.3 of the *Biodiversity Conservation Act 2016* (BC Act) and Section 5.7 of the *Environmental Planning and Assessment Act 1979 (EP&A Act)*. It was concluded that the proposal is unlikely to have a significant impact on species, populations and communities listed under the New South Wales *Biodiversity Conservation Act 2016* and Commonwealth *Environment Protection Biodiversity Conservation Act 1999.*

In order to offset the proposed tree removal, approx. 1500 sqm of screen planting and nine additional individual trees using locally native species can be provided at a latter date as a condition of consent. This would equate to over 300 trees proposed for re-planting. This would result in a net ecological benefit to offset the loss of two trees proposed for removal.

The major conclusion arising from this Flora and Fauna Impact Assessment is that the proposed works are unlikely to result in a significant impact on any listed species or communities providing that the applicant actively implements the recommendations from this assessment. Therefore, in accordance with the EPA Act (1979) and BC Act (2016), a Biodiversity Assessment Report (BDAR) is not required.

Disclaimer

This document may only be used for the purposes for which it was commissioned.

Fraser Ecological Consulting accepts no liability or responsibility in respect of any use or reliance upon this report by any third party.

Unauthorised use of this report in any form is prohibited.

Licensing

When conducting flora and fauna surveys, consultants are required to possess licences to ensure that works are completed in an appropriate manner. Fraser Ecological Consulting is licensed under s.132c and s.91 of the NSW National Parks and Wildlife Act (1974) from the NSW NPWS. This allows Alex Fraser to undertake scientific investigations, collect specimens of protected flora and fauna across NSW in service and non-service areas and undertake bushland restoration works in EECs. This licence requires that all survey results are reported to the NSW NPWS for inclusion into the Atlas of NSW Wildlife).

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FIGURES:

1. Introduction

1.1. Introduction

Fraser Ecological Consulting has been contracted by Mr. Adam Moore to prepare an impact assessment of the proposed works on the terrestrial ecology located at 57 WANDEAN ROAD, WANDANDIAN in the Shoalhaven Council LGA. The SOFC – Biodiversity - Land and Environment Court proceedings (2024/00150241) -Insufficient Information regarding Biodiversity have been addressed in Section 1.3 and form the basis our SoFC in reply.

The subject site is legally identified as Lot 1 DP 1268021 and is known respectively as 57 WANDEAN ROAD, WANDANDIAN (Figures 1 – 5).

The subject site is located around 210 m west of the Princes Highway, off Wandypark Road at Wandandian, NSW; and around 25.8 km south-south-west of Nowra, this being part of the Shoalhaven LGA (Figure 1-3). The site is bounded by Wandean Road to the north, Wandypark Road to the east and rural properties to the west and south.

Surrounding land uses include open rural and semi-rural properties, as well as those commercial businesses that are part of the township of Wandandian. It is noted that the majority of the subject site has been previously cleared and now contains only isolated patches of woodland. The landform within the subject site is generally flat, though some slight rises and depressions are present. Four farm dams occur within the subject site, these all supporting water at the time of the field investigation.

Whilst no major creek lines occur within the subject site, Wandandian Creek flows in an easterly direction, this drainage line being around 200 m south of the subject site. The layout for the development would not have a direct impact on this water body, and, with the adoption of suitable bunding/storm water management, no indirect impacts are expected to arise.

Whilst no conservation reserves occur within the subject site, Yerriyong and Jerrawangala State Forests, Conjola National Park and Corramy State Conservation Area all occur within the study region, these covering areas of 4600 ha, 4100 ha, 1000 ha and 856 ha, respectively.

Yerriyong State Forest occurs around 3 km to the north and west of the subject site, adjoining Jerrawangala State Forest, this around 7.4 km to the south-west; whilst Conjola National Park occurs around 2 km to the south, with Corramy State Conservation Area occurring in association with Wandandian Creek and extending eastwards.

Natural elevations within the area investigated are between 8 m and 23 m ASL. According to monthly rainfall figures from Nowra Royal Australian Navy Air Station1, the annual average rainfall in the region is approximately 1133.1 mm with the greatest falls being experienced between February and March

(Bureau of Meteorology 2023). Average temperatures range from a July minimum of 6.2 degrees Celsius to a January high of 25.8 degrees Celsius (Bureau of Meteorology 2023).

The title of the land includes following general restrictions:

- The water course that drains the dam in the adjoining property
- Hollow bearing trees are not to be removed without Council consent
- Tree overhangs not to be trimmed without Council consent
- No removal or disturbance of Indigenous vegetation without Council consent

This terrestrial ecological assessment:

- Identifies key flora and fauna habitats within the subject site;
- Reviews literature and databases relevant to the subject site;
- Describes the methodology and results of the survey;
- Addresses potential impacts on flora and fauna and their habitats resulting from the proposed development;
- Proposes appropriate mitigation measures; and
- Provides an assessment of the likelihood of significant impacts on threatened species and populations, and endangered ecological communities, according to Section 5A of the NSW EPA Act, BC ACT, Commonwealth EPBC Act. This was done to determine the need for an SIS or an application under the EPBC Act.

Activities specifically related to the preparation of this report included:

- Identification of weed and indigenous native species recorded from the subject site
- Assessment of impacts of the proposed development
- Outlining the applicant's responsibilities including weed control and environmental safeguards before, during and post construction.

1.2 Proposed development

The proposed 2-lot subdivision at 57 Wandean Road, Wandandian, NSW includes:

- Lot 1 (2.21ha): New indicative building envelope in existing cleared area (on a vacant lot) and associated bushfire asset protection zone within pastureland, wastewater treatment and disposal systems will be designed for a potential 5-bedroom dwelling with both subsurface irrigation and sand mounds proposed as possible methods of wastewater disposal **(will not require any additional tree OR native vegetation removal)**.

- Lot 2 (5.67ha): Contains an existing 3-bedroom dwelling with an approved subsurface irrigation area. Includes a bushfire asset protection zone **(will require two (2) locally native trees proposed for removal)**.

The bushfire assessment report prepared by Harris Environmental dated 24/3/2023 states that the bushfire Asset Protection Zones (APZs) shall be as follows:

- The proposed Lot 1 and Lot 2 can be constructed to **BAL 29** as specified by AS3959 - 2018 construction for Buildings in Bushfire Prone Areas, *PBP 2019* and/or *NASH Standard Steel Framed Construction in Bushfire Areas* (2014).
- A BAL 29 APZ for the proposed Lots 1 and 2 should be established from the commencement of building works and maintained for perpetuity for the following dimensions:
    - 29 m on the northern and eastern elevations;
    - 10 m on the southern and western elevations.

In order to offset the proposed tree removal, approx. 1500 sqm of screen planting and nine additional individual tree using locally native species can be provided at a latter date as a condition of consent. This would equate to over 300 trees proposed for re-planting to offset the 2 native trees proposed for removal.

The proposed plans are provided on the following pages.

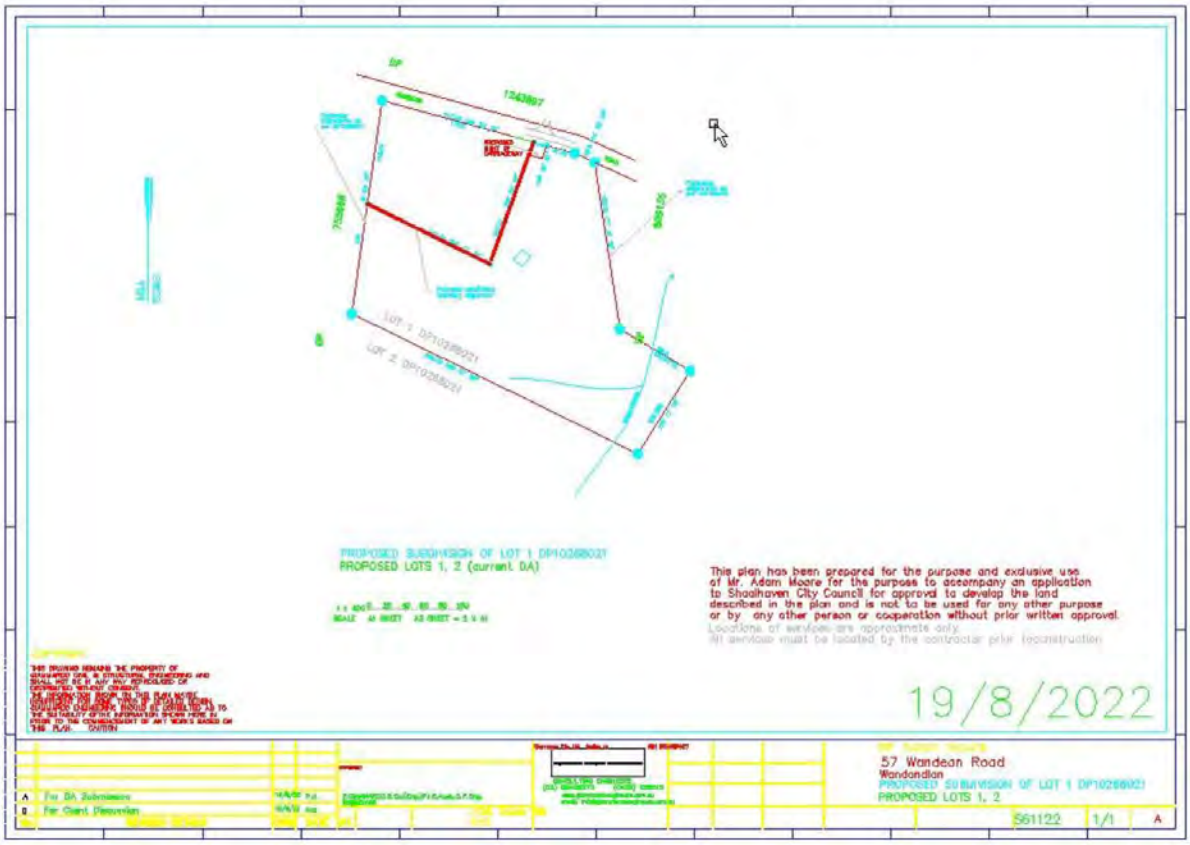


Figure 1 Proposed subdivision plans prepared by Giammarco Civil Structural Engineers dated 19/8/2022

Figure 2 Proposed building envelopes and APZ plan prepared by Harris Environmental dated 24/3/2023

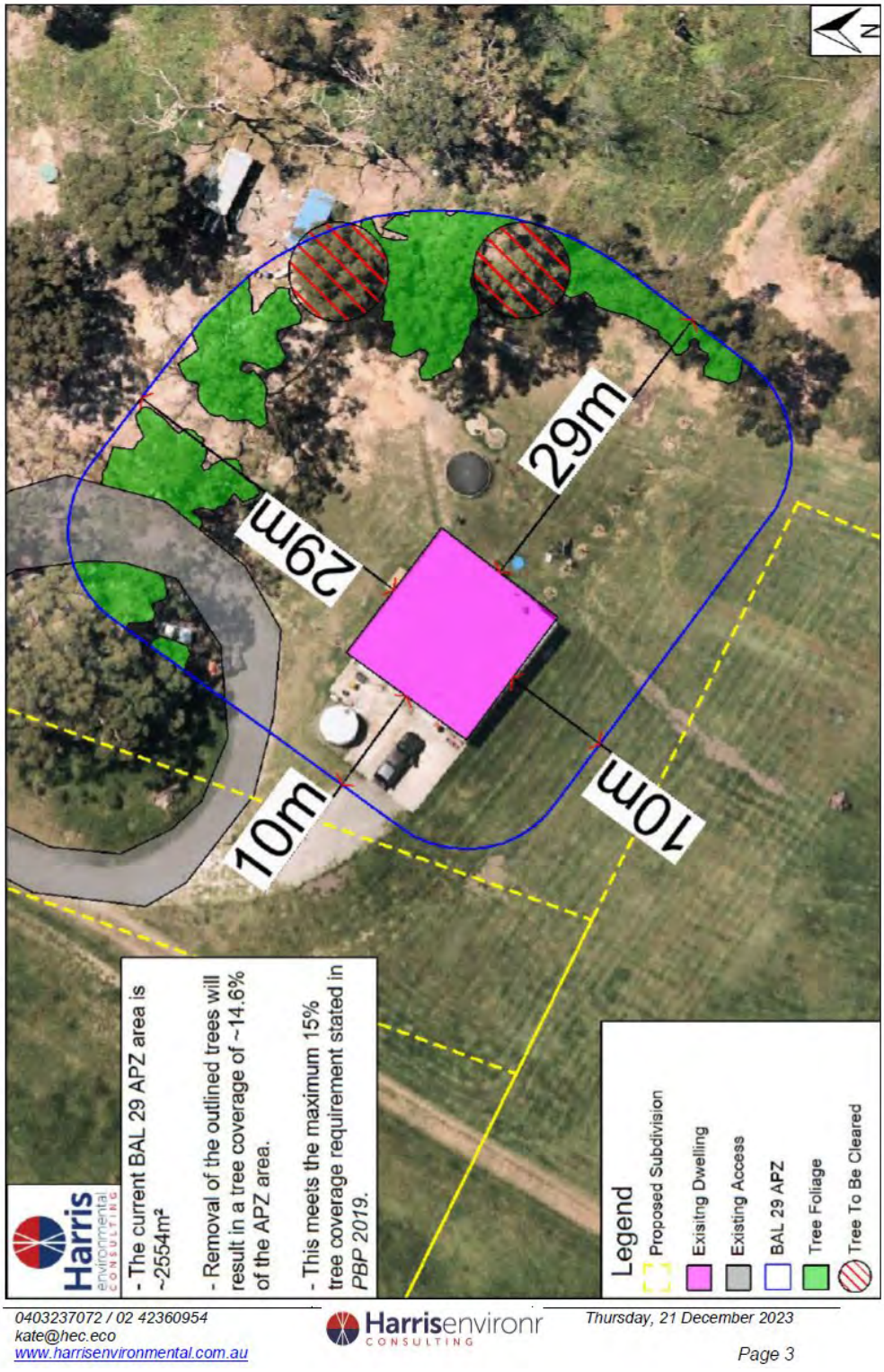


Figure 3: Lot 2 Proposed building envelopes and APZ plan (Source: Bushfire Letter for Inner Protection Area at 57 Wandean Road, Wandandian December 2023 prepared by Harris Environmental)

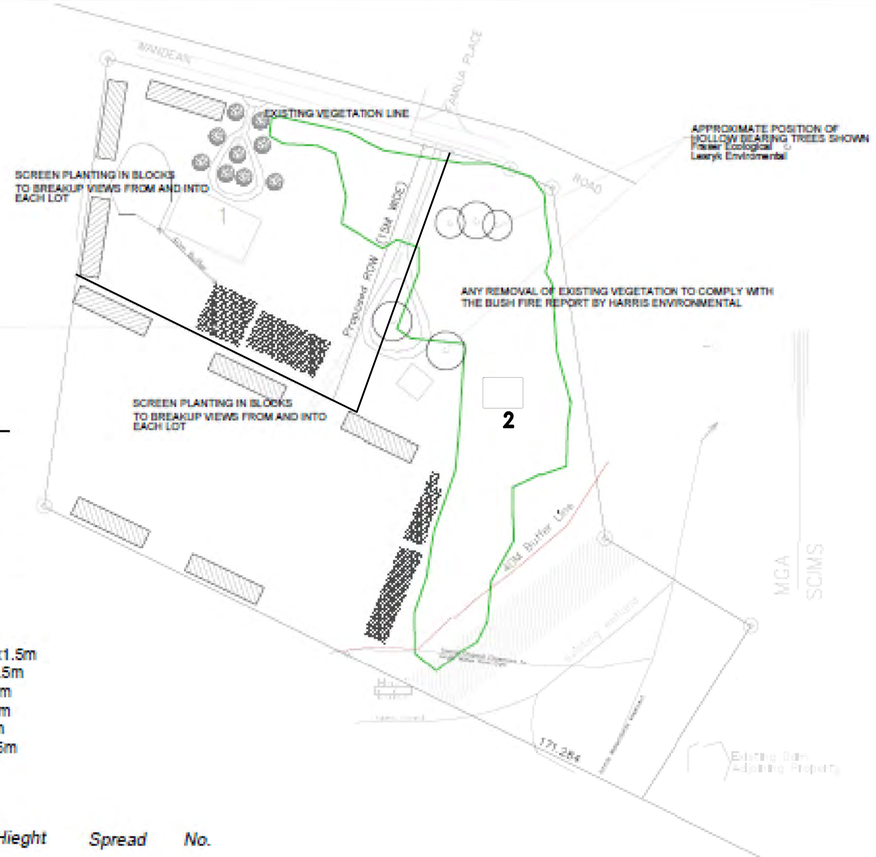
Photograph 1: Location of the 2 trees proposed for removal to accommodate the APZ within proposed Lot 2 surrounding the existing dwelling Note: The understorey is already maintenance mowed in a fuel reduced state and is dominated by introduced grass

LEGEND

SCREEN PLANTING AREAS

STREET TREE PLANTING TO PROPOSED ACCESS ROAD

ON SITE SEWAGE DISPOSAL MANAGEMENT
Sand Mount and gravel dispersion
or
Subsurface Irrigation areas
HARRIS ENVIRONMENTAL CONSULTING



RECOMMENDED SCREEN SPECIES LIST

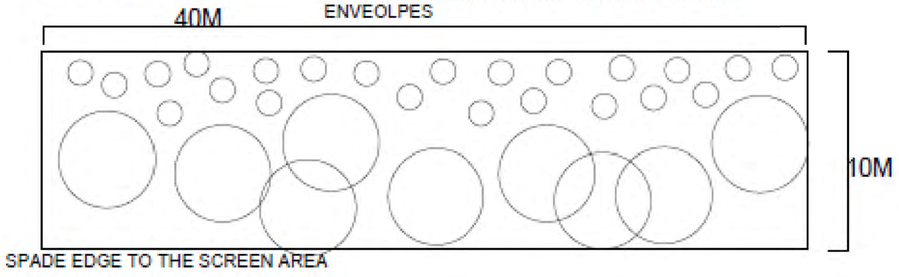
Name	Common Name	Size
TREES & LARGE SHRUBS		
Acmena smithii	Lilly Pilly	8x5m
Banksia serrata	Old Man Banksia	8x4m
Callistemon salignus	Pink Tips Bottlebrush	7x4m
Elaeocarpus reticulatus	Blueberry Ash	7x4m
Melaleuca ericifolia	Swamp Paperbark	8x4m
Syzygium australe	Brush Cherry	8x5m
Casuarina glauca and Allocasuarina littoralis should be planted at a rate of one per 15 metres within these screening blocks.		
MEDIUM TO SMALL SHRUBS		
Acacia longifolia	Golden Wattle	3x2m1.5x1.5m
Banksia spinulosa	Hairpin Banksia	1.5mx1.5m
Callistemon citrinus	Crimson Bottlebrush	4x2.5m
Leptospermum polygalifolium	Lemon Scented Tea Tree	3x2.5m
Dodonea triquetra	Hop Bush	3x2m
Lomandra longifolia	Mat Rush	1.5x1.5m

ACCESS ROAD PLANT SCHEDULE

Symbol	*Botanical Name*	*Common Name*	*Size*	*Hieght*	*Spread*	*No.*
AS	*Acmena smithii*	*Lilly Pilly*	*45 Litre*	*9m*	*5m*	*9*

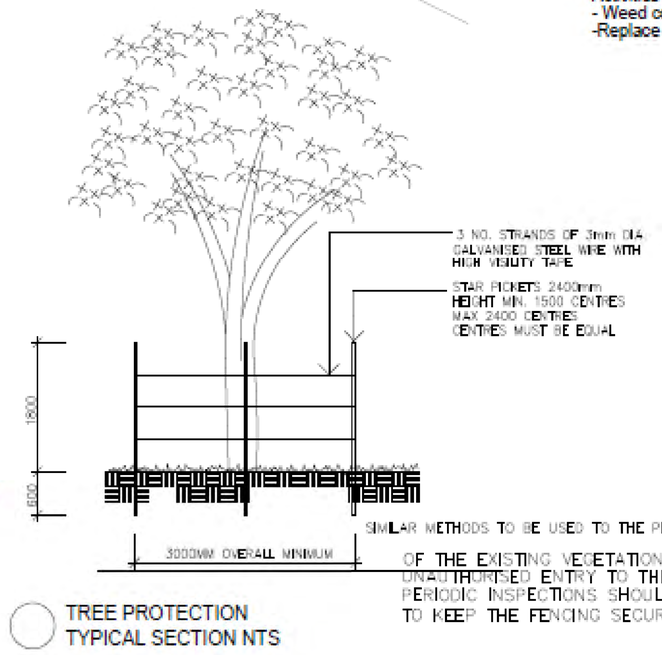
THESE SPECIES ARE ENDEMIC AND ARE AVAILABLE FROM NURSERIES OR CULTIVARS OF THEM. ALL ARE FIRE RESISTENT AND COMPLY WITH BUSH FIRE REGULATIONS

INDICATIVE LAYOUT FOR SCREEN PLANTING



SPADE EDGE TO THE SCREEN AREA

ROW OF TREES AND LARGE SHRUBS TO BOUNDARY WITH MINIMUM 2.5M CANOPY SPACING. SPECIES TO BE LIMITED TO 7 TREES AND 23-25 SHRUBS MULCH WITH BRUSH CHIPPINGS AND LEAF LITTER WITH SUFFICIENT DISTANCE FROM THE BUILDING ENVELOPES AS PER BUSHFIRE REPORT BY HARRIS ENVIRONMENTAL CONSULTING REPORT MARCH 2023



TREE PROTECTION
TYPICAL SECTION NTS

MAINTENANCE NOTES

Landscape contractor must carry out maintenance for a minimum period of 26 weeks from the date of practical completion of works to ensure the full establishment of plant material. Maintenance is to include but not be limited to watering, weeding, rubbish removal, staking and tying, fertilising, pest and disease control, replacement of dead plant material and turf, renovation, pruning, cultivation and reinstatement of mulch.

DURATION AND ATTENDANCE
Landscape contractor is to attend the site weekly for the duration of the stated maintenance or plant establishment period and maintain the site to the satisfaction of Council.

WATERING
Water trees and shrubs to ensure their establishment and continued healthy,
Water every day in the first 3 weeks and then twice weekly for the next 10 weeks or as required to achieve a healthy growth.

RUBBISH
Remove rubbish from site at each weekly maintenance visit to ensure neat presentation of site at all times.

PLANT MATERIAL
Replace all dead, damaged or missing plant material at contractor's cost. Replacement plants are to be identical to those originally installed unless otherwise approved by Landscape Architect. Replacements shall be made within 2 weeks of the plant failing or being removed.

STAKING
Replace or adjust stakes and ties as required or directed by Landscape Architect. Remove stakes and ties at end of maintenance period or as directed by Landscape Architect.

PRUNING
Remove dead, diseased or damaged plant material to improve the health, vigour and foliage density of the plant material. Remove and dispose of prunings away from site according to relevant authorities regulations.

MULCH
Reinstate mulch to maintain 75mm depth. Ensure mulch does not contact plant stems.

PEST AND DISEASES
Report detection of pests and diseases to Landscape Architect as soon as they are noticed. Spray according to manufacturer's recommendations to control infestations of pests and diseases.

WEED CONTROL METHODS
The three main methods to be employed are:
HAND REMOVAL
The complete removal of all parts of the plant, including roots with all material stockpiled on site.
SPRAY
Where the above methods are inappropriate, spraying of the entire plant with a selective herbicide using the following procedures:
- Best results will be achieved when applied during active growing season
-Strong caution should be used by applicators to ensure non-target species are not affected by spray drift
- Caution should also be employed by applicators working in close proximity to watercourses
- All staff involved in the application of chemicals need to be educated on the correct handling procedures and emergency procedures
- An approved bio degradable, non-residual herbicide is to be used

-MAINTENANCE ACTIVITIES
Maintenance site visits will be carried out on a weekly basis for a 12 month period following completion of planting works
Activities to include:
- Weed control
-Replace failed plant material

IF THE EXISTING HOLLOW BEARING TREES ARE TO REMAIN, THERE WILL BE NO NEED FOR NESTING BOXES TO BE PLACED WITHIN THE VEGETATION AREA. TREES TO BE REMOVED SHALL BE REPLACED WITH BLACK SHE OAK (ALLOCASUARINA LITTORALIS)

REVEGETATION IF NOT NATURALLY, SHOULD BE UNDERTAKEN TO COMPLY WITH THE BUSHFIRE REPORT BY HARRIS ENVIRONMENTAL CONSULTING MARCH 2023 AND THE ENVIRONMENTAL REPORT AND LETTER FROM FRASER ECOLOGICAL CONSULTING MARCH 2023

DWG ISSUE	REVISION NOTES	DATE ISSUED	NOTES
B	COUNCIL SUBMISSION Added notes to comply with bushfire and waste water Reports	30-03-2023	
C	COUNCIL RESUBMISSION Amendments to the plan reguarding Council comments	18-012-2024	

PPLA
Peter Phillips Landscape Architecture
4 BINDON CLOSE BOMADERRY 2541 FAX : 0244221310 MOB : 0410040507

PROJECT :
PROPOSED SUBDIVISION LOT 1 DP10268021
57 WANDEAN ROAD WANDANDIAN
FOR: ADAM MOORE

TITLE : LANDSCAPE PLAN

SCALE : 1:500 @ A1 | DWG. LO1 | Rev :C

DATE : JAN 2024 | DRAWN : Peter Phillips

No.	REVISION DETAILS	DWN	DATE
A	For S8.2 Review. 3 lot to 2 lot subdivision	20/2/24	P.G.
0	For Client Discussion	10/3/22	P.G.

