Biodiversity Development Assessment Report

559 Anambah Road, Gosforth

Prepared for

Thirdi Anambah Pty Ltd

Final Report / August 2024

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DOCUMENT CONTROL

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Accredited Assessor	**Matt Doherty**

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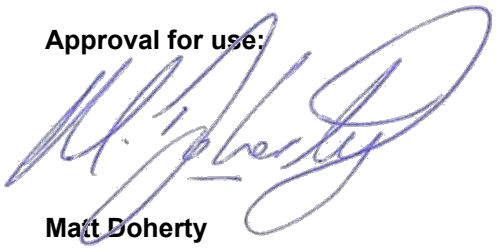

Matt Doherty

Accredited BAM Assessor # BAAS17044

30 August 2024

SUMMARY

MJD Environmental have been engaged by Thirdi Anambah Pty Ltd to prepare a Biodiversity Development Assessment Report to accompany a Concept Development Application. The proposal is seeking concept approval for the staged development of the concept master plan, and for which detailed proposals for the Site or for separate parts of the site are to be subject of subsequent Development Applications (DAs), apart from stage 1.

The masterplan creates a new subdivision of R1 General Residential zoned land within the Anambah Urban Release Area primarily on Lots 55/874170 and 177/874171 at 559 Anambah Road, Gosforth, with access via Anambah Road together with an emergency flood access to be constructed via the unformed River Road.

The subject land is not mapped on the OEH Biodiversity Values Map, however the proposal exceeds the area clearing threshold for the relevant minimum lot size of 450 m^2, being the clearing of an area of native vegetation greater than 2500 m^2. This is one of the triggers for the Biodiversity Offsets Scheme applying to the proposal.

The project location and design are predicated on a substantial history of assessment informing the Anambah Urban Release Area, which identified the predominantly cleared pastoral lands for residential development and avoided remnant native vegetation to the west associated with Lower Hunter Spotted Gum Ironbark communities.

The scattered paddock trees and small timbered patches on the subject land have been assessed as being best represented by the Plant Community Types in **Table E1**.

Table E1. Plant Community Types assessed on the subject land

PCT ID	PCT Name	Vegetation formation	Vegetation class	Per cent cleared value (%)
3446	Lower North Foothills Ironbark-Box-Gum Grassy Forest	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Hunter-Macleay Dry Sclerophyll Forests	74.93%
3433	Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest			68.60%

The PCTs on the subject land have been assessed as not representative of any BC Act or EPBC Act Threatened Ecological Communities.

Surveys carried out over the subject land ruled out the presence of candidate species credit species with the exception of:

- Callocephalon fimbriatum (Gang-gang Cockatoo)
- Myotis macropus (Southern Myotis)
- Ninox connivens (Barking Owl)
- Petaurus norfolcensis (Squirrel Glider)
- Phascogale tapoatafa (Brush-tailed Phascogale)

No entities at risk of Serious and Irreversible Impact were identified on the subject land or assessed as having likely habitat within the relevant buffers from the subject land as per the TBDC.

Site selection and project design have a substantial history in the assessment of the study area and subject land, as well as the broader locality associated with the Anambah Urban Release Area. Studies informing the LEP amendments indicated minimal biodiversity constraints on the pastoral

lands in the release area. The project avoided access options through remnant forest and woodland, and proposes the replacement of dams with water quality basins to mitigate aquatic habitat loss.

The proposal will impact 3.71 ha of native vegetation comprising the listed PCTs and forming habitat for the listed Threatened Species, with offsets required for relevant impacts to vegetation zones and species polygons calculated in **Table E2** (Ecosystem Credits) and **Table E3** (Species Credits)

Table E2. Impacts that require an offset – ecosystem credits

Vegetation zone	PCT	TEC/EC	Impact area (ha)	Number of ecosystem credits required
VZ1: 3446_Canopy	3446	Not a TEC	3.26	65
VZ2: 3433_Canopy	3433	Not a TEC	0.45	6

Table E3. Impacts that require an offset – species credits

Scientific name	Common name	Loss of habitat (ha) or individuals	Number of species credits required
Callocephalon fimbriatum	Gang-gang Cockatoo	3.71 ha	72
Myotis macropus	Southern Myotis	1.96 ha	37
Ninox connivens	Barking Owl	3.71 ha	72
Petaurus norfolcensis	Squirrel Glider	3.62 ha	71
Phascogale tapoatafa	Brush-tailed Phascogale	3.62 ha	71

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APPENDICES

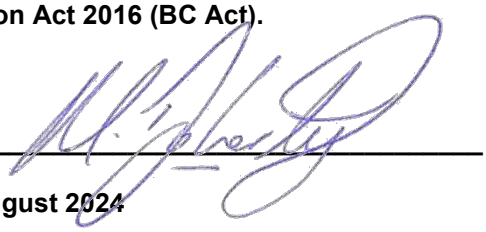
SHORTENED FORMS

APZ	Asset Protection Zone
BAM	Biodiversity Assessment Method
BAM-C	Biodiversity Assessment Method Calculator
BC Act	Biodiversity Conservation Act 2016 (NSW)
BC Regulation	Biodiversity Conservation Regulation 2017 (NSW)
BDAR	Biodiversity Development Assessment Report
BOAMS	Biodiversity Offsets and Agreement Management System
BOS	Biodiversity Offsets Scheme
CDA	Concept Development Application
CEEC	Critically Endangered Ecological Community
Council	Maitland City Council
DBH	Diameter at Breast Height over bark
EC	Ecological Community listed under the EPBC Act
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999 (Cwlth)
EP&A Act	Environmental Planning and Assessment Act 1979 (NSW)
EEC	Endangered Ecological Community
HTW	High Threat Weed
IBRA	Interim Biogeographic Regionalisation for Australia
KAR	Koala Assessment Report
LLS Act	Local Land Services Act 2013 (NSW)
MCC	Maitland City Council
MNES	Matters of National Environmental Significance
NPW Act	National Parks and Wildlife Act 1974 (NSW)
NSW	New South Wales
PCT	Plant Community Type
SAII	Serious and Irreversible Impact
TBDC	Threatened Biodiversity Data Collection
TEC	Threatened Ecological Community
URA	Urban Release Area
VEC	Vulnerable Ecological Community
VI	Vegetation Integrity
Vegetation SEPP	State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017 (NSW)

DECLARATIONS

I. CERTIFICATION UNDER CLAUSE 6.15 BIODIVERSITY CONSERVATION ACT 2016

I certify that this report has been prepared based on the requirements of, and information provided under, the Biodiversity Assessment Method and clause 6.15 of the Biodiversity Conservation Act 2016 (BC Act).

Signature: 

Date: 30 August 2024

BAM Assessor Accreditation no: 17044

This BDAR has been prepared to meet the requirements of BAM 2020. Appendix A provides an assessment of compliance with the minimum information requirements outlined in BAM Appendix K.

II. QUALIFICATIONS AND LICENCING

This BDAR has been prepared by Chris Spraggon (B.Sc.(Hons)), Stephanie Sheehy (B.Sc.), Kurtis Mumford (B.Sc.) and Dr. Simone-Louise Yasui (B.Sc., M.Sc., PhD), under the guidance of Matt Doherty (BAAS# 17044).

Field work for the BDAR by various MJD Environmental (Aust) Pty Ltd. ecological staff. Refer to Appendix K for personnel qualifications.

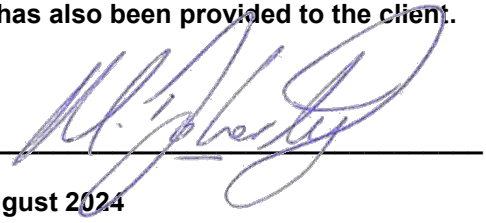
Research was conducted under the following licences:

- NSW National Parks and Wildlife Service Scientific Investigation Licence SL101684 (Valid 31 November 2024).
- Animal Research Authority (Trim File No: 16/170) issued by NSW Department of Primary Industries (Valid 8 February 2027).
- Animal Care and Ethics Committee Certificate of Approval (Trim File No: 16/170) issued by NSW Department of Primary Industries (Valid 8 February 2024 to 8 February 2025).
- Animal Research Establishment Accreditation (No. 85120) issued by NSW Department of Primary Industries (Valid 28 February 2024 to 27 February 2025).

III. CONFLICT OF INTEREST

I declare that I have considered the circumstances and there is no actual, perceived or potential conflict of interest

This declaration has been made in the interests of full disclosure to the decision-maker. Full disclosure has also been provided to the client.

Signature: 

Date: 30 August 2024

BAM Assessor Accreditation no: 17044

STAGE 1: BIODIVERSITY ASSESSMENT

1. Introduction

1.1 Proposed development

1.1.1 Development overview

The Project is for a Concept Development Application (CDA) seeking concept approval for the staged development of the concept master plan, and for which detailed proposals for the Site or for separate parts of the site are to be subject of subsequent Development Applications (DAs), apart from stage 1.

The masterplan creates a new urban subdivision within the Anambah Urban Release Area accommodating a mix of housing types with approximately 900 residential lots, and incorporates open space, roads, pedestrian networks, utilities and services, intersection upgrades and drainage infrastructure.

The application includes a development application for stage 1, which is made up of approximately 240 lots. This stage includes the subdivision of the land, construction of the lots including roads, services, bulk earth works and dedication of reserves. The application includes an intersection to provide access into the development via Anambah Road, together with an emergency flood access to be constructed via the unformed River Road. Refer to **Appendix B Concept Layout**

1.1.2 Proposed development and the subject land

The following nomenclature has been used in this report (Refer to **Figure 1**):

- Study Area – Refers to the affected lot/s including road corridor/s
- Subject Land – Refers to the assessed impact area.

Locality	The subject lands are in Anambah, NSW
Land Title/s	Lot 55 874170 Lot 177. 874171 Part Lot 462 858901 (APZ only) Road Corridors (Anambah Rd, River Rd)
LGA	Maitland
Area	Study Area 136.74 ha approx. Subject Land 76.53 ha approx.
Zoning	R1 General Residential; RU2 Rural Landscape; and RU1 (APZ only)
Minimum Lot Size/s	450 m^2 (smallest; apply R1); 40 ha (apply RU1/2)
Boundaries	The subject land is zoned R1 General Residential and bounded by Anambah Road in the east. To the north and west lie RU1 Primary Production and RU2 Rural Landscape zoned land respectively. To the south lie undeveloped R1 and C4 Environmental Living lands associated with the Anambah Urban Release Area.

Current Land Use	The broader study area and the associated subject land comprise predominantly cleared pastoral land actively and continuously grazed by cattle. The western extent of the study area includes areas of remnant timbered vegetation, from which stock are not excluded.
Topography	The subject land is a gently rolling landscape typified by low relief associated with a series of gullies running downstream generally to the east and south. Elevation and relief increase to the west in the study area lot associated with low slopes, with a peak of 174 m to the west of the study area at Winders Hill. The subject land has a local peak of 53 m in the east, and mirrored in the west, and a low of 25 m in the south. All heights are AHD. Three (3) mapped 1st order watercourses flow north from the northern extent of the subject land, to join as they cross Anambah Road. Another 1st order watercourse flow east and then south, draining onto adjoining land. A 3rd order watercourse intersects the extreme south-west corner of the subject land, flowing east onto adjoining land. Three moderately sized dams are present within the subject land, one occurs on the northern boundary, with the second occurring near the eastern boundary, both of which connect to the northern 1st order watercourses. The largest dam occurs in the southern section of the subject land.

1.1.3 Other documentation

Listed below are other documentation or reports submitted with the proposed development that are relevant to the assessment of biodiversity

- Bushfire Assessment Report – 559 Anambah Road, Gosforth – Bushfire Planning Australia 2024

1.2 Biodiversity Offsets Scheme entry

The subject land is not mapped on the OEH Biodiversity Values Map (**Appendix C Biodiversity Values Map and Threshold tool report**), however the proposal exceeds the area clearing threshold for the relevant minimum lot size (MLS). This is one of the triggers for determining whether the Biodiversity Offsets Scheme applies to the proposed impact.

The threshold for clearing is dependent on the minimum lot size applicable to the land under the relevant Local Environmental Plan, detailed in **Table 1** (the threshold relevant to this proposal is **bold**).

Table 1. BC Regulation 7.2 Table

Minimum lot size associated with the property	Threshold for clearing, above which the Biodiversity Assessment Method and Biodiversity Offsets Scheme apply.
Less than 1 ha	**0.25 ha or more**
1 ha to less than 40 ha	0.5 ha or more
40 ha to less than 1000 ha	1 ha or more
1000 ha or more	2 ha or more

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

The affected Lot with the smallest MLS has a minimum lot size of 450 m^2 and clearing of up to 3.71 ha of native vegetation (>0.25 ha) is proposed, therefore exceeding the area clearing threshold triggering entry into the Biodiversity Offsets Scheme (BOS).

1.3 Excluded impacts

Assessment of impact to biodiversity values of any clearing of native vegetation and loss of habitat has been excluded from Category 1 - exempt land totalling 4.66 ha, occurring in the mapped Asset Protection Zone on RU2 land in the west of the subject land. Assessment of Category 1-exempt land is in accordance with the Drasft Native Vegetation Regulatory Map and detailed site assessment. Prescribed impacts are assessed for Category 1-exempt land. Any areas identified as Category 2-regulated land in the APZ are included in assessment under the BAM. Refer to **Figure 7**.

1.4 Matters of national environmental significance

Preliminary assessment was undertaken having regard to those threatened entities listed under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). Refer to **Appendix D Matters of National Environmental Significance** (MNES), **Appendix E EPBC Likelihood of Occurrence** and **Appendix F EPBC Assessments of Significance**.

This preliminary assessment concluded that no actions associated with the proposal are likely to have a significant impact on a Matter of National Significance. The proposal therefore does not require referral under the EPBC Act. Flora, fauna and ecological communities nominated by the BAM-C and listed under the EPBC Act are tabulated and assessed throughout this BDAR as appropriate and required.

1.5 Other legislative considerations

Other legislation or instruments that require consideration under the proposal and listed below, with relevant Appendices references.

- SEPP (Biodiversity and Conservation) 2021 – an assessment of the BC SEPP as it applies to habitat for the Koala is contained in **Appendix G.** As a result of that assessment, a Koala Assessment Report (KAR) is **Appendix H**.

1.6 Information sources

Key information sources used in the BDAR, including but not limited to:

- *Threatened Biodiversity Data Collection (TBDC);*
- *Biodiversity Assessment Methodology (BAM): Department of Planning, Industry and Environment (DPIE), October 2020;*
- *Biodiversity Assessment Method Operational Manual- Stage 1 Department of Planning, Industry and Environment (DPIE), December 2020; and*
- *NSW survey guide for the Biodiversity Assessment Method; Surveying threatened plants and their habitats (DPIE), April 2020.*
- *NSW survey guide for the Biodiversity Assessment Method; Surveying threatened plants and their habitats (DPIE), April 2020;*
- *NSW Survey Guide for Threatened Frogs – A guide for the survey of threatened frogs and their habitats for the Biodiversity Assessment Method DPIE September 2020;*
- *NSW survey guideline for the Biodiversity Assessment Method; 'Species credit' threatened bats and their habitats (OEH), September 2018;*
- *NSW Department of Planning and Environment – Koala (Phascolarctos cinereus) Biodiversity Assessment Method Survey Guide, 2022;* and
- *NSW Department of Planning and Environment Threatened – Threatened reptiles Biodiversity Assessment Method survey guide, 2022.*

2. Methods

2.1 Site context methods

Where field survey is listed in **Section 2.1** as used to ground truth desktop appraisal of site context, the delineation surveys for site context were carried out on the following dates:

- 6 December 2023
- 23 January 2024
- 15 April 2024

2.1.1 Landscape features

The landscape features of the subject land were assessed by API of high-quality digital aerial photography (NearMap – imagery capture June 16 2024), using GIS Software (QGIS) and *NSW Digital Topographic Database* (NSW DCCEEW 2024). Features were confirmed by ground survey.

2.1.2 Native vegetation cover

The native vegetation cover of the subject land and 1,500 m buffer was carried out by API of high-quality digital aerial photography (NearMap – imagery capture June 16 2024), using GIS Software (QGIS) and the *NSW State Vegetation Type Map* regional PCT data (DCCEEW 2022). Vegetation on the subject land and study area was confirmed by ground survey. A large proportion of the assessment area outside the subject land is private land and not accessible for survey. In all instances where the native condition of vegetation was uncertain at a desktop level, precautionarily this vegetation was included in calculations.

2.2 Native vegetation, threatened ecological communities and vegetation integrity methods

2.2.1 Existing information

Existing information sources used to assist identification of PCT, TEC and vegetation extent for this assessment include:

- NSW State Vegetation Type Map (DCCEEW 2022)
- NSW BioNet (VIS)
- Maitland LEP 2011 Amendment - Anambah Investigation Area (3000 lots) (via NSW Planning Portal, accessed 23 July 2024)
- NSW Landscape - Modified (DEM-S) Elevation layer

2.2.2 Mapping native vegetation extent

In accordance with Section 4.1 of the BAM (2020), native vegetation extent, including all native ground cover and tree canopy cover was mapped within the subject land. Native vegetation extent was mapped using digital aerial photography (as described in **Section 2.1.2**), which was informed by the NSW STVM and by field surveys conducted across the study area.

To assist scale, the extent of River Road south of an unnamed 3rd order watercourse has not been mapped other than in Site and Location maps – no native vegetation has been assessed as present beyond the unnamed 3rd order watercourse.

2.2.3 Plot-based vegetation survey

Plot-based vegetation surveys were conducted within the subject land on the following dates:

- 6 December 2023
- 10 July 2024

During these surveys, seven (7) BAM plots were conducted and included the collection of the following:

- Identification of all flora species to genus where identification attributes were present (in accordance with BAM Section 4.2.1);
- Composition, Structure attributes within 20x20 plot (in accordance with BAM Section 4.3.4); and
- Function attributes within the 20x50 m plot (in accordance with BAM Section 4.3.4)

Locations for sampling were determined differently for areas of extant native timber vegetation and grazed pasture lands. No vegetation on the subject land exists in a remnant or undisturbed form, and a large proportion of the area of native vegetation zones comprises individual and dispersed paddock trees.

Plots to assess timbered vegetation on the site were taken in areas of high coverage, in order to best capture vegetation density when extrapolated to include paddock trees, which have been mapped to canopy drip-line. Plots were carried out in disjunct locations to capture the small amount of variability within the modified landscape.

A sub-sample (reduced from Table 3 requirements from BAM 2020 for the total area of pasture on the subject land) of pasture plots were carried out in areas that were subjectively assessed as having a relatively high native species component (c.f. the general condition of the pasture). This assessment was carried out to determine whether the pasture generally was likely to require further assessment as native vegetation.

These methods are discussed further in Section **4.5.1**.

Refer to **Figure 3** for BAM plot locations.

2.2.4 Vegetation integrity survey

To assess vegetation integrity (vegetation condition) for each of the delineated vegetation zones, the collected BAM plot data was input into the BAM-C to determine the current vegetation integrity scores. All plots were conformant dimensions.

2.3 Threatened flora survey methods

2.3.1 Review of existing information

Existing information sources used to assist identification of habitat constraints, presence of microhabitats and extant woody vegetation for this assessment include:

- NSW State Vegetation Type Map (DCCEEW 2022)
- NSW BioNet (VIS)
- Maitland LEP 2011 Amendment - Anambah Investigation Area (3000 lots) (via NSW Planning Portal, accessed 23 July 2024)
- NSW Landscape - Modified (DEM-S) Elevation layer

A review of threatened species information was undertaken to provide context and understanding of biodiversity and habitat values occurring within the study area. Information reviewed included:

- Species auto-populated by the BAM-C; and
- Online database searches involving a 10 x 10 km search around the Study Area to provide potentially occurring threatened flora and fauna and migratory species under both the BC Act and EPBC Act:
    - NSW Bionet (accessed 22 January 2024 and continually during BIR production)
    - Commonwealth Protected Matters of National Significance search tool (accessed 22 January 2024); and

2.3.2 Habitat constraints assessment

Over the duration of the biodiversity impact assessment, habitat features which would exclude the presence of threatened flora species were assessed. Such features include:

- Cleared and grazed vegetation; and
- Disturbed vegetation, including frequent management or high weed density.

Methods for assessment included API of high-quality digital aerial photography (NearMap – imagery capture 16 June 2024), using GIS Software (QGIS), and confirmed by ground survey.

The absence of woody vegetation on high resolution API was used as an indicator that threatened flora species of the Tree growth form were unlikely to have habitat present. Based on confirmation by ground survey, areas devoid of all woody vegetation were excluded as likely potential habitat for flora species of the Shrub growth form. All candidate species of a ground layer growth form were individually assessed against available potential habitat in timbered and pasture areas of the subject land – resulting in exclusion of these species on the basis of habitat degradation. No other habitat constraints were identified to exclude the presence of the listed flora candidate species, however, geographic limitations were considered (refer to **Section 5**).

2.3.3 Field surveys

Threatened flora surveys were undertaken in accordance with the *NSW Survey guide for the Biodiversity Assessment Method; Surveying threatened plants and their habitats* (DPIE, 2020), or as informed by the TBDC, exceptions are described and justified below. In accordance with Section 4.1 of the flora guidelines (DPIE, 2020), parallel field traverses are conducted to systematically cover all areas of suitable habitat on the subject land. This technique includes the following methodology:

- One ecologist walks along an array of parallel transects searching for the target flora species;
- The separation distance between the parallel transects is set at a distance between 5-40 m depending on the growth form of the species and the density of the vegetation at time of survey (per Table 1 of the guidelines);
- Transects conducted in suitable habitat for each of the targeted species; and
- Transects were recorded using a hand-held GPS unit.

A modified survey technique was utilised in the present survey, considered suitable for the condition and extent of native vegetation. Modified transects were used, which followed a meander through all areas of woody vegetation on the site at a suitable distance to relevant growth forms in the open pasture habitat. Some isolated trees that could be clearly identified to species at a distance were not incorporated into the meander.

Refer to **Figure 4** for all targeted flora surveys.

2.4 Threatened fauna survey methods

2.4.1 Review of existing information

Existing information sources used to assist identification of habitat constraints, presence of microhabitats and extant woody vegetation for this assessment include:

- NSW State Vegetation Type Map (DCCEEW 2022)
- NSW BioNet (VIS)
- Maitland LEP 2011 Amendment - Anambah Investigation Area (3000 lots) (via NSW Planning Portal, accessed 23 July 2024)
- NSW Landscape - Modified (DEM-S) Elevation layer

A desktop assessment of the potential use of the study area by threatened fauna species (as listed under the BC Act and EPBC Act) identified from the vicinity was undertaken prior to the commencement of field surveys (Refer to **Section 3.2**).

Threatened fauna surveys were undertaken in accordance with the requirements and guidelines listed in **Section 1.6**.

2.4.2 Habitat constraints assessment

Over the duration of the biodiversity impact assessment, habitat features within the subject land were identified in accordance with Section 6 of the BAM (2020) and detailed below. The results of the habitat assessments are detailed in Section **5**

Habitat Survey

An assessment of the relative habitat value present within the subject land was undertaken. This assessment focused primarily on the identification of specific habitat types and resources in the subject land favoured by known threatened species from the locality. The assessment also considered the potential value of the subject land (and surrounds) for all major guilds of native flora and fauna. Habitat assessment included:

- presence, size and types of tree hollows within the subject land;
- survey for trees containing suitable hollows for Large Forest Owls;
- presence of Karst, caves, crevices, cliffs, rocks and other geological features of significance;
- vegetation complexity, structure and quality;
- human-made structures that can be utilised by microbats
- presence of freshwater or estuarine aquatic habitats, noting permanency;
- connectivity to adjacent areas of habitat;
- extent and types of disturbance;
- foraging opportunities, such as winter flowering gum utilised by *Lathamus discolor* (Swift Parrot), and mistletoe (*Amyema spp.*) utilised by *Anthochaera phrygia* (Regent Honeyeater);
- (flowering eucalypts, fruits, seeds or other nectar bearing native plants);
- presence and abundance of various potential prey species;
- fallen Timber and hollow logs utilised by ground nesting or foraging threatened fauna; and
- stick nests utilised by threatened raptors.