APPROVED

P.GIAMMARCO.B.Sc.(Eng.)F.I.E.Aust.,C.P.Eng. Registered

SIZE: A1 SCALE:

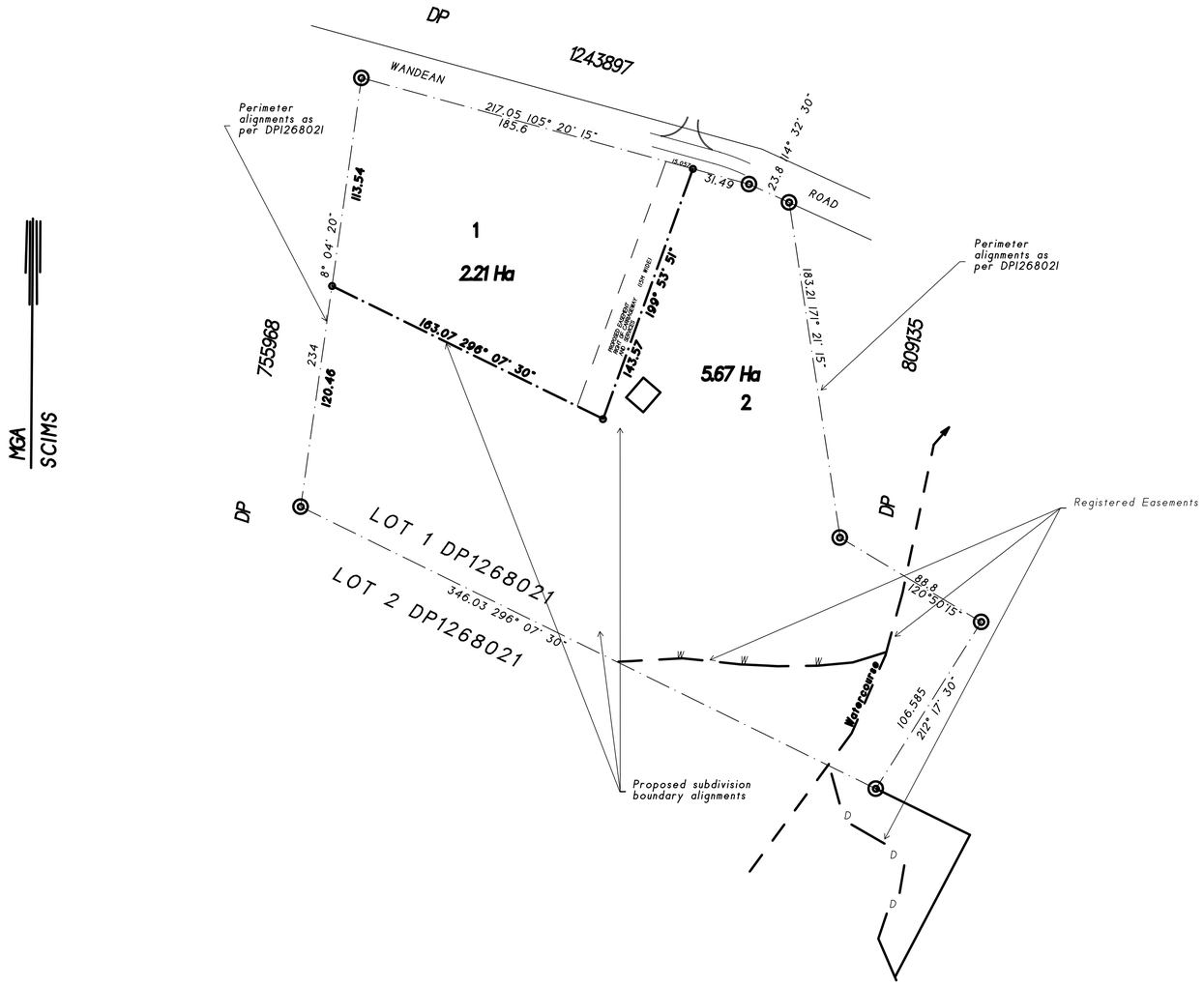
CO-ORDINATE SYSTEM: MGA Zone 56
HEIGHT DATUM: AHD

Giammarco Pty. Ltd. trading as ABN 66003864177
Giammarco Civil Structural Engineers
CONSULTING ENGINEERS
(02) 96428373 (0429) 655515
www.giammarcoengineers.com.au
email: info@giammarcoengineers.com.au

DESIGNED: DATE: COMPANY:
DRAWN: DATE: COMPANY:
CHECKED: DATE: COMPANY:
APPROVED: DATE: COMPANY:

TITLE
Mr Adam Moore
57 Wandean Road
Wandandean
REVIEW S 8.2 PROPOSED TWO LOT SUBDIVISION

CONSULTANT REFERENCE No.	INDEX No.	DRAWING No.	SHEET	REV No.
		S60722	1/1	A



PROPOSED SUBDIVISION OF LOT 1 DP1268021

PROPOSED LOTS 1 and 2

0 20 40 60 80 100

This plan has been prepared for the purpose and exclusive use of Mr. Adam Moore for the purpose to accompany an application to Shoalhaven City Council for approval to develop the land described in the plan and is not to be used for any other purpose or by any other person or cooperation without prior written approval.
Locations of services are approximate only.
All services must be located by the contractor prior toconstruction.

7/02/2024

No.	REVISION DETAILS	DWN	DATE
C	For S8.2 Review. 3 lot to 2 lot subdivision	P.G.	7/2/24
B	Registered Easements	P.G.	28/3/23
A	For DA Submission	P.G.	14/7/22
0	For Client Discussion	P.G.	10/3/22

APPROVED

P.GIAMMARCO.B.Sc.(Eng.)F.I.E.Aust.,C.P.Eng.
Registered

SIZE: A1 | SCALE: | CO-ORDINATE SYSTEM: MGA Zone 56 | HEIGHT DATUM: AHD

Giammarco Pty. Ltd. trading as Giammarco Civil Structural Engineers ABN 66003864177
CONSULTING ENGINEERS
(02) 96428373 (0429) 655515
www.giammarcoengineers.com.au
email: info@giammarcoengineers.com.au

		DATE	COMPANY
DESIGNED:			
DRAWN:			
CHECKED:			
APPROVED:			

TITLE: Mr Adam Moore
57 Wandean Road
Wandandian
PROPOSED SUBDIVISION OF LOT 1 DP1268021
PROPOSED LOTS 1 and 2

CONSULTANT REFERENCE No.	INDEX No.	DRAWING No.	SHEET	REV No.
		S60722	2/5	C

100 mm on original

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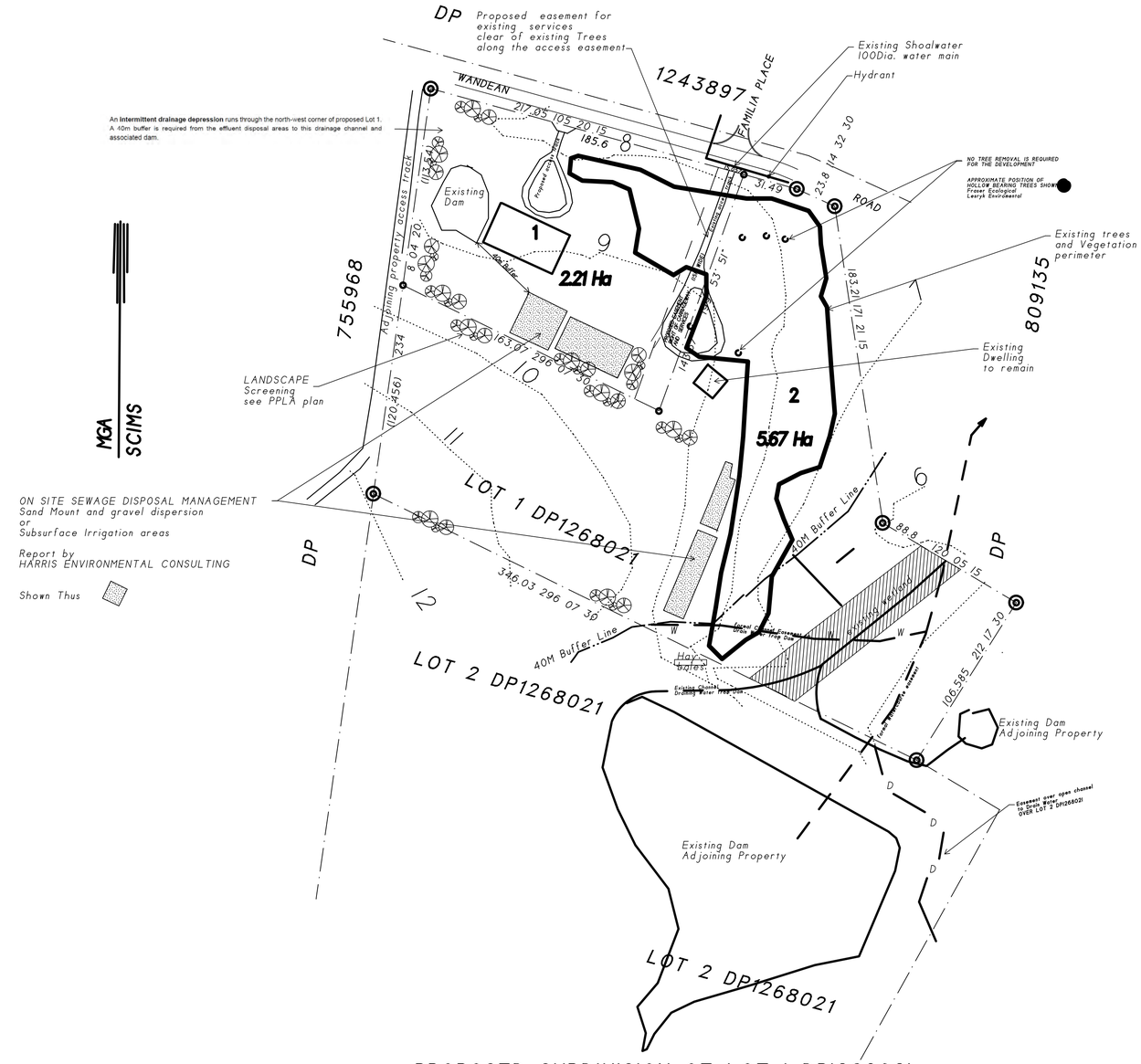

PROPOSED SUBDIVISION OF LOT 1 DP1268021

SITE ANALYSIS

0 20 40 60 80 100

NOTES:-

1) Bearings. Area & Distances are by Title and / or deeds only. No boundary investigation has been carried out.

2) Proposed boundaries are approximate only and should be confirmed by full peg out survey.

3) Contours shown depict the topography.

4) Services shown hereon have been determined from visual evidence only. Prior to any design. demolition. excavation or construction on site the relevant authority should be contacted to establish detailed location and depth.

5) These notes form an integral part of this plan & should not be separated.

6) On site Disposal to Harris Environmental Consulting Report dated 28 March 2023. (for Lot 1.2 and 3 in the report now Lot 2 and Lot 3 denoted as Lot 2 with existing dwelling)

7) The Symbols are not to scale and are indicative only

8) Tree dimensions are approximate only. not shown.

9) Australian Height Datum (AHD) was established from SIX MAPS

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7/02/2024

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0	For Client Discussion	10/3/22	P.G.

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SIZE: A1 | SCALE: | CO-ORDINATE SYSTEM: MGA Zone 56 | HEIGHT DATUM: AHD

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CONSULTING ENGINEERS
(02) 96428373 (0429) 655515
www.giammarcoengineers.com.au
email: info@giammarcoengineers.com.au

DESIGNED:	DATE:	COMPANY:	
DRAWN:	DATE:	COMPANY:	
CHECKED:	DATE:	COMPANY:	
APPROVED:	DATE:	COMPANY:	

TITLE: Mr Adam Moore
57 Wandean Road Wandandian

PROPOSED SUBDIVISION OF LOT 1 DP1026802I
SITE ANALYSIS

CONSULTANT REFERENCE No.	INDEX No.	DRAWING No.	SHEET	REV No.
		S60722	3/5	C

1.3 SOFC – Biodiversity - Land and Environment Court proceedings (2024/00150241) -Insufficient Information regarding biodiversity

B.3 CONTENTIONS THAT FURTHER INFORMATION IS REQUIRED TO ASSESS THE PROPOSED DEVELOPMENT

5. Insufficient information has been provided with respect to the extent of vegetation clearing and the Proposed Development's likely effect on vulnerable species pursuant to the BC Act.

Particulars

5a. *The Proposed Development will require the removal of vegetation on the Site pursuant to the General Terms of Approval issued by RFS under section 100B of the Rural Fires Act 1997 (reference DA20220912010577-CL55-1 dated 19 April 2023).*

The APZs are identified in the aerial image at Figure 3. Condition 2 of the General Terms is provided for below:

"At the issue of a subdivision certificate, and in perpetuity, the site around the existing building on lot 3 must be maintained as an inner protection area in accordance with the requirements of Appendix 4 of Planning for Bush Fire Protection 2019 as follows:

- *north and east for a distance of 29 metres; and,*
- *south and west for a distance of 10m metres."*

Fraser Ecological response:

- Lot 1: New indicative building envelope in existing cleared area and associated bushfire asset protection zone within pastureland, wastewater treatment and disposal systems will be designed for a potential 5-bedroom dwelling, with both subsurface irrigation and sand mounds proposed as possible methods of wastewater disposal **(will not require any additional tree OR native vegetation removal)**.

- Lot 2: Contains an existing 3-bedroom dwelling with an approved subsurface irrigation area. Includes a bushfire asset protection zone **(will require two (2) trees proposed for removal)**. They are not hollow-bearing trees and are not considered ecologically significant.

- The understorey is already maintained in a fuel reduced state. The remaining trees within the bushfire asset protection zone may require some maintenance pruning of limbs but the trees can be retained. These impacts are not considered ecologically significant.

- All of the above has been confirmed in the recent Bushfire Hazard Assessment prepared by Harris Environmental.

- These are the same ecological impacts as previous 3 lot subdivision proposal.

5b. *On 29 November 2022, in RFI 2 Council requested an amended Flora and Fauna Assessment in connection to the Bushfire Hazard Assessment establishment of APZs, extent of vegetation removal and the General Terms of Approval issued by RFS.*

Fraser Ecological response: This information was provided – refer to Ecological Review letter dated 9th January 2024

5c. *Consequently, there is insufficient information and a Test of Significance is required given the prevalence of vulnerable species on the Site, including:*

i. Microchiropterans;

ii. Cryptostylis hunteriana commonly referred to as the Leafless Tongue Orchid

iii. Hieraaetus morphnoides commonly referred to as the Little Eagle; and

iv. other vulnerable species pursuant to Schedule 1, Part 3 of the BC Act including the Eastern Freetail Bat, Eastern Bent-wing Bat, Yellow-bellied Sheath-tail Bat, Greater Broad-nosed Bat, Eastern False Pipistrelle and Large-eared Pied Bat.

Fraser Ecological response: The above mentioned species were not raised as issues in any previous RFIs provided by Council. Nevertheless, we have addressed these species in this updated assessment. The '5 Part Tests' Assessments of Significance for the abovementioned threatened species are provided in Appendix C in accordance with Section 7.3 of the Biodiversity Conservation Act 2016 (BC Act) and Section 5.7 of the Environmental Planning and Assessment Act 1979 (EP&A Act). It was concluded that the proposal is unlikely to have a significant impact on species, populations and communities listed under the New South Wales *Biodiversity Conservation Act 2016* and Commonwealth *Environment Protection Biodiversity Conservation Act 1999*.

In order to offset the proposed tree removal, approx. 1500 sqm of screen planting and nine additional individual trees using locally native species is proposed. This would equate to over 300 trees proposed for re-planting. This would result in a net ecological benefit.

5d. *As the Proposed Development necessitates vegetation removal to ensure compliance with provisions of proposed APZs, and General Terms of Approval issued by the RFS in the circumstances set out in Part A above further information is required from the Applicant in relation impacted flora and fauna*.

Fraser Ecological response:

- Lot 1: New indicative building envelope in existing cleared area and associated bushfire asset protection zone within pastureland, wastewater treatment and disposal systems will be designed for a potential 5-bedroom dwelling, with both subsurface irrigation and sand

mounds proposed as possible methods of wastewater disposal **(will not require any additional tree OR native vegetation removal)**.

- Lot 2: Contains an existing 3-bedroom dwelling with an approved subsurface irrigation area. Includes a bushfire asset protection zone **(will require two (2) trees proposed for removal)**. They are not hollow-bearing trees and are not considered ecologically significant.

- The understorey is already maintained in a fuel reduced state. The remaining trees within the bushfire asset protection zone may require some maintenance pruning of limbs but the trees can be retained. These impacts are not considered ecologically significant.

- All of the above has been confirmed in the recent Bushfire Hazard Assessment prepared by Harris Environmental.

5e. *Council has identified deficiencies in the Flora and Fauna report dated 28 March 2023 in that the Proposed Development has not demonstrated compliance with the Acceptable Solution A2.1/P2 of Chapter G5 of the DCP.*

Fraser Ecological response: 'Acceptable solutions' are a bushfire assessment matter not an ecological matter. The bushfire assessment report provides a map showing the exact impacts of the proposed APZ and this complies with bushfire assessment legislation.

5f. *Furthermore, as identified above in contention 2, the impact of essential services provisions has not been addressed by the Applicant nor shown on any plans. The impact of these works is unknown, and any impacts on flora and fauna must be addressed.*

Fraser Ecological response: No vegetation removal is required for essential services provisions. All lots will utilise existing driveways that have services already installed within it for the existing dwelling. These same service routes/ trenches will be used for any future development as a result of the proposed subdivision.

Any services trenching will not have a significant incursion upon critical tree protection zones and can be undertaken under the supervision of a suitably qualified and experienced AQF Level 5 Project Arborist prior to the release of the Subdivision Certificate as a precautionary measure.

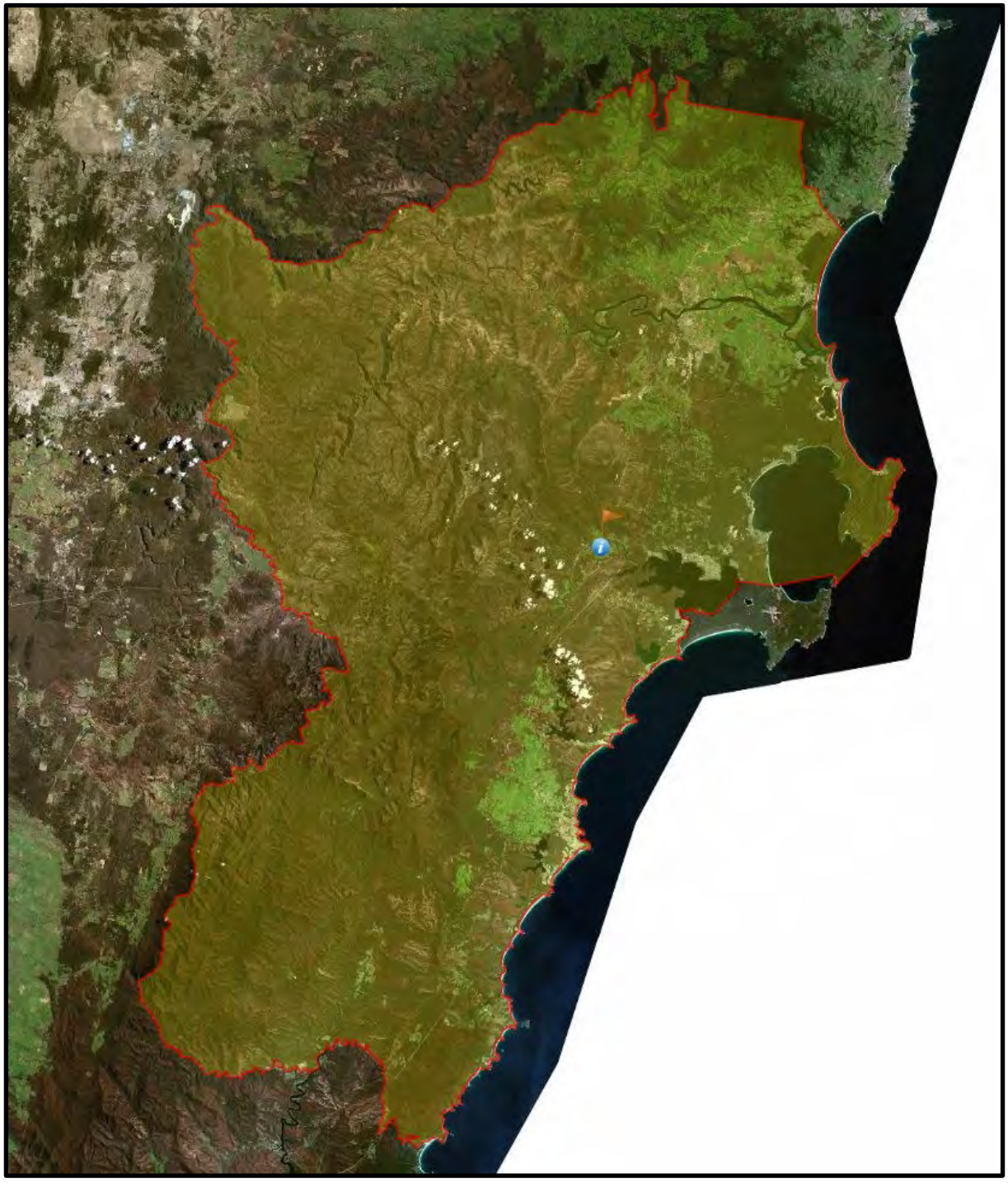


Figure 4 The study area and wider locality within the Shoalhaven Council LGA (Source: SIX maps.com)

Figure 5 Cadastral map of the subject site in relation to the locality (Source: SIX Maps.com)

Figure 6: The subject site shown on aerial imagery (Source: Nearmap.com)

Figure 7: Aerial map showing location of proposed development (Source: Harris Environmental dated March 2023)

2. Statutory Framework

The criteria used to assess likely impacts upon threatened species, populations or endangered ecological communities vary between Commonwealth and State jurisdictions. The following describes the legislative requirements for each level.

2.1. Commonwealth

The *Environment Protection and Biodiversity Conservation Act (1999)* (EPBC Act) is a nationally applicable Act that is administered by the Department of the Environment, Water, Heritage and the Arts. This Act requires approval for actions that are likely to have a significant impact on matters of National Environmental Significance (NES).

There are seven matters of NES that are triggers for Commonwealth assessment and approval. These are:

1. World Heritage properties;
2. National Heritage places;
3. Ramsar wetlands of international importance;
4. Nationally threatened species and communities;
5. Migratory species;
6. Nuclear actions; and
7. Commonwealth marine environment.

Threatened species and ecological communities are listed under Part 13, Division 1, Subdivision A of the EPBC Act 1999. Migratory species are listed under part 13, Division2, Subdivision A of the Act.

The Department of the Environment and Water Resources identifies the following:

"*Under the EPBC Act a person must not take an action that has, will have or is likely to have significant impact on any of these matter of NES without approval from the Commonwealth Environment Minister. There are penalties for taking such an action without approval.*

In general, an action that may need approval under the Act will involve some physical interaction with the environment, such as clearing native vegetation, building a new road, discharging pollutants into the environment, or offshore seismic survey.

If, following a referral, it is determined that that an action is likely to have a significant impact, and approval is therefore required, the action is called a 'controlled action'. The proposal will then undergo a formal assessment and approval process, and cannot proceed unless approval is granted.

If it is determined that an action is not likely to have a significant impact, then the action is not a controlled action. Approval under the EPBC Act is not required and the action may proceed, subject to obtaining any other necessary permits or approvals."

2.2. State

2.2.1 Local Government Act 1993

The Act sets out the responsibilities of Councils including public land management, activity approvals, corporate and operation planning, orders and enforcement powers, setting rates and charges (LGSA 2009). Section 7(e) of the Act requires Councils, Councillors and Council employees to have regard to the principles of ecologically sustainable development in carrying out their responsibilities. The Charter (Section 8) also requires Councils to properly manage, develop, protect, restore, enhance and conserve the environment of the area for which it is responsible, in a manner that is consistent with and promotes the principles of ecologically sustainable development. Under this Act, Councils are required to have Plans of Management for all Council owned land.

2.2.2 Rural Fires Amendment (Vegetation Clearing) Bill 2014

The recent Rural Fires Amendment (Vegetation Clearing) Bill 2014 gives the relevant authorities a mechanism to clear certain vegetation for the purposes of preventing a bushfire. The bill seeks to authorise vegetation clearing work to be carried out in certain areas near residential accommodation or high-risk facilities to reduce bushfire risk. This bill will give residents living in bushfire-prone areas additional powers to protect their homes and to clear trees and vegetation from around their property. The new laws will provide for people with homes in bushfire zones to clear within 10 metres of their home and to clear shrubs and other vegetation, except for trees, within 50 metres of their home. The vegetation clearing entitlement area may carry out certain vegetation clearing work on that land, despite any requirement for an approval, consent or other authorisation for the work made by other legislation.

The bill provides that the Commissioner of the NSW Rural Fire Service is to determine what land is a 10/50 vegetation clearing entitlement area and to identify this land on a map published on the NSW Rural Fire Service website. The map has yet been published. However, it is understood that by accessing a portal on the Rural Fire Service website, home owners will be able to identify easily whether their home stands within an entitlement area. It is unknown when this map will be produced, however, given the location of the dwelling it is likely that site would be contained within the mapped area.

The bill states that vegetation clearing work must be carried out in accordance with the 10/50 clearing code of practice, which is to be prepared by the commissioner and is to deal with certain matters. Those matters are listed in the bill as follows:

(a) the type of vegetation that can and cannot be cleared, including the types of trees,
(b) the circumstances in which vegetation should be pruned and not entirely removed,

(c) the use of herbicides,
(d) managing soil erosion and landslip risks,
(e) protection of riparian buffer zones,
(f) protection of Aboriginal and other cultural heritage,
(g) protection of vegetation that the owner of the land on which vegetation clearing work may be carried out is under a legal obligation to preserve by agreement or otherwise

The code of practice has not yet been prepared. The bill further states the vegetation clearing work that can be carried out is the removal, destruction (by means other than by fire) or pruning of:

- any vegetation (including trees or parts of trees) within 10 metres of an external wall of a building containing habitable rooms that comprises or is part of residential accommodation or a high-risk facility, and
- any vegetation, except for trees or parts of trees, within 50 metres of an external wall of a building containing habitable rooms that comprises or is part of residential accommodation or a high-risk facility.

Of most relevance to the development application, the bill also makes consequential amendments to the *National Parks and Wildlife Act 1974* to expand the exemptions contained in sections 118A and 118D of that Act, provided there is compliance with the 10/50 Vegetation Clearing Code of Practice.

2.2.3 Biosecurity Act 2015

The NSW Biosecurity Act 2015 requires that "the responsibility of any person who has any dealing with weeds (biosecurity matter), whether they have an infestation on their land, are selling a potentially invasive species, dumping garden rubbish, or supplying contaminated fodder or the like must prevent, minimise or eliminate the biosecurity risk (as far as is reasonably practicable)". This report addresses the NSW Biosecurity Act 2015 by referring to the document '*Greater Sydney Regional Strategies Weed Management Plan 2017-2022*' by the Local Land Services of Greater Sydney.

The Management Plan seeks to provide guidance on the management of weeds on a local scale in order to comply with the NSW Biosecurity Act 2015. Appendix 1.1 of this Management Plan identifies 'State level determined priority weeds" and is broken up into the strategic response categories of 'Prevention', 'Eradication', 'Containment' and 'Asset Protection (Whole of State)'. Appendix 1.2 of the plan outlines the 'Regional priority weeds' and is also broken up into these same four strategic responses. Weeds in the 'prevention' category have not yet been identified in the state, but they pose a large biosecurity risk so it is expected that these are prevented from entering the state.

'Eradication' applies to weeds that are only limited in distribution and abundance, and so, these must be fully removed. 'Containment' is appropriate to weeds that have a wide distributed, hence widescale eradication is not currently possible, but these must be prevented from spreading further. 'Asset Protection' refers to Weeds of National Significance whose spread must be minimised. Appendix 2 of the plan lists "Other weeds of regional concern".