Habitat assessment was based on the specific habitat requirements of each threatened fauna species with regard to home range, feeding, roosting, breeding, movement patterns and corridor

requirements. Consideration was given to contributing factors including topography, soil, light and hydrology for threatened flora and assemblages.

Hollow bearing tree survey

Hollow bearing tree surveys were undertaken in December 2023, and January, May and June 2024 (**Figure 3**) across the subject land with the following information collected:

- Location (D-GPS);
- Tree species;
- Tree DBH;
- Presences of hollows (including potential hollows) and class;
- Habitat suitability for large Forest Owls; and
- Any observational information.

Secondary Indications and Incidental Observations

Opportunistic sightings of secondary indications (scratches, scats, diggings, tracks etc.) of resident fauna were noted. Such indicators included:

- Distinctive scats left by mammals;
- Scratch marks made by various types of arboreal animals;
- Nests made by various guilds of birds;
- Feeding scars on Eucalyptus trees made by Gliders;
- Whitewash, regurgitation pellets and prey remains from Owls;
- Aural recognition of bird and frog calls;
- Skeletal material of vertebrate fauna; and
- Searches for indirect evidence of fauna (such as scats, nests, burrows, hollows, tracks, and diggings).

2.4.3 Field surveys

Targeted surveys for fauna species recognised to have potential to occur within the subject land were carried out as part of the works informing this BDAR and are described below. All surveys were conducted in accordance with the relevant guidelines listed in **Section 1.6**, with modifications or adjustments made based on survey comments included in the TBDC or specific site considerations and justifications as described.

Refer to **Figure 5** for Field survey locations.

Arboreal Mammals

Arboreal mammal surveys targeting *Phascogale tapoatafa* (Brush-tailed Phascogale) and P*etaurus norfolcensis* (Squirrel Glider) were undertaken using Scout Guard remote wildlife cameras deployed from 23 May to 20 June 2024. Other species are commonly incidentally recorded using this methodology. Cameras were mounted to trees via a bracket or strap and set to record images in bursts of three photos, with a three-minute delay before the next photo sequence would be triggered (Refer to **Figure 5**).

To attract fauna to the camera, a bait station was attached to a tree within 1- 1.5 m of the camera. The bait station was filled with a bait containing a mixture of sardines, oats, honey, and peanut butter. The tree in which the bait station was attached also was sprayed with an attractant of honey / sugar water to increase the chance of arboreal fauna.

A total of 22 cameras were deployed for at least four (4) weeks accounting for 638 camera trap nights undertaken to target arboreal mammals within the subject land.

Arboreal mammal surveys targeting *Phascolarctos cinereus* (Koala) were undertaken on the 5 June and 4 July 2024 by nocturnal spotlighting using headtorches and 6W LED reflector lens handheld searchlights (1 LUX @ 334 m).

Spot Assessment Technique (SAT) surveys were undertaken for *Phascolarctos cinereus* (Koala) on 25 July 2024 as per guidelines.

Avifauna

The observation of diurnal avifauna within the subject land was undertaken via opportunistic observations during other diurnal fieldwork (Refer to **Figure 5**). Rigorous assessment of all remnant timber vegetation was undertaken for large stick nests associated with threatened diurnal birds of prey.

Nocturnal bird surveys were undertaken, and detail of methods employed is outlined in below under Spotlighting and Nocturnal Call Playback survey techniques.

Spotlighting

Spotlighting surveys targeting Large Forest Owls, *Phascolarctos cinereus* (Koala), *Phascogale tapoatafa* (Brush-tailed Phascogale) and *Petaurus norfolcensis* (Squirrel Glider) were undertaken with the use of a Lightforce Enforcer 140mm LED (1 LUX @ 334m) hand-held spotlight and head torch with all areas of timber vegetation targeted.

A total of 10 person hours of spotlighting surveys were conducted over seven (7) nights in June and July 2024.

Nocturnal Call Playback

The use of pre-recorded calls of Forest Owl that may occur within the subject land and surrounding area were broadcast during the nocturnal surveys in an effort to receive a vocal response or to attract the species to the playback site. The calls were broadcast through an amplification system (25W megaphone) designed to project the sound for at least 1 km under still night conditions.

A 10-minute interval of listening and observation time was conducted prior to the surveys. The call of each species was broadcast for 15 seconds followed by 30 seconds of listening time with the sequence of calls being repeated for 15 minutes for each target owl. Volume of the call was increased by 20% of natural volume up to 200% of natural volume with each repeated broadcast. Followed by a search within a 1 ha plot around the broadcast station at the end of the 15-minute repeated broadcast.

A total of six (6) call playback sessions were undertaken over six separate nights. The location of the call playback sites is shown in **Figure 5**.

2.5 Weather conditions

Field surveys were undertaken by MJD Environmental between the 23 May to the 25 July 2024. The prevailing weather conditions during the survey are present in **Table 2** below.

Table 2. Environmental conditions during threatened species surveys

Survey undertaken (e.g. method / targeted species)	**Date**	**Time**	**Temperature** (min. & max.)	**Wind** (light, mod…)	**Rain** (mm)	**Other conditions relevant to the species**
Arboreal camera trapping *Phascogale tapoatafa* *Petaurus norfolcensis*	23/05 – 20/6/24	24 hrs	9.5 -16	WNW 20 km/h – WNW 20 km/h	0	
Owl call play back *Ninox connivens* *Ninox strenua* *Tyto novaehollandiae*	5/06/24	c.6pm	13.7 – 20.7	SE 11 km/hr – SE 20 km/hr	20.8	
	11/06/24	c.6pm	6.1 - 18.5	W 13 km/hr – WNW 19 km/hr	0	
	18/06/24	c.6pm	7.1 – 17.7	WNW 19 km/hr – WNW 9 km/hr	0	
	25/06/24	c.6pm	2.2 – 19.4	W 9 km/hr – Calm	0	
	4/07/24	c.6pm	6.2	SSW 7 km/hr – SSE 20 km/hr	2	
	8/07/24	c.6pm	10.6 – 21.8	SSW 2 km/hr – E 15 km/hr	0	
	25/07/24	c.6pm	7.1 – 19.4	NNW 6 km/hr – SSE 2 km/hr	0	
Call playback *Burhinus grallarius*	4/07/24	c.6pm	6.2	SSW 7 km/hr – SSE 20 km/hr	2	
Spotlight *Phascolarctos cinereus* *Phascogale tapoatafa* *Petaurus norfolcensis* Large Forest Owls	5/06/24	c.7pm	13.7 – 20.7	SE 11 km/hr – SE 20 km/hr	20.8	
	4/07/24	c.7pm	6.2	SSW 7 km/hr – SSE 20 km/hr	2	
SAT *Phascolarctos cinereus*	25/07/24	1200-1630	7.1 – 19.4	NNW 6 km/hr – SSE 2 km/hr	0	No rain in preceding 7 days

2.6 Limitations

Limitations associated with this assessment report are presented herewith. The limitations have been taken into account specifically in relation to threatened species assessments, results and conclusions.

In these instances, a precautionary approach has been adopted, whereby ‘assumed presence’ of known and expected threatened species, populations and ecological communities has been made where relevant and scientifically justified to ensure a holistic assessment.

Seasonality & Conditions

The flowering and fruiting plant species that attract some nomadic or migratory threatened species, often fruit or flower in cycles spanning a number of years. Furthermore, these resources might only be accessed in some areas during years when resources more accessible to threatened species fail. As a consequence, threatened species may be absent from some areas where potential habitat exists for extended periods and this might be the case for nomadic and opportunistic species.

Additionally, Eastern Australia experienced substantially wetter conditions during the summer of 2021 – 2022 due to the declared La Nina. The climate event likely had influence on species occurrence, behaviours and vegetation community traits.

Data Availability & Accuracy

The collated threatened flora and fauna species records provided by NSW BioNet are known to vary in accuracy and reliability. This is usually due to the reliability of information provided to the National Parks and Wildlife Service (NPWS) for collation and/or the need to protect specific threatened species locations. During the review of threatened species records sourced from BioNet Atlas of NSW, consideration has been given to the date and accuracy of each threatened species record in addition to an assessment of habitat suitability within the subject land.

Similarly, EPBC Protected Matters Searches provide a list of threatened species and communities that have been recorded within 10 km of the study area, or which have suitable habitat within the wider area, and are subject to the same inherent inaccuracy issues as the State derived databases.

In order to address these limitations in respect to data accuracy, threatened species records have only been used to provide a guide to the types of species that occur within the locality of the study area. Consequently, BAM assessment and the results of surveys conducted within the subject land and surrounds have been used to assess the likelihood of occurrence of threatened species, populations and ecological communities to occur therein.

3. Site context

3.1 Assessment area

The following section provides a description of the landscape features within the subject land and surrounding 1,500 m buffer as outlined in Section 3 of the BAM (2020). Refer to **Figure 1** for Location Map.

3.2 Landscape features

Landscape features identified within the subject land and assessment area are shown on **Figure 2**. A discussion of relevant landscape features is provided below.

Features were assessed by high-resolution aerial image interpretation (NearMap) of the assessment area, coupled with use of DEM-S elevation data overlay and NSW basemap. The subject land was subject to a full site walkover, and the study area was also subject to a meandering walkover

3.2.1 IBRA bioregions and IBRA subregions

Bioregion

The study area occurs wholly within the Sydney Basin Bioregion. The Syndey Basin Bioregion is includes a significant proportion of the catchments of the Hawkesbury Nepean, Hunter and Shoalhaven river systems, all of the smaller catchments of Lake Macquarie, Lake Illawarra, Hacking, Georges and Parramatta Rivers, and smaller portions of the headwaters of the Clyde and Macquarie rivers (NPWS 2003).

This Bioregion borders the NSW North Coast, Brigalow Belt South, NSW South Western Slopes, South Eastern Highlands, and South East Corner bioregions.

Subregion

The study area occurs wholly within the Hunter subregion.

3.2.2 Rivers, streams, estuaries and wetlands

The study area is located within the Hunter River catchment in the Hunter region, with the Hunter River occurring approximately 0.8 km northwest of the extent of the study area.

The hydrology of the subject land is characterised by four 1st order ephemeral streams that meander for approximately a kilometre before reaching the Hunter River to the north. Three of the 1st order streams run toward the northeast. A fourth 1st order stream runs east to west through the south of the site, passing through one of the dams. A 3rd order stream intersects the extreme south-west corner of the subject land, flowing east into adjoining land. Three dams within the subject land provide for grazing cattle.

3.2.3 Habitat connectivity

Connectivity is provided to the broader landscape by a vegetation corridor to the west of the lot which may facilitate the movement of fauna to more intact vegetation patches to the southwest of the subject land. However, connectivity within the subject land is limited, typified by isolated paddock trees which could facilitate the movement of more mobile species.

3.2.4 Karst, caves, crevices, cliffs, rocks or other geological features of significance

There are no occurrences of karst, caves, crevices or cliffs within the study area. The topography of the study area is typically undulating with no apparent escarpments nearby. Rocky outcrop occurs within the subject land and within the broader landscape, namely along the western aspect of Summer Hill west of the site.

3.2.5 Areas of outstanding biodiversity value

There are no Areas of Outstanding Biodiversity Values within the 1,500 m buffer or in the general locality of the study area.

3.2.6 NSW (Mitchell) landscape

The study area occurs wholly within the Sydney Basin Hunter *Nrm Newcastle Coastal Ramp:*

From Mitchell (2002): 'Undulating lowlands and low to steep hills on complex patterns of faulted and gently folded Carboniferous conglomerate, lithic sandstone, felspathic sandstone, and mudstone, general elevation 50 to 275m, local relief 40 to 150m. Stony red texture-contrast soils on steep slopes, yellow and brown texture-contrast soils on lower slopes and deep dark clay loams along streams. Woodland of spotted gum (*Corymbia maculata*), forest red gum (*Eucalyptus tereticornis*), red ironbark (*Eucalyptus sideroxylon*), white mahogany (*Eucalyptus acmenoides*), large-fruited grey gum (*Eucalyptus canaliculata*), with sub-tropical rainforest elements in sheltered gullies. Similar eucalypts with forest oak (*Allocasuarina torulosa*) and grasses on lower slopes, merging to forest of smooth-barked apple (*Angophora costata*), red bloodwood (*Corymbia gummifera*), blackbutt (*Eucalyptus pilularis*) with bracken (*Pteridium esculentum*) and grasses nearer the coast.'

3.2.7 Soil hazard features

A review of the Acid Sulphate Soils Risk mapping (Naylor et al 1998) records indicate the Study Area has not been assessed for ASS.

3.3 Native vegetation cover

Native vegetation cover was determined using QGIS and applying a 1500m buffer to the R1 zoned land subject to the proposal, the extent of the unformed River Road assessed. This formed the Assessment Area, totalling 1,973 ha.

Native vegetation cover was assessed using NVACE_v1 (DCCEEW 2024). The layer was overlaid and clipped to the assessment area. Using 2023 Aerial imagery (NearMap), polygons were assessed for native vegetation. Polygons containing no native vegetation were removed. Polygons containing partial native vegetation were split. Uncertain vegetation was retained (generally pasture of unknown composition). The resulting native vegetation cover was 33%.

Table 3 summarises the extent of native vegetation cover within the assessment area. **Figure 2** shows native vegetation cover within the assessment area.

Table 3. Native vegetation cover in the assessment area

Assessment area (ha)	1,973
Total area of native vegetation cover (ha)	652
Percentage of native vegetation cover (%)	33%
Class (0-10, >10-30, >30-70 or >70%)	>30-70

4. Native Vegetation, Threatened Ecological Communities and Vegetation Integrity

4.1 Native vegetation extent

The subject land is 76.53 ha in size, comprising 3.71 ha of native vegetation (3.26 ha of PCT 3446 and 0.45 ha of PCT 3433), 66.84 ha of pasture (non-native vegetation), 4.66 ha of Category 1 – excluded land (comprising pasture, as assessed), 0.26 ha of unvegetated land (hard surface, built form), and 0.79 ha of waterbodies. Refer to **Figure 2** Native Vegetation Extent

4.1.1 Changes to the mapped native vegetation extent

Native vegetation extent on the subject land was assessed by digital aerial photography (as described in **Section 2.1.2**) and confirmed by field surveys conducted across the entire extent of the subject land. Native vegetation extent on the subject land conforms with aerial imagery.

4.1.2 Areas that are not native vegetation

The cleared grazing land within the subject land has been identified as not native vegetation for assessment. The extent of the cleared grazing land in the subject land was traversed, and areas that were observed to have greater occurrence and cover of native grasses were assessed by conducting three (3) BAM plots to determine if they were assessable as native vegetation. The results are summarised in **Section 4.5** – the pasture was assessed as not constituting native vegetation.

Based on the above assessment of the pasture, along with the broader context of other pasture land on nearby landholdings within the Urban Release Area (URA), the unformed River Road corridor has been assessed as not native vegetation, with the exception of all woody vegetation visible on high resolution aerial imagery, which has been conservatively mapped as PCT 3433. No surveys have been carried out over this land due to access constraints. Further, all formed roads, large areas of bare earth, structures and open water were assessed as not native vegetation.

To assist scale, the extent of River Road south of an unnamed 3rd order watercourse has not been mapped other than in Site and Location maps – no native vegetation has been assessed as present beyond the unnamed 3rd order watercourse.

4.2 Plant community types

4.2.1 Overview

The subject land is approximately 76.53 ha in size, of which 3.71 ha was observed as native vegetation. The extent of native vegetation has been interpreted using API and ground truthing during field survey works.

The vegetation within the subject land has been broadly cleared historically for grazing. The historic land use has resulted in a pasture landscape composed of native and exotic species, including high threat exotic species (HTE). The subject land contains a number of large mature eucalypt paddock trees, and some small stands of late regeneration eucalypt.

Vegetation within the subject land has been assessed as aligning with the BioNet Vegetation Classification PCTs identified within **Table 4** and their extent is shown in **Figure 3 Plant Community Types & Vegetation Zones**.

NB due to the substantial clearance and fragmentation of the land, the low diversity of floristic species assemblages and associated modified landform, PCTs identified have been assigned as ‘Best-Fit’.

Identification of PCTs within the subject land were determined using:

- Occurrence within the Sydney IBRA bioregion & Hunter Sub-region;
- Vegetation formation and class:
- landscape position; and
- dominant species noted during field data collected from the full floristic plots/transects established in accordance.

Due to the Best-Fit assignation of PCTs in a cleared agricultural landscape, data from the contemporary and historical SVTM resources within the broader locality was also used to filter potential PCTs. Detailed descriptions of each PCT are provided in the following subsections.

Vegetation within the subject land is characterised by a canopy of *Corymbia maculata* (Spotted Gum), with either *Eucalyptus crebra* (Narrow Leaved Ironbark) or *Eucalyptus moluccana* (Grey Box) respectively in PCT 3446 and 3433, with rare *Eucalyptus fibrosa* (Broad-leaved Ironbark) and *Eucalyptus acmenoides* (White Mahogany). The site occurs over gentle undulating hills containing grassland that is predominantly non-native. The site has been heavily grazed by beef cattle and has been almost completely cleared since at least 1954 (NSW Historic Aerial Imagery).

Table 4. PCTs identified within the subject land

PCT ID	PCT name	Subject land area (ha)
3446	Lower North Foothills Ironbark-Box-Gum Grassy Forest	3.26
3433	Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest	0.45
	Total area	**3.71**

4.2.2 PCT 3446 Lower North Foothills Ironbark-Box-Gum Grassy Forest

4.2.2.1 PCT overview

Table 5. PCT 3446 Lower North Foothills Ironbark-Box-Gum Grassy Forest

PCT ID	3446
PCT name	Lower North Foothills Ironbark-Box-Gum Grassy Forest
Vegetation formation	Dry Sclerophyll Forests (Shrub/grass sub-formation)
Vegetation class	Hunter-Macleay Dry Sclerophyll Forests
Per cent cleared value (%)	74.93
Extent within subject land (ha)	3.26

The PCT exists on the subject land as disparate patches of remnant trees, isolated large mature paddock trees, and patches of late canopy regeneration surrounding a large mature paddock tree. In most areas the native vegetation is limited to canopy, with limited or no shrub layer and generally limited native groundcover. Hollow bearing trees of a range of sizes occur in this PCT throughout the subject land. All areas of the PCT on the subject land are subject to ongoing grazing of beef cattle.

Plate 1 PCT 3446 Lower North Foothills Ironbark-Box-Gum Grassy Forest

4.2.2.2 Condition states

The PCT exists as a highly disturbed and fragmented community in a broadly cleared agricultural landscape. As such, the variability within the PCT on the subject land is not considered substantial enough to warrant separation into multiple Vegetation Zones. Nonetheless, variation across the land does occur, with variation in canopy cover and native groundcover most apparent. When assessing the PCT for biodiversity value, plots were carried out in the areas of high canopy cover, to conservatively capture vegetation integrity and support the inclusion of paddock trees to dripline.

4.2.2.3 Justification of PCT selection

On the subject land, PCT selection is considered 'Best-Fit', as floristic diversity is limited and the landscape highly fragmented. To assist PCT selection, contemporary and historical NSW SVTM resources within the broader locality were used to guide likely PCTs.

Initial PCT trims were carried out by occurrence of Dry Sclerophyll Forest in the Hunter subregion of the Sydney Basin bioregion (limiting results to Eastern NSW PCT Classification). Further trims were carried out to filter PCTs with outlying rainfall or elevation relative to the subject land. PCT names were used to trigger further assessment of PCTs associated with locations or landforms unsuitable for the location of the subject land, and these were removed if appropriate. Finally, characteristic tree growth form species were filtered by *Corymbia maculata* and *Eucalyptus moluccana*, the most consistent canopy dominants on the subject land. A review of the vegetation descriptions for the resulting output (four [4] PCTs, including 3446 described here and 3433 [see Section **4.2.3**]) resulted in the removal of 3442 and 3444 on the basis of listed *Eucalyptus fibrosa* dominance and groundcover assemblage, and rainfall ranges inconsistent with the subject land.

4.2.2.4 Alignment with TECs

BC Act **Endangered** – *Hunter Lowland Redgum Forest in the Sydney Basin and New South Wales North Coast Bioregions* (NSW BioNet VIS, at 19 June 2024).

Based on landscape position, geology and IBRA subregion this PCT on the subject land is potentially a degraded example of this TEC. However, key characteristic tree species are rare to absent from the subject land (*Eucalyptus tereticornis* and *E. punctata* respectively). Characteristic species from other growth forms are almost entirely absent. The vegetation on the site is highly fragmented, reduced to paddock trees and small remnants with limited species assemblage. Floristic and structural diversity has been degraded by historical land use to the extent that insufficient components of the TEC persist to identify this PCT on the subject land as an example of this TEC. This TEC is not further assessed.

4.2.2.5 Alignment with EPBC Act listed ECs

EPBC Act **Critically Endangered** – *Central Hunter Valley eucalypt forest and woodland* (NSW BioNet VIS, at 19 June 2024).

The PCT and single VZ representing extant woody native vegetation on the subject land has been determined not to be representative of the CEEC. Native groundcover throughout the subject land is generally below all relevant coverage thresholds in the approved Conservation Advice, and scattered trees do not meet patch size or tree density thresholds. An area of higher groundcover in the south-west supports both *Eucalyptus acmenoides* and *E. fibrosa* in the canopy – both contraindicative species. This CEEC is considered unlikely to occur and is not further assessed.

4.2.3 PCT 3433 Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest

4.2.3.1 PCT overview

Table 6. PCT 3433 Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest

PCT ID	3433
PCT name	Lower North Foothills Ironbark-Box-Gum Grassy Forest
Vegetation formation	Dry Sclerophyll Forests (Shrub/grass sub-formation)
Vegetation class	Hunter-Macleay Dry Sclerophyll Forests
Per cent cleared value (%)	68.6
Extent within subject land (ha)	0.45

The PCT exists on the subject land as an isolate area of remnant trees and sub-canopy. The woody native vegetation occurs sparsely as canopy, sub-canopy, and very sparse shrubs. Native groundcover is better than average for the subject land, proportionally nearing half of all groundcover. High Threat Exotic cover is generally consistent with all timbered areas on the subject land. This PCT includes hollow bearing trees. The PCT on the subject land is subject to ongoing grazing of beef cattle. `

Plate 2 PCT 3446 Lower North Foothills Ironbark-Box-Gum Grassy Forest

4.2.3.2 Condition states

The PCT exists as a highly disturbed and fragmented community in a broadly cleared agricultural landscape. No substantial variability within the PCT on the subject land as mapped is apparent. The PCT is assessed as a single vegetation zone.

4.2.3.3 Justification of PCT selection

On the subject land, PCT selection is considered 'Best-Fit', as floristic diversity is limited and the landscape highly fragmented. To assist PCT selection, contemporary and historical NSW SVTM resources within the broader locality were used to guide likely PCTs.