The weeds in appendices 1.1 and 1.2 must be managed in order to comply with the NSW Biosecurity Act 2015. However, weeds in Appendix 2, are not legally-binding and it is not required by State law to manage these weeds, but it may be required by the local Council.

2.2.4 Biodiversity Conservation Act 2016

Proponents should be aware that transitional arrangements under the new Scheme have not been fully developed and, in some cases, NSW Office of Environment and Heritage (**OEH**) should be approached directly for further information. The BC Act sets out the biodiversity assessment requirement for any development or activity that requires assessment or approval under the EP&A Act. The main elements of the Act:

- Biodiversity Offsets Scheme (BOS)
- Assessment methodology - Biodiversity Assessment Method (BAM)
- Establishment of a Biodiversity Conservation Fund (collects and directs spending of offset monies throughout the state)
- Expansion of Biodiversity Certification for large rezoning proposal and masterplan 'green field' type developments (streamlined assessment at strategic planning stage)

It also consolidates:

- existing wildlife licensing requirements
- nominations of areas of outstanding biodiversity values
- updated criteria for listing threatened species and communities
- biodiversity offsets scheme
- Biocertification (large scale master planning development)
- Biodiversity stewardship agreements (where offset credits are created)

Note: The BOS area clearing threshold in this Act is also applied within the new SEPP and LLS Act. If the amount of native vegetation clearing application is below the threshold it is optional if the applicant wants to submit a Biodiversity Assessment Report (BAR). In relation to Council DAs assessments, Part 4 local development requires application of the BAM to determine whether an offset obligation if it either:

1) Exceeds the BOS threshold (also referred to as 'area trigger')
2) Located in an area of '*Sensitive Biodiversity Values*'

The Act sets outs the Biodiversity Assessment Methodology (BAM) which directs the methodology to be undertaken by accredited assessors (consultants) to produce a Biodiversity Assessment Report (BAR) submitted with a development application. The BAM sets out a detailed, complex and quantitative assessment methodology for producing the assessment report (BAR).

The methodology sets a framework for decision makers (Council assessment officers) to determine whether or not the proposal will have **'Serious and Irreversible Impact (SAII)'** for certain threatened species and communities (referred to as 'candidate entities').

For local developments, the new regulations make the new Offset Scheme **mandatory** for applications assessed under part of the Act that exceed the BOS thresholds. Under the Act, and offsets calculator will be used by accredited and appropriately trained assessors.

- The proposed development is below the 0.5ha area clearing threshold.
- The site is not mapped on the Sensitive Biodiversity Values Map (Figure 6).

NSW GOVERNMENT

Biodiversity Values Map and Threshold Report

Results Summary

Date of Calculation	23/03/2023 5:04 PM	**BDAR Required***
Total Digitised Area	1,468.4 sqm	
Minimum Lot Size Method	LEP	
Minimum Lot Size 10,000sqm = 1ha	20,000 sqm	
Area Clearing Threshold 10,000sqm = 1ha	5,000 sqm	
Area clearing trigger Area of native vegetation cleared	no	no
Biodiversity values map trigger Impact on biodiversity values map(not including values added within the last 90 days)?	no	no
Date of the 90 day Expiry	N/A	

Therefore, the Biodiversity Offsets Scheme is not triggered for this development application.

Figure 8: DPIE Sensitive Biodiversity Values Map (accessed 28th March 2024)

3. Methodology

This chapter presents the methods used in conducting the ecological survey and assessment of the conservation importance of the study area.

3.1 Existing records

Records of threatened flora and fauna species and populations, listed in the schedule of the BC and EPBC Acts, were obtained and reviewed to document known locations threatened and regionally significant fauna within the locality. The source of these records was the National Parks and Wildlife Services' Atlas of Wildlife (Bionet) and the Department of Environment, Water, Heritage and the Arts online Protected Matters Search Tool database (Appendix B) for an area covering approximately 10km radius of the subject site.

3.2. Literature review

A literature review was carried out. Of particular importance were those containing records of species, populations and communities of conservation significance. This background information informed the impact assessment.

The following information was relied upon in regard to local conservation and planning issues for this study.

1. ***Soil landscapes of the Sydney 1: 100 000 Sheet (Hazelton and Tile 1990)***

The soils are moderately fertile, derived from Wianamatta Shales. The soils are part of the Gymea Soil Landscape (Chapman et 1989).

2. ***Vegetation Mapping***

NSW State Vegetation Type Map (Department of Planning and Environment 2022)

The State Vegetation Type Map (SVTM) is a regional-scale map of NSW Plant Community Types. This map represents the current extent of each Plant Community Type, Vegetation Class and Vegetation Formation, across all tenures in NSW. Further, a SVTM map of pre-clearing is also available separately here. This map is updated periodically as part of the Integrated BioNet Vegetation Data program to improve quality and alignment to the NSW vegetation classification hierarchy.

It is accessed via the following link:

https://datasets.seed.nsw.gov.au/dataset/nsw-state-vegetation-type-map

This release represents the first state-wide vegetation coverage using the NSW vegetation classification hierarchy, including the revised eastern NSW PCT classification C1.1. The "M1" in the

version release number (C1.1.M1), represents the first map release against PCT master list version C1.1

This coverage supersedes pre-release versions (v1.1 and v1.1.1) and 7 individual prior regional coverages including: Sydney Metropolitan Area Mapping, SVTM Border Rivers Gwydir – Namoi, SVTM Central West – Lachlan, SVTM Riverina – Murray, SVTM Western, SVTM Central Tablelands, and SVTM Upper Hunter.

Limitations on Use: This mapping data may be used as a guide to the occurrence and distribution of Plant Community Types, Vegetation Classes, and Vegetation Formations, before and after clearing.

Users of these maps should note the following issues which will be address in future SVTM versions:

- PCT attribution errors – corrected as better information becomes available Spatial errors or omissions (eg, gaps and slithers or mapping linework inaccuracies)
- Eastern NSW PCT classification topologies differ from central and western NSW classification topologies
- Some PCTs mapped as part of earlier regional coverages have since been discontinued
- Some PCTs approved in BioNet have not been mapped due to technical issues
- Spatial and data gaps and discontinuities may occur at the edges of former regional coverages.
- Pre-clearing coverage for central NSW is not currently available

Data Access

Map data may be downloaded, viewed within the SEED Map Viewer, or accessed via the underlying ArcGIS REST Services or WMS for integration in GIS or business applications.

The Trees Near Me NSW app provides quick access to view the map using a mobile device or desktop. Download the app from Google Play or the App Store, or access the web site at https://treesnearme.app.

3.3 Desktop survey

A desktop survey was performed to ensure all relevant documentation is considered when preparing the plan. Documents and other information resources utilised include:

- Aerial photographs (Google Maps, NearMaps & DPI Land Information)
- Proposed site plans prepared by Giammarco Civil Structural Engineers (dated 20/2/24)
- Bushfire Assessment Report prepared by Harris Environmental dated 1st August 2024
- Wastewater Assessment Report prepared by Harris Environmental dated March 2023
- Bushfire Letter for Inner Protection Area at 57 Wandean Road, Wandandian 21st December 2023 prepared by Harris Environmental

- Flora and fauna assessment prepared by Lesryk Environmental dated October 2016 (investigation into the development of eight residential lots and two rural lifestyle lots)
- Landscape Plan prepared by Peter Phillips Landscape Architects PPLA dated January 2024

In addition, an updated review of government databases and GIS layers was undertaken to identify potential threatened species, populations and ecological communities within a 10 kilometre radius of the study area.

Data sources include:

- Vegetation types database [Biometric] (OEH 2013a). http://mapdata.environment.nsw.gov.au/geonetwork/srv/en/main.home.
- Threatened species database, NSW Office of Environment and Heritage (OEH 2013b). http://www.environment.nsw.gov.au/threatenedspecies/
- Native vegetation of south-east NSW: a revised classification and map for the coast and eastern tablelands (Tozer et al. 2010).
- BIONET Database
- EPBC Act Protected Matters Search Tool

3.4 Field Surveys

A visual inspection was undertaken on the 12th of March 2023 and 1st July 2024 to identify and evaluate the current vegetation community occurring on the subject site, identify any threatened flora and fauna species and assess the current nature and extent of fauna habitats. Given the relatively small size of the site one day of surveying was considered an appropriate period of time to assess the native flora and fauna and values of the site.

Features of the vegetation including floristics, structure, extent, type and projective foliage cover, presence of weed species and other significant features were noted and recorded). All flora recorded were predominantly identified to family, genus and species level with confirmation according to *Field Guide to the Native Plants of Sydney* (Robinson, 2003), *Weeds of the south-east: an identification guide for Australia* (Richardson, 2006*), Tree & Shrubs in Rainforest of New South Wales and Southern QLD* (Williams et al 1984), *Native Plants of the Sydney District* (Fairly and Moore 2000) and the Botanic Gardens Trust (2009) *PlantNET* flora database.

It was not possible to determine with certainty all the fauna that utilise habitats in the subject site. This is because of the likely seasonal occurrences of some fauna species, the occasional occurrence of vagrant species, and because some species are difficult to detect because of their timid or cryptic behaviour. Therefore, fauna investigations comprised an assessment of fauna habitats present on site and an indication of their potential to support native wildlife populations and, in particular, threatened species.

The fauna habitat assessment criteria included:

Mammals: extent of ground cover, shrub layer and tree canopy, hollow-bearing trees, substrate type (for burrowing etc), evidence such as droppings, diggings, footprints, scratches on trees, nests, burrow paths and runways.

Birds: structural; features such as the extent and nature of the canopy, understorey and ground strata and flowering character

Reptiles and amphibians: cover shelter, suitable substrate, basking and breeding site availability, reptiles and frogs sough in likely sheltering places

Invertebrates: logs and other debris, leaf and bark accumulations around base of trees, grass clumps, loose soil for burrowing

Wildlife corridor values: Importance of the creek systems and riparian vegetation as movement corridors for fauna, especially birds, aquatic fauna, mammals (e.g. microchiropteran bats) & amphibians

3.5 Assessment of conservation value

Conservation value parameters

The conservation value of flora and fauna habitats on the subject site was determined by reference to the following criteria:

- Representativeness - whether the vegetation communities of the site are unique, typical or common in the bioregion. In addition the criteria takes into account whether or not such vegetation units are presently held in conservation reserves;
- the presence of threatened or regionally significant species on the site;
- the extent of human influence on the natural environment of the site and the condition of habitats (e.g. the presence of weeds, fire frequency, etc.);
- the uniqueness of the natural values of the site;
- the amount of native vegetation to be cleared or modified by the proposed development in relation to what remnant vegetation will remain in the locality; and
- the relative importance of the site as a corridor for the movement of wildlife.

Vegetation condition was broadly assessed within each of the vegetation communities, based on the degree of modification and disturbance observed in these areas. A basic scale was established to quantify the condition of each patch of native vegetation. The scale for vegetation condition is defined in Table 1.

Table 1: Vegetation condition classes

Condition class	Description	Criteria			
		Native flora diversity	Canopy cover	Mid-storey	Weed abundance
High	Vegetation still retains the majority of native species and structural characteristics of the pre-European equivalent. Such vegetation is usually ina near-natural state and displays resilience to weed invasion due to intactground cover, shrub and canopy layers and lack of soil disturbance. Some limited weed cover is present in edge habitats.	High	Intact	Intact	Low
Moderate	Vegetation generally still retains most ofits structural integrity but has been partially disturbed and has lost some component of its original species complement. Weed invasion varies fromslight to high.	Moderate	Intact	Partial-Intact	Moderate - High
Low	Modified areas where most of the nativediversity and vegetation structure has been lost. Typically includes thin strips of roadside vegetation, areas of derived grassland and shrubby vegetation in power easement. Environmental weedsare often co-dominant with the original indigenous species	Low- moderate	Partial	Absent	High-Moderate
Very Low	Includes cleared paddock areas and roadside clearings dominated by exotic species including noxious weeds. Someregenerating shrubs and native groundcovers may be present in low abundance. Some of these areas support planted trees and shrubs including native and exotic species.	Low	None	Absent-Sparse	High

4. Native vegetation

The site for the proposed development is dominated by introduced pastureland that is not consistent with a native vegetation community.

Proposed Lot 2 that contains an existing dwelling has 'Stringybark - Scribbly Gum Woodland' and 'Scribbly Gum – Red Bloodwood – Black She-Oak Woodland' vegetation community occurring north-east of the existing dwelling.

In order to establish the asset protection zone to native trees are proposed for removal. These two (2) locally native trees comprise of 1 x *Eucalyptus eugenoides* and 1 x *Eucalyptus sclerophylla*. They are not hollow bearing trees providing fauna habitat and are not considered ecologically significant.

Stringybark - Scribbly Gum Woodland' is consistent with 'Currambene-Batemans Lowlands Forest' that has been mapped as the dominant vegetation community within the study area within statewide vegetation mapping.

This vegetation type is not listed, or currently being considered for listing, as endangered or threatened on the Schedules to either the EPBC or BC Acts. The vegetation occurring on site is locally common and not consistent with a threatened ecological community listed under NSW *Biodiversity Conservation Act 2016* and Commonwealth *EPBC Act 1999*.

In summary, the following vegetation communities occur on-site:

- Scribbly Gum – Red Bloodwood – Black She-Oak Woodland
- Stringybark - Scribbly Gum Woodland
- Tea tree shrubland
- Exotic grassland

A description of all the vegetation communities are provided below.

4.1 Exotic Grassland

This community dominates the study area and consists of native and exotic grasses, herbs and forbs that vary in height and density depending on the area's grazing pressure. **Includes the area for the proposed building envelope and wastewater disposal area for proposed Lot 1.**

Dominant species include Carpet Grass (*Axonopus fissifolius*), Pigeon Grass, Kikuyu Grass, Giant Parramatta Grass, Yorkshire Fog (*Holcus lanatus*), *Richardia humistrata*, Fireweed and Fleabane (*Conyza bonariensis*).

It is noted that, none of the vegetation recorded conforms to South Coast Grassy Woodland. As such, no areas of South Coast Grassy Woodland will be adversely impacted by the proposal.

The following introduced environmental weed species were recorded on-site:

- *Axonopus fissifolius*
- *Briza maxima*
- *Cenchrus clandestinus*
- *Cirsium vulgare*
- *Conyza bonariensis*
- *Cynodon dactylon*
- *Cyperus brevifolius*
- *Cyperus polystachyos*
- *Holcus lanatus*
- *Hypochaeris radicata*
- *Paspalum dilatatum*
- *Paspalum urvillei*
- *Phytolacca octandra*
- *Plantago lanceolata*
- *Richardia humistrata*
- *Rumex sp*
- *Setaria gracilis*
- *Sida rhombifolia*
- *Sonchus oleraceus*
- *Sporobolus fertilis*
- *Trifolium repens*
- *Verbena bonariensis*
- *Senecio madagascariensis*
- *Rubus fruticosus agg*
- *Sporobolus fertilis*

Photograph 1: Exotic Grassland

4.2 Scribbly Gum – Red Bloodwood – Black She-Oak Woodland

Hard-leaved Scribbly Gum (*Eucalyptus sclerophylla*), Red Bloodwood (*Corymbia gummifera*) and Black She-Oak (*Allocasuarina littoralis*) dominate the canopy, whilst Turpentine (*Syncarpia glomulifera*) is also present in some areas. A sparse understorey is present, common species within this stratum including Old Man Banksia (*Banksia serrata*), Sweet-scented Wattle (*Acacia suaveolens*), Smooth Geebung (*Persoonia levis*) and Conestick (*Petrophile pedunculata*). The groundcover consists of *Lomatia ilicifolia*, Kangaroo Grass (*Themeda australis*), Wiry Panic (*Entolasia stricta*), Paddock Lovegrass (*Eragrostis leptostachya*) and Wallaby Grass (*Austrodanthonia sp.*).

Areas of this community consist of only the canopy, the understorey having been generally cleared. Isoalted shrub species previously mentioned do occur, as well as *Bossiaea spp.*, Paperbark Tea-tree (*Leptospermum trinervium*) and *Mirbelia speciosa* along Wandypark Road.

The groundcover is of a high density reaching a height of 15 cm and a mixture of native and introduced species. Common native species include Fish Bones (*Lomandra obliqua*), *Entolasia spp.* and a Wallaby Grass. Common introduced species include Pigeon Grass (*Setaria gracilis*), Kikuyu Grass (*Cenchrus clandestinus*), Giant Parramatta Grass (*Sporobolus fertilis*) and Fireweed (*Senecio madagascariensis*).

With reference to the descriptions provided in Tozer *et al* (2010) it is considered that the Scribbly Gum – Red Bloodwood – Black She-Oak Woodland conforms to Currambene-Batemans Lowlands Forest. Currambene-Batemans Lowlands Forest is not part of any endangered ecological community. With reference to Keith (2004), this community conforms to the description provided for Sydney Coastal Dry Sclerophyll Forests, this vegetation association not being listed under either the EPBC or BC Acts. As such, the Scribbly Gum – Red Bloodwood – Black She-Oak Woodland recorded within the project area is not considered to represent an endangered ecological community.

<u>The following plant species were recorded this vegetation community:</u>

- *Acacia binervata*
- *Acacia suaveolens*
- *Acacia ulicifolia*
- *Allocasuarina littoralis*
- *Alternanthera denticulata*
- *Banksia ericifolia*
- *Banksia spinulosa*
- *Boronia pinnata*
- *Callistemon linearis*
- *Commelina cyanea*
- *Corymbia gummifera*
- *Daviesia ulicifolia subsp. ulicifolia*

- *Dodonaea triquetra*
- *Entolasia stricta*
- *Eucalyptus eugenoides*
- *Eucalyptus sclerophylla*
- *Exocarpus cupressiformis*
- *Gahnia sieberiana*
- *Glycine clandestina*
- *Hibbertia fasciculata*
- *Isopogon anemonifolius*
- *Juncus usitatus*
- *Kunzea ambigua*
- *Leptospermum polygalifolium subsp. Polygalifolium*
- *Leptospermum trinervium*
- *Lobelia purpurascens*
- *Lomanda multiflora*
- *Lomandra obliqua*
- *Lomatia ilicifolia*
- *Melaleuca armillaris subsp. armillaris*
- *Melaleuca thymifolia*
- *Microlaena stipoides*
- *Mirbelia speciosa*
- *Ozothamnus diosmifolius*
- *Parsonsia straminea*
- *Persoonia linearis*
- *Pittosporum undulatum*
- *Pteridium esculentum*
- *Themeda australis*
- *Viola hederaceae*

Photograph 2: Scribbly Gum – Red Bloodwood – Black She-Oak Woodland

4.3 Stringybark - Scribbly Gum Woodland

Stringybarks (*Eucalyptus eugenioides, Eucalyptus globoidea*), Red Bloodwood and Hard-leaved Scribbly Gum dominate the canopy, with Black She-Oak also being present. Common species in the understorey include *Daviesia ulicifolia*, Tick Bush (*Kunzea ambigua*), Tea-tree (*Leptospermum spp.*), Sweet Pittosporum (*Pittosporum undulatum*) and Cherry Ballarat (*Exocarpus cupressiformis*). The groundcover consists of Kangaroo Grass, Sword Sedge (*Lepidosperma laterale*), Weeping Grass (*Microlaena stipoides*), Paddock Lovegrass (*Eragrostis leptostachya*) and Wiry Panic among others.

The NSW State Vegetation Type Map (Department of Planning and Environment 2022) maps the vegetation occurring below the site as containing PCT 4109 – 'Coastal Alluvial Bangalay Forest'.

Vegetation Formation: Forested Wetlands
Vegetation Class: Coastal Floodplain Wetlands
PCT Name: 'Coastal Alluvial Bangalay Forest'

Vegetation mapping of the Shoalhaven, Eurobodalla & Bega Valley LGA's was also carried out by OEH (2013) (not illustrated). The subject site has been mapped as containing 'Red Bloodwood - Hard-leaved Scribbly Gum - Silvertop Ash heathy open forest on sandstone plateaux of the lower Shoalhaven Valley, Sydney Basin' (PCT 1082 in the NSW Master Plant Community Type Classification [OEH 2016c]).
PCT 1082 is not part of any ecological community listed under the EPBC or TSC Acts. At a regional scale PCT 1082 is part of Sydney Coastal Dry Sclerophyll Forests (Keith 2004).

With reference to the descriptions provided in Tozer *et al* (2010) it is considered that the Stringybark – Red Bloodwood - Scribbly Gum Woodland conforms to Currambene-Batemans Lowlands Forest. With reference to Keith (2004), this community conforms to the description provided for Sydney Coastal Dry Sclerophyll Forests. As such, the Stringybark – Red Bloodwood - Scribbly Gum Woodland recorded within the project area is not considered to represent an endangered ecological community.

<u>The following plant species were recorded this vegetation community:</u>

- *Acacia binervata*
- *Acacia suaveolens*
- *Acacia ulicifolia*
- *Allocasuarina littoralis*
- *Alternanthera denticulata*
- *Banksia ericifolia*
- *Banksia spinulosa*
- *Boronia pinnata*
- *Callistemon linearis*
- *Commelina cyanea*
- *Corymbia gummifera*

- *Daviesia ulicifolia subsp. ulicifolia*
- *Dodonaea triquetra*
- *Entolasia stricta*
- *Eucalyptus eugenoides*
- *Eucalyptus sclerophylla*
- *Exocarpus cupressiformis*
- *Gahnia sieberiana*
- *Glycine clandestina*
- *Hibbertia fasciculata*
- *Isopogon anemonifolius*
- *Juncus usitatus*
- *Kunzea ambigua*
- *Leptospermum polygalifolium subsp. Polygalifolium*
- *Leptospermum trinervium*
- *Lobelia purpurascens*
- *Lomanda multiflora*
- *Lomandra obliqua*
- *Lomatia ilicifolia*
- *Melaleuca armillaris subsp. armillaris*
- *Melaleuca thymifolia*
- *Microlaena stipoides*
- *Mirbelia speciosa*
- *Ozothamnus diosmifolius*
- *Parsonsia straminea*
- *Persoonia linearis*
- *Pittosporum undulatum*
- *Pteridium esculentum*
- *Themeda australis*
- *Viola hederaceae*

Photograph 3: Stringybark - Scribbly Gum Woodland

Figure 9: NSW State Vegetation Type Map maps the area north of the existing dwelling as 'PCT 4019 Coastal Alluvial Bangalay Forest' (Source: Department of Planning and Environment 2024)

4.4 Tea-tree shrubland

This area has been previously cleared and consists of regenerating shrubs that are of a high density. Common species include Bushy Needlebush (*Hakea sericea*), Tick Bush, Tea-tree (*Leptospermum spp.), Melaleuca thymifolia*, Bottlebrush (*Callistemon spp.*) and Red-fruited Saw-sedge (*Gahnia sieberiana*) (present only in north-east portion of community).

A medium to highly dense groundcover approximately 20 cm high is present and consists of Bracken (*Pteridium esculentum*), Wiry Panic, Kangaroo Grass and Two-colour Panic (*Panicum simile*).

This vegetation type occurs in the lower lying topography of the site and experiences periods of inundation hence the types of vegetation that occurs in this area (Tea-tree (*Leptospermum spp.), Melaleuca thymifolia*, Bottlebrush (*Callistemon spp.*) and Red-fruitedSaw-sedge (*Gahnia sieberiana*).

The NSW State Vegetation Type Map (Department of Planning and Environment 2022) maps the vegetation occurring below the site as containing PCT 4056 'Southern Estuarine Swamp Paperbark Creekflat Scrub'.

- Vegetation Formation: Forested Wetlands
- Vegetation Class: Coastal Floodplain Wetlands

This community has no conservation significance (i.e listed as a threatened ecological community under the NSW *Biodiversity Conservation Act 2016*), however, contains sensitive habitat that should be protected as part of future development. There are no perceived impacts to this vegetation community. It is outside the proposed development areas.

Figure 10: NSW State Vegetation Type Map identifying the tea tree shrub land 'PCT 4056 Southern Estuarine Swamp Paperbark Creekflat Scrub' (Source: Department of Planning and Environment 2024)

Photograph 4: Tea-tree shrubland

Table 2: Flora species recorded during the field investigation

	GENUS Species	**Common Name**
FILICOPSIDA		
Dennstaedtiaceae	*Pteridium esculentum*	Bracken Fern
Gleicheniaceae	*Gleichenia dicarpa*	Pouched Coral Fern
Lindsaeaceae	*Lindsaea linearis*	Screw Fern
LYCOPODIACEA		
Selaginellaceae	*Selaginella uliginosa*	
MAGNOLIOPSIDA - DICOTYLEDONS		
Amaranthaceae	*Alternanthera denticulata*	
Apiaceae	*Platysace linearifolia*	Carrot Tops
Apocynaceae	*Parsonsia straminea*	Common Silkpod
Asteraceae	*Cirsium vulgare* *	Scotch Thistle
	Conyza bonariensis *	Fleabane
	Hypochaeris radicata *	Catsear
	Ozothamnus diosmifolius	White Dogwood
	Senecio madagascariensis * [N]	Fireweed
	Sonchus oleraceus *	Sowthistle
Casuarinaceae	*Allocasuarina littoralis*	Black She-Oak
Clusiaceae	*Hypericum gramineum*	Small St John's Wort
Commelinaceae	*Commelina cyanea*	Creeping Christian
Dilleniaceae	*Hibbertia sp.*	Guinea Flower
	Hibbertia fasciculata	
Epacridaceae	*Epacris microphylla* var. *microphylla*	
Fabaceae: Faboideae	*Bossiaea heterophylla*	Variable Bossiaea
	Bossiaea obcordata	
	Daviesia ulicifolia subsp. *ulicifolia*	Gorse Bitter-pea
	Glycine sp.	
	Gompholobium glabratum	Dainty Wedge-pea
	Mirbelia speciosa	
	Trifolium repens *	White Clover
Fabaceae: Mimosoideae	*Acacia binervata*	Two-veined Hickory
	Acacia floribunda	Sally Wattle
	Acacia irrorata subsp. *irrorata*	Green Wattle
	Acacia longiflora var. *longifolia*	Sydney Golden Wattle
	Acacia myrtifolia	Myrtle Wattle
	Acacia suaveolens	Sweet-scented Wattle
	Acacia terminalis subsp. *angustifolia*	Sunshine Wattle
	Acacia ulicifolia	Prickly Moses
Geraniaceae	*Geranium sp.*	
Goodeniaceae	*Goodenia bellidifolia* subsp. *bellidifolia*	
Liliaceae	*Lilium formosanum* *	Formosan Lily
Malvaceae	*Sida rhombifolia* *	Paddy's Lucerne
Myrtaceae	*Callistemon linearis*	Narrow-leaved Bottlebrush
	Callistemon sp.	Bottlebrush
	Corymbia gummifera	Red Bloodwood
	Eucalyptus eugenioides	Thin-leaved Stringybark
	Eucalyptus globoidea	White Stringybark
	Eucalyptus sclerophylla	Hard-leaved Scribbly Gum
	Eucalyptus pilularis	Blackbutt
	Kunzea ambigua	Tick Bush
	Leptospermum polygalifolium subsp. *polygalifolium*	Lemon-scented Tea-tree
	Leptospermum trinervium	Paperbark Tea-tree
	Melaleuca armillaris subsp. *armillaris*	Bracelet Honeymyrtle
	Melaleuca thymifolia	
	Syncarpia glomulifera	Turpentine
Oleaceae	*Ligustrum sinense* * [N]	Small-leaved Privett

[N] – indicates species listed under the NW Act

	GENUS Species	Common Name
	Notelaea sp.	Mock Olive
Phytolaccaceae	*Phytolacca octandra* *	Inkweed
Pittosporaceae	*Pittosporum undulatum*	Sweet Pittosporum
Plantaginaceae	*Plantago lanceolata* *	Lamb's Tongue
Polygonaceae	*Rumex sp.* *	Dock
Proteaceae	*Banksia ericifolia*	Heath-leaved Banksia
	Banksia serrata	Old Man Banksia
	Banksia spinulosa	Hair-pin Banksia
	Hakea dactyloides	Broad-leaved Hakea
	Hakea sericea	Bushy Needlebush
	Hakea teretifolia	Dagger Hakea
	Isopogon anemonifolius	Broad-leaf Drumsticks
	Lomatia ilicifolia	Holly-leaved Lomatia
	Lambertia formosa	Mountain Devils
	Persoonia linearis	Narrow-leaved Geebung
	Persoonia levis	Smooth Geebung
	Petrophile pedunculata	Conestick
Rhamnaceae	*Alphitonia excelsa*	Red Ash
Rosaceae	*Rubus fruticosus* agg. spp. * [N]	Blackberry
Rubiaceae	*Opercularia diphylla*	
	Pomax umbellata	
	Richardia humistrata *	
Rutaceae	*Boronia pinnata*	Pinnate Boronia
Santalaceae	*Exocarpus cupressiformis*	Cherry Ballart
Sapindaceae	*Dodonaea triquetra*	Common Hop Bush
Stylidiaceae	*Stylidium productum*	Trigger Plant
Verbenaceae	*Verbena bonariensis* *	Purpletop
Violaceae	*Viola hederaceae*	Native Violet
MAGNOLIOPSIDA - MONOCOTYLEDONS		
Cyperaceae	*Cyperus brevifolius* *	
	Cyperus polystachyos *	Sedge
	Eleocharis sphacelata	Tall Spike-rush
	Gahnia sieberiana	Red-fruited Saw-sedge
	Lepidosperma laterale	Sword-sedge
Iridaceae	*Patersonia sp.*	Purple Flag
Juncaceae	*Juncus sp.*	Rush
	Juncus usitatus	Common Rush
Lomandraceae	*Lomandra multiflora*	
	Lomandra obliqua	Fish Bones
	Xanthorrhoea sp.	Grass-tree
Poaceae	*Axonopus fissifolius* *	Carpet Grass
	Aristida vagans	Three-awn Speargrass
	Austrodanthonia sp.	A Wallaby Grass
	Briza maxima *	Blowfly Grass
	Cenchrus clandestinus *	Kikuyu Grass
	Cynodon dactylon *	Couch
	Echinopogon caespitosus	Common Hedgehog Grass
	Entolasia marginata	Spreading Panic
	Entolasia stricta	Wiry Panic
	Eragrostis leptostachya	Paddock Lovegrass
	Holcus lanatus *	Yorkshire Fog
	Imperata cylindrica var. *major*	Blady Grass
	Joycea pallida	Red-flowered Wallaby Grass
	Lachnagrostis sp.	Blown Grass
	Microlaena stipoides	Weeping Grass
	Panicum simile	Two Colour Panic
	Paspalidium distans	Slender Panic
	Paspalum dilatatum *	Paspalum
	Paspalum distichum	Fresh Water Couch
	Paspalum urvillei *	Vasey Grass

	GENUS Species	Common Name
	Poa affinis	
	Setaria gracilis *	Pigeon Grass
	Sporobolus fertilis * [N]	Giant Parramatta Grass
	Themeda triandra	Kangaroo Grass
Typhaceae	*Typha orientalis*	Cumbungi

Appendix 4: Fauna species recorded or previously detected in the vicinity of the study area

Source of Records
1 = Species recorded during present study
2 = OEH (2016a)
3 = Environment and Natural Solutions 2010 (2010), Lesryk Environmental Pty Ltd 2010)
4 = Lesryk Environmental Pty Ltd (1996)

Key
A - species listed under the EPBC Act
B - species listed under the TSC Act
V - vulnerable
M - migratory
F - migratory family
* - introduced species

A	B	Common Name	Family and Scientific Name	1	2	3	4
		MAMMALS					
			Ornithorhynchidae				
		Platypus	*Ornithorhynchus anatinus*		x		
			Tachyglossidae				
		Short-beaked Echidna	*Tachyglossus aculeatus*		x		x
			Dasyuridae				
		Brown Antechinus	*Antechinus stuartii*		x		x
			Peramelidae				
		Long-nosed Bandicoot	*Perameles nasuta*		x		x
			Vombatidae				
		Common Wombat	*Vombatus ursinus*	x	x	x	
			Burramyidae				
	V	Eastern Pygmy-possum	*Cercartetus nanus*		x		
			Petauridae				
	V	Yellow-bellied Glider	*Petaurus australis*		x		x
		Sugar Glider	*Petaurus breviceps*		x		x
			Pseudocheiridae				
		Common Ringtail Possum	*Pseudocheirus peregrinus*		x		
			Phalangeridae				
		Common Brushtail Possum	*Trichosurus vulpecula*		x	x	x
			Potoroidae				
V	V	Long-nosed Potoroo	*Potorous tridactylus*		x		x
			Macropodidae				
		Eastern Grey Kangaroo	*Macropus giganteus*	x	x	x	x
		Red-necked Wallaby	*Macropus rufogriseus*			x	x
		Swamp Wallaby	*Wallabia bicolor*		x		x
			Pteropodidae				
V	V	Grey-headed Flying-fox	*Pteropus poliocephalus*	x	x		x
			Rhinolophidae				
		Eastern Horseshoe Bat	*Rhinolophus megaphyllus*	x	x		
			Vespertilioidae				
		Gould's Wattled Bat	*Chalinolobus gouldii*	x	x		x
		Chocolate Wattled Bat	*Chalinolobus morio*	x	x	x	
	V	Eastern Falsistrelle	*Falsistrellus tasmaniensis*	x			

A	B	Common Name	Family and Scientific Name	1	2	3	4
		Long-eared Bat	*Nyctophilus sp.*	x			
		Lesser Long-eared Bat	*Nyctophilus geoffroyi*		x		
		Gould's Long-eared Bat	*Nyctophilus gouldi*		x		
	V	Greater Broad-nosed Bat	*Scoteanax rueppellii*	x	x		
		Eastern Broad-nosed Bat	*Scotorepens orion*	x			x
		Large Forest Bat	*Vespadelus darlingtoni*	x	x		
		Eastern Forest Bat	*Vespadelus pumilus*		x		
		Southern Forest Bat	*Vespadelus regulus*		x	x	x
		Little Forest Bat	*Vespadelus vulturnus*	x	x		x
			Miniopteridae				
	V	Little Bentwing Bat	*Miniopterus australis*	x			
	V	Eastern Bentwing Bat	*Miniopterus* (*schreibersii*) *orianae oceanensis*	x	x		x
			Molossidae				
	V	East-coast Freetail Bat	*Micronomus norfolkensis*	x	x		
			Muridae				
		Bush Rat	*Rattus fuscipes*		x		x
		Swamp Rat	*Rattus lutreolus*		x		
			Canidae				
		Dingo	*Canis lupus dingo*		x		
		* Fox	*Vulpes vulpes*	x	x		x
		* Dog	*Canis familiaris*	x			
			Felidae				
		* Feral Cat	*Felis catus*		x		
			Leporidae				
		* Rabbit	*Oryctolagus cuniculus*	x	x	x	
			Cervidae				
		Deer	*Cervus sp.*		x		
		BIRDS					
F			**Anatidae**				
		Pacific Black Duck	*Anas superciliosa*	x	x	x	
		Grey Teal	*Anas gracilis*	x		x	
		Chestnut Teal	*Anas castanea*	x		x	
		Hardhead	*Aythya australis*	x		x	
		Australian Wood Duck	*Chenonetta jubata*	x	x	x	
			Podicipedidae				
		Australasian Grebe	*Tachybaptus novaehollandiae*	x	x		
			Columbidae				
		Crested Pigeon	*Ocyphaps lophotes*				x
			Podargidae				
		Tawny Frogmouth	*Podargus strigoides*		x		
			Eurostopodidae				
		White-throated Nightjar	*Eurostopodus mystacalis*		x		
			Aegothelidae				
		Australian Owlet-nightjar	*Aegotheles cristatus*		x		
			Apodidae				
M		White-throated Needletail	*Hirundapus caudacutus*			x	
			Phalacrocoracidae				

A	B	Common Name	Family and Scientific Name	1	2	3	4
		Little Pied Cormorant	*Phalacrocorax melanoleucos*	x			
		Great Cormorant	*Phalacrocorax carbo*			x	x
		Little Black Cormorant	*Phalacrocorax sulcirostris*	x			
			Ardeidae				
		White-necked Heron	*Ardea pacifica*		x		
		White-faced Heron	*Egretta novaehollandiae*	x			
		Little Egret	*Egretta garzetta*	x			
		Intermediate Egret	*Ardea intermedia*	x			
F			**Accipitridae**				
M	V	Eastern Osprey	*Pandion cristatus*		x		
		Whistling Kite	*Haliastur sphenurus*				x
M		White-bellied Sea-eagle	*Haliaeetus leucogaster*		x		x
		Wedge-tailed Eagle	*Aquila audax*			x	
	V	Little Eagle	*Hieraaetus morphnoides*		x	x	
		Collared Sparrowhawk	*Accipiter cirrocephalus*				x
		Grey Goshawk	*Accipiter novaehollandiae*			x	
F			**Falconidae**				
		Peregrine Falcon	*Falco peregrinus*		x		
		Nankeen Kestrel	*Falco cenchroides*			x	
			Rallidae				
		Purple Swamphen	*Porphyrio porphyrio*	x	x		
F			**Charadriidae**				
		Masked Lapwing	*Vanellus miles*	x	x	x	
		Black-fronted Dotterel	*Elseyornis melanops*			x	
			Cacatuidae				
	V	Glossy Black-cockatoo	*Calyptorhynchus lathami*	x	x	x	x
		Yellow-tailed Black Cockatoo	*Calyptorhynchus funereus*		x		x
	V	Gang-gang Cockatoo	*Callocephalon fimbriatum*		x		x
		Galah	*Eolophus roseicapillus*	x	x		x
		Sulphur-crested Cockatoo	*Cacatua galerita*				x
			Psittacidae				
		Rainbow Lorikeet	*Trichoglossus haematodus*	x	x		x
		Musk Lorikeet	*Glossopsitta concinna*		x		
	V	Little Lorikeet	*Glossopsitta pusilla*		x		
		Australian King Parrot	*Alisterus scapularis*		x		x
		Crimson Rosella	*Platycercus elegans*	x	x	x	x
		Eastern Rosella	*Platycercus eximius*		x	x	
		Red-rumped Parrot	*Psephotus haematonotus*			x	
			Cuculidae				
		Brush Cuckoo	*Cacomantis variolosus*		x		
		Fan-tailed Cuckoo	*Cacomantis flabelliformis*				x
		Horsfield's Bronze-Cuckoo	*Chalcites basalis*				x
		Shining Bronze-Cuckoo	*Chalcites lucidus*			x	
		Eastern Koel	*Eudynamys orientalis*			x	
		Channel-billed Cuckoo	*Scythrops novaehollandiae*	x	x		
			Strigidae				
	V	Powerful Owl	*Ninox strenua*		x		
		Southern Boobook	*Ninox novaeseelandiae*		x		x

A	B	Common Name	Family and Scientific Name	1	2	3	4
			Tytonidae				
	V	Sooty Owl	*Tyto tenebricosa*		x		
	V	Masked Owl	*Tyto novaehollandiae*		x		
			Halcyonidae				
		Laughing Kookaburra	*Dacelo novaeguineae*	x	x	x	x
		Sacred Kingfisher	*Todiramphus sanctus*	x	x	x	
			Coraciidae				
		Dollarbird	*Eurystomus orientalis*			x	x
			Menuridae				
		Superb Lyrebird	*Menura novaehollandiae*		x		
			Climacteridae				
		White-throated Treecreeper	*Cormobates leucophaea*	x	x	x	x
		Red-browed Treecreeper	*Climacteris erythrops*				x
			Ptilonorhynchidae				
		Satin Bowerbird	*Ptilonorhychus violaceus*				x
			Maluridae				
		Superb Fairy-wren	*Malurus cyaneus*		x	x	x
		Variegated Fairy-wren	*Malurus lamberti*	x			x
		Southern Emu-wren	*Stipiturus malachurus*		x		
			Acanthizidae				
		Rockwarbler	*Origma solitaria*		x		
		White-browed Scrubwren	*Sericornis frontalis*		x		x
		Weebill	*Smicrornis brevirostris*				x
		White-throated Gerygone	*Gerygone albogularis*	x			
		Brown Thornbill	*Acanthiza pusilla*		x		x
		Yellow Thornbill	*Acanthiza nana*	x			x
		Striated Thornbill	*Acanthiza lineata*	x	x	x	x
		Buff-rumped Thornbill	*Acanthiza reguloides*		x		
		Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*			x	
			Pardalotidae				
		Spotted Pardalote	*Pardalotus punctatus*		x	x	x
		Striated Pardalote	*Pardalotus striatus*		x		x
			Meliphagidae				
		Red Wattlebird	*Anthochaera carunculata*	x	x		x
		Little (Brush) Wattlebird	*Anthochaera chrysoptera*		x		x
		Noisy Friarbird	*Philemon corniculatus*	x	x	x	x
		Noisy Miner	*Manorina melanocephala*		x	x	
		Lewin's Honeyeater	*Meliphaga lewinii*	x	x	x	x
		Yellow-faced Honeyeater	*Lichenostomus chrysops*	x	x	x	x
		Fuscous Honeyeater	*Lichenostomus fuscus*				x
		Brown-headed Honeyeater	*Melithreptus brevirostris*				x
		New Holland Honeyeater	*Phylidonryis novaehollandiae*		x		
		Eastern Spinebill	*Acanthorhynchus tenuirostris*		x	x	x
		Scarlet Honeyeater	*Myzomela sanguinolenta*		x		
			Psophodidae				
		Eastern Whipbird	*Psophodes olivaceus*		x	x	x
			Campephagidae				
		Black-faced Cuckoo-shrike	*Coracina novaehollandiae*	x	x	x	x

A	B	Common Name	Family and Scientific Name	1	2	3	4
			Pachycephalidae				
		Grey Shrike-thrush	*Colluricincla harmonica*	x	x		x
		Golden Whistler	*Pachycephala pectoralis*		x		x
		Rufous Whistler	*Pachycephala rufiventris*		x	x	x
			Oriolidae				
		Olive-backed Oriole	*Oriolus sagittatus*		x		x
			Artamidae				
		Little Woodswallow	*Artamus minor*				
		Grey Butcherbird	*Cracticus torquatus*	x	x		x
		Pied Butcherbird	*Cracticus nigrogularis*			x	
		Australian Magpie	*Cracticus tibicen*	x	x	x	x
		Pied Currawong	*Strepera graculina*	x	x		x
			Rhipiduridae				
		Grey Fantail	*Rhipidura albiscapa*	x	x	x	x
M		Rufous Fantail	*Rhipidura rufifrons*			x	x
		Willie Wagtail	*Rhipidura leucophrys*	x	x	x	x
			Corvidae				
		Australian Raven	*Corvus coronoides*		x		x
			Monarchidae				
		Leaden Flycatcher	*Myiagra rubecula*		x		x
M		Black-faced Monarch	*Monarcha melanopsis*		x		x
		Magpie-lark	*Grallina cyanoleuca*	x	x	x	x
			Petroicidae				
		Rose Robin	*Petroica rosea*		x		
		Red-capped Robin	*Petroica goodenovii*			x	
		Eastern Yellow Robin	*Eopsaltria australis*		x	x	x
		Jacky Winter	*Microeca fascinans*	x		x	
			Timaliidae				
		Silvereye	*Zosterops lateralis*		x		x
			Hirundinidae				
		Welcome Swallow	*Hirundo neoxena*	x	x	x	
		Tree Martin	*Petrochelidon nigricans*			x	
F			**Turdidae**				
		Bassian Thrush	*Zoothera lunulata*		x		
			Sturnidae				
		* Common Myna	*Sturnus tristis*			x	
			Estrildidae				
		Red-browed Finch	*Neochmia temporalis*	x		x	x
			Motacillidae				
		Australasian Pipit	*Anthus naovaeseelandiae*			x	
		REPTILES					
			Chelidae				
		Eastern Snake-necked Turtle	*Chelodina longicollis*			x	
			Diplodactylidae				
		Lesueur's Velvet Gecko	*Amalosia lesueurii*		x		
			Scincidae				
		Striped Snake-eyed Skink	*Cryptoblepharus virgatus*		x		
		Eastern Water Skink	*Eulamprus quoyii*			x	x

A	B	Common Name	Family and Scientific Name	1	2	3	4
		Dark-flecked Garden Sun-skink	*Lampropholis delicata*	x	x	x	x
			Agamidae				
		Jacky Lizard	*Amphibolurus muricatus*	x	x		x
			Varanidae				
	V	Heath monitor	*Varanus rosenbergi*		x		
			Typhlopidae				
		Blackish blind snake	*Ramphotyphlops nigrescens*		x		
			Elapidae				
		Red-bellied Black Snake	*Pseudechis porphyriacus*				x
		AMPHIBIANS					
			Limnodynastidae				
		Brown-striped Frog	*Limnodynastes peronii*	x	x		
			Myobatrachidae				
		Common Eastern Froglet	*Crinia signifera*	x	x	x	x
		Haswell's Frog	*Paracrinia haswelli*		x		
		Brown Toadlet	*Pseudophryne bibronii*		x		
		Tyler's Toadlet	*Uperoleia tyleri*		x		
			Hylidae				
		Blue Mountains Tree Frog	*Litoria citropa*		x		
		Bleating Tree Frog	*Litoria dentata*			x	x
		Lesueur's Frog	*Litoria lesueuri*		x		
V	V	Littlejohn's Tree Frog	*Litoria littlejohni*		x		
		Southern Leaf Green Tree Frog	*Litoria nudidigita*		x		
		Peron's Tree Frog	*Litoria peronii*		x		
		Tyler's Tree Frog	*Litoria tyleri*		x		
		Verreaux's Tree Frog	*Litoria verreauxii*		x	x	

5. Fauna habitat and species

The area for the proposed development (immediate impact area) comprises of a relatively small lawn terrace that does not provide significant fauna habitat.

A number of woodland patches are present within the subject site, these varying in size depending on the impacts associated with past clearing. Most of the woodland stands occur as isolated patches, these being surrounded by grazing pastures. Whilst this is the case, 'links' to adjacent stands of similar vegetation occur, particularly those bushland areas that occur beyond the limits of the subject site.

The woodlands support trees that are to 15 m in height, a number of the mature plants present being hollow-bearing (hollow diameter ~100 mm).The ground cover is composed of grasses, forbs, leaf litter and ground debris, this layer varying in development depending on the properties grazing pressure.

Some of the woodland patches appear to have been underscrubbed at some stage. Similarly, some appear to have been selectively logged. The remnant trees below the site function as a habitat corridor for mobile species including microchiropteran bats, flying foxes, variety of bird species and arboreal marsupials (possums).

Cleared grassland is the dominant habitat type within the study area. The cleared grassland supports a mixture of grasses, forbs and weeds, the majority of which are introduced species, though natives are also present. The density and development of these depends on the areas' grazing pressure.

The dams is essentially an open expanse of water with a limited amount of emergent aquatic vegetation. The dams in the central region of the study area support small amounts of emergent aquatic vegetation.

Dam present in the north-west corner of the site on Proposed Lot 2

5.1 Hollow-bearing trees

The subject site for the construction envelope and bushfire asset protection zone does not require the removal of hollow-bearing trees.

Whilst hollow bearing trees do occur on the property, no hollow bearing trees or significant rocky habitat features are proposed for removal. Please refer to Figure 11 for a map of hollow bearing trees all of which will be retained.

Hollow tree recorded on-site

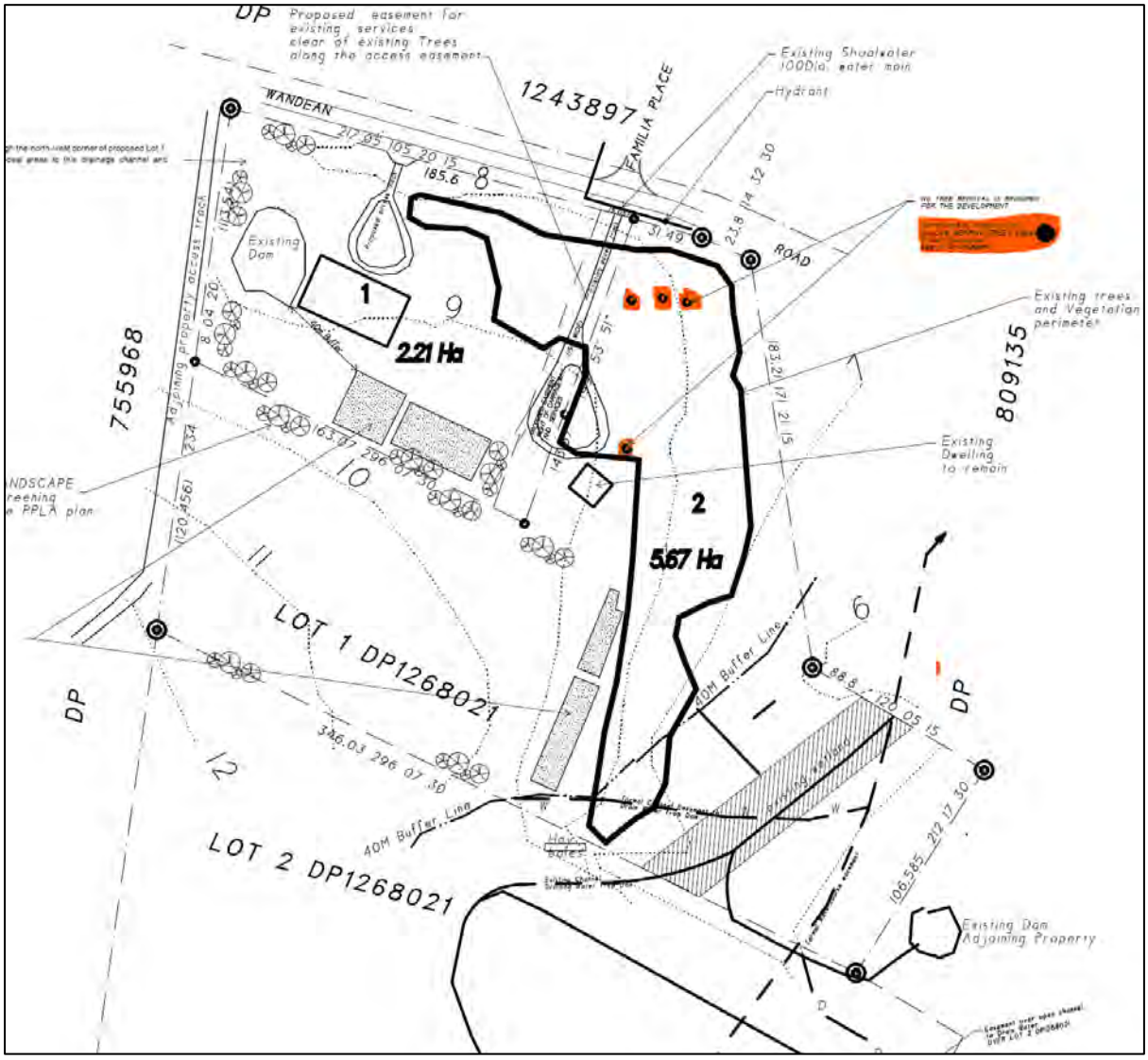


Figure 11 Hollow bearing tree location map (shown as red shading)

5.2 Nectar sources from trees

The Myrtataceace group of trees occurring downslope of the site provide nectar through flowering blossoms and direct extraction from the trunk for a variety of fauna including Grey-headed Flying Fox, birds and gliders.

There are a variety of nectar feeding species that utilise flowering blossoms are transient through the site and generally rely upon the flowering times.

The vegetation surrounding the site provides foraging and sheltering habitat for woodland bird species and generalist birds of agricultural habitats, although the smaller size of the remnants and general lack of connectivity may influence the suite of species.

Common birds found in these woodland habitats include White-throated Treecreeper (*Cormobates leucophaea*), Buff-rumped and Yellow Thornbill *(Acanthiza reguloides* and *Acanthiza nana*), Striated Pardalote (*Pardalotus striatus*), Grey Shrike-thrush (*Colluricincla harmonica*), Willy Wagtail (*Rhipidura leucophrys*), Yellow-faced Honeyeater (*Lichenostomus chrysops*), White-naped Honeyeater (*Melithreptus lunatus*), Crimson Rosella (*Platycercus elegans*), Magpie Lark (*Grallina cyanoleuca*) and Australian Magpie (*Gymnorhina tibicen*).

5.3 Species recorded

By the completion of the field investigation, 15 native mammals, 40 native birds, two reptiles and two frogs had been detected within, or in close proximity to, the subject site (Appendix 4).

In regards to the detection of these animals:

- Scats and burrows indicative of the presence of the Common Wombat (*Vombatus*
- *ursinus*) were observed in the north-eastern portion of the subject site
- The Eastern Grey Kangaroo (*Macropus giganteus*) was observed
- The Grey-headed Flying-fox (*Pteropus poliocephalus*) was observed previously by Lesryk Environmental during the spotlighting session
- All microchiropterans were identified through the analysis of those echolocation calls
- Obtained was observed previously by Lesryk Environmental during the spotlighting session
- The Dark-flecked Garden Sun-skink (*Lampropholis delicata*) and Jacky Lizard
- (*Amphibolurus muricatus)* were observed during the ground debris searches
- The Brown-striped Frog and Common Eastern Froglet (*Crinia signifera*) were heard calling in association with those wet areas was observed previously by Lesryk Environmental during the spotlighting session.