Initial PCT trims were carried out by occurrence of Dry Sclerophyll Forest in the Hunter subregion of the Sydney Basin bioregion (limiting results to Eastern NSW PCT Classification). Further trims were carried out to filter PCTs with outlying rainfall or elevation relative to the subject land. PCT names were used to trigger further assessment of PCTs associated with locations or landforms unsuitable for the location of the subject land, and these were removed if appropriate. Finally, characteristic tree growth form species were filtered by *Corymbia maculata* and *Eucalyptus moluccana*, the most consistent canopy dominants on the subject land. A review of the vegetation descriptions for the resulting output (four [4] PCTs, including 3433 described here and 3446 [see Section **4.2.2**]) resulted in the removal of 3442 and 3444 on the basis of listed *Eucalyptus fibrosa* dominance and groundcover assemblage, and rainfall ranges inconsistent with the subject land.

4.2.3.4 Alignment with TECs

BC Act **Endangered** – *Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions* (NSW BioNet VIS, at 19 June 2024).

The condition of the single VZ associated with this PCT, representing extant woody native vegetation, is too fragmented and disturbed to effectively assess the species assemblage with reference to characteristic species listed in the Threatened Species Scientific Committee final determination for *Lower Hunter Spotted Gum Ironbark Forest* etc. A single characteristic species (*Corymbia maculata*) occurs, however this is a widespread species, characteristic of 59 East Coast PCTs and four (4) TECs in the Hunter. While the landscape position and geology is within the bounds described in the final determination, the VZ has been assessed as not representative of the TEC.

4.2.3.5 Alignment with EPBC Act listed ECs

No associated EPBC Act listed Ecological Communities (NSW BioNet VIS, at 19 June 2024).

4.3 Threatened ecological communities

No PCTs have been identified as representative of TECs on the subject land.

4.4 Vegetation zones

The timbered vegetation on the subject land, assigned to two (2) PCTs as per **Section 4.2**, were not further stratified into separate vegetation zones (VZ). This approach is justified on the basis that no substantial variation occurs within the subject land on a scale that can be well represented using the BAM. Areas are generally small and isolated, and limited areas exist of sufficient size to contain floristic plots. Conservatively, paddock trees have been assessed using woodland plots to avoid their potential exclusion from assessment for biodiversity values.

As such, two (2) VZs exist on the subject land: PCT 3446 (Canopy) & PCT 3433 (Canopy) and they are shown in **Figure 3.** Plots were carried out as per **Plate 3** – Table 3 of BAM (2020).

The pasture on the subject land was investigated for further assessment as described in **Section 2.2** and further in **Section 4.5**. The assessment determined that the pasture would not be considered further as native vegetation. The Plot IDs used for the assessment of pasture were B01, B02 & B03. Survey data for pasture land is included in **Appendix I** but is otherwise not further assessed.

The unformed River Road corridor has been assessed (see **Section 4.1.2**) as equivalent to the pasture on the development lots, with the exception of any woody vegetation which has been assigned to PCT 3433 (VZ2 -3433_Canopy).

To assist scale, the extent of River Road south of an unnamed 3rd order watercourse has not been mapped other than in Site and Location maps – no native vegetation has been assessed as present beyond the unnamed 3rd order watercourse.

Patch size was assessed using high-resolution aerial imagery and assessed for hostile connections of > 100m across the subject land and into adjoining lands. It was determined that patch sizes exceeded 100 ha for all VZs. Paddock trees isolated from other parts of VZs by more than 100m were assigned patch size of < 5 ha.

Vegetation zones are summarised in **Table 7**.

Table 3 Minimum number of plots required per zone area

Vegetation zone area (ha)	Minimum number of plots
<2	1 plot
>2–5	2 plots
>5–20	3 plots
>20–50	4 plots
>50–100	5 plots
>100–250	6 plots
>250–1000	7 plots; more plots may be needed if the condition of the vegetation is variable across the zone
>1000	8 plots; more plots may be needed if the condition of the vegetation is variable across the zone

Plate 3 Table 3 of the Biodiversity Assessment Method 2020

Table 7. Vegetation zones and patch sizes

Vegetation zone ID	Condition / other defining feature	Area (ha)	Patch size class (select multiple if areas of native vegetation are discontinuous)	No. vegetation integrity plots Completed (Required)	Plot IDs of vegetation integrity plots used in assessment
3446_Canopy	Canopy	3.26	☒ <5 ha ☐ 5–24 ha ☐ 25–100 ha ☒ >100 ha	3 (2)	B05 B07 B04
3433_Canopy	Canopy	0.45	☒ <5 ha ☐ 5–24 ha ☐ 25–100 ha ☒ >100 ha	1 (1)	B06

4.5 Vegetation integrity (vegetation condition)

4.5.1 Vegetation integrity survey plots

Required minimum vegetation integrity survey plots have been sampled in accordance with BAM section 4.3.4 (Table 3) for each assessable VZ. The minimum number of plots has been assigned to each VZ based upon these guidelines (See **Table 7**). Vegetation Integrity results are in **Table 8**

The grazed pasture land, which has been assessed as non-native vegetation and not assigned a VZ under a PCT, was assessed using three (3) plots (B01-03). For the size of that land, the BAM (2020) requires five (5) plots. As discussed in Section **4.1.2**, the plots were carried out on parts of the land with the subjectively highest native component to determine the potential for assessable vegetation. As sample did not generate a VI score that met the relevant thresholds as per BAM section 9.2.1, the plot sample was deemed sufficient to demonstrate pasture condition.

As both PCTs on the subject land were selected as Best-Fit, the condition of pasture was assessed against the benchmark for both PCTs (i.e. using each PCT as the basis for the VZ in the BAM-C). Each PCT resulted in the same scores for composition, structure, function and vegetation integrity. As the assessment was indicative, and resulted in a sub-threshold VI score for the subjectively assessed highest native component, the pasture has not been carried as an assessable vegetation zone in the BAM-C.

4.5.2 Scores

Table 8. Vegetation integrity scores

Vegetation zone ID	Composition condition score	Structure condition score	Function condition score (where relevant)	Vegetation integrity score	Hollow bearing trees present?
3446_Canopy	36.9	33.8	50.7	39.8	Yes
3433_Canopy	22.4	36.1	38	31.4	Yes
NA – Pasture (see 4.5.1)*	18.3	17	14.2	*16.4***	No

** not carried for assessment* ***Indicative score - does not represent aggregate pasture condition.*

4.5.3 Use of benchmark data

Default benchmarks were used.

5. Habitat suitability for threatened species

Habitat surveys over the subject land (see **Section 2**) extensively assessed potential and actual foraging, breeding and refuge habitat for threatened and protected entities. The subject land includes Eucalypt trees which are hollow-bearing (see **Figure 3**), including hollows of all size classes and suitably elevated for the constraints of hollow-dependent species associated with the PCTs on the subject land. No large stick nests suitable for birds of prey occur within the subject land. The subject land includes waterbodies in the form of farm dams, and pools in watercourses crossing the subject land, including stretches 3 m and wider. The waterbodies generally lack substantial emergent or fringing vegetation, and riparian vegetation forming riparian habitat is generally absent. The watercourses on the subject land are ephemeral with the exception of the pools, with the channel generally defined by a cover of low grazed High Threat Weeds. In a very limited area of the subject land, deeply embedded surface rocks are exposed at a local high point. The rocks are densely grown through and around with High Threat Weeds which occupy any cracks, and none of the rocks can be lifted or moved by hand, indicating that the rocks do not provide substantial habitat for any candidate species associated with PCTs on the subject land.

5.1 Identification of threatened species for assessment

5.1.1 Ecosystem credit species

Table 9. Predicted ecosystem credit species

Scientific name	Common name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID	Sensitivity to gain class
		BC Act	EPBC Act						
Anthochaera phrygia	Regent Honeyeater	Critically Endangered	Critically Endangered	Yes	BAM-C	Yes	N/A	3433;3446	High
Artamus cyanopterus cyanopterus	Dusky Woodswallow	Vulnerable	Not Listed	No	BAM-C	Yes	N/A	3433;3446	Moderate
Callocephalon fimbriatum	Gang-gang Cockatoo	Endangered	Endangered	Yes	BAM-C	Yes	N/A	3433;3446	Moderate
Calyptorhynchus lathami lathami	South-eastern Glossy Black-Cockatoo	Vulnerable	Vulnerable	Yes	BAM-C	**No**	Habitat Constraint – absence of *Casuarina* or *Allocasuarina* spp.	NA - excluded	High
Chthonicola sagittata	Speckled Warbler	Vulnerable	Not Listed	No	BAM-C	Yes	N/A	3433;3446	High

Scientific name	Common name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID	Sensitivity to gain class
		BC Act	EPBC Act						
Circus assimilis	Spotted Harrier	Vulnerable	Not Listed	No	BAM-C	Yes	N/A	3433;3446	Moderate
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	Vulnerable	Vulnerable	No	BAM-C	Yes	N/A	3433;3446	High
Daphoenositta chrysoptera	Varied Sittella	Vulnerable	Not Listed	No	BAM-C	Yes	N/A	3433;3446	Moderate
Dasyurus maculatus	Spotted-tailed Quoll	Vulnerable	Endangered	No	BAM-C	Yes	N/A	3433;3446	High
Ephippiorhynchus asiaticus	Black-necked Stork	Endangered	Not Listed	No	BAM-C	Yes	N/A	3433;3446	Moderate
Falco subniger	Black Falcon	Vulnerable	Not Listed	No	BAM-C	Yes	N/A	3433;3446	Moderate
Falsistrellus tasmaniensis	Eastern False Pipistrelle	Vulnerable	Not Listed	No	BAM-C	Yes	N/A	3433	High
Glossopsitta pusilla	Little Lorikeet	Vulnerable	Not Listed	No	BAM-C	Yes	N/A	3433;3446	High
Haliaeetus leucogaster	White-bellied Sea-Eagle	Vulnerable	Not Listed	Yes	BAM-C	Yes	N/A	3433;3446	High
Hieraaetus morphnoides	Little Eagle	Vulnerable	Not Listed	Yes	BAM-C	Yes	N/A	3433;3446	Moderate
Hirundapus caudacutus	White-throated Needletail	Vulnerable	Vulnerable	No	BAM-C	Yes	N/A	3433;3446	High
Ixobrychus flavicollis	Black Bittern	Vulnerable	Not Listed	No	BAM-C	Yes	N/A	3433;3446	Moderate
Lathamus discolor	Swift Parrot	Endangered	Critically Endangered	Yes	BAM-C	Yes	N/A	3433;3446	Moderate
Limicola falcinellus	Broad-billed Sandpiper	Vulnerable	Not Listed	Yes	BAM-C	Yes	N/A	3433;3446	High

Scientific name	Common name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID	Sensitivity to gain class
		BC Act	EPBC Act						
Lophoictinia isura	Square-tailed Kite	Vulnerable	Not Listed	Yes	BAM-C	Yes	N/A	3433;3446	Moderate
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	Vulnerable	Not Listed	No	BAM-C	Yes	N/A	3433;3446	Moderate
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	Vulnerable	Not Listed	No	BAM-C	Yes	N/A	3433;3446	High
Miniopterus australis	Little Bent-winged Bat	Vulnerable	Not Listed	Yes	BAM-C	Yes	N/A	3433;3446	High
Miniopterus orianae oceanensis	Large Bent-winged Bat	Vulnerable	Not Listed	Yes	BAM-C	Yes	N/A	3433;3446	High
Neophema pulchella	Turquoise Parrot	Vulnerable	Not Listed	No	BAM-C	Yes	N/A	3433;3446	High
Nyctophilus corbeni	Corben's Long-eared Bat	Vulnerable	Vulnerable	No	BAM-C	Yes	N/A	3433	High
Pandion cristatus	Eastern Osprey	Vulnerable	Not Listed	Yes	BAM-C	Yes	N/A	3433;3446	Moderate
Petroica boodang	Scarlet Robin	Vulnerable	Not Listed	No	BAM-C	Yes	N/A	3433;3446	Moderate
Petroica phoenicea	Flame Robin	Vulnerable	Not Listed	No	BAM-C	Yes	N/A	3433;3446	Moderate
Phoniscus papuensis	Golden-tipped Bat	Vulnerable	Not Listed	No	BAM-C	Yes	N/A	3433;3446	High
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	Vulnerable	Not Listed	No	BAM-C	Yes	N/A	3433;3446	Moderate

Scientific name	Common name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID	Sensitivity to gain class
		BC Act	EPBC Act						
Pseudomys gracilicaudatus	Eastern Chestnut Mouse	Vulnerable	Not Listed	No	BAM-C	Yes	N/A	3433	High
Pseudomys novaehollandiae	New Holland Mouse	Not Listed	Vulnerable	No	BAM-C	Yes	N/A	3433;3446	High
Pteropus poliocephalus	Grey-headed Flying-fox	Vulnerable	Vulnerable	Yes	BAM-C	Yes	N/A	3433;3446	High
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	Vulnerable	Not Listed	No	BAM-C	Yes	N/A	3433;3446	High
Stagonopleura guttata	Diamond Firetail	Vulnerable	Vulnerable	No	BAM-C	Yes	N/A	3433;3446	Moderate
Tyto longimembris	Eastern Grass Owl	Vulnerable	Not Listed	No	BAM-C	Yes	N/A	3433	Moderate

Excluded Ecosystem Credit Species

- *Calyptorhynchus lathami lathami* (South-eastern Glossy Black-Cockatoo) – excluded on the basis of BAM-C Habitat Constraint – Presence of *Allocasuarina* and *Casuarina* species. No suitable foraging vegetation occurs on the subject land. The subject land is almost entirely without sub-canopy or shrubs. Rigorous surveys of all vegetation on the subject land were carried out and did not detect individuals of *Allocasuarina* or *Casuarina*. As such, exclusion of this species foraging habitat from the subject land is justified.

5.1.2 Species credit species

Table 10. Predicted flora species credit species

Scientific name	Common name	Listing status		Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
		BC Act	EPBC Act				
Acacia bynoeana	Bynoe's Wattle	E	V	BAM-C	Yes	N/A	3433
Angophora inopina	Charmhaven Apple	V	V	BAM-C	Yes	N/A	3433
Callistemon linearifolius	Netted Bottle Brush	V	--	BAM-C	Yes	N/A	3433
Corybas dowlingii	Red Helmet Orchid	E	--	BAM-C	**No**	1. Geographic limitation; note that BAM-C lists 'East of Morpeth' as a Geographic limitation, but the Candidate Species Report does not and says 'Refer to BAR'.	
Eucalyptus castrensis	Singleton Mallee	E	--	BAM-C	Yes	N/A	3446
Eucalyptus glaucina	Slaty Red Gum	V	V	BAM-C	Yes	N/A	3433;3446
Eucalyptus parramattensis subsp. decadens	Eucalyptus parramattensis subsp. decadens	V	V	BAM-C	Yes	N/A	3433
Eucalyptus pumila	Pokolbin Mallee	V	V	BAM-C	Yes	N/A	3433;3446
Grevillea parviflora subsp. parviflora	Small-flower Grevillea	V	V	BAM-C	Yes	N/A	3433;3446
Persoonia pauciflora	North Rothbury Persoonia	CE	CE	BAM-C	**No**	1. Geographic limitation; note that BAM-C lists 'Within 10km of North Rothbury' as a Geographic limitation, but the Candidate Species Report does not and says 'Refer to BAR'.	
Pomaderris queenslandica	Scant Pomaderris	E	--	BAM-C	Yes	N/A	3433
Prostanthera cineolifera	Singleton Mint Bush	V	V	BAM-C	Yes	N/A	3433;3446
Pterostylis chaetophora	Pterostylis chaetophora	V	--	BAM-C	**No**	3. Microhabitats	

Scientific name	Common name	Listing status		Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
		BC Act	EPBC Act				
Rhodamnia rubescens	Scrub Turpentine	CE	CE	BAM-C	**No**	3. Microhabitats	
Rutidosis heterogama	Heath Wrinklewort	V	V	BAM-C	**No**	3. Microhabitats	
Spyridium burragorang - endangered population	Spyridium burragorang in the Cessnock local government area	E	--	BAM-C	**No**	1. Geographic limitation; note that limitations are taken from TBDC and not provided in BAM-C	
Syzygium paniculatum	Magenta Lilly Pilly	E	V	BAM-C	**No**	3. Microhabitats	
Tetratheca juncea	Black-eyed Susan	V	V	BAM-C	**No**	1. Geographic limitation; note that limitations are taken from TBDC and not provided in BAM-C; 3. Microhabitats	

Excluded Flora Species Credit Species

- *Corybas dowlingii* (Red Helmet Orchid)
    - This species is excluded on the basis of subject land located west of Morpeth, NSW. Geographic limitation as per BAM-C.
- *Persoonia pauciflora* (North Rothbury Persoonia)
    - This species is excluded on the basis of subject land located >10 km from North Rothbury, NSW. Geographic limitation as per BAM-C.
- *Pterostylis chaetophora* (Pterostylis chaetophora)
    - This species has been excluded on the basis of inadequate microhabitat on the subject land. The species prefers seasonally moist, dry sclerophyll forest with a grass and shrub understorey, or other open grassy forest. The subject land has limited to absent native grass or shrub understorey, and a ground layer and soil profile that is highly and continuously disturbed by cattle grazing. The subject land has been consistently cleared and grazed since at least 1954 (NSW Spatial Services Historical Imagery).
- *Rhodamnia rubescens (Scrub Turpentine)*
    - This species has been excluded on the basis of inadequate microhabitat on the subject land. This species grows in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest. The subject land has limited to absent shrub layer and the very sparse canopy provides no suitable sheltered areas for this species to persist.

- *Rutidosis heterogama (Heath Wrinklewort)*
    - This species has been excluded on the basis of inadequate microhabitat on the subject land. The species grows in heath on sandy soils and moist areas in open forest. The subject land is not characterised by suitable vegetation or geology. The subject land has limited to absent native grass or shrub understorey, and a ground layer and soil profile that is highly and continuously disturbed by cattle grazing. The subject land has been consistently cleared and grazed since at least 1954 (NSW Spatial Services Historical Imagery).
- *Spyridium burragorang* - endangered population (*Spyridium burragorang* in the Cessnock local government area)
    - This species has been excluded on the basis of its highly limited distribution, currently known from a single site in the western part of Werakata State Conservation Area approximately 4 km southwest of Cessnock and covers approximately 3.9 ha (NSW Scientific Committee - final determination). The subject land is over 25 km from the known extent of this species outlier population. Further, the subject land has limited to absent native grass or shrub understorey, and a ground layer and soil profile that is highly and continuously disturbed by cattle grazing. The subject land has been consistently cleared and grazed since at least 1954 (NSW Spatial Services Historical Imagery).
- *Syzygium paniculatum* (Magenta Lilly Pilly)
    - This species has been excluded on the basis of inadequate microhabitat on the subject land. This species grows in riverside gallery rainforests and remnant littoral rainforest communities. The subject land is not characterised by suitable vegetation or landscape position. The subject land has limited to absent shrub layer and the very sparse canopy provides no suitable sheltered areas for this species to persist.
- *Tetratheca juncea* (Black-eyed Susan)
    - This species has been excluded on the basis of its distribution in TBDC, occurring in the local government areas of Wyong, Lake Macquarie, Newcastle, Port Stephens, Great Lakes and Cessnock. The subject land is located in Maitland LGA. No records of the species occur within at least 15 km of the subject land. Further, the subject land has limited to absent native grass or shrub understorey, and a ground layer and soil profile that is highly and continuously disturbed by cattle grazing. The subject land has been consistently cleared and grazed since at least 1954 (NSW Spatial Services Historical Imagery).

Table 11. Predicted fauna species credit species

Scientific name	Common name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
		BC Act	EPBC Act					
Anthochaera phrygia	Regent Honeyeater	CE	CE	Yes	BAM-C	**No**	2. Habitat Constraints (IHM)	
Burhinus grallarius	Bush Stone-curlew	E	--	No	BAM-C	Yes	N/A	3433;3446
Callocephalon fimbriatum	Gang-gang Cockatoo	E	E	Yes	BAM-C	Yes	N/A	3433;3446
Calyptorhynchus lathami lathami	South-eastern Glossy Black-Cockatoo	V	V	Yes	BAM-C	Yes	N/A	3433;3446
Cercartetus nanus	Eastern Pygmy-possum	V	--	No	BAM-C	**No**	4. Microhabitats	
Chalinolobus dwyeri	Large-eared Pied Bat	V	E	No	BAM-C	**No**	2. Habitat constraints	
Crinia tinnula	Wallum Froglet	V	--	No	BAM-C	**No**	3. Species vagrant; 4. Microhabitats	
Delma impar	Striped Legless Lizard	V	V	No	BAM-C	**No**	4. Microhabitats	
Dromaius novaehollandiae - endangered population	Emu population in the NSW North Coast Bioregion and Port Stephens LGA	E	--	No	BAM-C	**No**	1. Geographic limitation; note that BAM-C lists Port Stephens LGA as a Geographic limitation, but the Candidate Species Report does not and says 'Refer to BAR'.	
Haliaeetus leucogaster	White-bellied Sea-Eagle	V	--	Yes	BAM-C	Yes	N/A	3433;3446
Hieraaetus morphnoides	Little Eagle	V	--	Yes	BAM-C	Yes	N/A	3433;3446
Hoplocephalus stephensii	Stephens' Banded Snake	V	--	No	BAM-C	**No**	3. Species vagrant; 4. Microhabitats	
Lathamus discolor	Swift Parrot	E	CE	Yes	BAM-C	**No**	2. Habitat constraints (IHM)	3433;3446
Limicola falcinellus	Broad-billed Sandpiper	V	--	Yes	BAM-C	**No**	2. Habitat constraints (IHM)	
Litoria aurea	Green and Golden Bell Frog	E	V	No	BAM-C	**No**	4. Microhabitats	
Litoria brevipalmata	Green-thighed Frog	V	--	No	BAM-C	**No**	4. Microhabitats	

Scientific name	Common name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
		BC Act	EPBC Act					
Lophoictinia isura	Square-tailed Kite	V	--	Yes	BAM-C	Yes	N/A	3433;3446
Miniopterus australis	Little Bent-winged Bat	V	--	Yes	BAM-C	**No**	2. Habitat constraints	
Miniopterus orianae oceanensis	Large Bent-winged Bat	V	--	Yes	BAM-C	**No**	2. Habitat constraints	
Myotis macropus	Southern Myotis	V	--	No	BAM-C	Yes	N/A	3433;3446
Ninox connivens	Barking Owl	V	--	No	BAM-C	Yes	N/A	3433;3446
Ninox strenua	Powerful Owl	V	--	No	BAM-C	Yes	N/A	3433;3446
Pandion cristatus	Eastern Osprey	V	--	Yes	BAM-C	**No**	2. Habitat constraints	
Petaurus norfolcensis	Squirrel Glider	V	--	No	BAM-C	Yes	N/A	3433;3446
Petrogale penicillata	Brush-tailed Rock-wallaby	E	V	No	BAM-C	**No**	2. Habitat constraints	
Phascogale tapoatafa	Brush-tailed Phascogale	V	--	No	BAM-C	Yes	N/A	3433;3446
Phascolarctos cinereus	Koala	E	E	No	BAM-C	Yes	N/A	3433;3446
Planigale maculata	Common Planigale	V	--	No	BAM-C	No	2. Habitat constraints; 3. Species vagrant	3433;3446
Pteropus poliocephalus	Grey-headed Flying-fox	V	V	Yes	BAM-C	**No**	2. Habitat constraints	
Tyto novaehollandiae	Masked Owl	V	--	No	BAM-C	Yes	N/A	3433;3446
Uperoleia mahonyi	Mahony's Toadlet	E	E	No	BAM-C	**No**	3. Species vagrant 4. Microhabitats	3433
Vespadelus troughtoni	Eastern Cave Bat	V	--	No	BAM-C	**No**	2. Habitat constraints	3433;3446

Excluded Fauna Species Credit Species

- *Anthochaera phrygia* (Regent Honeyeater)
    - This species has been excluded on the basis of Important Habitat Mapping. The subject land is not mapped for this species (at time of publishing).
- *Cercartetus nanus* (Eastern Pygmy-possum)

- This species has been excluded on the basis of inadequate microhabitat on the subject land (see **Section 2.4.2**). The subject land has limited and highly fragmented canopy and limited to absent understorey, with no feasible movement corridors for this species. The subject land has been consistently cleared and grazed since at least 1954 (NSW Spatial Services Historical Imagery).