Of those native species recorded, seven species were observed previously by Lesryk Environmental are listed as vulnerable on the Schedules to the EPBC and/or BC Acts, these being:

- Grey-headed Flying-fox - listed as vulnerable under the EPBC and BC Acts
- Eastern Falsistrelle (Falsistrellus tasmaniensis) - vulnerable under the BC Act
- Greater Broad-nosed Bat (Scoteanax rueppellii) - vulnerable under the BC Act
- Little Bentwing Bat (Miniopterus australis) - vulnerable under the BC Act
- Eastern Bentwing Bat (Miniopterus (schreibersii) orianae oceanensis) - vulnerable under
- the BC Act
- East-coast Freetail Bat (Micronomus norfolkensis) - vulnerable under the BC Act
- Glossy Black-cockatoo (Calyptorhynchus lathami) - vulnerable under the BC Act.

No stick nests were observed in the trees within the development site. BAM recognised hollows were observed on-site. The trees are isolated within open cleared paddocks and are unlikely to be used as breeding habitat.

The Little Eagle is partly migratory or dispersive. Adult birds are mainly sedentary, while the young birds disperse. The Little Eagle searches for prey on the wing or from a high exposed perch, taking prey from the ground, the shrub layer or the canopy. Prey includes rabbits, other live mammals and insects. Little Eagles nest in mature living trees in open woodland or tree-lined watercourses. They rarely nest in isolated trees. The nest is an open bowl of twigs and branches, lined with green leaves. No such nests were observed on site.

We have undertaken a BIONET search of records previously recorded within 10km of the subject site. It reveals that there are 6 records within 10km and therefore a local population could be present. However, no evidence of this specie was recorded on-site.

No significant habitat for this species will be impacted by the proposed development.

In regard to the Little Bentwing Bat and Eastern Bentwing Bat, these species are cave-dwelling bats. No caves or suitable cave substitutes suitable for these species' roosting requirements are present within, or in close proximity to, the study area.

As such, the proposal is not expected to result in the removal of any roosting or breeding sites occupied by these species. Whilst the proposal will result in the removal of a small amount of insect attracting plants suitable for the foraging needs of the Little Bentwing Bat and Eastern Bentwing Bat, this, when compared to the amount within, and surrounding the study area (including those nearby conservation reserves), is considered insignificant. This small scale of disturbance is unlikely to affect these species, such that their populations would decline. No further legislative consideration is considered necessary in regard to either the Little Bentwing Bat or Eastern Bentwing Bat.

The remainder of the non-threatened native species recorded during the field investigation are all protected, as defined by the NPW Act, but considered to be common to abundant throughout, and well conserved within, the surrounding region.

These species would not be solely reliant upon those habitats present within, or close to the proposed subdivision, such that the removal or disturbance of these would threaten the local occurrence of these animals. The species recorded are all expected to be present within the study area and surrounds post-development.

It is noted that, of those species recorded, six are listed as occurring within a Family (Families as in the Taxonomic classification system) of birds listed as migratory under the EPBC Act, these being:

- Pacific Black Duck (*Anas superciliosa*)
- Grey Teal (*Anas gracilis*)
- Chestnut Teal (*Anas castanea*)
- Hardhead (*Aythya australis*)
- Australian Wood Duck (*Chenonetta jubata*)
- Masked Lapwing (*Vanellus miles*).

Although listed as occurring within a Family of migratory birds, none of these are considered to be migratory within Australia. As such, no further assessment (i.e. giving consideration to the Significant Impact Guidelines provided in association with the EPBC Act for a migratory species) is required for these species.

Table 2: Fauna habitat assessment

TOPOGRAPHY				
Flat ✓	Gentle ✓	Moderate	Steep	Drop-offs
VEGETATION STRUCTURE				
Closed Forest	Open Forest	Woodland ✓	Heath	Grassland ✓
DISTURBANCE HISTORY				
Fire	Under-scrubbing ✓	Cut and fill works - Drainage culvert		
Tree clearing	Grazing ✓			
SOIL LANDSCAPE				
DEPTH:	Deep	Moderate ✓	Shallow	Skeletal
TYPE:	Clay ✓	Loam ✓	Sand	Organic
VALUE:	Surface foraging	Sub-surface foraging	Denning/burrowing ✓	
WATER RETENTION:	Well Drained ✓	Damp / Moist ✓	Water logged	Swamp / Soak
ROCK HABITAT				
CAVES:	Large	Small	Deep	Shallow
CREVICES:	Large	Small	Deep	Shallow
ESCARPMENTS:	Winter / late sunny aspects		Shaded winter / late aspects	
OUTCROPS:	High Surface Area Hides	Med. Surface Area Hides	Low Surface Area Hides	
SCATTERED / ISOLATED:	High Surface Area Hides	Med. Surface Area Hides	Low Surface Area Hides	
FEED RESOURCES				
FLOWERING TREES:	Eucalypts ✓	Corymbias ✓	Melaleucas	
	Banksias ✓	Acacias ✓		
SEEDING TREES:	Allocasuarinas ✓	Conifers		
WINTER FLOWERING EUCALYPTS:	*C. maculata*	*E. crebra*	*E. globoidea*	*E. sideroxylon*
	E. squamosa	*E. grandis*	*E. multicaulis*	*E. scias*
	E. robusta	*E. tereticornis*	*E. agglomerata*	*E. siderophloia*
FLOWERING PERIODS:	Autumn ✓	Winter	Spring ✓✓	Summer
OTHER:	Mistletoe ✓	Figs / Fruit	Sap / Manna ✓	Termites ✓
FOLIAGE PROTECTION				
UPPER STRATA:	Dense	Moderate	Sparse ✓	
MID STRATA:	Dense	Moderate	Sparse	
PLANT / SHRUB LAYER:	Dense	Moderate	Sparse ✓	
GROUNDCOVERS:	Dense	Moderate	Sparse ✓	
HOLLOWS / LOGS				
TREE HOLLOWS:	Large	Medium ✓	Small	
TREE HOLLOW TYPES	Spouts / branch ✓	Trunk ✓	Broken Trunk	Basal Cavities ✓	Stags ✓
GROUND HOLLOWS:	Large	Medium	Small	
VEGETATION DEBRIS				
FALLEN TREES:	Large	Medium	Small ✓	
FALLEN BRANCHES:	Large	Medium ✓	Small	
LITTER:	Deep	Moderate ✓	Shallow	
HUMUS:	Deep	Moderate ✓	Shallow	
DRAINAGE CATCHMENT				
WATER BODIES	Wetland(s)	Soak(s)	Dam(s) ✓	Drainage line(s)	Creek(s)	River(s)
RATE OF FLOW:	Still	Slow ✓	Rapid	
CONSISTENCY:	Permanent	Perennial	Ephemeral ✓	
RUNOFF SOURCE:	Urban / Industrial	Parkland	Grazing ✓	Natural ✓
RIPARIAN HABITAT:	High quality	Moderate quality ✓	Low quality	Poor quality

ARTIFICIAL HABITAT			
STRUCTURES:	Sheds	Infrastructure	Equipment
SUB-SURFACE	Pipe / culvert(s)	Tunnel(s)	Shaft(s)
FOREIGN MATERIALS:	Sheet	Pile / refuse	

6. Migratory species

A total of 13 migratory fauna species were identified in the EPBC Act Protected Matters Search Tool report as potentially occurring in the broader study area. Six species have a moderate potential to occur. The remaining species have either a low or unlikely potential to occur. These migratory species, along with their preferred habitat requirements and a preliminary assessment of their likely presence in the study area, are listed in Table 3.

Table 3: Potential occurrence of migratory species (EPBC Act)

Common name	Species	Status	Preferred habitat	Likelihood of occurrence at the construction footprint
Swift Parrot	*Lathamus discolour*	Endangered (BC Act and EPBC Act) Terrestrial	On the mainland they occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations. Favoured feed trees include winter flowering species such as Swamp Mahogany Eucalyptus robusta, Spotted Gum Corymbia maculata, Red Bloodwood C. gummifera, Mugga Ironbark E. sideroxylon, and White Box E. albens.	Low chance of occurring at forested sites throughout the study area. These habitats form part of the much larger habitat range
Black-faced Monarch	*Monarcha melanopsis*	Terrestrial, Migratory (Bonn)	Rainforests, eucalypt forests and coastal scrubs	Low chance of occurring at forested sites throughout the study area. These habitats form part of the much larger habitat range of the species.
White-bellied Sea Eagle	*Haliaeetus leucogaster*	Terrestrial, Migratory (CAMBA)	Predominantly ocean shores and estuaries, occasionally inland rivers and streams.	Low
White-throated Needletail	*Hirundapus caudacutus*	Terrestrial, Migratory (CAMBA, JAMBA)	An aerial foraging species which occupies a range of habitats from open modified landscapes to woodland and forest.	Low
Osprey	*Pandion haliaetus*	Vulnerable (BC Act) Marine,	Estuarine areas and rivers	Unlikely

Common name	Species	Status	Preferred habitat	Likelihood of occurrence at the construction footprint
		Migratory (Bonn)		
Rufus Fantail	*Rhipidura rufifrons*	Terrestrial, Migratory (Bonn)	Predominantly rainforest and forests	Low chance of occurring at forested sites throughout the corridor. These habitats form part of the much larger habitat range of the species.
Rainbow Bee-eater	*Merops ornatus*	Terrestrial, Migratory (JAMBA)	Predominantly woodland and timbered plains	Moderate, potential habitat for this species occurs in a diversity of habitats including remnant woodland and partially cleared agricultural areas provided there is a patchwork of small woodland remnants in the landscape. These habitats form part of the much larger habitat range of the species.
Painted Snipe	*Rostratula australis)*	Endangered (BC Act and EPBC Act) Wetland, Migratory (CAMBA)	Wetlands, reedlands, marshes and swamps	Unlikely
Cattle Egret	*Ardea ibis*	Wetland, Migratory (CAMBA, JAMBA)	Grasslands, woodlands and wetlands, and is not common in arid areas. It also uses pastures and croplands, especially where drainage is poor. Often seen with	Moderate, this species may forage over all open habitat types

Common name	Species	Status	Preferred habitat	Likelihood of occurrence at the construction footprint
			cattle.	particularly those with isolated paddock trees and small habitat patches.
Great Egret	*Ardea alba*	Wetland, Migratory (CAMBA, JAMBA)	Prefers shallow water, particularly when flowing, but may be seen on any watered area, including damp grasslands.	Moderate, potentially present in farm dams, wet meadows and riparian areas along the study area.
Fork-tailed Swift	*Apus pacificus*	Marine, Migratory (CAMBA, JAMBA, ROKAMBA)	The species breeds in Asia and migrate to Australia in the summer from which they spend their entire life-cycle on the wing, hunting, resting and sleeping.	Unlikely

As indicated in the significant impact guidelines (1.1 in DEWHA 2009), an action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will:

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

Given the lack of identified significant migratory bird habitat and the lack of large populations using the study location, it is considered that there will not be a significant impact on migratory species from the proposal.

7. Assessment of Ecological Impacts

This chapter evaluates if the proposed development will significantly impact on ecological processes and the conservation value of the subject site and neighbouring bushland areas, especially with respect to threatened biota and migratory fauna species, and their habitats, and on the ecological integrity of the landscape. It also recommends ways in which impacts can be minimised or avoided.

8.1 Vegetation removal

The vegetation occurring on site is locally common and not consistent with a threatened ecological community listed under NSW *Biodiversity Conservation Act 2016* and Commonwealth *EPBC Act 1999*.

Building envelope impacts

No vegetation removal is required. There is an existing dwelling on proposed Lot 2. The indicative envelope within proposed Lot 1 will be within an existing cleared area dominated by introduced vegetation.

Installation and service impacts

No vegetation removal is required. All lots will utilise existing driveways that have services already installed within it. These same service roots will be used for any future development as a result of the proposed subdivision. Any services trenching will not have a significant incursion upon critical tree protection zones and can be undertaken under the supervision of a suitably qualified and experienced AQF Level 5 Project Arborist prior to the release of the Subdivision Certificate.

Bushfire APZ impacts

The bushfire assessment report prepared by Harris Environmental dated states that the bushfire Asset Protection Zones (APZs) shall be as follows:

- The proposed Lot 1 and Lot 2 can be constructed to **BAL 29** as specified by AS3959 - 2018 Construction for Buildings in Bushfire Prone Areas, *PBP 2019* and/or *NASH Standard Steel Framed Construction in Bushfire Areas* (2014).
- A BAL 29 APZ for the proposed Lots 1 and 2 should be established from the commencement of building works and maintained for perpetuity for the following dimensions:

  • 29 m on the northern and eastern elevations;

  • 10 m on the southern and western elevations.

In terms of vegetation removal, only 2 trees require removal to establish the APZs on proposed Lot 2 (surrounding existing dwelling). These two (2) locally native trees comprise of 1 x *Eucalyptus eugenoides* and 1x *Eucalyptus sclerophylla.* They are not hollow bearing trees providing fauna habitat

and are not considered ecologically significant. The understorey is already maintained in a fuel reduced state. The remaining trees within the bushfire asset protection zone may require some maintenance pruning of limbs but the trees can be retained. These impacts are not considered ecologically significant.

Whilst hollow bearing trees do occur on the property, no hollow bearing trees or significant rocky habitat features are proposed for removal (refer to Figure 11 for location of hollow bearing trees).

No significant native trees belonging to the native vegetation community will be adversely impacted.

The access complies with provisions of Planning for Bushfire Protection 2021. To achieve such compliance, (widths and clearances), no additional vegetation needs to be removed for access.

In summary, the proposed development as shown in this attachment will not result in any vegetation being cleared within proposed Lot 1 but rather the pastureland to be managed.

In order to offset the proposed tree removal, approx. 1500 sqm of screen planting and nine additional individual trees using locally native species can be provided as a condition of consent. This would equate to over 300 trees proposed for re-planting. This would result in a net ecological benefit.

An assessment of significance ('5 part test') was undertaken in accordance with Section 7.3 of the *Biodiversity Conservation Act 2016* (BC Act) and Section 5.7 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The major conclusion arising from this Flora and Fauna Impact Assessment is that the proposed works are unlikely to result in a significant impact on any listed species or communities providing that the applicant actively implements the recommendations from this assessment. Therefore, in accordance with the EPA Act (1979) and BC Act (2016), a Biodiversity Assessment Report is not required.

8.2 Overall loss of terrestrial flora and fauna habitat

Biodiversity is the diversity and richness of living things. This includes the variety of plant communities and animal habitats, and the number of different species. Most natural areas support a complex mixture of different species and plant communities. Biodiversity in disturbed areas is generally lower than in more pristine areas. An awareness on native biodiversity emphasis the conservation of the variety of native life, rather just rare or threatened species.

There are three important principles associated with ESD. These are:

- maintenance of native biodiversity
- erring on the side of caution when assessing and taking risks with the biological environment; and
- passing on to future generations a natural environment that is at least as good and enjoyable as our own.
- many species of forest flora and fauna are threatened both nationally and within NSW. This is largely a result of the clearing of this native habitat.

The proposed development is unlikely to result in the loss of biodiversity at a local, regional, state or national level. This is because of the small area of bushland to be removed from the site, the highly degraded or modified habitat area to be developed, the unlikelihood of the status of threatened or regionally significant species being significantly placed at risk, and the broader distribution of other fauna and flora species.

8.3 Impacts on wildlife corridor

The native vegetation present on the subject site is likely to function as a stepping stone for the movement of mobile fauna such as birds, microchiropteran bats and megachiropteran bats, through the presence of inter connecting canopy connectivity of trees present within local residential backyards.

The proposal will not interrupt upper canopy connectivity nor would it significantly impact upon the movement of wildlife and genetic exchange and dispersal of plant pollen in the local ecosystem.

Within the study area woodland stands provide opportunities for the dispersal and movement of those native species recorded or expected to occur within the area investigated. The structure of the woodland would permit the movement of both gliding and flying species, whilst ground traversing animals would be able to easily negotiate both the woodland and cleared grassland. Beyond the subject site, a series of conservation reserves provide relatively continuous vegetated corridors.

These corridors provide connectivity north and east towards Yerriyong State Forest, east towards Corramy State Conservation Area, and south and south-east through to Conjola National Park and Jerrawangala State Forest. The connectivity of these corridors within the locality and wider region is important for the dispersal, movement, interbreeding and migratory needs of a number of native

species. Given the scope of the proposal, all of the animals currently traversing the study area's corridor are also expected to do so post-development. Resultant vegetation clearing is not considered to erect any additional barriers to the movement patterns of native animals. Similarly, the proposal is not considered to isolate or further fragment any of their habitat areas.

8.4 Impacts on migratory species

Under the EPBC Act, a migratory species is significantly impacted on if a proposal will or is likely to:

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

Significant habitat for migratory species does not exist on site.

8.5 Impacts on threatened species

No species listed under the NSW *Biodiversity Conservation Act 2016* and Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* were recorded on site. Threatened flora and fauna previous recorded within 10km of the site and have the potential to occur site have been considered in the table provided in Appendix A.

Assessments of Significance (known as 'five part tests') were undertaken for threatened species that may occasionally use the site as marginal foraging or roosting habitat, and may be indirectly impacted by the proposal (Appendix C). The assessments concluded the proposal would **not** have a significant impact upon the local population of threatened species.

8.6 Fauna of Conservation Significance

Commonwealth

Results from the Protected Matters Search Tool and the Atlas of NSW Wildlife database searches revealed a number of EPBC Act (1999) listed species that require consideration as part of this assessment (see Appendix A and B).

Of those species, the following have potential habitat within the subject site:

1. *Pteropus poliocephalus* Grey-Headed Flying-fox

State

The results of the Atlas of NSW Wildlife (NSW NPWS 2008) database search indicated that a number of threatened fauna species and population were recorded within 10 kilometres of the subject site (see Appendix A).

Of those threatened species, the following have realised or potential habitat within the subject site:

1. *Parvipsitta pusilla* Little Lorikeet (foraging)
2. *Pteropus poliocephalus* Grey-Headed Flying-fox (foraging)
3. *Mormopterus norfolkensis* Eastern Freetail-bat (foraging)
4. *Miniopterus schreibersii oceanensis* Eastern Bent-wing Bat (foraging)
5. *Saccolaimus flaviventris* Yellow-bellied Sheathtail-bat (foraging)
6. *Daphoenositta chrysoptera* Varied Sittella (foraging)
7. *Scoteanax rueppellii* Greater Broad-nosed bat (foraging)
8. *Falsistrellus tasmaniensis* Eastern False Pipistrelle (foraging)
9. *Chalinolobus dwyeri* Large-eared Pied Bat (foraging)
10. *Calyptorhynchus lathami* Glossy Black Cockatoo (foraging)
11. *Hieraaetus morphnoides* Little Eagle (foraging/ potential breeding);
12. *Cryptostylis hunteriana* Leafless Tongue Orchid

Five part tests have been completed for these listed species as a precautionary measure (Appendix C).

8.7 Impact on relevant key threatening processes

Key threatening processes listed under the BC Act, FM Act and EPBC Act and considered likely to be increased by the upgrade are listed in Table 3.

Key threatening processes identified as being impacted by the upgrade comprise those associated with habitat degradation including vegetation clearing, and fallen timber. Mitigation measures would be implemented to minimise the extent of vegetation clearing and habitat disturbance (refer to Section 9), and relocate important fauna habitats.

There is also potential for other key threatening processes to be increased e.g. weed invasion or introduction of pests and diseases.

Threatening process	Relevant legislation	Increased by the proposal?	Proposed mitigation
Habitat degradation			
Bushrock removal	BC Act	No	Section 9
Land clearance/Clearing of native vegetation	EPBC Act, BC Act	Yes	

Loss of hollow-bearing trees	BC Act	No	
Removal of dead wood and dead trees	BC Act	No	
Feral invertebrate fauna			
Competition from feral honey bees (*Apis mellifera*)	BC Act	No	Section 9
Feral vertebrate fauna			
Competition and land degradation by rabbits / Competition and grazing by the feral European rabbit (*Oryctolagus cuniculus*)	EPBC Act, BC Act	No	Section 9
Hydrology and riparian zones			
Alteration to the natural flow regimes of rivers and streamsand their floodplains and wetlands	BC Act	No	Section 9
The degradation of native riparian vegetation along NSW	FM Act	No	Section 9
Threatening process	Relevant legislation	Increased by the proposal?	Proposed mitigation
water courses			
Removal of large woody debris from NSW rivers and streams	FM Act	No	Section 9
Installation and operation of in-stream structures and other mechanisms that alter natural flow regimes of rivers and streams	FM Act	No	Section 9
Pathogens			
Dieback caused by the root-rot fungus (*Phytophthora cinnamomi*)/Infection of native plants by *Phytophthora cinnamomi*	EPBC Act, BC Act	No	Section 9
Weeds			
Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants	EPBC Act	No	Section 9
Invasion of native plant communities by exotic perennial grasses	BC Act	No	
Climate change			
Loss of terrestrial climatic habitat caused by anthropogenic emissions of greenhouse gases	EPBC Act	No	N/A
Anthropogenic climate change	BC Act	No	N/A

8. Environmental Protection Measures

The current proposal is to be carried out in accordance with all policies, operational procedures and guidelines in place as part of consent conditions issued by Shoalhaven Council LGA relating to environmental management.

Based on the principles of Ecologically Sustainable Development, as identified in Schedule 2 of the Environmental Planning and Assessment Regulation, the following recommendations are provided:

- This report has been prepared on the basis that all hollow-bearing trees are to be retained. Should any hollow-bearing trees be removed, the significance impact assessments undertaken in this report MUST be reviewed.
- The location of all hollow-bearing trees should be clearly marked on a plan and provided to the works contractor. These trees should be fenced off during construction, fencing being placed at the outer drip line of the plant (this minimising root disturbance).
- Landscape work carried out post-development should include a suite of locally occurring native species, including Black She-Oak (Allocasuarina littoralis) and Swamp She-Oak (Casuarina glauca) to meet with the foraging requirements of the Glossy Black Cockatoo.
- Regeneration/rehabilitation areas should be fenced to prevent livestock from grazing, trampling and compacting the soil within these sites.

1) Vegetation protection fencing

A protection zone is to be provided for all areas of native vegetation to be retained during construction.

The following activities shall not be conducted outside the dwelling footprint area:

- Ripping, cultivation, trenching or mechanical removal of vegetation or earth
- The placement of fill
- Movement, stockpiling or storage of plant, materials, waste, equipment or vehicles
- Any activity likely to damage the trunk, crown or root system of the protected vegetation

2) Tree removal and protection

Removed trees should be mulched and re-used on site. The applicant has endeavoured to remain as many native trees as possible.

All works (including driveways and retaining walls) within the tree protection zone of any trees required to be retained (whether or not on the land the subject of this consent), must be carried out under the supervision of an 'AQF Level 5 Arborist' or equivalent and a certificate submitted to the principal certifying authority detailing the method(s) used to preserve the tree(s). No excavation,

filling or stockpiling of building materials is to occur within the tree protection zone of any tree to be retained.

3) Erosion and Sediment Control

All erosion and sediment controls (i.e. geotextile sediment fence and straw bales) shall be in place before any works begin. Techniques used for erosion and sediment control on building sites are to be adequately maintained at all times and must be installed in accordance with Council and EPA/OEH guidelines. All techniques shall remain in proper operation until all development activities have been completed and the site fully stabilised. This condition must be complied with during building work.

4) Sensitive excavation around critical root zones

Any construction for essential stormwater/ sewerage infrastructure shall be undertaken under the supervision of an 'AQF Level 5 Arborist' or equivalent to minimise damage of critical root zones of trees proposed for retention.

5) Prevent Spread of Weed and Pathogens

To prevent the spread of weeds and fungal pathogens such as Cinnamon Fungus (*Phytophthora cinnamomi*) and Chytrid Fungus (*Batrachochytrium dendrobatidis*), all machinery shall be cleaned of soil and debris before entering the subject site.

6) General Environmental Management

The site must be managed in accordance with the *Protection of the Environment Operations Act 1997* by way of implementing appropriate measures to prevent sediment run-off, excessive dust, noise or odour emanating from the site during the construction of the development.

9. Conclusion

Based on the detailed field survey and information provided in this report it is concluded that:

(a) No threatened flora or fauna species listed within the *BC Act (2016)* or the *EPBC Act (1999)* were observed during surveys;

(b) The impact on threatened species including Koala are considered minimal.

(c) No migratory species listed within the EPBC Act (1999), were observed within the subject site.

(d) Assessments of significance ('5 part test') were undertaken in accordance with Section 7.3 of the Biodiversity Conservation Act 2016 (BC Act) and Section 5.7 of the Environmental Planning and Assessment Act 1979 (EP&A Act). It was concluded that the proposal is unlikely to have a significant impact on species, populations and communities listed under the New South Wales Biodiversity Conservation Act 2016 and Commonwealth Environment Protection Biodiversity Conservation Act 1999.

(e) A referral to the Australian Government Department of the Environment is not likely to be required as it was determined that the proposal would not have a significant impact on nationally listed threatened or migratory species listed under the EPBC Act (1999).

(f) A Biodiversity Assessment Report is not required for the proposed development. The proposed development is not likely to have a significant effect on threatened species, populations or ecological communities or their habitats listed under the BC Act (2016).

(g) In order to offset the proposed tree removal, approx. 1500 sqm of screen planting and nine additional individual trees using locally native species is proposed. This would equate to over 300 trees proposed as a condition of consent at a later date. This would result in a net ecological benefit to offset the two trees proposed for removal.

10. References

Auld, R.A & Medd, R.W 19897. Weeds – an illustrated guide the weeds of Australia. Inkata Press Melbourne

ARBOR 1996. Garden plants that go feral in the Sydney Bushland, Sydney.

Australian Museum (2005) Birds in Backyards. http://birdsinbackyards.net/finder

Chapman and Murphy (1989) Soil Landscapes of the Penrith 1:100,000 Sheet. Soil Conservation Service of NSW, Sydney

Barker, J., Grigg, G. C., and Tyler, M. J. (1995) A Field Guide to Australian Frogs. Surrey Beatty & Sons, Chipping Norton

Benson, D.H. and Howell, J. (1990) Taken for Granted: The Bushland of Sydney and Its Suburbs. Kangaroo Press, Sydney

Benson, D.H. and Howell, J. (1994) The Natural Vegetation of the Sydney 1:100,000 Map Sheet. Cunninghamia 3(4):679-788

Benson, D.H. and Howell, J. (2000) Sydney's Bushland — More than Meets the Eye. Royal Botanic Gardens, Sydney

Benson, D.H., Howell J. and McDougall, L. (1996) Mountain devil to mangrove. Royal Botanic Gardens, Sydney

Beruldsen G (1980) Field Guide to Nests and Eggs of Australian Birds. Rigby: Adelaide

Blakers, M., Davies, S.J.J.F. and Reilly, P.N. (1984) The Atlas of Australian Birds. Globe Press Pty Ltd, Australia

Botanic Gardens Trust (2010) NSW Flora Online (http://plantnet.rbgsyd.nsw.gov.au) . Accessed March 2010

Benson, D and Howell, J., Cunninghamia Volume 3 (4), National Herbarium of NSW, Royal Botanic Gardens Sydney 1994.

Benson, D. and Howell, J. (1994) The natural vegetation of the Sydney 1:100 000 map sheet Cunninghamia 3(4):677-995.