- *Chalinolobus dwyeri (Large-eared Pied Bat)*
  - This species has been excluded on the basis of habitat constraints. API of high resolution imagery (see **Section 3.2**) indicated that no caves, rocky areas or overhangs suitable for this species occur within 2 km of the subject land. No derelict structures potentially used for breeding occur on or within 100 m of the subject land.
- *Crinia tinnula* (Wallum Froglet)
  - This species has been excluded on the basis of vagrancy in the IBRA subregion. The species is not recorded in the Hunter subregion, with the exceptions of a single 2018 record in Cessnock LGA at least 20 km from any other valid record, and a record at Medowie. Further, the subject land is not characterised by suitable vegetation (sedgelands, wet heathlands, swamp sclerophyll forests) or geology (acidic swamps on coastal sand plains). The subject land is also highly disturbed, with a ground layer and soil profile that is highly and continuously disturbed by cattle grazing. The subject land has been consistently cleared and grazed since at least 1954 (NSW Spatial Services Historical Imagery). There is no substantial leaf litter, debris or vegetation surrounding any of the dams on the site to provide habitat for this species.
- *Delma impar* (Striped Legless Lizard)
  - This species has been excluded on the basis of inadequate microhabitat on the subject land. The subject land has limited to absent native grass or shrub understorey, and a ground layer and soil profile that is highly and continuously disturbed by cattle grazing. The subject land has been consistently cleared and grazed since at least 1954 (NSW Spatial Services Historical Imagery). The soils on the subject land are not prone to cracking, no surface rocks are present for shelter, and tussock grasses are limited due to grazing. Further, the species has not been recorded east of Warkworth, NSW, indicating that its range is exclusive of the subject land.
- *Dromaius novaehollandiae* - endangered population (Emu population in the NSW North Coast Bioregion and Port Stephens LGA)
  - This species has been excluded on the basis of geographic limitation. The subject land does not occur in the North Coast bioregion or Port Stephens local government area.
- *Hoplocephalus stephensii* (Stephens' Banded Snake)
  - This species has been excluded on the basis of inadequate microhabitat on the subject land. While the subject land has hollows, it has limited to absent native grass or shrub understorey, and a ground layer and soil profile that is highly and continuously disturbed by cattle grazing. The subject land has been consistently cleared and grazed since at least 1954 (NSW Spatial Services Historical Imagery). There is no substantial leaf litter, debris or vegetation tussocks to provide refuge or a safe path for this species to disperse within the subject land. Further, there are no reliable records in the Hunter subregion, indicating the species is vagrant on the subject land.
- *Lathamus discolor* (Swift Parrot)
  - This species has been excluded on the basis of Important Habitat Mapping. The subject land is not mapped for this species (at time of publishing).

- *Limicola falcinellus (Broad-billed Sandpiper)*
    - This species has been excluded on the basis of Important Habitat Mapping. The subject land is not mapped for this species (at time of publishing).
- *Litoria aurea* (Green and Golden Bell Frog)
    - This species has been excluded on the basis of inadequate microhabitat on the subject land. The subject land has limited to absent native grass or shrub understorey, and a ground layer and soil profile that is highly and continuously disturbed by cattle grazing. The subject land has been consistently cleared and grazed since at least 1954 (NSW Spatial Services Historical Imagery). There is no substantial leaf litter, debris or vegetation surrounding any of the dams on the site to provide habitat for this species. The species is highly unlikely to persist on the subject land. Further, there is no connectivity across the landscape for this species to access the subject land from any substantial waterbodies or other aquatic habitats in the locality.
- *Litoria brevipalmata* (Green-thighed Frog)
    - This species has been excluded on the basis of inadequate microhabitat on the subject land. The subject land has limited to absent native grass or shrub understorey, and a ground layer and soil profile that is highly and continuously disturbed by cattle grazing. The subject land has been consistently cleared and grazed since at least 1954 (NSW Spatial Services Historical Imagery). There is no substantial leaf litter, debris or vegetation surrounding any of the dams on the site to provide habitat for this species. The species is highly unlikely to persist on the subject land. Further, there is no connectivity across the landscape for this species to access the subject land from any substantial waterbodies or other aquatic habitats in the locality.
- *Miniopterus australis* (Little Bent-winged Bat – Breeding)
    - This species has been excluded on the basis of habitat constraints. The subject land does not contain any caves, tunnels, mines, culverts or other structures suitable for breeding (see **Section 2.4.2**), and no records in the locality of the species in caves or nest roosts occur, or with large numbers of individuals recorded.
- *Miniopterus orianae oceanensis* (Large Bent-winged Bat – Breeding)
    - This species has been excluded on the basis of habitat constraints. The subject land does not contain any caves, tunnels, mines, culverts or other structures suitable for breeding (see **Section 2.4.2**), and no records in the locality of the species in caves or nest roosts occur, or with large numbers of individuals recorded.
- *Pandion cristatus* (Eastern Osprey)
    - This species has been excluded on the basis of habitat constraints. No stick nests occur on the subject land (see **Section 2.4.2**), and the subject land is not within 100 m of a floodplain.
- *Petrogale penicillata* (Brush-tailed Rock-wallaby)
    - This species has been excluded on the basis of habitat constraints. API of high resolution imagery (see **Section 3.2**) indicated that no rocky areas suitable for this species occur within 1 km of the subject land.

- *Planigale maculata (Common Planigale)*
    - This species has been excluded on the basis of vagrancy in the IBRA subregion. The species is not recorded in the Hunter subregion, and is very rarely recorded in the Sydney basin. Further, the subject land has limited to absent native grass or shrub understorey, and a ground layer and soil profile that is highly and continuously disturbed by cattle grazing. The subject land has been consistently cleared and grazed since at least 1954 (NSW Spatial Services Historical Imagery). There is no substantial leaf litter, debris or ground vegetation to shelter this species or provide foraging or refuge habitat.
- *Pteropus poliocephalus* (Grey-headed Flying-fox)
    - This species has been excluded on the basis of habitat constraints. There are no Flying Fox camps on the subject land (see **Section 2.4.2**).
- *Uperoleia mahonyi* (Mahony's Toadlet)
    - This species has been excluded on the basis of vagrancy in the IBRA subregion. The species is not recorded in the Hunter subregion, and is very rarely recorded in the Sydney basin except for a population at Norah Head. Further, the subject land has limited to absent native grass or shrub understorey, and a ground layer and soil profile that is highly and continuously disturbed by cattle grazing. The subject land has been consistently cleared and grazed since at least 1954 (NSW Spatial Services Historical Imagery). There is no substantial leaf litter, debris or vegetation surrounding any of the dams on the site to provide habitat for this species. The species is highly unlikely to persist on the subject land. Further, there is no connectivity across the landscape for this species to access the subject land from any substantial waterbodies or other aquatic habitats in the locality.
- *Vespadelus troughtoni* (Eastern Cave Bat**)**
    - This species has been excluded on the basis of habitat constraints. API of high resolution imagery (see **Section 3.2**) indicated that no caves, rocky areas or overhangs suitable for this species occur within 2 km of the subject land. No derelict structures potentially used for breeding occur on or within 100 m of the subject land.

5.2 Presence of candidate species credit species

In accordance with BAM Subsection 5.2.4, from the remaining list of Candidate Species from Section **5.1.2**, **Table 12** (flora) and **Table 13** (fauna) identify the species determined to be present within the Study Area based on:

- assumed presence within the subject land
- an important habitat map (for dual credit species)
- targeted threatened species surveys, or
- an expert report

Table 12. Determining the presence of candidate flora species credit species on the subject land

Common name	Scientific name	Listing status		Method used to determine presence	Present?	Further assessment required? (BAM Subsections 5.2.5 and 5.2.6)
		BC Act	EPBC Act			
Acacia bynoeana	Bynoe's Wattle	E	V	Survey (see **Section 5.3**)	*No*	*No*
Angophora inopina	Charmhaven Apple	V	V	Survey (see **Section 5.3**)	*No*	*No*
Callistemon linearifolius	Netted Bottle Brush	V	-	Survey (see **Section 5.3**)	*No*	*No*
Eucalyptus castrensis	Singleton Mallee	E	-	Survey (see **Section 5.3**)	*No*	*No*
Eucalyptus glaucina	Slaty Red Gum	V	V	Survey (see **Section 5.3**)	*No*	*No*
Eucalyptus parramattensis subsp. decadens	Eucalyptus parramattensis subsp. decadens	V	V	Survey (see **Section 5.3**)	*No*	*No*
Eucalyptus pumila	Pokolbin Mallee	V	V	Survey (see **Section 5.3**)	*No*	*No*
Grevillea parviflora subsp. parviflora	Small-flower Grevillea	V	V	Survey (see **Section 5.3**)	*No*	*No*
Pomaderris queenslandica	Scant Pomaderris	E	-	Survey (see **Section 5.3**)	*No*	*No*
Prostanthera cineolifera	Singleton Mint Bush	V	V	Survey (see **Section 5.3**)	*No*	*No*

Table 13. Determining the presence of candidate fauna species credit species on the subject land

Common name	Scientific name	Listing status		Method used to determine presence	Present?	Further assessment required? (BAM Subsections 5.2.5 and 5.2.6)
		BC Act	EPBC Act			
Burhinus grallarius	Bush Stone-curlew	E	-	Survey (see **Section 5.3**)	*No*	*No*
Callocephalon fimbriatum	Gang-gang Cockatoo	E	E	Assumed Present	***Yes***	***Yes***
Calyptorhynchus lathami lathami	South-eastern Glossy Black-Cockatoo	V	V	Survey (see **Section 5.3**)	*No*	*No*
Haliaeetus leucogaster	White-bellied Sea-Eagle	V	-	Survey (see **Section 5.3**)	*No*	*No*
Hieraaetus morphnoides	Little Eagle	V	-	Survey (see **Section 5.3**)	*No*	*No*
Lophoictinia isura	Square-tailed Kite	V	-	Survey (see **Section 5.3**)	*No*	*No*
Myotis macropus	Southern Myotis	V	-	Survey (see **Section 5.3**)	***Yes***	***Yes***
Ninox connivens	Barking Owl	V	-	Survey (see **Section 5.3**)	***Yes***	***Yes***
Ninox strenua	Powerful Owl	V	-	Survey (see **Section 5.3**)	*No*	*No*
Petaurus norfolcensis	Squirrel Glider	V	-	Survey (see **Section 5.3**)	***Yes***	***Yes***
Phascogale tapoatafa	Brush-tailed Phascogale	V	-	Survey (see **Section 5.3**)	***Yes***	***Yes***
Phascolarctos cinereus	Koala	E	E	Survey (see **Section 5.3**)	*No*	*No*
Tyto novaehollandiae	Masked Owl	V	-	Survey (see **Section 5.3**)	*No*	*No*

5.3 Threatened species surveys

In accordance with the guidelines listed in **Section 2.3** and **Section 2.4**, **Table 14** and **Table 15** lists the flora and fauna surveys conducted, respectively.

Table 14. Surveys for candidate flora species credit species on the subject land

Common name	Scientific name	Threatened flora species surveys				Present	Further assessment required? (BAM Subsections 5.2.5 and 5.2.6)
		Survey method (transects or grids)	Timing of survey (BAM-C / TBDC)		Effort (hours; no. ppl)		
			Dates Comply	Non-comply			
Acacia bynoeana	Bynoe's Wattle	Transect (meander)	4/6/24; 23/1/24; 19/12/23		16;(2)	No	No
Angophora inopina	Charmhaven Apple	Transect (meander)				No	No
Callistemon linearifolius	Netted Bottle Brush	Transect (meander)				No	No
Eucalyptus castrensis	Singleton Mallee	Transect (meander)				No	No
Eucalyptus glaucina	Slaty Red Gum	Transect (meander)				No	No
Eucalyptus parramattensis subsp. decadens	Eucalyptus parramattensis subsp. decadens	Transect (meander)				No	No
Eucalyptus pumila	Pokolbin Mallee	Transect (meander)				No	No
Pomaderris queenslandica	Scant Pomaderris	Transect (meander)				No	No
Grevillea parviflora subsp. parviflora	Small-flower Grevillea	Transect (meander)		4/6/24; 23/1/24; 19/12/23		No	No
Prostanthera cineolifera	Singleton Mint Bush	Transect (meander)				No	No

- Surveys outside of the specified months
    - Surveys outside of specified months for shrub species are justified based on the near absence of shrubs on the subject land, and the absence following preliminary surveys of any congeners occurring on the subject land. For example, surveys concluded that no *Grevillea* of any species is likely to occur on the subject land, discharging any concern regarding false positives or negatives.
- Modified transects
    - Surveys were modified from NSW threatened plant survey guidelines. Transects were carried out as meanders through all areas of timbered vegetation for shrub and tree species. Extensive informal surveys of the subject land indicated that no substantial shrub regeneration was apparent in any of the general pasture areas, with the exception of very occasional *Daviesia genistifolia*.
- Native vegetation on the subject land was broadly exceptionally limited, due to land use history. The subject land, study area and general locality have been the subject of previous surveys informing the development of the Anambah Urban Release Area, and these surveys did not result in the publication in BioNet of any threatened species records.

Table 15. Surveys for candidate fauna species credit species on the subject land

Common name	Scientific name	Threatened flora species surveys				Present	Further assessment required? (BAM Subsections 5.2.5 and 5.2.6)
		Survey method (camera, harp, etc)	Timing of survey (BAM-C / TBDC)		Effort (hours; no. ppl) / *other*		
			Dates Comply	Non-comply			
Burhinus grallarius	Bush Stone-curlew	CPB, Spotlight	18/6/24; 11/6/24		1.5;(4), 5.5;(4)	No	No
Callocephalon fimbriatum	Gang-gang Cockatoo	Assumed Present			*N/A - assumed*	**Yes**	**Yes**
Calyptorhynchus lathami lathami	South-eastern Glossy Black-Cockatoo	Habitat Survey, Bird Census	13/6/24; 25/7/24; 8/7/24;		3.0;(1), 2.0;(4)	No	No
Haliaeetus leucogaster	White-bellied Sea-Eagle	Habitat Survey, Bird Census			3.0;(1), 2.0;(4)	No	No
Hieraaetus morphnoides	Little Eagle	Habitat Survey, Bird Census		13/6/24; 25/7/24; 8/7/24;	3.0;(1), 2.0;(4)	No	No
Lophoictinia isura	Square-tailed Kite	Habitat Survey, Bird Census			3.0;(1), 2.0;(4)	No	No
Myotis macropus	Southern Myotis	Assumed Present	*N/A - assumed*		*N/A - assumed*	**Yes**	**Yes**
Ninox connivens	Barking Owl	CPB, Spotlight	25/7/24; 8/7/24; 3/7/24; 4/7/24; 25/6/24; 5/6/24; 18/6/24; 11/6/24		1.5;(4), 5.5;(4)	**Yes**	**Yes**
Ninox strenua	Powerful Owl	CPB, Spotlight			1.5;(4), 5.5;(4)	No	No
Tyto novaehollandiae	Masked Owl	CPB, Spotlight			1.5;(4), 5.5;(4)	No	No
Petaurus norfolcensis	Squirrel Glider	Remote Camera	23/5-20/6/24		*638 camera nights*	**Yes**	**Yes**
Phascogale tapoatafa	Brush-tailed Phascogale	Remote Camera				**Yes**	**Yes**
Phascolarctos cinereus	Koala	SAT, Spotlight	25/7/24;		6;(2), 5.5;(4)	No	No

- Surveys outside of the specified months
  - Habitat surveys for spring-breeding birds of prey were carried out in June and July 2024. The native vegetation on the subject land was traversed extensively and no stick-nests were detected. The nature of the highly fragmented vegetation made the assessment of every tree on the site practical, and no nests suitable for these species or any raptor species were identified within the subject land. No individuals of any raptor species except for *Falco cenchroides* (Nankeen Kestrel) were observed utilising the subject land during surveys.
- Incidental observations
  - The Kestrel was observed roosting in various hollows during nocturnal surveys.
  - During surveys for threatened Large Forest Owls, a pair of *Tyto alba* (Barn Owls) were detected utilising a hollow adjacent to Anambah Road. High resolution photographs and call recordings were provided to two (2) species experts to confirm the species identification.

5.4 Expert reports

No species expert reports were utilised for this proposal.

5.5 More appropriate local data (where relevant)

No other local data was utilised to assess habitat suitability for the threatened species surveys.

5.6 Area or count, and location of suitable habitat for a species credit species (a species polygon)

Habitat condition for Species credit species determined or assumed to be present on the subject land is described in detail below. **Table 16** includes details related to present species from the TBDC.

- *Callocephalon fimbriatum* (Gang-gang Cockatoo)
    - This species has been **assumed present** on the subject land. Assumption of presence has been made due to seasonality constraints for survey in the TBDC. While the species is rarely recorded in the region (there are no BioNet records within 10 km), there is suitable habitat in the form of potential breeding hollows and the species range includes the subject land. The vegetation on the subject land is highly disturbed and fragmented, however the mature paddock trees include hollows of the required size and height. Further, the subject land has sufficient landscape connectivity for highly mobile species to provide no barrier to dispersing adults of this species establishing foraging and breeding habitat. This species is associated with all PCTs within the subject land, and by extension all VZs – as all contain appropriate hollows. All of the extant timber native vegetation on the subject land has been included in the species polygon.
    - A species polygon is **Figure 6**
- *Myotis macropus* (Southern Myotis)
    - This species has been assumed present on the subject land. Assumption of presence has been made due to seasonality constraints for survey in the TBDC. The species is recorded periodically in the region and is recorded within 10km of the subject land (18 records). While most of the records are associated with artificial structures (bridges, culverts), there is potential foraging habitat on the subject land associated with waterbodies suitable for gleaning. The surrounding native vegetation is highly disturbed and fragmented, but nonetheless suitable for roosting and potentially for breeding for this species. This species is associated with all PCTs within the subject land, and by extension all VZs. All extant timber native vegetation within 200 m of suitable waterbodies has been included in the species polygon.
    - A species polygon is **Figure 6**
- *Ninox connivens* (Barking Owl)
    - This species was detected on the subject land during surveys carried out according to the TBDC. One individual was observed or heard on four (4) out of seven (7) call playback nights. This species has recently been changed to species credit only (formerly dual credit), and habitat includes all VZs with suitable hollows within 800m of survey stations. Surveys were conducted centrally to capture the entire subject land. This species is associated with all PCTs within the subject land, and by extension all VZs – as all contain appropriate hollows. All of the extant timber native vegetation on the subject land has been included in the species polygon.
    - A species polygon is **Figure 6**
- *Petaurus norfolcensis* (Squirrel Glider)
    - This species was detected on the subject land during surveys carried out according to the TBDC. This species was detected on multiple remote camera stations on the

periphery of the subject land. The centre of the subject land is generally too highly fragmented for this species, however only the most isolated vegetation (>120 m separation), which also comprised of only isolated single trees, was excluded the species polygon. Generally, this species will not move over 50m between trees, however conservatively the species has not been ruled out from going to ground to reach foraging or breeding resources. This species is associated with all PCTs within the subject land, and by extension all VZs. All extant timber native vegetation on the subject land, with exclusions as described, has been included in the species polygon.

- A species polygon is **Figure 6**

- *Phascogale tapoatafa* (Brush-tailed Phascogale)
  - This species was detected on the subject land during surveys carried out according to the TBDC. This species was detected on multiple remote camera stations on the periphery of the subject land. The centre of the subject land is generally too highly fragmented for this species, however only the most isolated vegetation (>120 m separation), which also comprised of only isolated single trees, was excluded the species polygon. This species is associated with all PCTs within the subject land, and by extension all VZs. All extant timber native vegetation on the subject land, with exclusions as described, has been included in the species polygon.
  - A species polygon is **Figure 6**

Table 16. Results for present species (recorded within the subject land)

Common name	Scientific name	Biodiversity risk weighting (BAM-C & TBDC*)	SAII entity** (BAM-C & TBDC)	Habitat constraints / microhabitats present on the subject land / vegetation zone	Abundance – No. individual plants present on subject land (flora with unit of measure of count)	Extent (ha) of suitable habitat present on site (flora or fauna with unit of measure of area)	TBDC species specific recommendations e.g. buffers, general comments (where relevant)	Habitat condition (VI score for each VZ in the polygon – area species only)
Callocephalon fimbriatum	Gang-gang Cockatoo	2.00 (High)	no	Eucalypt hollows >7cm diameter opening, and >3m from ground	N/A	3.71	Buffers (200 m) (see **Section 5.6**)	VZ1 (39.8); VZ2 (31.4)
Myotis macropus	Southern Myotis	2.00 (High)	no	Waterways 3m wide, and native vegetation for roosting and breeding habitat within 200m		1.96		VZ1 (39.8); VZ2 (31.4)
Ninox connivens	Barking Owl	2.00 (High)	no	Living or dead hollows >20cm diameter opening and >4m from ground		3.71		VZ1 (39.8); VZ2 (31.4)
Petaurus norfolcensis	Squirrel Glider	2.00 (High)	no	No constraints		3.62		VZ1 (39.8); VZ2 (31.4)
Phascogale tapoatafa	Brush-tailed Phascogale	2.00 (High)	no	No constraints		3.62		VZ1 (39.8); VZ2 (31.4)

Table 17. Results for EPBC Act listed species present (recorded within the subject land)

Common name	Scientific name	Abundance – No. individual plants present on subject land (flora with unit of measure as count)	Extent (ha) of suitable habitat present on site (flora or fauna with unit of measure as area)
Callocephalon fimbriatum	Gang-gang Cockatoo	N/A	3.71 ha

6. Identifying prescribed impacts

Prescribed impacts are listed below in **Table 18**. Presence with an asterisk * indicates the prescribed impact is present but not of material impact.

Table 18. Prescribed impacts identified

Feature	Present (Y/N)	Description of feature characteristics and location	Threatened entities that use, are likely to use, or are part of the habitat feature. Where relevant, threatened species or fauna that are part of a TEC or EC, that are at risk of vehicle strike
Karst, caves, crevices, cliffs, rocks or other geological features of significance	N	There are no occurrences of karst, caves, crevices or cliffs within the subject land. Surface rocks are present	N/A. Not further assessed
Human-made structures	Y*	The subject land contains rural style wire fencing along paddock boundaries.	Large Forest Owls are known to perch on fenceposts and may forage opportunistically from these features, however they are unlikely to represent high value habitat. Not further assessed.
Non-native vegetation	Y*	The subject land contains non-native vegetation in the form of exotic groundcover species (pasture).	While pasture is not a barrier to the movement of mobile species, no threatened species assessed are considered likely to use the non-native pasture as a regular foraging resource or habitat. Not further assessed.
Habitat connectivity	N	The subject land provides limited habitat connectivity within the broader landscape due to clearing. Connectivity exists to the west of the subject land. Habitat within the subject land is typified by isolated paddock trees which could facilitate the movement of more mobile species.	Paddock trees may be used by birds (and to a lesser degree arboreal mammals) directly to facilitate their movement through the landscape (albeit to a limited extent on the subject land). However, no vegetation on the subject land creates connectivity to other substantial areas of habitat. Not further assessed.
Waterbodies, water quality and hydrological processes	Y	The hydrology of the subject land is typified by four 1st order streams, a 3rd order stream and three dams. All watercourses eventually connect to Hunter River, which is approximately 0.8 km from the study area.	The listed entities may utilise the dams periodically, however only two records of the Stork occur within 10km and no records of others. *Ephippiorhynchus asiaticus* – Black-necked Stork *Ixobrychus flavicollis* – Black Bittern *Limicola falcinellus* – Broad-billed Sandpiper
Wind turbine strikes (wind farm development only)	N	Not applicable to this proposal.	Not further assessed.
Vehicle strikes	Y	There is currently limited vehicle thoroughfare within and adjacent to the subject land. The proposal would significantly increase vehicle movements in the locality.	*Pseudomys novaehollandiae* – New Holland Mouse *Dasyurus maculatus* – Spotted-tailed Quoll *Phascogale tapoatafa* – Brush-tailed Phascogale Birds are also at risk of vehicle strike

Identified Prescribed Impacts

Potentially impacted threatened species were generated by the BAM-C and retained for assessment under the proposal (and present, in the case of Species Credit species). Potential impacts were assessed based on habitat and ecology descriptions for relevant species in the TBDC.

- Waterbodies, water quality and hydrological processes
    - *Ephippiorhynchus asiaticus* – Black-necked Stork
    - *Ixobrychus flavicollis* – Black Bittern
    - *Limicola falcinellus* – Broad-billed Sandpiper

  The agricultural dams within the subject land that would be impacted directly or indirectly by the proposal represent very marginal habitat for the species assessed. The dams do not form part of a larger wetland complex, are not proximal to mapped swamps or wetlands or marine shorelines, and are approximately 1 km from the Hunter River in the north. While there is potential for these species to intermittently use the dams in transit, larger and more intact waterbodies exist in all directions that would provide equal or greater ecosystem function. The dams do not represent substantial foraging resources, as they generally lack fringing vegetation, and therefore are highly unlikely to function as nesting habitat. The identified prescribed impact is minimal, and not further assessed.
- Vehicle strikes
    - *Pseudomys novaehollandiae* – New Holland Mouse
    - *Dasyurus maculatus* – Spotted-tailed Quoll
    - *Phascogale tapoatafa* – Brush-tailed Phascogale
    - Birds

  Anambah Road represents an existing high-speed hostile connection to any fauna moving across the landscape at ground level. The proposal would substantially increase vehicle movements. However, the proposal will likely result in reduced vehicle speed due to built-up-area speed limits. Further, there is very limited vegetation that would be retained on the western road corridor to which fauna might transit from the east. Connectivity across the landscape is generally limited in an east-west plane, which would further limit likely fauna movement across this corridor.

  Internal roads would be constructed as part of future proposals under the concept, however these would be in a dense residential setting and fauna movement within the future development would likely be highly limited.

  Vehicle strikes remain a potential risk for all protected fauna under the proposed Concept. Future applications should consider traffic calming measures, signage and fauna-friendly fencing to mitigate the potential for vehicle strikes.

STAGE 2: IMPACT ASSESSMENT (BIODIVERSITY VALUES AND PRESCRIBED IMPACTS)

7. Avoid and minimise impacts

7.1 Avoid and minimise direct and indirect impacts

7.1.1 Project location

The project location is part of the Anambah Urban Release Area. This area was chosen to be part of the urban release plan as biodiversity constraints within the Area and local area were determined to be minimal. The proposed development within 559 Anambah Rd was chosen due to the limited extent of native vegetation found within the subject land, as the land consists predominantly of pastoral land with limited canopy cover in the form of scattered paddock trees. The proposal avoids impact to TECs and ECs as the PCT's within the subject land have been assessed as not commensurate with any BC or EPBC Act listed communities.

7.1.2 Project design

The project location and design are predicated on a substantial history of assessment informing the Anambah Urban Release Area, which identified the predominantly cleared pastoral lands for residential development and avoided remnant native vegetation to the west associated with Lower Hunter Spotted Gum Ironbark communities. The project constrains all infrastructure to R1 zoned lands and avoids construction in RU2 lands which tend to increasing native vegetation cover to the west.

7.2 Avoid and minimise prescribed impacts

7.2.1 Project location

The project location is north of a 3rd order stream, and retains a substantial 1st order stream, minimising impacts to hydrology. The subject land contains limited landscape connectivity, with scattered paddock trees and small patches separated by large open space and providing for minimal fauna movement. The project at completion will not direct new traffic through areas that function as habitat corridors, reducing the risk of vehicle strike.

7.2.2 Project design

The project retains aquatic habitat by replacing farm dams with water quality basins, and in doing so minimises downstream impacts to water quality. The project also retains aquatic habitat connectivity through the retained 1st order stream running east-west through the subject land. Road networks will be designed with traffic calming devices to reduce vehicle speed and decrease the likelihood of vehicle strikes.

8. Impact assessment

8.1 Direct impacts

8.1.1 Residual direct impacts

Table 19 documents impacts likely to occur on the subject land after steps taken to avoid and minimise impacts (refer to **Figure 6** & **Figure 7**).

Table 19. Summary of residual direct impacts

Direct impact (Describe the impact on PCT/TEC/EC or threatened species and their habitat)	**BC Act status**	**EPBC Act status**	**SAII entity**	**Project phase/timing of impact** (e.g. construction, operation, etc.)	**Extent** (ha, # individuals)
PCT 3446 – removal of native vegetation	-	-	No	Construction	3.26 ha
PCT 3433 – removal of native vegetation	-	-	No	Construction	0.45 ha
Callocephalon fimbriatum (Gang-gang Cockatoo) – removal of habitat	E	E	No	Construction	3.71 ha
Myotis macropus (Southern Myotis) – removal of habitat	V	-	No	Construction	1.96 ha
Ninox connivens (Barking Owl) – removal of habitat	V	-	No	Construction	3.71 ha
Petaurus norfolcensis (Squirrel Glider) – removal of habitat	V	-	No	Construction	3.62 ha
Phascogale tapoatafa (Brush-tailed Phascogale) – removal of habitat	V	-	No	Construction	3.62 ha

8.1.2 Change in vegetation integrity score

Table 20 documents the change in VI for residual direct impacts on native vegetation, TECs, threatened species and their habitat identified on the subject land.

Table 20. Impacts to vegetation integrity

Vegetation zone	**PCT ID**	**Management zone**	**Area** (ha)	**Before development**				**After development**				**Change**
				Composition	**Structure**	**Function**	**VI score**	**Composition**	**Structure**	**Function**	**VI**	**Change in VI**
1	3446	N/A	3.26	36.9	33.8	50.7	39.8	0	0	0	0	-39.8
2	3433	N/A	0.45	22.4	36.1	38	31.4	0	0	0	0	-31.4

8.2 Indirect impacts

Table 21 documents residual indirect impacts and the likelihood to occur on native vegetation, threatened entities and their habitat beyond the development footprint.

Table 21. Summary of residual indirect impacts

Indirect impact (Describe impact, e.g. transport of weeds and pathogens form the site to adjacent vegetation)	**Impacted entities** (PCT/threatened entity and their habitats and where relevant, EPBC Act listing)	**Extent** (ha or zone reference)	**Frequency**	**Duration** (long-term/ short-term/ medium-term)	**Project phase/ timing of impact** (e.g. construction, operation, rehabilitation)	**Likelihood and consequences**
inadvertent impacts on adjacent habitat or vegetation	PCT 3446, PCT 3433, potential habitat for *Myotis macropus, Phascogale tapoatafa, Petaurus norfolcensis, Ninox connivens, Callocephalon fimbriatum* (EPBC E)	Adjacent vegetation	Daily – during construction stage	Potentially long-term impact	Construction	Unlikely; Risk of disturbance of genetic exchange between flora species; Risk of disturbance to retained vegetation; Risk of loss/disturbance to fauna habitat (nests, foraging habitat); Minor risk of injury or mortality of fauna during clearing within subject land.
reduced viability of adjacent habitat due to edge effects	PCT 3446, PCT 3433, potential habitat for *Myotis macropus, Phascogale tapoatafa, Petaurus norfolcensis, Ninox connivens, Callocephalon fimbriatum* (EPBC E)	Adjacent vegetation	Ongoing – all stages	Potentially long-term impacts	All stages of development	Unlikely; Risk of disturbance to retained vegetation; Potential disturbance via erosion and sediment flows tor retained adjacent vegetation; Increased edge effect may have an impact on accessibility to native vegetation for threatened species.
reduced viability of adjacent habitat due to noise, dust or light spill	Potential habitat for *Myotis macropus, Phascogale tapoatafa, Petaurus norfolcensis, Ninox connivens, Callocephalon fimbriatum* (EPBC E)	Adjacent vegetation/ habitat	Daily – during construction phase	Medium term impact	Construction	Moderate; Alter fauna behaviour (breeding, roosting and movement) in the immediate locality; Dust cover may impact function of flora species in immediately adjacent vegetation; increased light in the locality impacting on nocturnal fauna movements.
transport of weeds and pathogens from the site to adjacent vegetation	PCT 3446, PCT 3433, potential habitat for *Myotis macropus*	Adjacent and downstream vegetation	Ongoing during construction and operation	Potentially long-term impact	All stages	Moderate; Mortality and degradation of adjacent vegetation from disease; increase risk in weed presences; loss of fauna habitat.

Indirect impact (Describe impact, e.g. transport of weeds and pathogens form the site to adjacent vegetation)	**Impacted entities** (PCT/threatened entity and their habitats and where relevant, EPBC Act listing)	**Extent** (ha or zone reference)	**Frequency**	**Duration** (long-term/ short-term/ medium-term)	**Project phase/ timing of impact** (e.g. construction, operation, rehabilitation)	**Likelihood and consequences**
increased risk of starvation or exposure, and loss of shade or shelter	*Myotis macropus, Phascogale tapoatafa, Petaurus norfolcensis, Ninox connivens, Callocephalon fimbriatum* (EPBC E)	Adjacent habitat	Ongoing During construction and Operation	Long term	Ongoing	Unlikely; increased density of fauna biota within given areas due to habitat clearing; starvation based on an increase of competition coupled with habitat lacking resources; dispersal of local fauna due to increase in competition.
loss of breeding habitat	*Myotis macropus, Phascogale tapoatafa, Petaurus norfolcensis, Ninox connivens, Callocephalon fimbriatum* (EPBC E)	Adjacent breeding habitat	Ongoing	Long term	Construction	Unlikely; inadvertent impact to breeding habitat through the loss of vegetation within development, increased pressure on existing adjacent breeding habitat.
trampling of threatened flora species	N/A	Adjacent vegetation	Ongoing during construction and operation	Potentially long-term impacts	All stages	Unlikely; minor risk of workers trampling adjacent vegetation during construction; minor risk of residents entering retained area and trampling vegetation.
inhibition of nitrogen fixation and increased soil salinity	PCT 3446, PCT 3433	Adjacent vegetation	During construction	Long Term	All stages	Unlikely; minor risk of inhibition of nitrogen fixation due to increased weed pressure; minor risk due to increase in sediment runoff.
fertiliser drift	PCT 3446, PCT 3433	Adjacent vegetation and downstream vegetation/ waterbodies	Ongoing construction and operation	Long Term	Operational	Unlikely; increase risk of eutrophication within downstream waterbodies, reduction in overall soil health of the area.
rubbish dumping	PCT 3446, PCT 3433, potential habitat for *Myotis macropus*	Adjacent vegetation	Ongoing construction and operation	Long term	Operational	Possible; moderate risk of residents dumping rubbish within retained vegetation.
wood collection	PCT 3446, PCT 3433, potential habitat for *Myotis macropus, Phascogale tapoatafa*	Adjacent vegetation	Ongoing construction and operation	Long Term	Operational	Possible; moderate risk of residents collecting wood within retained vegetation.

Indirect impact (Describe impact, e.g. transport of weeds and pathogens form the site to adjacent vegetation)	**Impacted entities** (PCT/threatened entity and their habitats and where relevant, EPBC Act listing)	**Extent** (ha or zone reference)	**Frequency**	**Duration** (long-term/ short-term/ medium-term)	**Project phase/ timing of impact** (e.g. construction, operation, rehabilitation)	**Likelihood and consequences**
removal and disturbance of rocks, including bush rock	N/A	Adjacent vegetation	Ongoing construction and operation	Long Term	Construction operation	Unlikely; minor risk displacement of bush rock, loss of habitat features.
increase in predators	PCT 3446, PCT 3433, potential habitat for *Myotis macropus, Phascogale tapoatafa, Petaurus norfolcensis, Ninox connivens, Callocephalon fimbriatum* (EPBC E)	Adjacent vegetation	Ongoing Operation	Long Term	Operational	Possible; Moderate risk introduction of domesticated predators e.g. cats, within the local area, increased risk of potential native fauna mortality.
increase in pest animal populations	*Phascogale tapoatafa, Petaurus norfolcensis, Callocephalon fimbriatum* (EPBC E)	Adjacent vegetation	Ongoing Construction and operation	Long Term	Construction and Operational	Unlikely; Moderate risk to increase populations of urban adapted species, resulting on increased competition/ risk of disease within local fauna population.
changed fire regimes	PCT 3446, PCT 3433, potential habitat for *Myotis macropus, Phascogale tapoatafa, Petaurus norfolcensis, Ninox connivens, Callocephalon fimbriatum* (EPBC E)	Adjacent vegetation	Ongoing Construction and Operation	Long Term	Construction and Operational	Unlikely; Moderate risk to changes in successional flora post fire events, leading to an increased risk of weeds; Minor risk to increase of intensity of fire events due to improper fire regimes.
disturbance to specialist breeding and foraging habitat (eg beach nesting for shorebirds)	N/A	Adjacent vegetation and waterbodies	Daily Construction	Short Term	Construction	Unlikely; Minor risk; specialist breeding species not detected within the site's boundaries, as such it is considered unlikely that the proposal would impact upon these specialist species.

8.3 Prescribed impacts

8.3.1 Waterbodies, water quality and hydrological processes

8.3.1.1 Nature

The proposal includes the removal of three (3) mapped 1st order watercourses draining farm dams primarily though overland flow, with one defined channel. These streams occur in the northern extent of the subject land, associated with two (2) farm dams. The dams represent the only permanent or semi-permanent water in these areas, with the streams draining rapidly to a culvert under Anambah Road. The proposal would locate water quality basins in this area, which would be roughly equal in area to the existing cattle dams. The defined 1st order watercourse running east-west across the subject land is retained under the proposal, albeit with minor modifications to banks.

Impacts to species that utilise the waterbodies on the site will be mitigated by the creation of water quality basins which will mimic to a degree the foraging functionality of the dams. The highly disturbed nature of the waterbodies throughout the site also limits the reach of the potential consequences for threatened species.

8.3.1.2 Extent

The extent of these impacts includes both onsite features, watercourses and dams located within the proposal as well as potentially downstream waterbodies. The water quality basins should function to mitigate downstream impacts and improve the quality of water on gaining streams running to the east of the subject land.

8.3.1.3 Duration

The duration of these impacts are both immediate (during construction) and long term (altered hydrology). It is expected that long term alterations to hydrology will be minor in the context of the current land use and future water quality infrastructure. Short term impacts from construction have the potential to negatively impact riparian habitat, and controls will be required to avoid indirect impacts.

8.3.1.4 Consequences

Unmanaged impacts to water quality could preclude threatened species from utilising riparian habitat in the immediate area and downstream. As substantial bodies of water exist within a small radius of the dams being removed, it is not anticipated that the temporary reduction in aquatic habitat will place local species populations under stress. A long term reduction in water quality downstream would result in a wider reduction of foraging habitat. Suitable controls for erosion and sedimentation will be required to mitigate impacts during construction.

8.3.2 Vehicle strikes

Table 22. Residual prescribed impacts – vehicle strikes

Species Name (Common Name)	SAII entity	Likelihood	Estimated vehicle strike rates	Consequences
Dasyurus maculatus (Spotted-tailed Quoll)	No	Low – low species not detected within the site.	Low	Increased risk of mortality in local population.
Phascogale tapoatafa (Brush-tailed Phascogale)	No	Moderate – species detected within the site.	Low	Increased risk of mortality in local population.
Pseudomys novaehollandiae – New Holland Mouse	No	Low – spceis not detected within the site	Low	Increased risk of mortality in local population.

8.4 Mitigating residual impacts – management measures and implementation

Table 23. Summary of proposed mitigation and management measures for residual impacts (direct, indirect and prescribed)

Mitigation measure	Method/technique	Timing	Freq.	Responsibility	Performance criteria	Corrective Action	Likely efficacy (including risk of failure)	MNES (when relevant)
Mitigate direct loss of individuals of threatened species associated with removal of habitat.	Vegetation removal works are to occur outside core breeding periods for species known to use habitat on site wherever possible. Where not possible supervision by an ecologist is required to ensure harm to individual entities is minimised.	Summer	N/A	Proponent/ Ecologist	Works plan indicates tree clearing areas during optimal months	Cease site works and refer to technique & performance criteria and timing of activities	Moderate. Risk of failure remains, as no timing can mitigate risks to all species.	N/A
	Pre-clearance survey of trees to be removed	Prior to commencement of works for each stage	N/A	Proponent/ Ecologist	Tree pre-clearance survey completed maximum one week prior to removal.	Cease site works, revert to technique & performance criteria	Good. Risk of losses significantly reduced	N/A
	Mark habitat trees	Prior to commencement of works for each stage	N/A	Proponent	No breeding fauna observed at time of clearing	Cease site works, revert to technique & performance criteria	Good. Risk of losses significantly reduced	N/A
	Under scrubbing of vegetation and removal of non-habitat trees to occur in a sequence to allow for resident fauna to move to adjacent areas of habitat	Prior to commencement of works for each stage	N/A	Proponent	All habitat trees flagged and determine fauna presences (utilisation)	Cease site works, revert to technique & performance criteria	Good. Risk of losses significantly reduced	N/A
	Hollow-bearing and habitat trees sectionally dismantled by arborist, or if not practical trees soft felled	During clearing works for each stage	N/A	Proponent/ Civil contractor/s	No injury or mortality of native fauna during clearing works	Cease site works, revert to technique & performance criteria	Good. Risk of losses significantly reduced	
	Felling supervised by Ecologist	During clearing works for each stage	N/A	Proponent/ Ecologist	Hollows checked for fauna. Welfare managed	Cease site works, revert to technique	Moderate. Risk of failure remains. Though this is a late	N/A

Mitigation measure	Method/technique	Timing	Freq.	Responsibility	Performance criteria	Corrective Action	Likely efficacy (including risk of failure)	MNES (when relevant)
					in accordance with ethics approval	& performance criteria	step in an otherwise effective process	
	Felled trees left in situ before stockpiling to allow for any fauna to relocate	After felling of hollow-bearing and habitat trees, prior to stockpiling	N/A	Proponent	Trees left overnight after felling, stockpiled within clearing boundary	Cease site works and refer to technique & performance criteria and timing of activities	Moderate. Risk of failure remains, though this method is the last step in an effective process, so risk is low.	N/A
	Develop a Biodiversity Management Plan (BMP) in consult with consent authority for addressing management actions of habitat removal	Prior to commencement of works for each stage	N/A	Proponent	Approved BMP prior to construction of each stage	Cease site works, revert to technique & performance criteria	Good. Risk of losses significantly reduced by documenting an effective process	N/A
Mitigate indirect impacts to retained vegetation adjacent to the subject land	Establish Tree Protection Zones (TPZ) around retained habitat trees on the boundary of the development/ within APZ area	Prior to commencement of works for each stage	N/A	Proponent/ Civil contractor/s	TPZ is in accordance with Australian Standards AS4970-2009. No-Go signs & fencing of boundary	Cease site works, revert to technique & performance criteria	Good. Risk of losses significantly reduced	N/A
	Develop a weed management protocol to be included in Construction Environment Management Plan (CEMP) for constructions period to limit degradation of interface of development and retained vegetation	Prior to commencement of works for each stage	N/A	Proponent	Approved CEMP (Inc. weed management protocols) prior to construction of each stage	Cease site works, revert to technique & performance criteria	Moderate. Risk of failure remains as mobile weed propagules difficult to control and construction spoil creates ideal habitat for the establishment of weeds of disturbance and Hight Threat Weeds	N/A
	Develop a Vegetation Management Plan (VMP) addressing ongoing impacts to retained and surrounding native vegetation.	Prior to commencement of works for each stage	N/A	Proponent	Approved VMP prior to construction of each stage	Cease site works, revert to technique & performance criteria	Good. Risk of degradation significantly reduced and substantial improvement is practically achievable	N/A

Mitigation measure	Method/technique	Timing	Freq.	Responsibility	Performance criteria	Corrective Action	Likely efficacy (including risk of failure)	MNES (when relevant)
	Equipment and vehicles entering Site are cleaned of foreign soil and seed prior to entering the site	Prior to machinery arriving on Site	Per Float	Proponent/ Civil contractor/s	Best practice hygiene protocols followed, No visible foreign material, certification available upon request	Cease site works, revert to technique & performance criteria	Moderate. Risk of failure remains as pathogens can persist in very low volumes of material	N/A
Mitigate indirect impacts to threatened species habitat retained adjacent to the subject land	Limit construction works to daylight hours to reduce impacts from light and noise	For the duration of Site works	N/A	Proponent/ Civil contractor/s	No construction works to occur from dusk till dawn. Site not lit between dusk and dawn	Cease site works, revert to technique & performance criteria	Good. No risk.	N/A
	All machinery is correctly maintained and operated as per operation manual to reduce excessive noise	For the duration of Site works	N/A	Proponent/ Civil contractor/s	No excessive noise of machinery due to poor maintenance or faulty parts	Cease site works, revert to technique & performance criteria	Moderate.	N/A
	Vehicles/machinery to observe 5-10km/h speed limit on Site to reduce dust	For the duration of Site works	N/A	Proponent/ Civil contractor/s	No excessive dust	Cease site works, revert to technique & performance criteria	Good. Risk remains however consequence is relatively low.	N/A
Mitigating Prescribed Impacts to threatened species and their habitat	Erosion and sediment controls enacted in accordance with construction environment management plan (CEMP) to limit impacts on retained vegetation and creeklines.	Prior to commencement of works, for duration of Site works	N/A	Proponent/ Civil contractor/s	CEMP followed & modified as needed	Cease site works, revert to technique & performance criteria	Good. Significant control is achievable if implemented effectively. High consequence of failure.	N/A
	Establish Speed limits during construction and operation of the proposed development	Prior to construction and during operation	N/A	Proponent/ Civil contractor/s	Low speed limits set to minimise vehicle strikes	Cease site works, revert to technique & performance criteria	Moderate. Risk of strikes remains and high consequence of failure.	N/A

9. Serious and irreversible impacts

9.1 Assessment for serious and irreversible impacts on biodiversity values

No impacts associated with the proposal are likely to be serious and irreversible. See **Section 5** for details of entities assessed and justification of exclusion of SAII.

Table 24. Entities at risk of an SAII

Common name	Scientific name	Reason for inclusion in assessment
N/A		Choose an item.

10. Impact summary

10.1 Determine an offset requirement for impacts

10.1.1 Impacts on native vegetation and TECs or ECs (ecosystem credits)

Table 25 identifies impacts on native vegetation and TECs or ECs that do not require an offset (as per BAM Subsection 9.2.1(3.)). **Table 26** identifies impacts that require an offset (as per BAM Subsection 9.2.1(1.)). Refer to **Figure 7**

Table 25. Impacts that do not require offset – ecosystem credits

Vegetation zone	PCT name	TEC	Impact area (ha)	TEC association	Entity at risk of an SAII?	Current VI score
N/A – Pasture	3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest (as benchmark)	Not representative of a TEC	66.84	Part association *Hunter Lowland Redgum Forest in the Sydney Basin and New South Wales North Coast Bioregions* (BC Act Endangered)	No	16.4

Table 26. Impacts that require an offset – ecosystem credits

Vegetation zone	PCT name	TEC	Impact area (ha)	Current VI score	Future VI score	Change in VI score	Biodiversity risk weighting	Number of ecosystem credits required
1	3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest	Not representative of a TEC	3.26	39.8	0	-39.8		65
2	3433-Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest	Not representative of a TEC	0.45	31.4	0	-31.4		6
Total credits								**71**

10.1.2 Impacts on threatened species and their habitat (species credits)

Table 27 identifies impacts on threatened species (species credits) that require an offset (as per BAM Subsection 9.2.2(2.)).