Buchanan, R. 1989. Bush Regeneration. TAFE Publications.

Bureau of Meterology 2010. Climate Averages Sydney Metropolitan Area, Sydney

Churchill, S. (1998) Australian Bats. Reed New Holland, Sydney Australia

Cogger, H. G. (2000) Reptiles and Amphibians of Australia. Reed New Holland, Sydney

Department of Environment and Conservation 2005. Restoring bushland on the Cumberland Plain: Best practice guidelines for the management and restoration of bushland. Department of Environment an4d Conservation. Sydney.

Department of the Environment, Water, Heritage and the Arts 2010. Weeds of National Significance. Canberra ACT.

Department of Environment and Heritage (2006) EPBC Act Policy Statement 1.1 Significant Impact Guidelines Matters of National Environmental Significance. Commonwealth of Australia

Duncan, A., Baker, G.B., and Montgomery, N. (eds) (1999) The Action Plan for Australian Bats. Environment Australia, Canberra

Department of Environment, Water, Heritage and the Arts (DATE) Environmental Protection and Biodiversity Conservation Act 1999 – Protected Matters Search Tool [http://deh.gov.au/cgi_bin/erin/ert/epbc] accessed October 2011

Fairley, A. (2004) Seldom Seen - Rare Plants of Greater Sydney. Reed New Holland:Sydney

Fairley, A. and Moore, P. (2002) Native Plants of the Sydney District. Revised edition. Kangaroo Press:Sydney

Flegg, J. (2002) photographic Field Guide – Birds of Australia. Second Edition. Reed New Holland.Sydney.

Fairley, A. Moore, P; Native Plants of the Sydney District and identification guide: New Holland Sydney 2002

Garnett S., and Crowley, G. (2000) The Action Plan for Australian Birds. National Heritage Trust.

Gibbons, P. and Lindenmayer, D. (2000) Tree Hollows and Wildlife Conservation in Australia. CSIRO Publishing: Canberra

Harden, G. (1990) (ed) Flora of New South Wales Vol. 1 NSW University Press

Harden, G. (1991) (ed) Flora of New South Wales Vol. 2 NSW University Press

Harden, G. (1992) (ed) Flora of New South Wales Vol. 3 NSW University Press

Harden, G. (1993) (ed) Flora of New South Wales Vol. 4 NSW University Press

Harden, G. J. (2000) (ed.) Flora of New South Wales Vol. 1. UNSW Press, Kensington, NSW.

Hindell, M.A. and Lee, A.K. 1990. Tree preferences of the koala In: Lee, A.K., Handasyde, K.A. and Sanson, G.D. (eds) Biology of the Koala. Surrey Beatty and Sons, Sydney

Hollands, D. (2003) Eagles, Hawks and Falcons of Australia. Bloomings Books, Melbourne

Kavanagh, R.P. and Peake, P. (1993) Survey procedures for nocturnal forest birds: an evaluation of the variability in census results due to temporal factors, weather and technique. Pp. 86-100 in Australian Raptor Studies, ed. by P. Olsen. Royal Australasian Ornithologists Union, Melbourne

Matheney, N.P and Clark, J.R Trees and Development: A technical guide to preservation of trees during land development. International Society of Arboriculture 1998

Menkhorst, P and Knight, F. (2001) A Field Guide to the Mammals of Australia. Oxford University Press, Melbourne Australia

Menkhorst, P. W. (1995) Eastern Pygmy-possum (pp101-102) in Menkhorst, P. W, (ed.) Mammals of Victoria: distribution, ecology and conservation. Oxford University Press, Melbourne.

NPWS Native Vegetation of the Cumberland Plain Map 1 to 16; NPWS Sydney 2002

NSW Department Infrastructure Planning and Natural Resources 2007. *Guidelines for the preparation of Vegetation Management Plans*, Parramatta.

NSW Rural Fire Service (2006) Planning for Bushfire Protection A Guide for Councils, Planners, Fire Authorities, Developers and Homeowners NSW Rural Fire Service, Sydney.

NSW Department of Environment, Climate Change and Water (2010) Threatened Species Profiles (http://www.threatenedspecies.environment.nsw.gov.au). Accessed 5th March 2010.

NSW National Parks and Wildlife Service (1997) Urban Bushland Biodiversity Survey. Native Flora of Western Sydney. NSW NPWS, Hurstville

NSW National Parks and Wildlife Service (1997) Urban Bushland Biodiversity Survey. Stage 1: Western Sydney. NSW NPWS, Hurstville

NSW National Parks and Wildlife Service (2002) Native Vegetation of the Cumberland Plain - Final Edition. NPWS, Sydney

NSW National Parks and Wildlife Service (2010) Wildlife Atlas website [http://wildlifeatlas.nationalparks.nsw.gov.au/wildlifeatlas/watlas.jsp] accessed March 2010

Pennay, M., Law, B. and Reinhold, L. (2004) Bat calls of NSW: Region based guide to the echolocation calls of Microchiropteran bats. NSW Department of Environment and Conservation, Hurstville.

Pizzey, G. and Knight, F. (1997) Field Guide to the Birds of Australia. Harper Collins Publishers, Hong Kong

Robinson, L. Field Guide to the Native Plants of Sydney; Kangaroo Press, Sydney 2004

Robinson, M. (1993) A Field Guide to Frogs of Australia. Australian Museum / Reed

Rural Fire Service of NSW (2006) Planning for Bushfire Protection. RFS of NSW in co-operation with the NSW Department of Planning

Simpson, K., and Day, N. (1999) Field Guide to the Birds of Australia. Sixth Edition. Penguin Books, Australia

Slater, P., Slater, P. and Slater, R. (1995) The Slater Field Guide to Australian Birds. Lansdowne Publishing, Australia

Strahan, R. (1995) A Photographic Guide to Mammals of Australia. New Holland, Sydney Australia

Swan, G. (1990) A Field Guide to the Snakes and Lizards of New South Wales. Three Sisters Productions, Winmalee NSW

Swan, G., Shea, G., and Sadlier, R. (2004) A Field Guide to Reptiles of New South Wales. Reed New Holland, Sydney

Tame, T. (1992) Acacias of South East Australia. Kangaroo Press Pty Ltd, Kenthurst

Tozer, M.G., Turner, K., Simpson, C., Keith, D.A., Beukers, P., MacKenzie, B., Tindall, D. and Pennay, C. (in press) Native vegetation of southeast NSW: a revised classification and map for the coast and eastern tablelands. Version 1.0. Cunninghamia 11

Tozer, M.G. (2003) The native vegetation of the Cumberland Plain, western Sydney: systematic classification and field identification of communities. Cunninghamia 8(1):1-75

Triggs, B. (1996) Tracks, Scats and Other Traces: A Field Guide to Australian Mammals. Oxford University Press:Melbourne

Tozer, M. (2003) The Native Vegetation of the Cumberland Plain, western Sydney: Systematic classification and field identification of communities Cunninghamia 8(1):1-75

Wilson, S.K. and Knowles, D.G. (1988) Australia's Reptiles – A Photographic Reference to the Terrestrial Reptiles of Australia. Collins Publishers, Australia

Wrigley, J.W Fagg, M.A Australian Native Plants Cultivation, Use in Landscaping and Propagation; Kangaroo Press, Sydney 2003

Native vegetation of southeast NSW: a revised classification and map for the coast and eastern tablelands (Tozer, *et al*. for DECCW 2006/2010).

APPENDIX A: Threatened species previously recorded within 10km of the site

Appendix A. Threatened flora and fauna species previously recorded in the study region and their likelihood of occurrence to occur as a resident population within the study area

Key
V – Vulnerable E – Endangered EP –endangered population CE - Critically Endangered M – Migratory
Ma- Marine

Notes
A State or nationally listed threatened species is considered to have a:

- **High** likelihood of occurrence if it has been recorded within 10 km of the subject site and suitable habitat for this species is present within the subject site.
- **Moderate** likelihood of occurrence if they have a predicted occurrence (via the EPBC Act PMST or OEH geographic search) and there is suitable habitat present.
- **Low** likelihood of occurrence if suitable habitat for an animal is not present regardless of whether they have been recorded within 10 km, or have a predicted occurrence.

Species underlined are those which the PMST (DE 2016a) predicted as occurring or are likely to have habitat within 10 km of the study area.

* - habitat requirements were generally extracted from Harden (1992-2002), Stephenson (2011), Frith (2007), Churchill (2008), Cogger (2014), Van Dyck and Strahan (2008), DEE (2016b) and OEH (2016b), with other references used being identified in the bibliography.

Common Name	Legislation		Primary habitat requirements	Likelihood of Occurrence	Significance assessment undertaken
	EPBC Act	BC Act			
PLANTS					
Albatross Mallee *Eucalyptus langleyi*	V	V, EP	Occurs north of the Shoalhaven River in the Shoalhaven LGA. Occurs on skeletal soils on rocky sloping Nowra Sandstone outcrops along Bomaderry Creek. The endangered population occurs around 30-40 m ASL whilst the general *E. langleyi* population occurs between 130 and 255 m ASL. Occurs as a midstorey species in woodland dominated by Grey Gum (*E. punctata*), but sometimes with Spotted Gum (*Corymbia maculata*) present.	Low. Habitat absent.	No
Ettrema Mallee *Eucalyptus sturgissiana*		V	Mostly restricted to the Northern Budawang Range in Morton National Park. Usually grows as an emergent in low shrub-heath, on sandy, swampy soils.	Low. Habitat absent.	No

Common Name	Legislation		Primary habitat requirements	Likelihood of Occurrence	Significance assessment undertaken
	EPBC Act	BC Act			
Biconvex Paperbark *Melaleuca biconvexa*	V	V	Scattered and dispersed populations of this species are found between Jervis Bay and Port Macquarie. It occurs in damp places, often near streams or low-lying areas on alluvial soils of low slopes or sheltered aspects.	Low. Whilst recorded by Council, targeted searches did not detect any individuals.	No
Leafless Tongue Orchid *Cryptostylis hunteriana*	V	V	Occurs in a range of communities, including swamp-heath and woodland. Larger populations typically occur in woodland dominated by Scribbly Gum (*Eucalyptus sclerophylla*), Silvertop Ash (*E. sieberi*), Red Bloodwood (*Corymbia gummifera*) and Black She-Oak (*Allocasuarina littoralis*). Flowers November to February.	High. Habitat present.	**Yes**
Thick-lipped Spider-orchid *Caladenia tessellata*	V	E	Generally found in grassy sclerophyll woodland on clay loam or sandy soils, though the population near Braidwood is in low woodland with stony soil. Also open heathland habitat. Flowers September to November.	Low. Habitat absent.	No
East Lynne Midge-orchid *Genoplesium vernale*	V	V	Currently known from only a narrow belt, around 12 km wide, of predominantly Dry Sclerophyll Forest from 17 km south of Batemans Bay to 24 km north of Ulladulla. Grows in 'poorer' dry sclerophyll woodland and forest on the south coast of NSW between Mogo and Ulladulla. It is confined to areas with good drainage and shallow, low fertility soils. Flowers September to December.	Low. Habitat absent.	No
Jervis Bay Leek Orchid *Prasophyllum affine*	E	E	Currently known from three areas south-east of Nowra on South Coast. These are Kinghorne Point, Wowly Gully near the town of Callala Bay, and near the township of Vincentia. Grows on poorly drained grey clay soils that support low heathland and sedgeland communities. Flowers November to December.	Low. Habitat absent.	No
Solanum celatum		E	Restricted to an area from Wollongong to just south of Nowra, and west to Bungonia. Grows in rainforest clearings, or in wet sclerophyll forests.	Low. Habitat absent.	No
Bauer's Midge Orchid *Genoplesium baueri*	E	E	Grows in dry sclerophyll forest and moss gardens over sandstone. Flowers February to March.	Moderate.	No
Eastern Underground Orchid *Rhizanthella slateri*	E	V	Habitat requirements are poorly understood and no particular vegetation type has been associated with the species, although it is known to occur in sclerophyll forest. Flowers October to November.	Moderate.	No
Villous Mintbush *Prostanthera densa*	V	V	Villous Mintbush generally grows in sclerophyll forest and shrubland on coastal headlands and near coastal ranges, chiefly on sandstone, and rocky slopes near the sea.	Low. Habitat absent.	No

Common Name	Legislation		Primary habitat requirements	Likelihood of Occurrence	Significance assessment undertaken
	EPBC Act	BC Act			
Illawarra Greenhood *Pterostylis gibbosa*	E	E	All known populations grow in open forest or woodland, on flat or gently sloping land with poor drainage. Near Nowra, the species grows in an open forest of Spotted Gum (*Corymbia maculata*), Forest Red Gum and Grey Ironbark (*E. paniculata*). Flowers September to October.	Low. Habitat absent.	No
Halbury Rustyhood *Pterostylis vernalis*	CE	CE	Only known from the Nowra area on the NSW south coast. There are five known populations located to the west and south-west of Nowra. Grows in open sites in shallow soil over sandstone sheets, in heath and heathy forest. Flowers September to October.	Low. Habitat absent.	No
Magenta Lilly Pilly *Syzygium paniculatum*	V	E	On the south coast the Magenta Lilly Pilly occurs on grey soils over sandstone, restricted mainly to remnant stands of littoral (coastal) rainforest.	Low. Habitat absent.	No
Kangaloon Sun Orchid *Thelymitra kangaloonica*	CE	CE	Only known from the southern tablelands of NSW in the Moss Vale / Kangaloon / Fitzroy Falls area where it occurs in swamps in sedgelands. late October and early November.	Low. Habitat absent.	No
Austral Toadflax *Thesium australe*	V	V	Occurs in grassland on coastal headlands or grassland and grassy woodland away from the coast.	Low. Habitat absent.	No
Nowra Heath-myrtle *Triplarina nowraensis*	E	E	There are five known populations of Nowra Heath Myrtle. Three of these form a cluster to the immediate west of Nowra. A fourth, much smaller population is found 18km south-west of Nowra in the Boolijong Creek Valley. The fifth population is located north of the Shoalhaven River on the plateau above Bundanon. Occurs on poorly drained, gently sloping sandstone shelves or along creek lines underlain by Nowra Sandstone.	Low. Habitat absent.	No
MAMMALS					
Spotted-tailed Quoll *Dasyurus maculatus*	E	V	Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline.	Low. No suitable habitat present.	No
Southern Brown Bandicoot *Isoodon obesulus obesulus*	E	E	Southern Brown Bandicoots are largely crepuscular (active mainly after dusk and/or before dawn). They are generally only found in heath or open forest with a heathy understorey on sandy or friable soils.	Low. No suitable habitat present.	No
Long-nosed Potoroo *Potorous tridactylus*	V	V	Inhabits coastal heath and dry and wet sclerophyll forests with dense cover which provides diurnal sheltering sites and protection from predators, whilst foraging in adjacent, open areas.	Low. No suitable habitat present.	No
Koala *Phascolarctos cinereus*	V	V	Open eucalypt forest and woodland, containing a variety of 'preferred' food tree species.	Low. No suitable habitat present.	No

Common Name	Legislation		Primary habitat requirements	Likelihood of Occurrence	Significance assessment undertaken
	EPBC Act	TSC Act			
Eastern Pygmy-possum *Cercartetus nanus*		V	Found in a broad range of habitats from rainforest through sclerophyll forest and woodland to heath, except in north-eastern NSW where they are most frequently encountered in rainforest. Feeds largely on nectar and pollen collected from banksias, eucalypts and bottlebrushes.	Low. No suitable habitat present.	No
Brush-tailed Rock-wallaby *Petrogale penicillata*	V	E	Habitats containing numerous ledges, caves and crevices are favoured by this species.	Low. No suitable habitat present.	No
Yellow-bellied Glider *Petaurus australis*		V	Occur in tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils.	Low. No suitable habitat present.	No
Grey-headed Flying-fox *Pteropus poliocephalus*	V	V	Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops.	Species recorded.	**Yes** Refer to Appendix 5
Large-eared Pied Bat *Chalinolobus dwyeri*	V	V	Cave-roosting bat that forages in timbered woodland and dry sclerophyll forest.	Low. No suitable habitat present.	No.
Greater Broad-nosed Bat *Scoteanax rueppellii*		V	Utilises a variety of habitats from woodland through to moist and dry eucalypt forest and rainforest, though it is most commonly found in tall wet forest. Although this species usually roosts in tree hollows, it has also been found in buildings.	Species recorded.	**Yes** Refer to Appendix 5
Eastern Bentwing Bat *Miniopterus* (*schreibersii*) *orianae oceanensis*		V	Cave-roosting bat that forages in well-timbered habitats and open grasslands.	Species recorded.	No
East-coast Freetail Ba *Micronomus norfolkensis*		V	Hollow-roosting bat that forages in dry eucalypt forests and woodlands.	Species recorded.	**Yes** Refer to Appendix 5
New Holland Mouse *Pseudomys novaehollandiae*	V		Open heathland, open woodland with a heathland understorey and vegetated sand dunes.	Low. No suitable habitat present.	No
BIRDS					
White-throated Needletail *Hirundapus caudacutus*	M		Almost exclusively aerial. Takes insects on wing over a range of habitat types. Recorded most often above wooded areas, including open forest and rainforest.	Moderate. Recorded during past investigation. Potential to fly across project area.	No
Fork-tailed Swift *Apus pacificus*	M		Almost exclusively aerial. Takes insects on wing over a range of habitat types, but also less then 1 m above open areas or over water. Mostly occur over inland plains but sometimes above foothills or in	Moderate. Potential to fly across project area.	No

Common Name	Legislation		Primary habitat requirements	Likelihood of Occurrence	Significance assessment undertaken
	EPBC Act	BC Act			
			coastal areas.		
Bar-tailed Godwit *Limosa lapponica*	M		Found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bay.	Low. No suitable habitat present.	No
Common Greenshank *Tringa nebularia*	M		Found in a wide variety of inland wetlands and sheltered coastal habitats of varying salinity.	Low. No suitable habitat present.	No
Eastern Osprey *Pandion cristatus*	M	V	A fish eating raptor, the Osprey inhabits mainly coastline areas. Nests are usually constructed in a large, dead tree, though rocky outcrops and artificial structures are also known to be used.	Low. No suitable habitat present.	No.
Little Eagle *Hieraaetus morphnoides*		V	Inhabits open woodlands, open eucalypt forests, grasslands and arid regions that are rich in prey species, shunning dense forest.	Moderate. Recorded during past investigation. Potential to fly across project area.	No
Australian Painted Snipe *Rostratula australis*	E	E	Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber.	Moderate. Potential habitat present.	**Yes**
Latham's Snipe *Gallinago hardwickii*	M		Wet, treeless, tussocky grasslands, short grasses and/or marshes along freshwater streams and channels, though it can also be found in any vegetation around freshwater wetlands, in sedges, grasses, lignum, reeds and rushes, saltmarshes, creek edges, crops and pastures.	Moderate. Potential habitat present.	**Yes**
Gang-gang Cockatoo *Callocephalon fimbriatum*		V	Prefers tall montane forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests during summer, these being at higher altitudes. In winter, occurs at lower altitudes in drier, more open eucalypt forests and woodlands, or in dry forest in coastal areas.	Low. Habitat not present.	No
Glossy Black-cockatoo *Calyptorhynchus lathami*		V	Inhabits eucalypt woodland and feeds almost exclusively on Casuarina fruits.	Species recorded.	**Yes** Refer to Appendix 5
Little Lorikeet *Glossopsitta pusilla*		V	Forages primarily in the open Eucalypt forest and woodland canopies, particularly along water courses; occasionally in Angophoras, Melaleucas and other tree species, also riparian habitats are used. They eat pollen, nectar, blossums, native and cultivated fruits and seeds.	High. Potential roosting habitat present.	**Yes**

Common Name	Legislation		Primary habitat requirements	Likelihood of Occurrence	Significance assessment undertaken
	EPBC Act	BC Act			
Swift Parrot *Lathamus discolor*	E	E	Eucalypt forests. When over-wintering on the mainland, this species is dependent on winter-flowering eucalypt species.	Low. Habitat not present.	No
Orange-bellied Parrot *Neophema chrysogaster*	CE	CE	Spends winter mostly within 3 km of the coast in sheltered coastal habitats including bays, lagoons, estuaries, coastal dunes and saltmarshes.	Low. Habitat not present.	No
Oriental Cuckoo *Cuculus optatus*	M		Mainly inhabiting forests; occurs in mixed, deciduous and coniferous forest.	Low. Habitat not present.	No
Powerful Owl *Ninox strenua*		V	Large tracts of open or closed sclerophyll forest or woodlands but can occur in fragmented landscapes as well. Gullies consisting of wet to dry sclerophyll forest with a dense understorey.	Low. Habitat not present.	No
Masked Owl *Tyto novaehollandiae*		V	Open forest with a sparse mid-storey layer, but with patches of dense low ground cover.	Low. Habitat not present.	No
Sooty Owl *Tyto tenebricosa*		V	Occurs in rainforest, including dry rainforest, subtropical and warm temperate rainforest, as well as moist eucalypt forests.	Low. No suitable habitat present.	No
Eastern Bristlebird *Dasyornis brachypterus*	E	E	Dense, low vegetation including heath and open woodland with a heath understorey.	Low. No suitable habitat present.	No
Regent Honeyeater *Anthochaera phrygia*	CE	CE	Mainly inhabits temperate woodlands and open forests of the inland slopes of south-east Australia. These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes.	Low. No suitable habitat present.	No
Rufous Fantail *Rhipidura rufifrons*	M		Mainly inhabits wet sclerophyll forests, often in gullies dominated by eucalypts.	Low. No suitable habitat present.	No
Satin Flycatcher *Myiagra cyanoleuca*	M		Mainly inhabit eucalypt forests, often near wetlands or watercourses.	Low. No suitable habitat present.	No
Black-faced Monarch *Monarcha melanopsis*	M		Rainforest and wet eucalypt forest.	Low. No suitable habitat present.	No
Spectacled Monarch *Monacrha trivirgatus*	M		Rainforest, mangroves and moist gloomy gullies of dense eucalypt forest.	Low. No suitable habitat present.	No

Common Name	Legislation		Primary habitat requirements	Likelihood of Occurrence	Significance assessment undertaken
	EPBC Act	TSC Act			
REPTILES					
Rosenberg's Goanna *Varanus rosenbergi*		V	Found in heath, open forest and woodland.	Low. No suitable habitat present.	No
Broad-headed Snake *Hoplocephalus bungaroides*	V	E	Shelters in rock crevices and under flat sandstone rocks on exposed cliff edges.	Low. No suitable habitat present.	No
AMPHIBIANS					
Giant Burrowing Frog *Heleioporus australiacus*	V	V	Mostly restricted to areas of Hawkesbury Sandstone. This frog has a marked preference for sandstone ridge top habitat and broader upland valleys that run through heathland and woodland. Lives in small semi-permanent to slightly flowing streams.	Low. No suitable habitat present.	No
Littlejohn's Tree Frog *Litoria littlejohni*	V	V	This species breeds in the upper reaches of permanent streams and in perched swamps. Non-breeding habitat is heath based forests and woodlands where it shelters under leaf litter and low vegetation.	Low. No suitable habitat present.	No
Stuttering Frog *Mixophyes balbus*	V	E	Typically found in association with permanent streams through temperate and sub-tropical rainforest and wet sclerophyll forest, and also in moist gullies in dry forest.	Low. No suitable habitat present.	No
Green and Golden Bell Frog *Litoria aurea*	V	E	Inhabits a variety of environments, including disturbed sites, ephemeral ponds, wetlands, marshes, dams and stream-sides, particularly those that contain one or more of the following aquatic plants: bullrush (*Typha* spp.), spikerush (*Eleocharis* spp.), *Juncus kraussii*, *Schoenoplectus littoralis* and *Sporobolus virginicus.*	Low. No suitable habitat present.	No

APPENDIX B: EPBC Online Protected Matters Search Tool Results

The following report was generated in March 2024.

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 23-Mar-2023

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	6
Listed Threatened Species:	61
Listed Migratory Species:	19

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	3
Commonwealth Heritage Places:	None
Listed Marine Species:	27
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	5
Regional Forest Agreements:	1
Nationally Important Wetlands:	1
EPBC Act Referrals:	5
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	1
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community	Endangered	Community likely to occur within area	In feature area
Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland	Endangered	Community likely to occur within area	In feature area
Illawarra and south coast lowland forest and woodland ecological community	Critically Endangered	Community likely to occur within area	In feature area
River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria	Critically Endangered	Community likely to occur within area	In feature area
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area	In buffer area only
Upland Basalt Eucalypt Forests of the Sydney Basin Bioregion	Endangered	Community may occur within area	In buffer area only

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area	In buffer area only
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Callocephalon fimbriatum Gang-gang Cockatoo [768]	Endangered	Species or species habitat known to occur within area	In feature area
Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo [67036]	Vulnerable	Species or species habitat known to occur within area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Dasyornis brachypterus Eastern Bristlebird [533]	Endangered	Species or species habitat known to occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area	In feature area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Limosa lapponica baueri Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Species or species habitat may occur within area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Pycnoptilus floccosus Pilotbird [525]	Vulnerable	Species or species habitat known to occur within area	In feature area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	In feature area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thinornis cucullatus cucullatus Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
FISH			
Macquaria australasica Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area	In buffer area only
Prototroctes maraena Australian Grayling [26179]	Vulnerable	Species or species habitat may occur within area	In feature area
FROG			
Heleioporus australiacus Giant Burrowing Frog [1973]	Vulnerable	Species or species habitat known to occur within area	In feature area
Litoria aurea Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat known to occur within area	In feature area
Litoria watsoni Watson's Tree Frog [91509]	Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Mixophyes balbus](#)			
Stuttering Frog, Southern Barred Frog (in Victoria) [1942]	Vulnerable	Species or species habitat may occur within area	In feature area
MAMMAL			
[Chalinolobus dwyeri](#)			
Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Dasyurus maculatus maculatus (SE mainland population)](#)			
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area	In feature area
[Isoodon obesulus obesulus](#)			
Southern Brown Bandicoot (eastern), Southern Brown Bandicoot (south-eastern) [68050]	Endangered	Species or species habitat known to occur within area	In feature area
[Notamacropus parma](#)			
Parma Wallaby [89289]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Petauroides volans](#)			
Greater Glider (southern and central) [254]	Endangered	Species or species habitat known to occur within area	In feature area
[Petaurus australis australis](#)			
Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Petrogale penicillata](#)			
Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)](#)			
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat known to occur within area	In feature area
[Potorous tridactylus trisulcatus](#)			
Long-nosed Potoroo (southern mainland) [86367]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Pseudomys novaehollandiae](#)			
New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Pteropus poliocephalus](#) Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area	In feature area
PLANT			
[Acacia bynoeana](#) Bynoe's Wattle, Tiny Wattle [8575]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Baloskion longipes](#) Dense Cord-rush [68511]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
[Caladenia tessellata](#) Thick-lipped Spider-orchid, Daddy Long-legs [2119]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Calochilus pulchellus](#) Pretty Beard Orchid, Pretty Beard-orchid [84677]	Endangered	Species or species habitat likely to occur within area	In feature area
[Corunastylis vernalis listed as Genoplesium vernale](#) East Lynne Midge-orchid [78699]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
[Cryptostylis hunteriana](#) Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Cynanchum elegans](#) White-flowered Wax Plant [12533]	Endangered	Species or species habitat likely to occur within area	In feature area
[Eucalyptus langleyi](#) Albatross Mallee, Green Mallee Ash [56224]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Genoplesium baueri](#) Yellow Gnat-orchid, Bauer's Midge Orchid, Brittle Midge Orchid [7528]	Endangered	Species or species habitat known to occur within area	In feature area
[Melaleuca biconvexa](#) Biconvex Paperbark [5583]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Persicaria elatior Knotweed, Tall Knotweed [5831]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Pomaderris brunnea Rufous Pomaderris, Brown Pomaderris [16845]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Pomaderris cotoneaster Cotoneaster Pomaderris [2043]	Endangered	Species or species habitat may occur within area	In buffer area only
Prasophyllum affine Jervis Bay Leek Orchid, Culburra Leek-orchid, Kinghorn Point Leek-orchid [2210]	Endangered	Species or species habitat known to occur within area	In buffer area only
Prostanthera densa Villous Mintbush [12233]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Pterostylis gibbosa Illawarra Greenhood, Rufa Greenhood, Pouched Greenhood [4562]	Endangered	Species or species habitat likely to occur within area	In feature area
Pterostylis vernalis Halbury Rustyhood [84711]	Critically Endangered	Species or species habitat known to occur within area	In buffer area only
Rhizanthella slateri Eastern Underground Orchid [11768]	Endangered	Species or species habitat likely to occur within area	In feature area
Rhodamnia rubescens Scrub Turpentine, Brown Malletwood [15763]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Syzygium paniculatum Magenta Lilly Pilly, Magenta Cherry, Daguba, Scrub Cherry, Creek Lilly Pilly, Brush Cherry [20307]	Vulnerable	Species or species habitat known to occur within area	In feature area
Thelymitra kangaloonica Kangaloon Sun Orchid [81861]	Critically Endangered	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Triplarina nowraensis Nowra Heath-myrtle [64544]	Endangered	Species or species habitat known to occur within area	In buffer area only
Xerochrysum palustre Swamp Everlasting, Swamp Paper Daisy [76215]	Vulnerable	Species or species habitat may occur within area	In feature area
REPTILE			
Hoplocephalus bungaroides Broad-headed Snake [1182]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Listed Migratory Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Sternula albifrons Little Tern [82849]		Species or species habitat may occur within area	In buffer area only
Migratory Terrestrial Species			
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat known to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Rhipidura rufifrons](#) Rufous Fantail [592]		Species or species habitat known to occur within area	In feature area
[Symposiachrus trivirgatus as Monarcha trivirgatus](#) Spectacled Monarch [83946]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			
[Actitis hypoleucos](#) Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
[Calidris acuminata](#) Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area	In feature area
[Calidris canutus](#) Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area	In buffer area only
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
[Calidris melanotos](#) Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
[Charadrius leschenaultii](#) Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Gallinago hardwickii](#) Latham's Snipe, Japanese Snipe [863]		Species or species habitat likely to occur within area	In feature area
[Limosa lapponica](#) Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In buffer area only
[Numenius madagascariensis](#) Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Pandion haliaetus			
Osprey [952]		Species or species habitat known to occur within area	In buffer area only
Tringa nebularia			
Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area	In feature area

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State	Buffer Status
Defence - Defence Housing Authority		
Commonwealth Land - Defence Housing Authority [12035]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [12033]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [12034]	NSW	In buffer area only

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Bubulcus ibis as Ardea ibis			
Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata			
Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area overfly marine area	In buffer area only
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat likely to occur within area overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In buffer area only
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area overfly marine area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area overfly marine area	In feature area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In buffer area only
Neophema chrysostoma Blue-winged Parrot [726]		Species or species habitat may occur within area overfly marine area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In buffer area only
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area	In feature area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area
Sternula albifrons as Sterna albifrons Little Tern [82849]		Species or species habitat may occur within area	In buffer area only
Symposiachrus trivirgatus as Monarcha trivirgatus Spectacled Monarch [83946]		Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thinornis cucullatus as Thinornis rubricollis			
Hooded Plover, Hooded Dotterel [87735]		Species or species habitat likely to occur within area overfly marine area	In buffer area only
Thinornis cucullatus cucullatus as Thinornis rubricollis rubricollis			
Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat likely to occur within area overfly marine area	In buffer area only
Tringa nebularia			
Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area overfly marine area	In feature area

Extra Information

State and Territory Reserves [Resource Information]

Protected Area Name	Reserve Type	State	Buffer Status
Conjola	National Park	NSW	In buffer area only
Corramy	Regional Park	NSW	In buffer area only
Jerrawangala	National Park	NSW	In buffer area only
Morton	National Park	NSW	In buffer area only
Parma Creek	Nature Reserve	NSW	In buffer area only

Regional Forest Agreements [Resource Information]

Note that all areas with completed RFAs have been included.

RFA Name	State	Buffer Status
Southern RFA	New South Wales	In feature area

Nationally Important Wetlands [Resource Information]

Wetland Name	State	Buffer Status
St Georges Basin	NSW	In buffer area only

EPBC Act Referrals [Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
Upgrade of existing road	2002/674	Controlled Action	Post-Approval	In buffer area only
Not controlled action				
Golf Course Extension	2001/215	Not Controlled Action	Completed	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed	In feature area
Not controlled action (particular manner)				
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval	In feature area

Bioregional Assessments

SubRegion	BioRegion	Website	Buffer Status
Sydney	Sydney Basin	BA website	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

Department of Climate Change, Energy, the Environment and Water
GPO Box 3090
Canberra ACT 2601 Australia
+61 2 6274 1111

APPENDIX C: Assessments of Significance – 'Five Part Test'

Section 5A subsection 1 of the *Environmental Planning and Assessment Act 1979* states that **each** of the factors in subsection 2 must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or ecological communities, or their habitats, and any **assessment guidelines**.

Biodiversity Assessment Report (SIS) is required if an activity is on land that is, or is part of critical habitat; or there is likely to be a significant effect as determined under s.5A of the EP&A Act, the five part assessment of significance.

Definitions:

- *Critical habitat: the whole or any part or parts of the area or areas of land comprising the habitat of an endangered species, population or ecological community that is critical to the survival of the species, population or ecological community.*
- *Significant impact: if the Assessment of Significance determines that a there will be a significant effect on threatened species, populations or ecological communities, or their habitats a SIS will be required.*
- *Assessment guidelines means assessment guidelines issued and in force under section 94A of the Biodiversity Conservation Act 2016 or, subject to section 5C, section 220ZZA of the Fisheries Management Act 1994.*

Each five-part Test of Significance considers the impact of the proposed development.

The species included in this assessment are as follows:

- *Pteropus poliocephalus* Grey-Headed Flying-fox (foraging)
- Large Forest Owls (*Ninox connivens* and *Ninox strenua*) (foraging)
- *Parvipsitta pusilla* Little Lorikeet (foraging)
- *Pteropus poliocephalus* Grey-Headed Flying-fox (foraging)
- *Mormopterus norfolkensis* Eastern Freetail-bat (foraging)
- *Miniopterus schreibersii oceanensis* Eastern Bent-wing Bat (foraging)
- *Saccolaimus flaviventris* Yellow-bellied Sheathtail-bat (foraging)
- *Daphoenositta chrysoptera* Varied Sittella (foraging)
- *Scoteanax rueppellii* Greater Broad-nosed bat (foraging)
- *Falsistrellus tasmaniensis* Eastern False Pipistrelle (foraging)
- *Chalinolobus dwyeri* Large-eared Pied Bat (foraging)
- *Calyptorhynchus lathami* Glossy Black Cockatoo (foraging)
- *Cryptostylis hunteriana*

Commonwealth Assessment of Significance

The *Environment Protection and Biodiversity Conservation Act, (1999)* requires that Commonwealth approval be obtained for certain actions. The Act provides an assessment and approvals systems for actions that have a significant impact on matters of National Environment Significance (NES). These may include:-

- Wetlands protected by international treaty (the Ramsar Convention);
- Nationally listed threatened species and ecological communities;
- Nationally listed migratory species.

Actions are projects, developments, undertakings, activities, series of activities or alteration of any of these. An action that needs Commonwealth approval is known as a controlled action. A controlled action needs approval where the Commonwealth decides the action would have a significant effect on a NES matter.

Where a proposed activity is located in an area identified to be of NES, or such that it is likely to significantly affect threatened species, ecological communities, migratory species or their habitats, the matter needs to be referred to the Australian Government Department of the Environment (AGDE).

The following assessment in accordance with the EP&BC Act Policy Statement 1.1 *Significant Impact Guideline* is provided:

i. Are there any Matters of National Environmental Significance located in the area of the proposed action?

A search of the Protected Matters Search Tool was conducted for EPBC Listed threatened and migratory species recorded within 10 km of the subject site (Appendix A).

Suitable habitat is present for the following nationally listed threatened species recorded from the Protected Matters Search which occur or which may occur within 10 km of the subject site:

Threatened Flora Species

- *Cryptostylis hunteriana* Leafless Tongue Orchid

Suitable habitat is present for the following nationally listed migratory species recorded from the Protected Matters Search which occur or which may occur within 5 km of the subject site:

Migratory Species

- White-throated Needletail (*Hirundapus caudacutus*)
- Fork-tailed Swift (*Apus pacificus*)

- Rufous Fantail (*Rhipidura rufifrons*)
- Satin Flycatcher *(Myiagra cyanoleuca*)
- Black-faced Monarch (*Monarcha melanopsis*)

ii. Considering the proposed action at its broadest scope, is there potential for impacts on Matters of National Environmental Significance?

The proposal will require the removal of a relatively small area of suitable habitat for nationally listed locally occurring threatened and migratory species which are highly mobile species.

iii. Are there any proposed measures to avoid or reduce impacts on Matters of National Environmental Significance?

No, as no matters of national environmental significance were observed during surveys.

iv. Are any impacts of the proposed action on Matters of National Environmental Significance likely to be significant impacts?

With regard to nationally listed threatened species it is considered that the proposal is not likely to:

• lead to a long-term decrease in the size of an important population of a species;

• reduce the area of occupancy of an important population;

• fragment an existing important population into two or more populations;

• adversely affect habitat critical to the survival of a species;

• disrupt the breeding cycle of an important population;

• modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;

• result in invasive species that are harmful to a threatened species becoming established in the threatened species' habitat;

• introduce disease that may cause a species to decline; or

• interfere with the recovery of the species.

The following reasons are provided:

• There are larger areas of higher quality habitat for locally occurring nationally listed threatened and migratory species present within the locality, including lands reserved for conservation; and

• No nationally listed threatened species were observed within the subject site during surveys.

With regard to nationally listed migratory species it is considered that the proposal is not likely to:

• substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species;

• result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species; or

• seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.

The following reasons are provided:

• The subject site has not been identified as containing important habitat for a nationally listed migratory species; and

• No nationally listed migratory species have been recorded within the subject site during surveys.

CONCLUSION

It is considered that the proposed action is not likely to have a significant impact on nationally listed threatened or migratory species and endangered ecological communities.

New South Wales Assessment of Significance

Assessments of Significance (5-part test) are required when a developer/proponent is submitting a Development Application (DA) to determine whether impacts associated with the development will have a 'significant impact' on biodiversity (in particular, threatened species or threatened vegetation communities). This test is pursuant to section 7.3 of the *Biodiversity Conservation Act 2016.*

Five part tests were undertaken for the following species:

- *Mormopterus norfolkensis* Eastern Freetail-bat (foraging)
- *Miniopterus schreibersii oceanensis* Eastern Bent-wing Bat (foraging)
- *Saccolaimus flaviventris* Yellow-bellied Sheathtail-bat (foraging)
- *Scoteanax rueppellii* Greater Broad-nosed bat (foraging)
- *Falsistrellus tasmaniensis* Eastern False Pipistrelle (foraging)
- *Chalinolobus dwyeri* Large-eared Pied Bat (foraging)
- *Calyptorhynchus lathami* Glossy Black Cockatoo (foraging)
- *Hieraaetus morphnoides* Little Eagle (foraging/ potential breeding);
- *Cryptostylis hunteriana* Leafless Tongue Orchid

Five part test for Microchiropteran bats

- *Mormopterus norfolkensis* Eastern Freetail-bat (foraging)
- *Miniopterus schreibersii oceanensis* Eastern Bent-wing Bat (foraging)
- *Saccolaimus flaviventris* Yellow-bellied Sheathtail-bat (foraging)
- *Scoteanax rueppellii* Greater Broad-nosed bat (foraging)
- *Falsistrellus tasmaniensis* Eastern False Pipistrelle (foraging)
- *Chalinolobus dwyeri* Large-eared Pied Bat (foraging)

(a) "…in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction…"

No nesting or maternity sites were observed on site for microbat species that rely on caves as maternity sites (i.e. LE Pied bat).

It is not anticipated that any hollow-bearing trees (and therefore nesting sites) will be removed making the proposal unlikely to place the species at risk of extinction.

(b) "…in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

(i) ..is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii).. is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction..."

An Endangered Ecological Community means a threatened ecological community specified in B*C Act*. Therefore, not applicable to threatened species.

(c) "…in relation to the habitat of a threatened species, population or ecological community:

(i)... the extent to which habitat is likely to be removed or modified as a result of the action proposed…", and

(ii) … whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action…, and

(iii)…the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality…

The proposal will impact upon marginal foraging habitat that would be considered of insignificant value to this species. Vegetation removal (2 trees) will not prevent the subject species from foraging on similar habitat resources in the locality. The removal of environmental weeds within the Study Area is unlikely to impact on the long-term survival of the subject species within the Locality or Region.

No hollow bearing trees are proposed for removal.

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

The Study Area is not listed as an area of outstanding biodiversity value.

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

"Clearing of Native Vegetation" is a Key Threatening Process listed in Schedule 3 of the *Biodiversity Conservation Act 2016*. However, given this species is highly mobile/migratory, and the area to be cleared is considered to be of relative small, and large areas of foraging habitat is still available in the locality it is considered that the proposal would not significantly exacerbate this KTP.

Conclusion

It is not considered that the proposal would have a significant impact on the subject species, their populations or habitats. Therefore, the preparation of a Biodiversity Assessment Report (BDAR) is NOT REQUIRED.

Five part test for *Hieraaetus morphnoides* Little Eagle

(a) "…in the case of a threatened species, whether the action proposed is likely to have an adverse
effect on the life cycle of the species such that a viable local population of the species is likely to be
placed at risk of extinction…"

This species was not recorded on-site during targeted surveys. However, as a precautionary measure we have assumed that potential foraging habitat occurs for this species on-site.

The DPE BIONET Threatened Biodiversity Database Collection (TBDC) provides the following ecological information for this species:

- Habitats are characterised by the presence of large areas of open water including larger rivers, swamps, lakes, and the sea.
- Occurs at sites near the sea or sea-shore, such as around bays and inlets, beaches, reefs, lagoons, estuaries and mangroves; and at, or in the vicinity of freshwater swamps, lakes, reservoirs, billabongs and saltmarsh.
- Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, and forest (including rainforest).
- Breeding habitat consists of mature tall open forest, open forest, tall woodland, and swamp sclerophyll forest close to foraging habitat. Nest trees are typically large emergent eucalypts and often have emergent dead branches or large dead trees nearby which are used as 'guard roosts'. Nests are large structures built from sticks and lined with leaves or grass.
- Feed mainly on fish and freshwater turtles, but also waterbirds, reptiles, mammals and carrion.
- Hunts its prey from a perch or whilst in flight (by circling slowly, or by sailing along 10–20 m above the shore). Prey is usually carried to a feeding platform or (if small) consumed in flight, but some items are eaten on the ground.
- May be solitary, or live in pairs or small family groups consisting of a pair of adults and dependent young.
- Typically lays two eggs between June and September with young birds remaining in the nest for 65-70 days.

No nesting sites were observed on site.

A local population was not defined or identified, especially as there are very minimal BIONET records of this species (see below). The species is highly mobile, and therefore, assuming that a local population is present and using the site, it is assumed that the local population would extend for at least 10-20km radius around the subject site.

The removal of a relatively small area of foraging habitat would have a negligible impact on availability of similar habitat to be retained elsewhere on the site and surrounding area. The proposal would not have adverse impacts on life cycles of this species.

The vegetation proposed for removal is not considered as 'important' habitat and as similar foraging habitat would be widely available and not documented nesting habitat used for breeding is proposed for removal.

No stick nests were observed in the trees within the development site. BAM recognised hollows were observed on-site. The trees are isolated within open cleared paddocks and are unlikely to be used as breeding habitat.

The Little Eagle is partly migratory or dispersive. Adult birds are mainly sedentary, while the young birds disperse. The Little Eagle searches for prey on the wing or from a high exposed perch, taking prey from the ground, the shrub layer or the canopy. Prey includes rabbits, other live mammals and insects. Little Eagles nest in mature living trees in open woodland or tree-lined watercourses. They rarely nest in isolated trees. The nest is an open bowl of twigs and branches, lined with green leaves. No such nests were observed on site

A viable local population is not likely to be placed at risk of extinction.

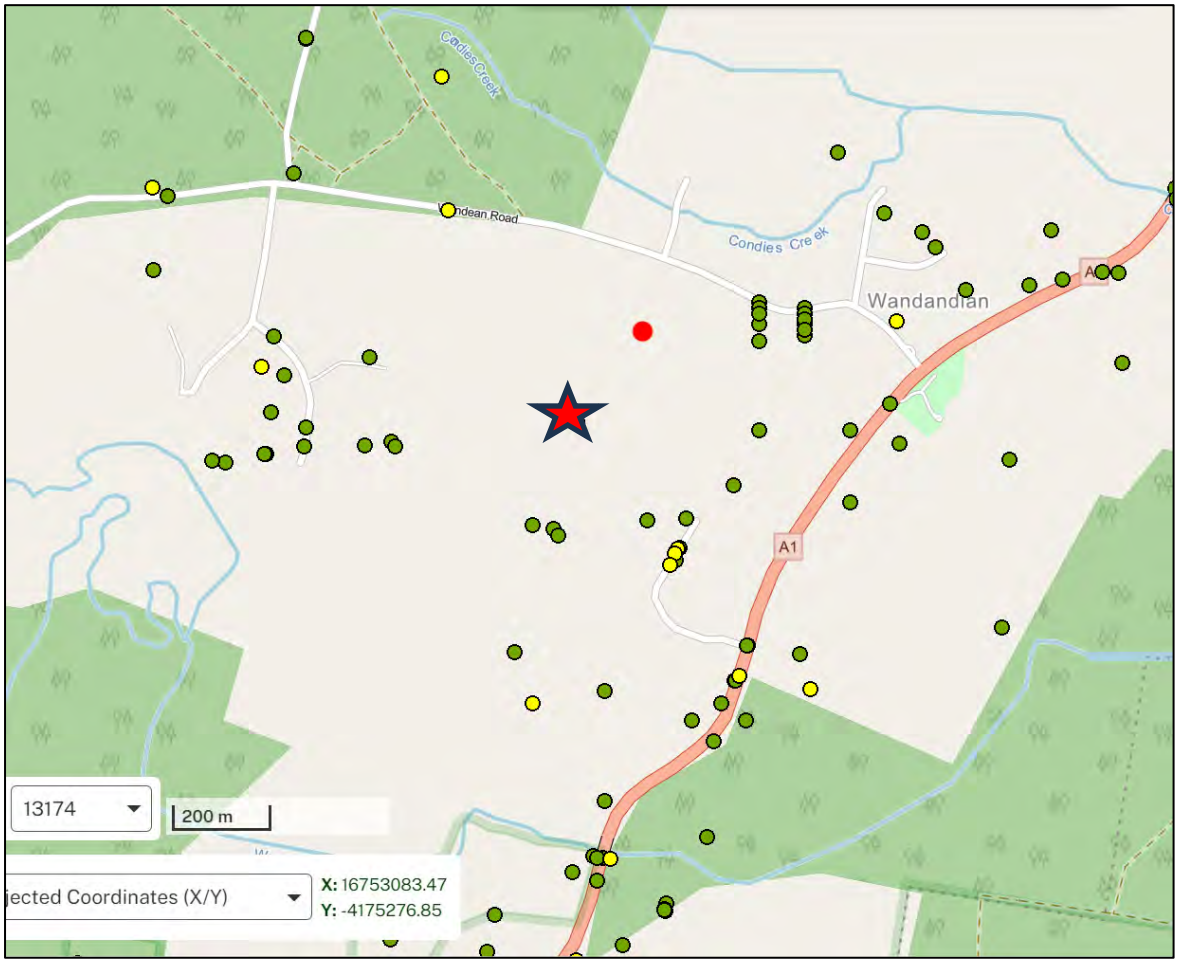
The proposal is consistent with the following management details identified within BIONET TBDC:

- Protect known populations and areas of potential habitat from clearing, fragmentation or disturbance.

- Establish 'buffer zones' around nest sites to limit disturbance by humans or human activity.
- Where nests are located closer to existing developments a minimum buffer distance of 250m should be maintained, along with an undisturbed corridor at least 100m wide extending from the nest to the nearest foraging grounds.

- Conduct annual, broad surveys to monitor known nest sites, locate new nest sites, determine breeding success and trends in populations, and determine areas of critical habitat.

- Educate the public about the sea-eagle and its status, promote the conservation of the species, and encourage members of the public to report sightings of sea-eagles to the appropriate authorities.



Previous BIONET records of Little Eagle shown as red star above in relation to the subject property

(b) "…in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

(i) ..is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii).. is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction..."

An Endangered Ecological Community means a threatened ecological community specified in B*C Act*. Therefore, not applicable to threatened species.

(c) "…in relation to the habitat of a threatened species, population or ecological community:

(i)... the extent to which habitat is likely to be removed or modified as a result of the action proposed…", and

(ii) … whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action…, and

(iii)…the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality…

The proposal will impact upon marginal foraging habitat that would be considered of insignificant value to this species. Vegetation removal for the future construction of the dwelling on the site will not prevent the subject species from foraging on similar habitat resources in the locality. The removal of environmental weeds within the Study Area is unlikely to impact on the long-term survival of the subject species within the Locality or Region.

In terms of vegetation removal only to trees require removal to establish the APZs on proposed Lot 2 (surrounding existing dwelling). These two (2) trees are not hollow bearing trees providing fauna habitat and are not considered ecologically significant. The understorey is already maintained in a fuel reduced state. The remaining trees within the bushfire asset protection zone may require some maintenance pruning of limbs but the trees can be retained. These impacts are not considered ecologically significant.

No hollow bearing trees are proposed for removal. The trees proposed for removal do not provide significant fauna habitat.

The wastewater disposal area will be located within an existing cleared area.

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

The Study Area is not listed as an area of outstanding biodiversity value.

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

"Clearing of Native Vegetation" is a Key Threatening Process listed in Schedule 3 of the *Biodiversity Conservation Act 2016*. However, given this species is highly mobile/migratory, and the area to be cleared is considered to be of relative small, and large areas of foraging habitat is still available in the locality it is considered that the proposal would not significantly exacerbate this KTP.

Conclusion

It is not considered that the proposal would have a significant impact on the subject species, their populations or habitats. Therefore, the preparation of a Species Impact Statement is NOT REQUIRED.

Five part test for Large-eared Pied Bat *Chalinolobus dwyeri* (foraging)

(a) "…in the case of a threatened species, whether the action proposed is likely to have an adverse
effect on the life cycle of the species such that a viable local population of the species is likely to be
placed at risk of extinction…"

This species was recorded on-site during targeted surveys. As a precautionary measure we have assumed that potential foraging habitat occurs for this species on-site.

The DPE BIONET Threatened Biodiversity Database Collection (TBDC) provides the following ecological information for this species:

- Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin (Petrochelidon ariel), frequenting low to mid-elevation dry open forest and woodland close to these features. Females have been recorded raising young in maternity roosts (c. 20-40 females) from November through to January in roof domes in sandstone caves and overhangs. They remain loyal to the same cave over many years.
- Found in well-timbered areas containing gullies.
- The relatively short, broad wing combined with the low weight per unit area of wing indicates manoeuvrable flight. This species probably forages for small, flying insects below the forest canopy.
- Likely to hibernate through the coolest months.
- It is uncertain whether mating occurs early in winter or in spring.

No maternity sites within rocky caves or overhangs were observed on site. It is not anticipated that any maternity camps will be removed making the proposal unlikely to place the species at risk of extinction.

A local population was not defined or identified, especially as there are no BIONET records of this species. The species is highly mobile, and therefore, assuming that a local population is present and using the site, it is assumed that the local population would extend for at least 5-10km radius around the subject site.

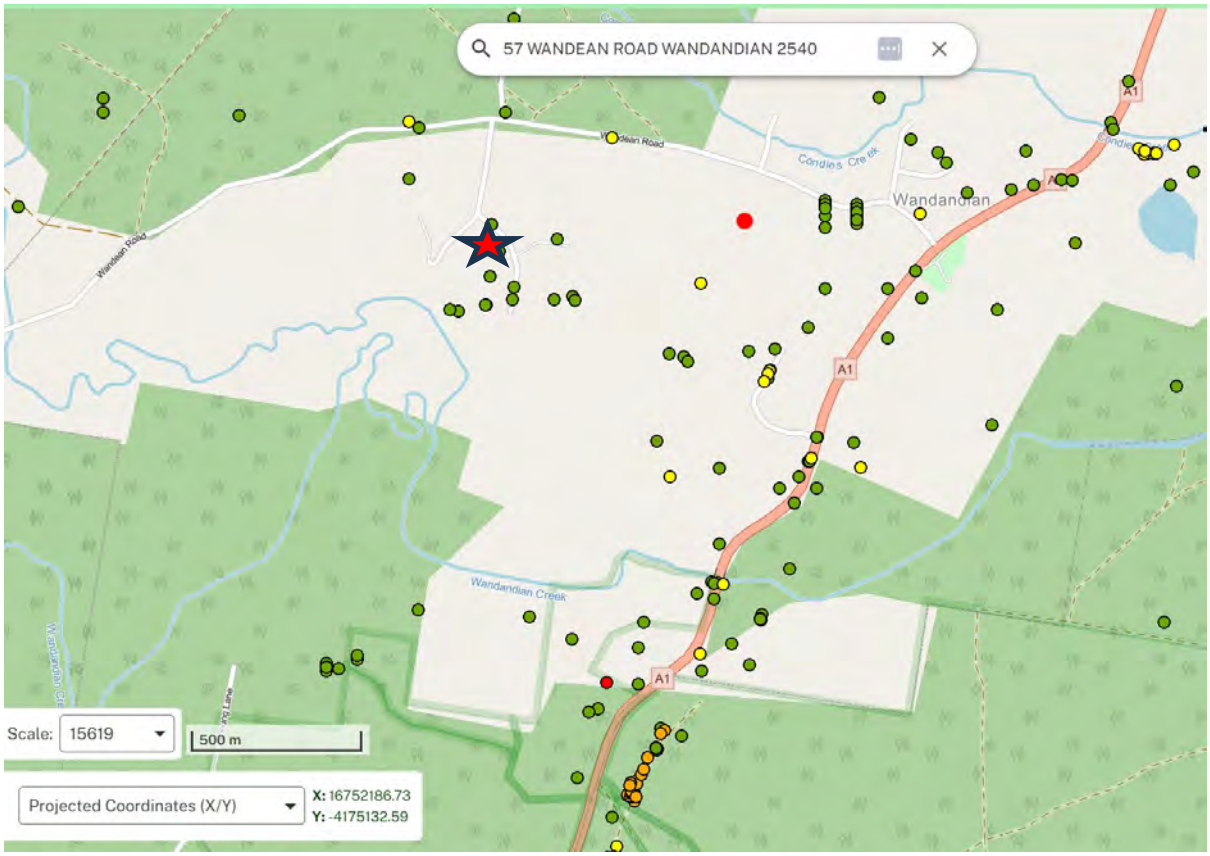
The removal of a relatively small area of foraging habitat would have a negligible impact on availability of similar habitat to be retained elsewhere on the site and surrounding area. The proposal would not have adverse impacts on life cycles of this species.