Table 27. Impacts that require an offset – species credits

Scientific name	Common name	BC Act status	EPBC Act status	Loss of habitat (ha) or individuals	Biodiversity risk weighting	Number of species credits required
Callocephalon fimbriatum	Gang-gang Cockatoo	E	E	3.71	2.00	72
Myotis macropus	Southern Myotis	V	-	1.96	2.00	37
Ninox connivens	Barking Owl	V	-	3.71	2.00	72
Petaurus norfolcensis	Squirrel Glider	V	-	3.62	2.00	71
Phascogale tapoatafa	Brush-tailed Phascogale	V	-	3.62	2.00	71
					Total credits	**323**

10.2 Impacts that do not need further assessment

Table 28 identifies impacts that do not need further assessment for ecosystem credits (as per BAM Section 9.3(1–2.). Refer to **Figure 7**

Table 28. Impacts that do not need further assessment for ecosystem credits

Impact	Location within subject land	Justification why no further assessment is required
Clearing of non-native vegetation, non-vegetation land, built form not comprising threatened species habitat	Throughout and primarily comprising subject land and ancillary works	Ongoing disturbance, low conservation value, low VI score (see **Sections 2.2.3**, **4.5**) and low likelihood of inadvertent impact to protected entities.

11. Biodiversity credit report

The BAM-C credit report must identify the numbers and classes of biodiversity credits required to be retired in accordance with the like-for-like requirements of the offset rules and those that could be retired in accordance with the variation rules. The BDAR must be submitted to the decision-maker within 14 days of the date the BAM-C credit report was finalised. Refer to **Appendix J Credit reports**.

11.1 Ecosystem credits

Table 29. Ecosystem credit class and matching credit profile

Ecosystem credits	Attributes shared with matching credits						
	PCT name	PCT vegetation class	PCT vegetation formation	Associated TEC or EC	Offset trading group (BAM Section 10.2, Tables 4 & 5)	Hollow bearing trees present?	IBRA subregion (in which proposal is located)
65	3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest	Hunter-Macleay Dry Sclerophyll Forests	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Not a TEC	Hunter-Macleay Dry Sclerophyll Forests >=70% and <90%	Yes	SYB-Hunter
6	3433-Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest	Hunter-Macleay Dry Sclerophyll Forests	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Not a TEC	Hunter-Macleay Dry Sclerophyll Forests >=50% and <70%	Yes	SYB-Hunter

11.2 Species credits

Table 30. Species credit class and matching credit profile

Species credits	Attributes shared with matching credits				
	Name of threatened species	Kingdom	BC Act status	EPBC Act status	IBRA region
72	Callocephalon fimbriatum	Animalia	E	E	Any in NSW
37	Myotis macropus	Animalia	V	-	Any in NSW
72	Ninox connivens	Animalia	V	-	Any in NSW
71	Petaurus norfolcensis	Animalia	V	-	Any in NSW
71	Phascogale tapoatafa	Animalia	V	-	Any in NSW

12. Conclusion

MJD Environmental have been engaged by Thirdi Anambah Pty Ltd to prepare a Biodiversity Development Assessment Report to accompany a Concept Development Application. The proposal is seeking concept approval for the staged development of the concept master plan, and for which detailed proposals for the Site or for separate parts of the site are to be subject of subsequent Development Applications (DAs), apart from stage 1.

The masterplan creates a new subdivision of R1 General Residential zoned land within the Anambah Urban Release Area primarily on Lots 55/874170 and 177/874171 at 559 Anambah Road, Gosforth, with access via Anambah Road together with an emergency flood access to be constructed via the unformed River Road.

The subject land is not mapped on the OEH Biodiversity Values Map, however the proposal exceeds the area clearing threshold for the relevant minimum lot size of 450 m^2, being the clearing of an area of native vegetation greater than 2500 m^2. This is one of the triggers for the Biodiversity Offsets Scheme applying to the proposal.

The project location and design are predicated on a substantial history of assessment informing the Anambah Urban Release Area, which identified the predominantly cleared pastoral lands for residential development and avoided remnant native vegetation to the west associated with Lower Hunter Spotted Gum Ironbark communities.

The scattered paddock trees and small timbered patches on the subject land have been assessed as being best represented by the Plant Community Types in **Table E1**.

Table E1. Plant Community Types assessed on the subject land

PCT ID	PCT Name	Vegetation formation	Vegetation class	Per cent cleared value (%)
3446	Lower North Foothills Ironbark-Box-Gum Grassy Forest	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Hunter-Macleay Dry Sclerophyll Forests	74.93%
3433	Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest			68.60%

The PCTs on the subject land have been assessed as not representative of any BC Act or EPBC Act Threatened Ecological Communities.

Surveys carried out over the subject land ruled out the presence of candidate species credit species with the exception of:

- Callocephalon fimbriatum (Gang-gang Cockatoo)
- Myotis macropus (Southern Myotis)
- Ninox connivens (Barking Owl)
- Petaurus norfolcensis (Squirrel Glider)
- Phascogale tapoatafa (Brush-tailed Phascogale)

No entities at risk of Serious and Irreversible Impact were identified on the subject land or assessed as having likely habitat within the relevant buffers from the subject land as per the TBDC.

Site selection and project design have a substantial history in the assessment of the study area and subject land, as well as the broader locality associated with the Anambah Urban Release Area. Studies informing the LEP amendments indicated minimal biodiversity constraints on the pastoral lands in the release area. The project avoided access options through remnant forest and woodland, and proposes the replacement of dams with water quality basins to mitigate aquatic habitat loss.

The proposal will impact 3.71 ha of native vegetation comprising the listed PCTs and forming habitat for the listed Threatened Species, with offsets required for relevant impacts to vegetation zones and species polygons calculated in **Table E2** (Ecosystem Credits) and **Table E3** (Species Credits)

Table E2. Impacts that require an offset – ecosystem credits

Vegetation zone	PCT	TEC/EC	Impact area (ha)	Number of ecosystem credits required
VZ1: 3446_Canopy	3446	Not a TEC	3.26	65
VZ2: 3433_Canopy	3433	Not a TEC	0.45	6

Table E3. Impacts that require an offset – species credits

Scientific name	Common name	Loss of habitat (ha) or individuals	Number of species credits required
Callocephalon fimbriatum	Gang-gang Cockatoo	3.71 ha	72
Myotis macropus	Southern Myotis	1.96 ha	37
Ninox connivens	Barking Owl	3.71 ha	72
Petaurus norfolcensis	Squirrel Glider	3.62 ha	71
Phascogale tapoatafa	Brush-tailed Phascogale	3.62 ha	71

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559 ANAMBAH ROAD, GOSFORTH

FIGURE 1: SITE LOCATION

Legend

- Subject Land
- Study Area
- Proposed Asset Protection Zone
- Cadastral Boundary

N
W E
S

0 150 300 450 600

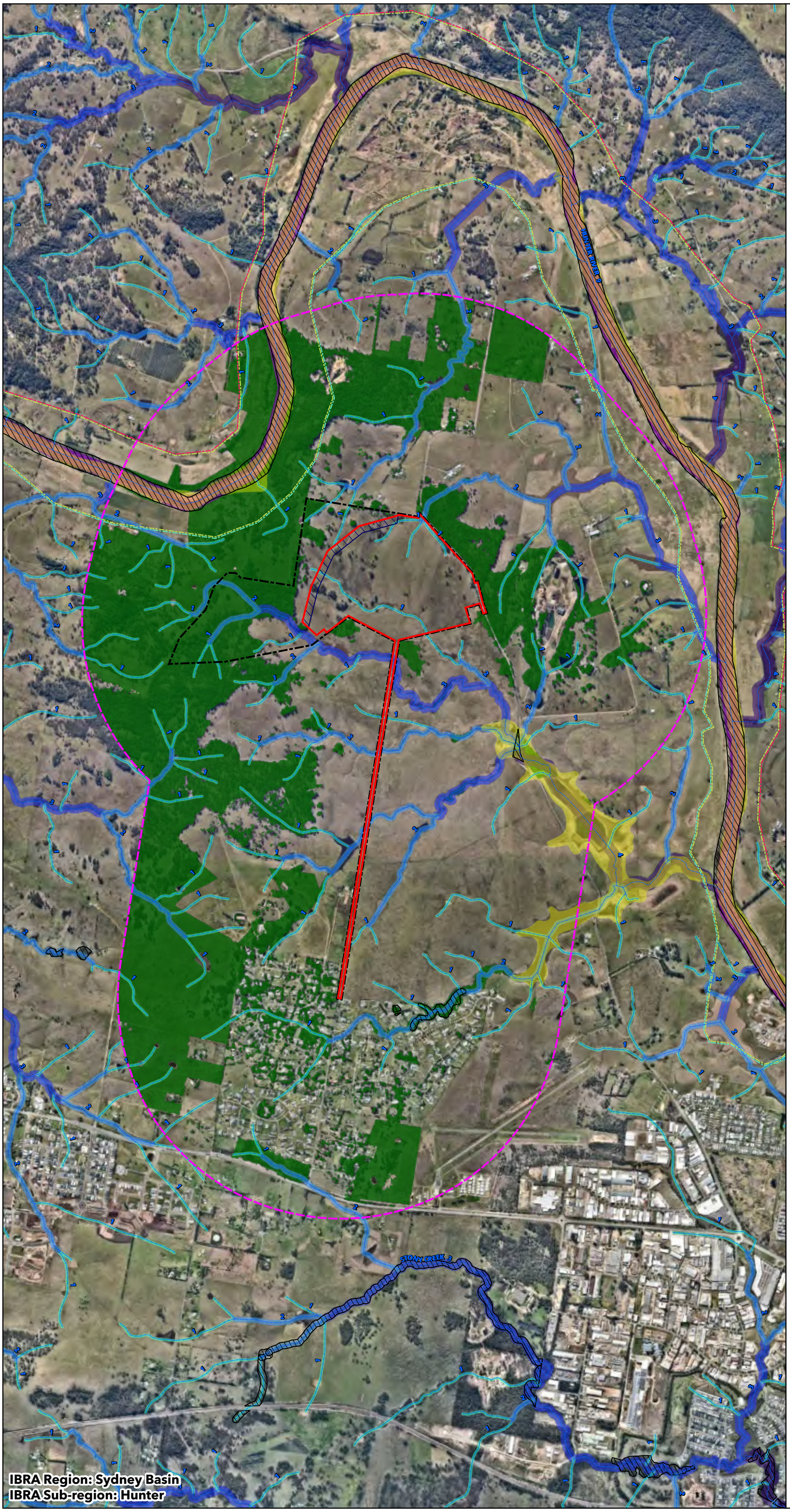
Metres
1:12000

MJD Environmental

Aerial: Nearmap (2024) | Data: MJD Environmental, Northrop, Torque Projects, NSW Spatial Services (2024) | Datum/Projection: GDA2020 / MGA zone 56 | Date: 2024-08-29 | Version: 1 | Z:\23071 - 559 Anambah Road, Gosforth | This plan should not be relied upon for critical design dimensions.

559 ANAMBAH ROAD,
GOSFORTH

FIGURE 2:
NATIVE VEGETATION EXTENT



Legend

- Subject Land
- Study Area
- Proposed Asset Protection Zone
- 1500 m Buffer from Subject Land
- Acid Sulfate Soil Risk
- Biodiversity Values Map
- Native Vegetation
- Watercourse (Strahler order as labelled)

Mitchell Landscape

- Central Hunter Alluvial Plains
- Central Hunter Foothills
- Newcastle Coastal Ramp

Vegetated Riparian Zone

- 10 m
- 20 m
- 30 m
- 40 m
- 50 m

N
W E
S

0 400 800 1,200 1,600

Metres
1:25000

MJD Environmental

Aerial: Nearmap (2024) | Data: MJD Environmental, NSW Department of Climate Change, Energy, the Environment, and Water, Northrop, Torque Projects, NSW Spatial Services (2024) | Datum/Projection: GDA2020 / MGA zone 56 | Date: 2024-08-29 | Version: 1 | Z:\23071 - 559 Anambah Road, Gosforth | This plan should not be relied upon for critical design dimensions.

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FIGURE 3: PLANT COMMUNITY TYPES & VEGETATION ZONES

Legend

- Subject Land
- Study Area
- Cadastral Boundary
- Proposed Asset Protection Zone
- Waterbody

Plant Community Types & Vegetation Zones

- VZ1 - 3446_Canopy
- VZ2 - 3433_Canopy
- Category 1 – Exempt Lands
- Pasture

- BAM Plot
- Hollow Bearing Tree

0 70 140 210 280

Metres
1:4500

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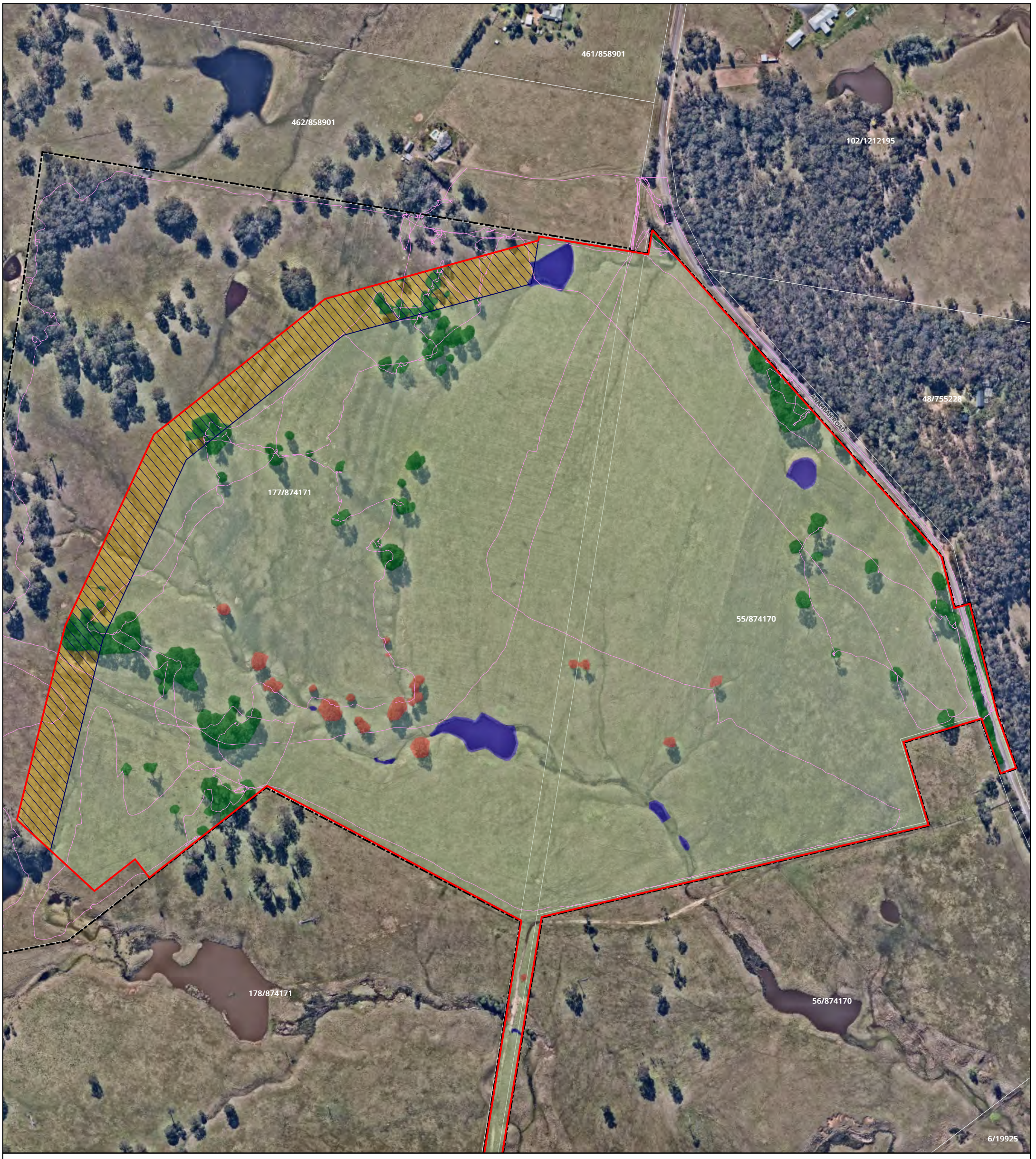
MJD Environmental

Aerial: Nearmap (2024) | Data: MJD Environmental, Northrop, Torque Projects, NSW Spatial Services (2024) | Datum/Projection: GDA2020 / MGA zone 56 | Date: 2024-08-29 | Version: 1 | Z:\23071 - 559 Anambah Road, Gosforth | This plan should not be relied upon for critical design dimensions.



559 ANAMBAH ROAD, GOSFORTH

FIGURE 4: FLORA SURVEYS

Legend

- Subject Land
- Study Area
- Proposed Asset Protection Zone
- Cadastral Boundary
- Waterbody
- Flora Survey Transects

Plant Community Types & Vegetation Zones

- VZ1 - 3446_Canopy
- VZ2 - 3433_Canopy
- Category 1 – Exempt Lands
- Pasture

0 70 140 210 280

Metres
1:4500

N W E S

MJD Environmental

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FIGURE 5: FAUNA SURVEYS

Legend

- Subject Land
- Study Area
- Proposed Asset Protection Zone
- Cadastral Boundary
- Waterbody

Plant Community Types & Vegetation Zones

- VZ1 - 3446_Canopy
- VZ2 - 3433_Canopy
- Category 1 – Exempt Lands
- Pasture

- Nocturnal Survey Transects
- Bush-stone Curlew Call Playback
- Camera Trap
- Koala SAT
- Owl Call Playback Station

0 70 140 210 280

Metres
1:4500

N
W E
S

MJD Environmental

Aerial: Nearmap (2024) | Data: MJD Environmental, Northrop, Torque Projects, NSW Spatial Services (2024) | Datum/Projection: GDA2020 / MGA zone 56 | Date: 2024-08-30 | Version: 1 | Z:\23071 - 559 Anambah Road, Gosforth | This plan should not be relied upon for critical design dimensions.

559 ANAMBAH ROAD, GOSFORTH

FIGURE 6: SPECIES POLYGONS

Legend

- Subject Land
- Study Area
- Proposed Asset Protection Zone
- Cadastral Boundary

Species Polygon

- *Petaurus norfolcensis* (Squirrel Glider) and *Phascogale tapoatafa* (Brush-tailed Phascogale)
- *Callocephalon fimbriatum* (Gang-gang Cockatoo) and *Ninox connivens* (Barking Owl)
- *Myotis macropus* (Southern Myotis)
- *Myotis macropus* 200 m Buffer from Waterbodies
- *Ninox connivens* (Barking Owl)
- *Petaurus norfolcensis* (Squirrel Glider)
- *Petaurus norfolcensis* (Squirrel Glider) and *Phascogale tapoatafa* (Brush-tailed Phascogale)
- *Phascogale tapoatafa* (Brush-tailed Phascogale)

0 70 140 210 280

Metres
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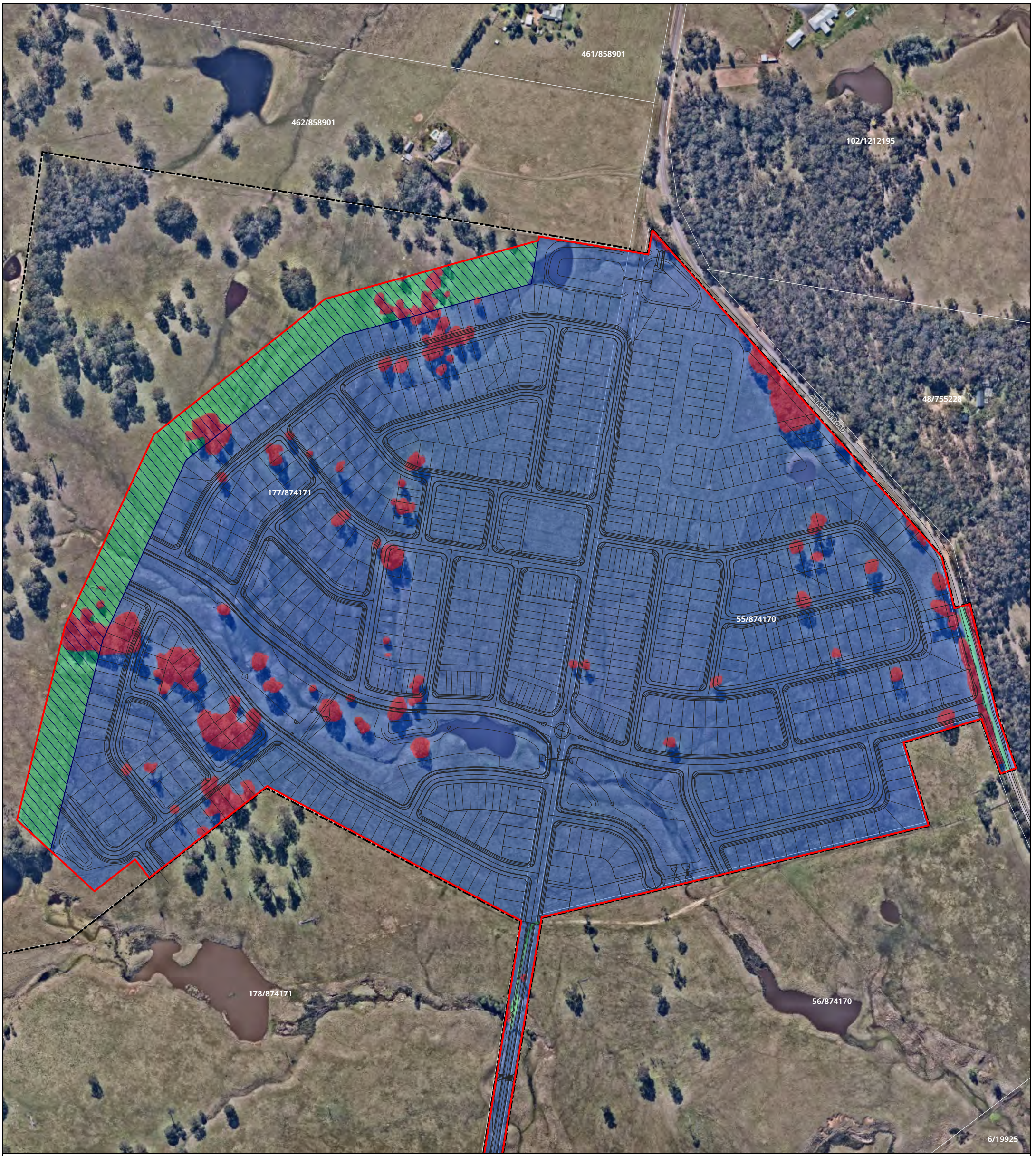
MJD Environmental

Aerial: Nearmap (2024) | Data: MJD Environmental, Northrop, Torque Projects, NSW Spatial Services (2024) | Datum/Projection: GDA2020 / MGA zone 56 | Date: 2024-08-30 | Version: 1 | Z:\23071 - 559 Anambah Road, Gosforth | This plan should not be relied upon for critical design dimensions.



559 ANAMBAH ROAD, GOSFORTH

FIGURE 7: OFFSET REQUIREMENTS

Legend

- Subject Land
- Study Area
- Cadastral Boundary
- Proposed Layout

Offset Requirements

- Impacts requiring offset
- Impacts not requiring offset
- Impacts not requiring further assessment

0 70 140 210 280

Metres
1:4500

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W E
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MJD Environmental

Aerial: Nearmap (2024) | Data: MJD Environmental, Northrop, Torque Projects, NSW Spatial Services (2024) | Datum/Projection: GDA2020 / MGA zone 56 | Date: 2024-08-29 | Version: 1 | Z:\23071 - 559 Anambah Road, Gosforth | This plan should not be relied upon for critical design dimensions.

Appendix A. BDAR requirements compliance

Table 31 specifies where each component of the BDAR minimum information requirements has been addressed in accordance with BAM Appendix K.

Table 31. Assessment of compliance with BDAR minimum information requirements

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
Introduction	Chapters 2 and 3	Information	
		Introduction to the biodiversity assessment including:	–
		☐ brief description of the proposal	**1.1.1**
		☐ identification of subject land boundary, including: ☐ operational footprint ☐ construction footprint indicating clearing associated with temporary/ancillary construction facilities and infrastructure	**1.1.2**
		☐ general description of the subject land	1.1.2
		☐ sources of information used in the assessment, including reports and spatial data	**1.6**
		☐ identification and justification for entering the BOS	**1.2**
		Maps and tables	
		☐ Map of the subject land boundary showing the final proposal footprint, including the construction footprint for any clearing associated with temporary/ancillary construction facilities and infrastructure	**Figure 1**
Landscape	Sections 3.1 and 3.2, Appendix E	Information	

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		Identification of site context components and landscape features, including:	–
		☐ general description of subject land topographic and hydrological setting, geology and soils	**1.1.2**
		☐ per cent native vegetation cover in the assessment area (as described in BAM Section 3.2)	**3.3**
		☐ IBRA bioregions and subregions (as described in BAM Subsection 3.1.3(2.))	**3.2.1**
		☐ rivers and streams classified according to stream order (as described in BAM Subsection 3.1.3(3.) and Appendix E)	**3.2.2**
		☐ wetlands within, adjacent to and downstream of the site (as described in BAM Subsection 3.1.3(3.))	**3.2.2**
		☐ connectivity of different areas of habitat (as described in BAM Subsection 3.1.3(5–6.))	**3.2.3**
		☐ karst, caves, crevices, cliffs, rocks and other geological features of significance and for vegetation clearing proposals, soil hazard features (as described in BAM Subsections 3.1.3(7.) and 3.1.3(12.))	**3.2.4**
		☐ areas of outstanding biodiversity value occurring on the subject land and assessment area (as described in BAM Subsection 3.1.3(8–9.))	**3.2.5**
		☐ any additional landscape features identified in any SEARs for the proposal	N/A
		☐ NSW (Mitchell) landscape on which the subject land occurs	**3.2.6**
		☐ details of field reconnaissance undertaken to confirm the extent and condition of landscape features and native vegetation cover (as described in Operational Manual Stage 1 Section 2.4)	**2.1**
		Maps and tables	
		☐ Site Map ☐ Property boundary ☐ Boundary of subject land ☐ Cadastre of subject land (including labelling of Lot and DP or section plan if relevant) ☐ Landscape features identified in BAM Subsection 3.1.3	**Figure 1**
		☐ Location Map ☐ Digital aerial photography at 1:1,000 scale or finer ☐ Boundary of subject land	**Figure 2**

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☐ Assessment area (i.e. the subject land and either 1500 m buffer area or 500 m buffer for linear development) ☐ Landscape features identified in BAM Subsection 3.1.3 ☐ Additional detail (e.g. local government area boundaries) relevant at this scale	
		Landscape features identified in BAM Subsection 3.1.3 and to be shown on the Site Map and/or Location Map include:	–
		☐ IBRA bioregions and subregions ☐ rivers, streams and estuaries ☐ wetlands and important wetlands ☐ connectivity of different areas of habitat ☐ karst, caves, crevices, cliffs, rocks and other geological features of significance and if required, soil hazard features ☐ areas of outstanding biodiversity value occurring on the subject land and assessment area ☐ any additional landscape features identified in any SEARs for the proposal ☐ NSW (Mitchell) landscape on which the subject land occurs	**Figure 1** & **Figure 2**
		Data	
		☐ All report maps as separate jpeg files	GeoPDF supplied
		Individual digital shape files of:	–
		☐ subject land boundary	–
		☐ assessment area (i.e. subject land and 1500 m buffer area) boundary	–
		☐ cadastral boundary of subject land	–
		☐ areas of native vegetation cover	–
		☐ landscape features	–
Native vegetation	Chapter 4, Appendix A	Information	

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
	and Appendix H		
		☐ Identify native vegetation extent within the subject land, including cleared areas and evidence to support differences between mapped vegetation extent and aerial imagery (as described in BAM Section 4.1(1–3.) and Subsection 4.1.1)	**4.1.1**
		☐ Provide justification for all parts of the subject land that do not contain native vegetation (as described in BAM Subsection 4.1.2)	**4.1.2**
		☐ Review of existing information on native vegetation including references to previous vegetation maps of the subject land and assessment area (described in BAM Section 4.1(3.) and Subsection 4.1.1)	**2.2.1**
		☐ Describe the systematic field-based floristic vegetation survey undertaken in accordance with BAM Section 4.2	**2.2.3**
		☐ Where relevant, describe the use of more appropriate local data, provide reasons that support the use of more appropriate local data and include the written confirmation from the decision-maker that they support the use of more appropriate local data (as described in BAM Subsection 1.4.2 and Appendix A)	N/A
		For each PCT within the subject land, describe:	–
		☐ PCT name and ID	**4.2**
		☐ vegetation class	4.2
		☐ extent (ha) within subject land	4.2
		☐ evidence used to identify a PCT including any analyses undertaken, references/sources, existing vegetation maps (BAM Section 4.2(1–3.))	**2.2.3**
		☐ plant species relied upon for identification of the PCT and relative abundance of each species	**4.2** & **Appendix I**
		☐ if relevant, TEC status including evidence used to determine vegetation is the TEC (BAM Subsection 4.2.2(1–2.))	**4.2**
		☐ estimate of per cent cleared value of PCT (BAM Subsection 4.2.1(5.))	4.2
		Describe the vegetation integrity assessment of the subject land, including:	–

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☐ identification and mapping of vegetation zones (as described in BAM Subsection 4.3.1)	**4.4** & **Figure 3**
		☐ description of vegetation zones within the subject land (as described in Operational Manual Stage 1 Table 2 and Subsection 3.3.2)	4.4
		☐ area (ha) of each vegetation zone	4.4
		☐ assessment of patch size (as described in BAM Subsection 4.3.2)	4.4
		☐ survey effort (i.e. number of vegetation integrity survey plots) as described in BAM Subsection 4.3.4(1–2.)	**4.5.1**
		☐ use of relevant benchmark data from BioNet Vegetation Classification (as described in BAM Subsection 4.3.3(5.))	**4.5.3**
		Where use of more appropriate local benchmark data is proposed (as described in BAM Subsection 1.4.2, BAM Subsection 4.3.3(5.) and BAM Appendix A):	–
		☐ identify the PCT or vegetation class for which local benchmark data will be applied ☐ identify published sources of local benchmark data (if benchmarks obtained from published sources) ☐ describe methods of local benchmark data collection (if reference plots used to determine local benchmark data)	N/A
		☐ provide justification for use of local data rather than BioNet Vegetation Classification benchmark values	N/A
		☐ provide written confirmation from the decision-maker that they support the use of local benchmark data	N/A
		Maps and tables	
		☐ Map of native vegetation extent within the subject land at scale not greater than 1:10,000 including identification of all areas of native vegetation including areas that are ground cover only, cleared areas (as described in BAM Section 4.1(1–3.)) and all parts of the subject land that do not contain native vegetation (BAM Subsection 4.1.2)	**Figure 3**
		☐ Map of PCTs within the subject land (as described in BAM Section 4.2(1.))	**Figure 3**
		☐ Map of vegetation zones within the subject land (as described in BAM Subsection 4.3.1)	**Figure 3**

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☐ Map the location of floristic vegetation survey plots and vegetation integrity survey plots relative to PCT boundaries	**Figure 3**
		☐ Map of TEC distribution on the subject land and table of TEC listing, status and area (ha)	**Figure 3**
		☐ Map of patch size locations for each native vegetation zone and table of patch size areas (as described in BAM Subsection 4.3.2)	**Table 7**
		Table of current vegetation integrity scores for each vegetation zone within the site and including:	–
		☐ composition condition score ☐ structure condition score ☐ function condition score ☐ presence of hollow bearing trees	**4.5.2**
		Data	
		☐ All report maps as separate jpeg files	GeoPDF supplied
		☐ Plot field data (MS Excel format)	
		☐ Plot field datasheets	<Appendix F>
		Digital shape files of:	–
		☐ PCT boundaries within subject land	–
		☐ TEC boundaries within subject land	–
		☐ vegetation zone boundaries within subject land	–
		☐ floristic vegetation survey and vegetation integrity plot locations	–
Threatened species	Chapter 5	Information	

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		Identify ecosystem credit species likely to occur on the subject land, including:	–
		☐ list of ecosystem credit species derived from the BAM-C (as described in BAM Subsection 5.1.1 and Section 5.2(1.))	**5.1.1**
		☐ justification and supporting evidence for exclusion of any ecosystem credit species based on geographic limitations, habitat constraints or vagrancy (as described in BAM Subsections 5.2.1 and 5.2.2)	5.1.1
		☐ justification for addition of any ecosystem credit species to the list	5.1.1
		Identify species credit species likely to occur on the subject land, including:	–
		☐ list of species credit species derived from the BAM-C (as described in BAM Subsection 5.1.1)	**5.1.2**
		☐ justification and supporting evidence for exclusions based on geographic limitations, habitat constraints or vagrancy (as described in BAM Subsections 5.2.1 and 5.2.2)	**5.1.2**
		☐ justification and supporting evidence for exclusions based on degraded habitat constraints and/or microhabitats on which the species depends (as described in BAM Subsection 5.2.2)	**5.1.2**
		☐ justification for addition of any species credit species to the list	**5.1.2**
		From the list of candidate species credit species, identify:	–
		☐ species assumed present within the subject land (if relevant) (as described in BAM Subsection 5.2.4(2.a.)) ☐ species present within the subject land on the basis of being identified on an important habitat map for a species (as described in BAM Subsection 5.2.4(2.d.)) ☐ species for which targeted surveys are to be completed to determine species presence (BAM Subsection 5.2.4(2.b.)) ☐ species for which an expert report is to be used to determine species presence (BAM Subsection 5.2.4(2.c.))	**5.2**
		Present the outcomes of species credit species assessments from:	–
		☐ threatened species survey (as described in BAM Section 5.2.4)	**Table 14** & **Table 15**
		☐ expert reports (if relevant) including justification for presence of the species and information used to make this determination (as described in BAM Subsection 5.2.4, Section 5.3, Box 3)	N/A

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		Where survey has been undertaken include detailed information on:	–
		☐ survey method and effort (as described in BAM Section 5.3)	**Table 14** & **Table 15**
		☐ justification of survey method and effort (e.g. citation of peer-reviewed literature) if approach differs from the department's taxa-specific survey guides or where no relevant guideline has been published	**5.3**
		☐ timing of survey in relation to requirements in the TBDC or the department's taxa-specific survey guides. Where survey was undertaken outside these guides include justification for the timing of surveys	5.3
		☐ survey personnel and relevant experience	**Appendix K**
		☐ describe any limitations to surveys and how these were addressed/overcome	**2.6**
		Where an expert report has been used in place of survey (as described in BAM Section 5.3, Box 3), include:	–
		☐ justification of the use of an expert report ☐ identify the expert, provide evidence of their expert credentials and departmental approval of expert status ☐ all requirements of Box 3 have been addressed in the expert report	N/A
		Where use of local data is proposed (BAM Subsection 1.4.2):	–
		☐ identify relevant species ☐ identify data to be amended ☐ identify source of information for local data, e.g. published literature, additional survey data, etc. ☐ justify use of local data in preference to VIS Classification or TBDC data	N/A
		☐ provide written confirmation from the decision-maker that they support the use of local data	N/A
		Species polygon completed for species credit species present within the subject land (assumed present or determined on the basis of survey, expert report or important habitat map) ensuring that:	–
		☐ the unit of measure for each species is documented	**Table 16** & **Table 17**
		for species assessed by area:	–

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☐ the polygon includes the extent of suitable habitat for the target species within the subject land (as described in BAM Subsection 5.2.5)	Figures as listed in **5.6** (if present)
		☐ a description of, and evidence-based justification for, the habitat constraints, features or microhabitats used to map the species polygon including reference to information in the TBDC for that species and any buffers applied	**5.6** (if present)
		for species assessed by counts of individuals:	–
		☐ the number of individual plants present on the subject land (as described in BAM Subsection 5.2.5(3.))	**5.6** (if present)
		☐ the method used to derive this number (i.e. threatened species survey or expert report) and evidence-based justification for the approach taken	**5.6** (if present)
		☐ the polygon includes all individuals located on the subject land with a buffer of 30 m around the individuals or groups of individuals on the subject land	Figures as listed in 5.6 (if present)
		☐ Identify the biodiversity risk weighting for each species credit species identified as present within the subject land (as described in BAM Section 5.4)	**Table 16**
		Maps and tables	
		☐ Table showing ecosystem credit species in accordance with BAM Subsection 5.1.1, and identifying:	
		☐ the ecosystem credit species removed from the list	**Table 9**
		☐ the sensitivity to gain class of each species	**Table 9**
		☐ Table detailing species credit species in accordance with BAM Section 5.2 and identifying:	**Table 10** & **Table 11**
		☐ the species credit species removed from the list of species because the species is considered vagrant, out of geographic range or the habitat or microhabitat features are not present	**5.1.2**
		☐ the candidate species credit species not recorded on the subject land as determined by targeted survey, expert report or important habitat map	**Table 10** & **Table 11**
		☐ Table detailing species credit species recorded or assumed as present within the subject land, habitat constraints or microhabitats associated with the species, counts of individuals (flora)/extent of suitable habitat (flora and fauna) (as described in BAM Subsection 5.2.6) and biodiversity risk weighting (BAM Section 5.4)	**Table 12** & **Table 13**

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☐ Map indicating the GPS coordinates of all individuals of each species recorded within the subject land and the species polygon for each species (as described in BAM Subsection 5.2.5)	**Figure 6**
		Data	
		☐ Digital shape files of suitable habitat identified for survey for each candidate species credit species	–
		☐ Survey locations including GPS coordinates of any plots, transects, grids	
		☐ Digital shape files of each species polygon including GPS coordinates of located individuals	–
		☐ Species polygon map in jpeg format	GeoPDF supplied
		☐ Expert reports and any supporting data used to support conclusions of the expert report	
		☐ Field datasheets detailing survey information including prevailing conditions, date, time, equipment used, etc.	
Prescribed impacts	Chapter 6	Information	
		Identify potential prescribed biodiversity impacts on threatened entities, including:	–
		☐ karst, caves, crevices, cliffs, rocks and other geological features of significance (as described in BAM Subsection 6.1.1) ☐ occurrences of human-made structures and non-native vegetation (as described in BAM Subsection 6.1.2) ☐ corridors or other areas of connectivity linking habitat for threatened entities (as described in BAM Subsection 6.1.3) ☐ waterbodies or any hydrological processes that sustain threatened entities (as described in BAM Subsection 6.1.4)	Table 18
		☐ protected animals that may use the proposed wind farm development site as a flyway or migration route (as described in BAM Subsection 6.1.5)	N/A
		☐ where the proposed development may result in vehicle strike on threatened fauna or on animals that are part of a threatened ecological community (as described in BAM Subsection 6.1.6)	**Table 18**
		☐ Identify a list of threatened entities that may be dependent upon or may use habitat features associated with any of the prescribed impacts	**6**
		☐ Describe the importance of habitat features to the species including, where relevant, impacts on life cycle or movement patterns (e.g. Subsection 6.1.3)	**6**

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		Where the proposed development is for a wind farm:	–
		☐ identify a candidate list of protected animals that may use the development site as a flyway or migration route, including: resident threatened aerial species, resident raptor species and nomadic and migratory species that are likely to fly over the proposal area (as described in BAM Subsection 6.1.5)	N/A
		☐ provide details of targeted survey for candidate species of wind farm developments undertaken in accordance with BAM Subsection 6.1.5(2–3.)	N/A
		☐ predict the habitual flight paths for nomadic and migratory species likely to fly over the subject land and map the likely habitat for resident threatened aerial and raptor species (BAM Subsection 6.1.5(4.))	N/A
		Where the proposal may result in vehicle strike:	–
		☐ identify a list of threatened fauna or protected fauna species that are part of a TEC and at risk of vehicle strike due to the proposal	**8.3.2**
		Maps and tables	
		☐ Map showing location of any prescribed impact features (i.e. karst, caves, crevices, cliffs, rocks, human-made structures, etc.)	<**Figure 1** & **Figure 2**>
		☐ Map showing location of potential vehicle strike locations	N/A
		☐ Maps of habitual flight paths for nomadic and migratory species likely to fly over the site and maps of likely habitat for threatened aerial species resident on the site (for wind farm developments only)	N/A
		Data	
		☐ Digital shape files of prescribed impact feature locations	–
		☐ Prescribed impact features map in jpeg format	GeoPDF supplied
Avoid and minimise impacts	Chapter 7	Information	

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		Demonstration of efforts to avoid and minimise impacts on biodiversity values (including prescribed impacts) associated with the proposal location in accordance with Chapter 7, including an analysis of alternative:	–
		☐ modes or technologies that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed mode or technology	**7** (where applicable)
		☐ routes that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed route	**7** (where applicable)
		☐ alternative locations that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed location	**7** (where applicable)
		☐ alternative sites within a property on which the proposal is located that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed site	**7** (where applicable)
		☐ Describe efforts to avoid and minimise impacts (including prescribed impacts) to biodiversity values through proposal design (as described in BAM Sections 7.1 and 7.2)	**7** (where applicable)
		☐ Identification of any other site constraints that the proponent has considered in determining the location and design of the proposal (as described in BAM Subsection 7.2.1(3.))	**7** (where applicable)
		☐ Detail measures or options considered but not implemented because they are not feasible and/or practical (e.g. due to site constraints)	**7** (where applicable)
		Maps and tables	
		☐ Table of measures to be implemented to avoid and minimise the impacts of the proposal, including action, outcome, timing and responsibility	N/A – see **7**
		☐ Map of alternative footprints considered to avoid or minimise impacts on biodiversity values; and of the final proposal footprint, including construction and operation	N/A – see **7**
		☐ Maps demonstrating indirect impact zones where applicable	N/A
		Data	
		Digital shape files of:	–
		☐ alternative and final proposal footprint	–
		☐ direct and indirect impact zones	–

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☐ Maps in jpeg format	GeoPDF supplied
Assessment of impacts	Chapter 8, Sections 8.1 and 8.2	Information	
		☐ Determine the impacts on native vegetation and threatened species habitat, including a description of direct impacts of clearing of native vegetation, threatened ecological communities and threatened species habitat (as described in BAM Section 8.1)	**8.1**
		Assessment of indirect impacts on vegetation and threatened species and their habitat including (as described in BAM Section 8.2):	–
		☐ description of the nature, extent, frequency, duration and timing of indirect impacts of the proposal	**8.2**
		☐ documenting the consequences to vegetation and threatened species and their habitat including evidence-based justifications	**8.2**
		☐ reporting any limitations or assumptions, etc. made during the assessment	**8.2**
		☐ identification of the threatened entities and their habitat likely to be affected	**8.2**
		Assessment of prescribed biodiversity impacts (as described in BAM Section 8.3) including:	–
		assessment of the nature, extent frequency, duration and timing of impacts on the habitat of threatened species or ecological communities associated with:	–
		☐ karst, caves, crevices, cliffs, rocks and other features of geological significance	**8.3** (if present)
		☐ human-made structures	**8.3** (if present)
		☐ non-native vegetation	**8.3** (if present)
		☐ connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range	**8.3** (if present)

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☐ movement of threatened species that maintains their life cycle	**8.3** (if present)
		☐ water quality, waterbodies and hydrological processes that sustain threatened species and threatened ecological communities	**8.3** (if present)
		☐ assessment of the impacts of wind turbine strikes on protected animals	N/A
		☐ assessment of the impacts of vehicle strikes on threatened species of animals or on animals that are part of a TEC	**8.3.2**
		☐ evaluate the consequences of prescribed impacts	**8.3** (if present)
		☐ describe impacts that are uncertain	**8.3** (if present)
		☐ document limitations to data, assumptions and predictions	**8.3** (if present)
		Maps and tables	
		☐ Table showing change in vegetation integrity score for each vegetation zone as a result of identified impacts	**Table 20**
		Data	
		N/A	–
Mitigation and management of impacts	Chapter 8, Sections 8.4 and 8.5	Information	
		Identification of measures to mitigate or manage impacts in accordance with the recommendations in BAM Sections 8.4 and 8.5 including:	–
		☐ techniques, timing, frequency and responsibility ☐ identify measures for which there is risk of failure ☐ evaluate the risk and consequence of any residual impacts	**8.4**

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☐ document any adaptive management strategy proposed	N/A
		Identification of measures for mitigating impacts related to:	–
		☐ displacement of resident fauna (as described in BAM Subsection 8.4.1(2.))	**8.4**
		☐ indirect impacts on native vegetation and habitat (as described in BAM Subsection 8.4.1(3.))	
		☐ mitigating prescribed biodiversity impacts (as described in BAM Subsection 8.4.2)	
		☐ Details of the adaptive management strategy proposed to monitor and respond to impacts on biodiversity values that are uncertain (BAM Section 8.5)	N/A
		Maps and tables	
		☐ Table of measures to be implemented before, during and after construction to mitigate and manage impacts of the proposal, including action, outcome, timing and responsibility	**Table 23**
		Data	
		N/A	–
Impact summary	Chapter 9	Information	
		Identification and assessment of impacts on TECs and threatened species that are at risk of a serious and irreversible impacts (SAII, in accordance with BAM Section 9.1) including:	–
		☐ addressing all criteria in Subsection 9.1.1 for each TEC listed as at risk of an SAII present on the subject land	**9.1** (if present)
		☐ for each TEC, report the extent of the TEC in NSW	**9.1** (if present)
		☐ addressing all criteria in Subsection 9.1.2 for each threatened species at risk of an SAII present on the subject land	**9.1** (if present)
		☐ for each threatened species, report the population size in NSW	**9.1** (if present)
		☐ documenting assumptions made and/or limitations to information	**9.1** (if present)
		☐ documenting all sources of data, information, references used or consulted	
		☐ clearly justifying why any criteria could not be addressed	

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☐ Identification of impacts requiring offset in accordance with BAM Section 9.2	**9.1** (if present)
		☐ Identification of impacts not requiring offset in accordance with BAM Subsection 9.2.1(3.)	**9.1** (if present)
		☐ Identification of areas not requiring assessment in accordance with BAM Section 9.3	**9.1** (if present)
		Maps and tables	
		☐ Map showing the extent of TECs at risk of an SAII within the subject land	Figures as listed in **9.1** (if present)
		☐ Map showing location of threatened species at risk of an SAII within the subject land	Figures as listed in **9.1** (if present)
		Map showing location of:	–
		☐ impacts requiring offset	Figures as listed in **9.1** (if present)
		☐ impacts not requiring offset	Figures as listed in **9.1** (if present)
		☐ areas not requiring assessment	Figures as listed in **9.1** (if present)
		Data	
		Digital shape files of:	–
		☐ extent of TECs at risk of an SAII within the subject land	–
		☐ location of threatened species at risk of an SAII within the subject land	–