The vegetation proposed for removal is not considered as 'important' habitat and as similar foraging habitat would be widely available and not documented nesting habitat used for breeding is proposed for removal.

A viable local population (if present) is not likely to be placed at risk of extinction.

The proposal is consistent with the following management details identified within BIONET TBDC:

Management details
Protect known and potential habitat from burning at too-frequent intervals.
Avoid damage to known roosting and maternity sites from mining activities, and from recreational caving by contacting the OEH prior to activities.
Reduce the use of pesticides and consider alternatives where available.
Protect known and potential forest and woodland habitat around cliffs, rock overhangs and old mine workings from clearing and isolation.
Control goats to reduce disturbance to roosting sites



Previous BIONET records of Chalinolobus dwyeri shown as red star above in relation to the subject property

(b) "…in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

(i) ..is likely to have an adverse effect on the extent of the ecological community such that its

local occurrence is likely to be placed at risk of extinction, or

(ii).. is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction..."

An Endangered Ecological Community means a threatened ecological community specified in B*C Act*. Therefore, not applicable to threatened species.

(c) "…in relation to the habitat of a threatened species, population or ecological community:

(i)... the extent to which habitat is likely to be removed or modified as a result of the action proposed…", and

(ii) … whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action…, and

(iii)…the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality…

The proposal will impact upon marginal foraging habitat that would be considered of insignificant value to this species. Vegetation removal for the future construction of the dwelling on the site will not prevent the subject species from foraging on similar habitat resources in the locality. The removal of environmental weeds within the Study Area is unlikely to impact on the long-term survival of the subject species within the Locality or Region.

In terms of vegetation removal only to trees require removal to establish the APZs on proposed Lot 2 (surrounding existing dwelling). These two (2) trees are not hollow bearing trees providing fauna habitat and are not considered ecologically significant. The understorey is already maintained in a fuel reduced state. The remaining trees within the bushfire asset protection zone may require some maintenance pruning of limbs but the trees can be retained. These impacts are not considered ecologically significant.

No hollow bearing trees are proposed for removal. The trees proposed for removal do not provide significant fauna habitat.

The wastewater disposal area will be located within an existing cleared area.

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

The Study Area is not listed as an area of outstanding biodiversity value.

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

"Clearing of Native Vegetation" is a Key Threatening Process listed in Schedule 3 of the *Biodiversity Conservation Act 2016*. However, given this species is highly mobile/migratory, and the area to be cleared is considered to be of relative small, and large areas of foraging habitat is still available in the locality it is considered that the proposal would not significantly exacerbate this KTP.

Conclusion

It is not considered that the proposal would have a significant impact on the subject species, their populations or habitats. Therefore, the preparation of a Species Impact Statement is NOT REQUIRED.

Five part test for *Calyptorhynchus lathami* Glossy Black Cockatoo (foraging)

The DPE BIONET Threatened Biodiversity Database Collection (TBDC) provides the following ecological information for this species:

- The South-eastern Glossy Black-Cockatoo is a small brown-black cockatoo with a massive, bulbous bill and a short crest. Males have a prominent red tail panel, while that of females is yellow to orange-red. The coloured tail panel is barred black in juvenile birds, with the extent of barring decreasing with age. The female usually has irregular pale-yellow markings on the head and neck, and may have yellow flecks on the underparts and underwing. They are usually seen in pairs or small groups feeding quietly in sheoaks.
- 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. An isolated population exists on Kangaroo Island, South Australia.
- Inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of sheoak occur. Black Sheoak (Allocasuarina littoralis) and Forest Sheoak (A. torulosa) are important foods.
- Inland populations feed on a wide range of sheoaks, including Drooping Sheoak, Allocasuaraina diminuta, and A. gymnathera. Belah is also utilised and may be a critical food source for some populations.
- In the Riverina, birds are associated with hills and rocky rises supporting Drooping Sheoak, but also recorded in open woodlands dominated by Belah (Casuarina cristata).
- Feeds almost exclusively on the seeds of several species of she-oak (Casuarina and Allocasuarina species), shredding the cones with the massive bill.
- Dependent on large hollow-bearing eucalypts for nest sites. A single egg is laid between March and May.

(a) "…in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction…"

No nesting or maternity sites were observed on site for Glossy Black Cockatoo within or near the proposed development impact area. Whilst the site does contain hollow bearing trees identified in section 5.1 of this report, none of them are proposed for removal.

It is not anticipated that any hollow-bearing trees (and therefore nesting sites) will be removed making the proposal unlikely to place the species at risk of extinction.

(b) "…in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

(i) ..is likely to have an adverse effect on the extent of the ecological community such that its

local occurrence is likely to be placed at risk of extinction, or

(ii).. is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction..."

An Endangered Ecological Community means a threatened ecological community specified in B*C Act*. Therefore, not applicable to threatened species.

(c) "…in relation to the habitat of a threatened species, population or ecological community:

(i)... the extent to which habitat is likely to be removed or modified as a result of the action proposed…", and

(ii) … whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action…, and

(iii)…the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality…

Identified threats to this species according to the NSW DPE are as follows:

Threat
Reduction of suitable habitat through clearing for development.
Decline of hollow bearing trees over time due to land management activities.
Excessively frequent fire which eliminates sheoaks from areas, prevents the development of mature sheoak stands, and destroys nest trees.
Firewood collection resulting in loss of hollow-bearing trees, reduced recruitment of hollow-bearing trees, and disturbance of breeding attempts.
Decline in extent and productivity of sheoak foraging habitat due to feral herbivores.
Reduced access to surface water in close proximity to foraging and nesting habitat.
Limited information on the location of nesting aggregations and the distribution of high quality breeding habitat.
Disturbance from coal seam gas and open cut coal mining causing loss of foraging and breeding habitat as well as disturbing reproductive attempts.
Decline in extent and productivity of sheoak foraging habitat caused by moisture stress due to climate change.
Forestry activity resulting in loss of hollow-bearing trees, reduced recruitment of hollow-bearing trees, degradation of foraging habitat, and disturbance of breeding attempts.

The proposal will impact upon marginal foraging habitat that would be considered of insignificant value to this species. Vegetation removal for the future construction of the dwelling on the site will not prevent the subject species from foraging on similar habitat resources in the locality. The removal of environmental weeds within the Study Area is unlikely to impact on the long-term survival of the subject species within the Locality or Region.

In terms of vegetation removal only to trees require removal to establish the APZs on proposed Lot 2 (surrounding existing dwelling). These two (2) trees are not hollow bearing trees providing fauna habitat and are not considered ecologically significant. The understorey is already maintained in a fuel reduced state. The remaining trees within the bushfire asset protection zone may require some maintenance pruning of limbs but the trees can be retained. These impacts are not considered ecologically significant.

No hollow bearing trees are proposed for removal. The trees proposed for removal do not provide significant fauna habitat.

The wastewater disposal area will be located within an existing cleared area.

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

The Study Area is not listed as an area of outstanding biodiversity value.

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

"Clearing of Native Vegetation" is a Key Threatening Process listed in Schedule 3 of the *Biodiversity Conservation Act 2016*. However, given this species is highly mobile/migratory, and the area to be cleared is considered to be of relative small, and large areas of foraging habitat is still available in the locality it is considered that the proposal would not significantly exacerbate this KTP.

Conclusion

It is not considered that the proposal would have a significant impact on the subject species, their populations or habitats. Therefore, the preparation of a Biodiversity Assessment Report is NOT REQUIRED.

Five part test for *Cryptostylis hunteriana* Leafless Tongue Orchid

The DPE BIONET Threatened Biodiversity Database Collection (TBDC) provides the following ecological information for this species:

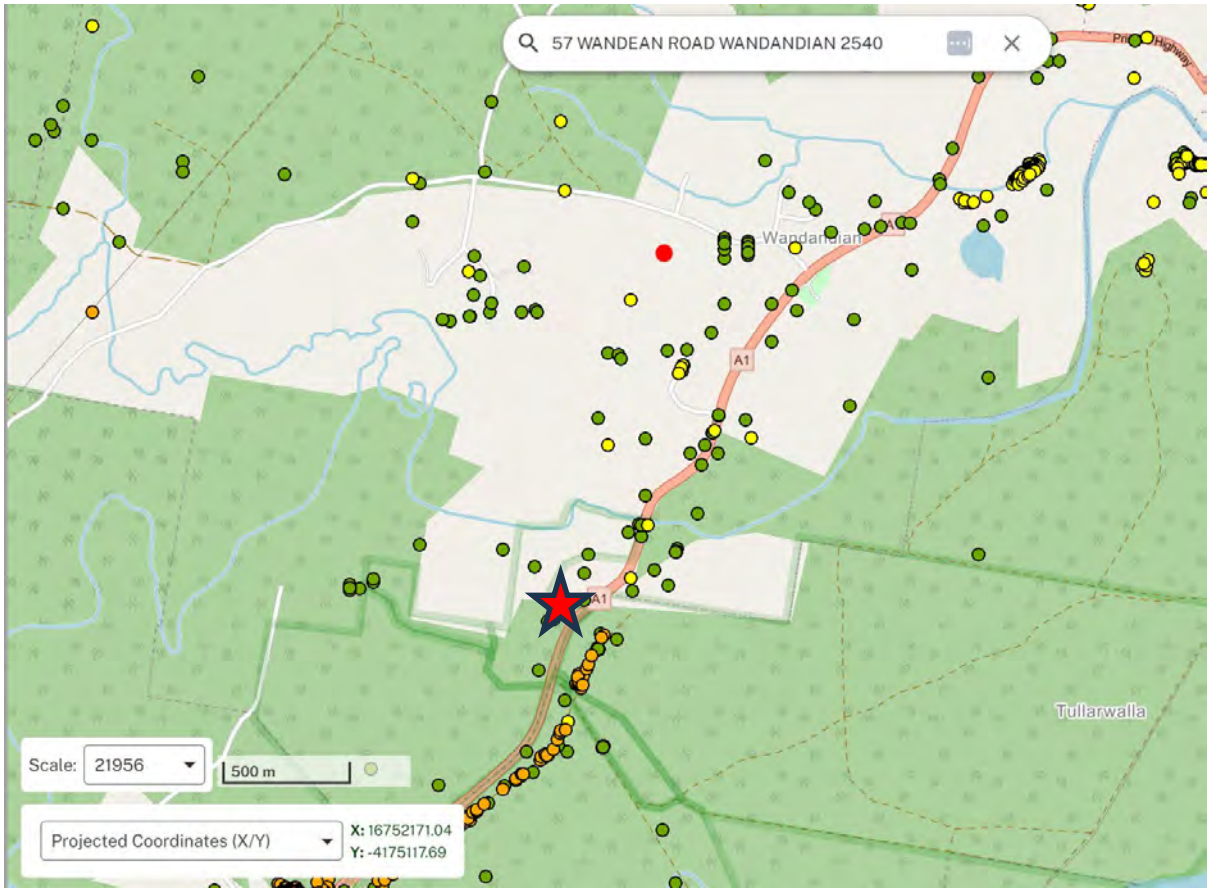
As its name implies, the Leafless Tongue Orchid has no leaf. It produces an upright flower-stem to 45 cm tall, bearing five to 10 flowers between November (early flowering in October observed) and February (late flowerin in March observed). It has small narrow green sepals and petals to 22 mm long, but is dominated by an erect narrow very hairy 'tongue' (the labellum). This is up to 33 mm long, maroon along the margins and at the widened tip, and with a black central band. All other tongue orchids have leaves; most have a downward pointing labellum.

The Leafless Tongue Orchid has been recorded from as far north as Gibraltar Range National Park south into Victoria around the coast as far as Orbost. It is known historically from a number of localities on the NSW south coast and has been observed in recent years at many sites between Batemans Bay and Nowra (although it is uncommon at all sites). Also recorded at Munmorah State Conservation Area, Nelson Bay, Wyee, Washpool National Park, Nowendoc State Forest, Ku-Ring-Gai Chase National Park and Ben Boyd National Park.

Unlike other Cryptostylis spp., Cryptostylis hunteriana has a poorly developed root system and is unlilkely to spread vegetatively. The species is a saprophyte and therefore reliant on a symbiotic relationship with micorrhizal fungus. Plants form from seed (from within a population or blown in) and grow to become a persistant tuber, which can remain dormant for a number of years and not produce above ground material. Cryptostylis hunteriana has been reported emerging 1-3 years after fire.

- Poor winter and spring rainfall may hamper flowering.
- Flowers between October and November in northern populations (north of Hunter Valley) and progressively later further south (November - December on the Central Coast to December to Late January on the South Coast). Species seems to flower well in periods when the understorey is more open.
- This species was not recorded during the targeted site survey undertaken in December 2023

References: Bell, A.J. Notes on population size and habitat of the vulnerable Cryptostylis hunteriana (Orchidaceae) from the Central Coast of NSW. Cunninghamia 7(2):195-204.



Previous BIONET records of *Cryptostylis hunteriana* shown as red star above in relation to the subject property (observation dated March 2024)

(a) "…in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction…"

Threats to this species include (NSW TBDC accessed July 2024):

Threat Category 1	Threat Category 2	Threat	Order
		Since the Leafless Tongue Orchid tends to occur in coastal areas the main threat to its continued survival appears to be development pressure on sites where it occurs.	1
Disturbance	Road/track works	Some populations are threatened by road works.	2
Disturbance	Disturbance from recreational users	Walkers on trail trampling adult plants; causes plant mortality.	3
Fire	Inappropriate fire regime	National Parks burning resulting in unplanned, high intensity fires within the species' habitat.	4
Fire	Risk of adverse fire/wildfire	Fire spreading from local RFS hazard-reduction burns potentially causing plant mortality.	5
Weed	Herbaceous weeds	Weed invasion following disturbance (e.g. by roadworks) of perenial grasses and other herbacous weeds which compete for space and resources.	6
Lack of knowledge	Insufficient understanding of distribution and/or abundance	Species monitoring - no threat	7

The proposed development will not increase any of the above threats.

(b) "…in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

(i) ..is likely to have an adverse effect on the extent of the ecological community such that its

local occurrence is likely to be placed at risk of extinction, or

(ii).. is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction..."

An Endangered Ecological Community means a threatened ecological community specified in B*C Act*. Therefore, not applicable to threatened species.

(c) "…in relation to the habitat of a threatened species, population or ecological community:

(i)... the extent to which habitat is likely to be removed or modified as a result of the action proposed…", and

(ii) … whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action…, and

(iii)…the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality…

The NSW Atlas TBDC identifies habitat and ecology for this species as follows:

- Does not appear to have well defined habitat preferences and is known from a range of communities, including swamp-heath and woodland.
- The larger populations typically occur in woodland dominated by Scribbly Gum (Eucalyptus sclerophylla), Silvertop Ash (E. sieberi), Red Bloodwood (Corymbia gummifera) and Black Sheoak (Allocasuarina littoralis); appears to prefer open areas in the understorey of this community and is often found in association with the Large Tongue Orchid (C. subulata) and the Tartan Tongue Orchid (C. erecta).
- Little is known about the ecology of the species; being leafless it is expected to have limited photosynthetic capability and probably depends upon a fungal associate to meet its nutritional requirements from either living or dead organic material.
- In addition to reproducing from seed, it is also capable of vegetative reproduction and thus forms colonies which can become more or less permanent at a site.
- On the Central Coast of NSW, populations have been recorded in woodland dominated by Scribbly Gum (E*ucalyptus haemastoma), Brown Stringybark (Eucalyptus capitellata), Red Bloodwood (Corymbia gummifera) and also associated with Large Tongue Orchid (C. subulata) and the Tartan Tongue Orchid (C. erecta).*

The proposal will impact upon marginal sub optimal habitat that would be considered of insignificant value to this species.

The proposed development impact areas comprise of either highly degraded land that are dominated by exotic pasture species or existing maintained understorey surrounding the asset protection of an existing dwelling. No individuals of this species have been recorded on-site.

The removal of environmental weeds within the Study Area is unlikely to impact on the long-term survival of the subject species within the Locality or Region.

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

The Study Area is not listed as an area of outstanding biodiversity value.

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

"Clearing of Native Vegetation" is a Key Threatening Process listed in Schedule 3 of the *Biodiversity Conservation Act 2016*. However, given this species is highly mobile/migratory, and the area to be cleared is considered to be of relative small, and large areas of foraging habitat is still available in the locality it is considered that the proposal would not significantly exacerbate this KTP.

Conclusion

It is not considered that the proposal would have a significant impact on the subject species, their populations or habitats. Therefore, the preparation of a iodiversity Assessment Report is NOT REQUIRED.

APPENDIX D: RELEVANT QUALIFICATIONS & EXPERIENCE OF THE AUTHOR

Alex Fraser (Fraser Ecological Consulting) has over 20 years experience in ecological assessment and on-ground bushland restoration management. Previous work roles include ecological consulting with Parsons Brinckerhoff (large infrastructure), NPWS (biodiversity surveys), NSW Department of Environment and Climate Change (SIS DGRs) and Hornsby Shire Council (residential and light industrial development) have focussed primarily on ecological survey, development assessment, project management and policy development for consent authorities. Alex also has practical experience in landscape construction, bushland restoration and property management. A full list of flora and fauna assessments previously undertaken can be provided upon request.

Professional Affiliations include the Australian Association of Bush Regenerators, Ecological Society of Australia, Royal Zoological Society of NSW, Birds Australia, Australasian Bat Society, Urban Feral Animal Action Control Group (Sydney North Councils), Surfrider Foundation & Fred Hollows Foundation.

Relevant qualifications and training:

- Bachelor of Applied Science – Coastal Resource Management (Honours)
- Certificate 3 Natural Area Restoration (Ryde Horticultural College)
- Chemcert (Department of Natural Resources)
- Chainsaw Cross Cutting Techniques (Ryde Horticultural College)
- Certificate 3 Vertebrate Animal Pest Control (NSW DPI, Orange)
- OH&S General Induction for Construction Work (Work Cover NSW)
- Senior First Aid (St. Johns Ambulance Australia)
- Project Management 'the hard and soft skills' (NPWS- 2004)
- Frog, Bat and Reptile: species identification and survey skills (Forests NSW)
- Certificate 3&4 Japanese language proficiency (The Japan Foundation)
- Advanced Open Water SCUBA diver (PADI Australia)
- State Rail Contractor Safety Awareness (State Rail Authority)
- NPWS Scientific Licence - S10445 (Department of Environment Climate Change and Water)
- Accredited under the Biodiversity Assessment Methodology - BAM (Accreditation No. BAAS18156)

Alexander Fraser

alohafraser@gmail.com | 0423238193 | 665 The Scenic Rd Macmasters Beach, NSW 2251

Key skills

- 12+ years private ecological consulting (Fraser Ecological Consulting)
- 15 + years local government ecological assessment for DAs (Hornsby Shire Council – current employer)
- 10 + years Land & Environment Court expert witness experience
- 2 years state government ecological assessment (NSW OEH)
- High level botanical field identification skills, plot surveys and project management
- Fauna survey and field assistant experience
- Biodiversity Assessment Reporting (BDAR) preparation and Stewardship Site (BSAR) under the NSW BOS Credit Scheme

Qualifications

Bachelor Environmental Science (Honours) Southern Cross University

Certificate 3 Natural Area Restoration

Certificate 3 Vertebrate Animal Pest Control (NSW DPI, Orange)

NPWS Scientific Licence - S10445

Animal Ethics Authority - 11/4299

Accredited under the Biodiversity Assessment Methodology - BAM (Accreditation No. BAAS18156)

Practising member of NSW Ecological Consultants Association (ECA)

Summary

Alex Fraser (Principal Ecologist, Fraser Ecological) has extensive experience in DA related ecological assessment as both an assessor (Hornsby Shire Council) and private consultancy (Fraser Ecological) which actively and currently involve a wide array projects. Fraser Ecological is based locally on the Central Coast, however, project experience extends to South Coast, Blue Mountains, Mid-north Coast and mainly in the Sydney Basin Bioregion.

Previous work roles include ecological consulting for Parsons Brinckerhoff (large infrastructure), NPWS threatened species unit (biodiversity surveys), former NSW Department of Climate Change/ OEH (SIS DGRs and major projects assessment) and Hornsby Shire Council (DA assessment officer) have focussed primarily on ecological survey, development assessment, project management and policy development for consent authorities.

Alex offers high level botanical ID and field survey skills which includes targeted surveys and BAM plot surveys. Fraser Ecological has extensive experience in the preparation of over 15 BDARs under the new BC Act 2016 BOS credit trading scheme. Alex has experience dealing with consent authorities including Council, Crown Lands, Metropolitan Land Council, RFS, Biodiversity Conservation Trust and Department of Planning for major projects including SSDI proposals.

Fraser Ecological has established a wide network of ecological specialists including the Royal Botanic Gardens and Australian Museum as well academic institutions for expert advice when required. Alex is a current member of the North Sydney Regional Land Managers Group that includes staff from Central Coast Council, Northern Beaches, Ku-ring-gai Council, Hornsby Council (HSC), NPWS and Crown Lands) as project manager developing the Natural Area Recreation Strategy for HSC. Current main role at Council is development assessment and review of Flora and Fauna Reports and Biodiversity Assessment Reports.

Fraser Ecological has been engaged by various Councils (Central Coast, Ku-ring-gai, Liverpool City, Blacktown City Council, Hornsby Shire Council and Hawkesbury City Council) to undertake biodiversity assessments for major civil works projects. He is continuously providing biodiversity assessments for private clients for a range od development proposals across coastal and western NSW. We have also undertaken threatened flora and fauna species survey and monitoring for the NSW OEH Save our Species grants.

Key skills:

- Targeted flora and fauna surveys
- BAM plots in accordance with the BAM
- Ecological monitoring & Opportunity and Constraints mapping
- Preparation of BDARs, BAM calculator and credit reporting
- Retirement of credits for approved projects via BCT and brokers
- Establishment of stewardship sites and other offset packages
- Expert witness reporting and attendance in the LAEC
- Compliance investigations and auditing
- Preparation of Vegetation Management Plans
- Preparation of Nestbox Monitoring Plans

ECA ECOLOGICAL CONSULTANTS ASSOCIATION of NSW Inc

2023 PRACTISING MEMBER

CERTIFICATE OF ACCREDITATION AS A BIODIVERSITY ASSESSMENT METHOD ASSESSOR under the *Biodiversity Conservation Act 2016* (NSW)

BAM Assessor		
Alexander Fraser		
Accreditation number	**Accreditation date (Date of issue)**	**Expiry Date of**
BAAS18156	17 October 2021	17 October 2024

The person named above is accredited under section 6.10 of the *Biodiversity Conservation Act 2016* (NSW) (**BC Act**) as a Biodiversity Assessment Method Assessor to apply the Biodiversity Assessment Method in connection with the preparation of biodiversity stewardship site assessment reports, biodiversity development assessment reports and biodiversity certification assessment reports pursuant to Part 6 of the BC Act.

The accreditation is in force until and including the Expiry Date. The accreditation is subject to the conditions set out in the *Accreditation Scheme for the Application of the Biodiversity Assessment Method*, under the BC Act, and the conditions specified on the reverse of this certificate.

LUCIAN MCELWAIN

Manager Ecosytem Programs
Department of Planning, Industry & Environment

NOTES

- DPIE maintains a register of Accredited Biodiversity Assessment Method (BAM) Assessors accessible from the DPIE website.
- The BAM Assessor's accreditation expires on the Expiry Date unless renewed in accordance with the *Accreditation Scheme for the Application of the Biodiversity Assessment Method*. It is the BAM Assessor's responsibility to monitor the Expiry Date of their accreditation, and apply for any renewal with sufficient time for the application to be processed prior to the Expiry Date.
- Words and expressions used in this accreditation instrument and which are also used in the Act have the same meaning.

SUMMARY OF CONDITIONS UNDER SCHEME

The following are conditions of all accreditations granted under the Scheme:

1. an accredited person must prepare Biodiversity Assessment Reports (and conduct surveys and other activities in connection with the preparation of such reports) in accordance with:
   a. the Biodiversity Assessment Method Manual,
   b. the Credit Calculator Operational Manual,
   c. Accredited Person Code of Conduct.
   d. this Scheme,
   e. any guidance materials published by the Department of Planning, Industry and Environment in connection with preparation of Biodiversity Assessment Reports or the application of the BAM
   f. any accreditation requirements notified by the Department of Planning, Industry and Environment to the accredited assessor from time to time.
2. an accredited person must maintain a detailed and up to date working knowledge of, and comply with, all relevant legislation.
3. an accredited person must maintain records of surveys and assessments, including field data sheets and targeted flora and fauna surveys, undertaken and used as part of the preparation of a Biodiversity Assessment Report, for at least ten years after certification of the relevant Biodiversity Assessment Report.
4. all records required kept by an accredited person must be in legible form, or in a form that can be readily be reduced to a legible form.
5. an accredited person must provide to the Department of Planning, Industry and Environment any information related to biodiversity assessment reports required to be provided by all accredited persons, or by a group of accredited persons, by way of a notice specified on a website maintained by it, in the form and within the time frames required in that notice.
6. an accredited person must comply with any scientific licence conditions relating to survey records.
7. an accredited person must possess, or operate under, an appropriate scientific licence as required for the type work, they are completing in the Biodiversity Offsets Scheme.

Note. Information that the Environment Agency Head (EAH) may require to be provided may include information collected during the application of the BAM such as site specific survey data.

Note. In addition to the conditions above, accredited persons must comply with obligations under the BC Act and regulations, including Part 6 Division 3 of the BC Act. Failure to comply with any of the conditions above may result in the EAH exercising the power to vary, suspend or cancel that accreditation under Part 5 of this Scheme.