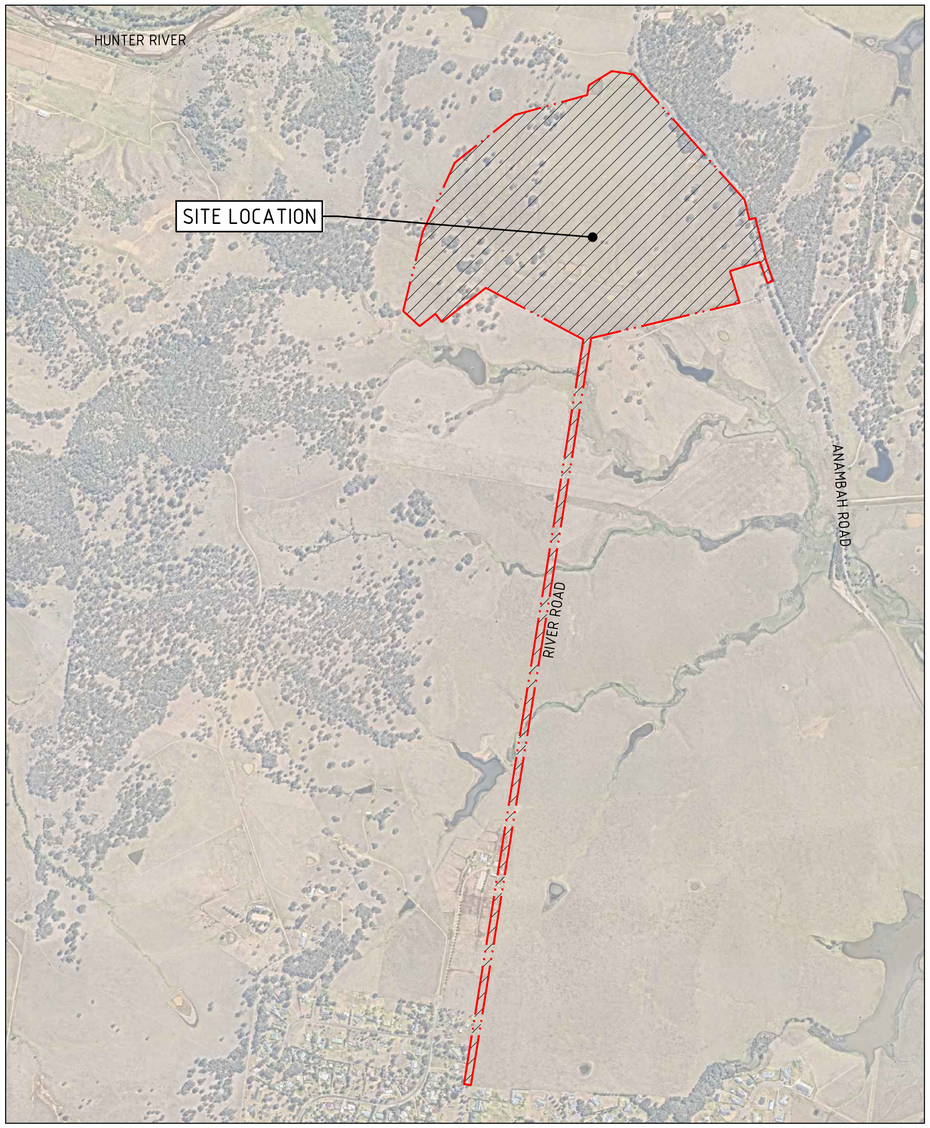
BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☐ boundary of impacts requiring offset	–
		☐ boundary of impacts not requiring offset	–
		☐ boundary of areas not requiring assessment	–
		☐ Maps in jpeg format	GeoPDF supplied
Impact summary	Chapter 10	Information	
		Ecosystem credits and species credits that measure the impact of the development on biodiversity values, including:	–
		☐ future vegetation integrity score for each vegetation zone within the subject land (Equation 25 and Equation 26 in BAM Appendix H) ☐ change in vegetation integrity score (BAM Subsection 8.1.1) ☐ number of required ecosystem credits for the direct impacts of the proposal on each vegetation zone within the subject land (BAM Subsection 10.1.2)	**Table 26**
		☐ biodiversity risk weighting for each	**Table 26** & **Table 27**
		☐ number of required species credits for each candidate threatened species that is directly impacted on by the proposal (BAM Subsection 10.1.3)	**Table 27**
		Maps and tables	
		☐ Table of PCTs requiring offset and the number of ecosystem credits required	**Table 26**
		☐ Table of threatened species requiring offset and the number of species credits required	**Table 27**
		Data	
		☐ Submitted proposal in the BAM Calculator	–

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
Biodiversity credit report	Chapter 10	Information	
		☐ Description of credit classes for ecosystem credits and species credits at the development or clearing site or land to be biodiversity certified (BAM Section 10.2)	**Table 29** & **Table 30**
		☐ BAM credit report in pdf format	**Appendix J**
		Maps and tables	
		☐ Table of credit class and matching credit profile	**Table 29** & **Table 30**
		Data	
		☐ BAM credit report in pdf format	**Appendix J**

Appendix B. Concept Layout

PROPOSED SUBDIVISION, 559 ANAMBAH ROAD GOSFORTH NSW 2320

MASTERPLANNING DEVELOPMENT APPLICATION
CIVIL ENGINEERING PACKAGE



LOCALITY PLAN

IMAGE SOURCE : NEARMAPS

DRAWING SCHEDULE

DWG NO.	DRAWING TITLE
MP-C01.01	COVER SHEET, DRAWING SCHEDULE AND LOCALITY PLAN
MP-C02.01	STAGING PLAN
MP-C03.01	CONCEPT BULK EARTHWORKS PLAN
MP-C03.11	BULK EARTHWORKS SITE SECTIONS - SHEET 1
MP-C03.12	BULK EARTHWORKS SITE SECTIONS - SHEET 2
MP-C03.13	BULK EARTHWORKS SITE SECTIONS - SHEET 3
MP-C04.01	CONCEPT CIVIL WORKS PLAN - SHEET 1
MP-C04.02	CONCEPT CIVIL WORKS PLAN - SHEET 2
MP-C04.03	CONCEPT CIVIL WORKS PLAN - SHEET 3
MP-C04.04	CONCEPT CIVIL WORKS PLAN - SHEET 4
MP-C05.01	FOOTPATH AND SHARED PATH PLAN
MP-C05.21	ROAD TYPICAL SECTIONS - SHEET 1
MP-C05.22	ROAD TYPICAL SECTIONS - SHEET 2
MP-C05.25	TYPICAL SECTIONS THROUGH LOTS
MP-C05.26	TYPICAL CIVIL DETAILS
MP-C05.31	ROAD LONGITUDINAL SECTIONS - SHEET 1
MP-C05.32	ROAD LONGITUDINAL SECTIONS - SHEET 2
MP-C05.33	ROAD LONGITUDINAL SECTIONS - SHEET 3
MP-C05.34	ROAD LONGITUDINAL SECTIONS - SHEET 4
MP-C05.35	ROAD LONGITUDINAL SECTIONS - SHEET 5
MP-C05.36	ROAD LONGITUDINAL SECTIONS - SHEET 6
MP-C05.37	ROAD LONGITUDINAL SECTIONS - SHEET 7
MP-C05.38	ROAD LONGITUDINAL SECTIONS - SHEET 8
MP-C05.39	ROAD LONGITUDINAL SECTIONS - SHEET 9
MP-C05.40	ROAD LONGITUDINAL SECTIONS - SHEET 10
MP-C05.41	ROAD LONGITUDINAL SECTIONS - SHEET 11
MP-C05.42	ROAD LONGITUDINAL SECTIONS - SHEET 12
MP-C05.43	ROAD LONGITUDINAL SECTIONS - SHEET 13
MP-C05.44	ROAD LONGITUDINAL SECTIONS - SHEET 14
MP-C05.45	ROAD LONGITUDINAL SECTIONS - SHEET 15
MP-C05.46	ROAD LONGITUDINAL SECTIONS - SHEET 16
MP-C05.47	ROAD LONGITUDINAL SECTIONS - SHEET 17
MP-C05.48	ROAD LONGITUDINAL SECTIONS - SHEET 18
MP-C05.49	ROAD LONGITUDINAL SECTIONS - SHEET 19
MP-C05.50	ROAD LONGITUDINAL SECTIONS - SHEET 20
MP-C05.51	ROAD LONGITUDINAL SECTIONS - SHEET 21
MP-C05.52	ROAD LONGITUDINAL SECTIONS - SHEET 22
MP-C05.53	ROAD LONGITUDINAL SECTIONS - SHEET 23
MP-C05.54	ROAD LONGITUDINAL SECTIONS - SHEET 24
MP-C05.55	ROAD LONGITUDINAL SECTIONS - SHEET 25
MP-C05.56	ROAD LONGITUDINAL SECTIONS - SHEET 26
MP-C05.57	ROAD LONGITUDINAL SECTIONS - SHEET 27
MP-C05.58	ROAD LONGITUDINAL SECTIONS - SHEET 28
MP-C05.59	ROAD LONGITUDINAL SECTIONS - SHEET 29
MP-C05.60	ROAD LONGITUDINAL SECTIONS - SHEET 30
MP-C05.61	ROAD LONGITUDINAL SECTIONS - SHEET 31
MP-C05.62	ROAD LONGITUDINAL SECTIONS - SHEET 32
MP-C05.63	ROAD LONGITUDINAL SECTIONS - SHEET 33
MP-C05.64	ROAD LONGITUDINAL SECTIONS - SHEET 34
MP-C05.65	ROAD LONGITUDINAL SECTIONS - SHEET 35
MP-C05.66	ROAD LONGITUDINAL SECTIONS - SHEET 36
MP-C06.01	CREEK PLAN AND LONGITUDINAL SECTION
MP-C06.11	CREEK CROSS SECTIONS
MP-C08.01	CONCEPT CIVIL WORKS PLAN RIVER ROAD - SHEET 1
MP-C08.02	CONCEPT CIVIL WORKS PLAN RIVER ROAD - SHEET 2
MP-C08.03	CONCEPT CIVIL WORKS PLAN RIVER ROAD - SHEET 3
MP-C08.04	CONCEPT CIVIL WORKS PLAN RIVER ROAD - SHEET 4
MP-C08.05	CONCEPT CIVIL WORKS PLAN RIVER ROAD - SHEET 5
MP-C08.21	ROAD TYPICAL SECTIONS RIVER ROAD
MP-C08.31	ROAD LONGITUDINAL SECTIONS RIVER ROAD - SHEET 1
MP-C08.32	ROAD LONGITUDINAL SECTIONS RIVER ROAD - SHEET 2
MP-C08.33	ROAD LONGITUDINAL SECTIONS RIVER ROAD - SHEET 3
MP-C08.34	ROAD LONGITUDINAL SECTIONS RIVER ROAD - SHEET 4

DRAWN: J.STAUB DESIGNED: A.TURNBULL JOB MANAGER: L.MCRAE VERIFIER: L.MCRAE

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REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
A	DRAFT ISSUE	JS		AK	09.08.24
B	DRAFT ISSUE	JS		AK	15.08.24
C	ISSUED FOR APPROVAL	JS	LM	AK	22.08.24

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PROJECT: PROPOSED SUBDIVISION 559 ANAMBAH ROAD GOSFORTH NSW 2320

MASTERPLANNING DA

DRAWING TITLE: CIVIL ENGINEERING PACKAGE

COVER SHEET, DRAWING SCHEDULE AND LOCALITY PLAN

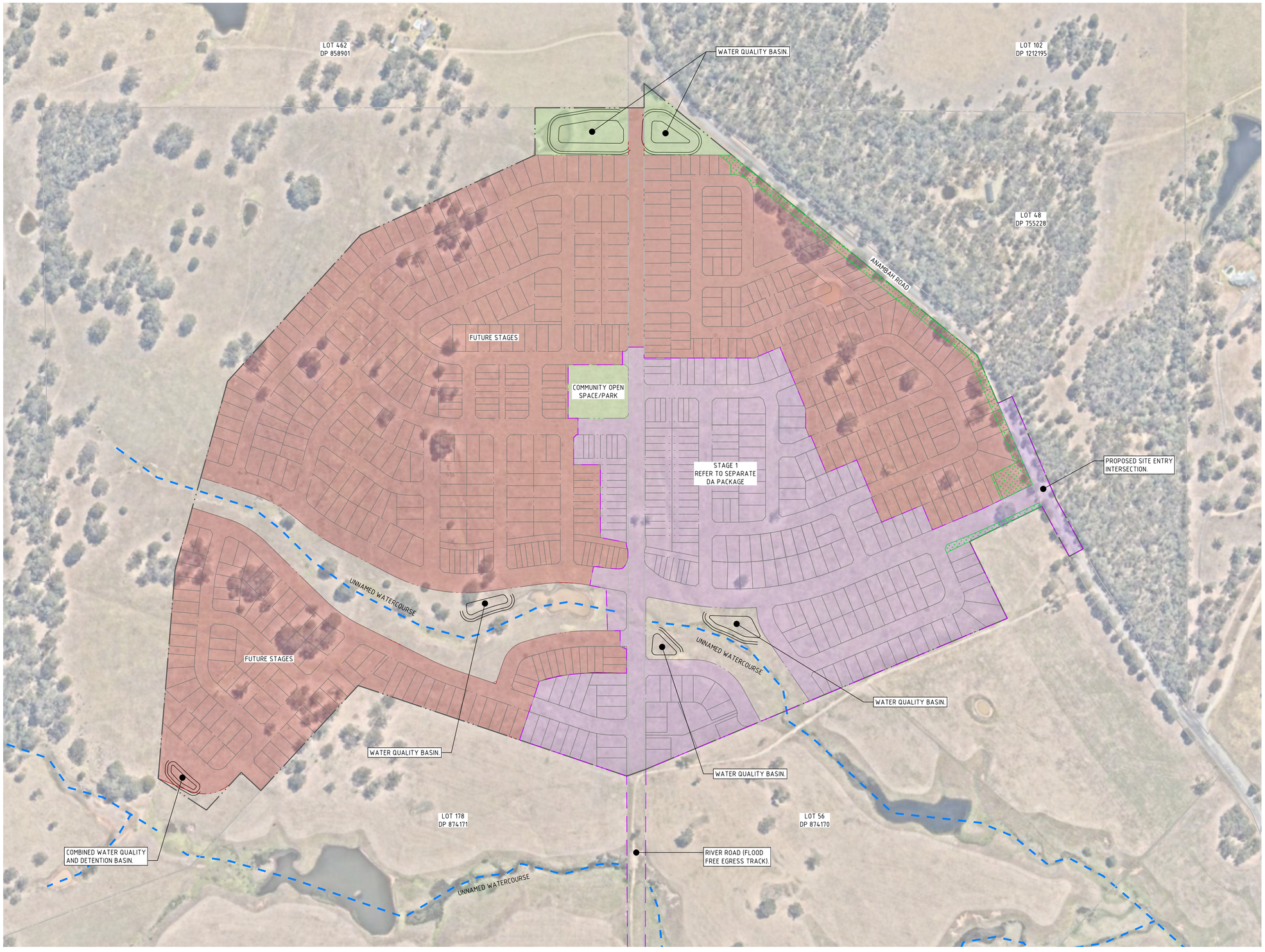
JOB NUMBER: NL222055-01

DRAWING NUMBER: MP-C01.01

REVISION: C

DRAWING SHEET SIZE = A1

Date : 22.08.2024 4:52 PM Plotted By : ANDREW KILLEN Found : O:\5 Pre-July 24 Projects\Newcastle\YEAR 2022 Jobs\NL222055-01 - 559 Anambah Road, Gosforth\n\D - Drawings\CIVIL\03-CAD\MP-MASTERPLANNL222055-01-MP-C01.01-COVER.dwg



LEGEND

- SITE BOUNDARY LINE
- EXISTING BOUNDARY LINE
- STAGE 1 WORKS EXTENT
- STAGE 1
- FUTURE STAGE
- OPEN SPACE
- LANDSCAPE SETBACK
- INDICATIVE LINE OF EXISTING WATERCOURSE.

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DESIGNED: A TURNBULL
JOB MANAGER: L MCRAE
VERIFIER: L MCRAE

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SCALE 1:2500@ A1

0 25 50 75 100 125m

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DRAWING TITLE: **CIVIL ENGINEERING PACKAGE**

STAGING PLAN

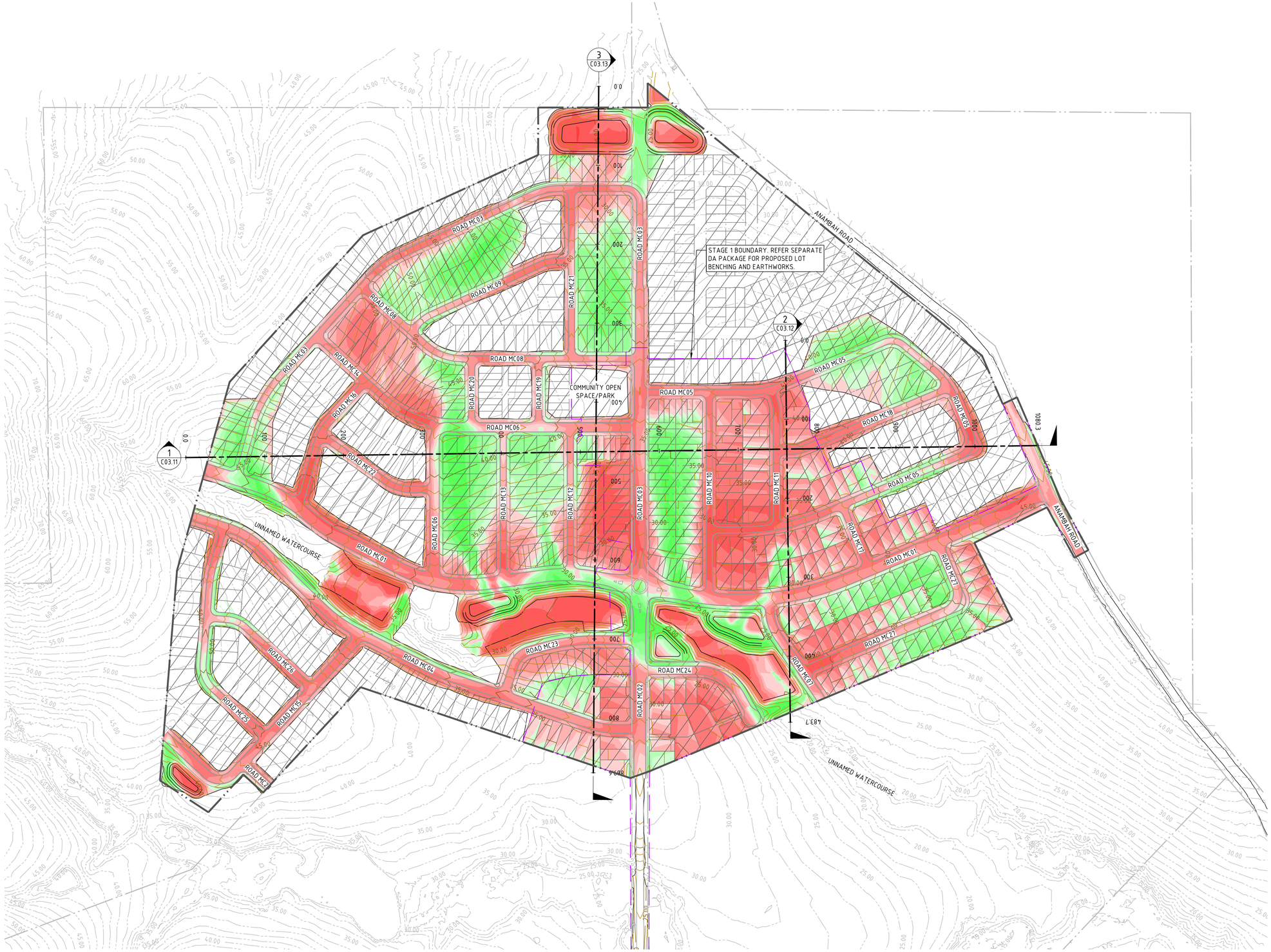
JOB NUMBER: **NL222055-01**

DRAWING NUMBER: **MP-C02.01**

REVISION: **C**

DRAWING SHEET SIZE = A1

Date : 22.08.2024 4:52 PM Plotted By : ANDREW KILLEN Found : O:\5 Pre-July 24 Projects\Newcastle\YEAR 2022 Jobs\NL222055-01 - 559 Anambah Road, Gosforth\02 - Drawings\Civil\03-CAD\MP-MASTERPLAN\NL222055-01-MP-C02.01-STAGING PLAN.dwg



LEGEND

- SITE BOUNDARY LINE
- PROPOSED BOUNDARY LINE
- EXISTING BOUNDARY LINE
- STAGE 1 WORKS EXTENT
- LOT RE-GRADING TO BE UNDERTAKEN AT SUBDIVISION WORKS STAGE VIA CONSTRUCTING RETAINING WALLS AND BATTERS. DETAILS TO BE PROVIDED AT SWC STAGE. REFER TO C05.25, TYPICAL LOT SECTIONS FOR STANDARD RESIDENTIAL LOT ARRANGEMENTS.
- XX.XX DESIGN CONTOURS (1.0m INTERVAL)
- XX.XX EXISTING CONTOURS (1.0m INTERVAL)
- A – SECTION MARKER

DEPTH OF CUT

- 999m	TO	- 15.0m
- 15.0m	TO	- 10.0m
- 10.0m	TO	- 5.0m
- 5.0m	TO	- 2.0m
- 2.0m	TO	- 1.0m
- 1.0m	TO	- 0.5m
- 0.5m	TO	- 0.25m
- 0.25m	TO	- 0.0m

DEPTH OF FILL

0.0m	TO	0.25m
0.25m	TO	0.5m
0.5m	TO	1.0m
1.0m	TO	2.0m
2.0m	TO	5.0m
5.0m	TO	10.0m
10.0m	TO	15.0m
15.0m	TO	999m

NOTES

THIS PLAN IS PROVIDED FOR INFORMATION PURPOSES ONLY AND IT IS EXPECTED THAT ADDITIONAL AREAS OF CUT AND FILLING WILL BE REQUIRED BEYOND THE EXTENTS SHOWN ON THIS PLAN. FURTHER LEVELS/DEPTHS OF CUT AND FILL WILL CONTINUE TO BE ALTERED AND THIS WILL BE CONFIRMED AS PART OF THE DETAILED DESIGN PHASE FOR SUBDIVISION WORKS CERTIFICATE PLAN PREPARATION.

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DESIGNED: A.TURNBULL
JOB MANAGER: L.MCRAE
VERIFIER: L.MCRAE

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MASTERPLANNING DA

DRAWING TITLE: CIVIL ENGINEERING PACKAGE

CONCEPT BULK EARTHWORKS PLAN

JOB NUMBER: NL222055-01

DRAWING NUMBER: MP-C03.01

REVISION: C

DRAWING SHEET SIZE = A1

Date : 22.08.2024 4:53 PM Plotted By : ANDREW KILLEN Found : O:\5 Pre-July 24 Projects\Newcastle\YEAR 2022 Jobs\NL222055-01 - 559 Anambah Road, Gosforth\03 - Drawings\CIVIL\03-CAD\MP-MASTERPLAN\NL222055-01-MP-C03.01-BULK EW.dwg

Appendix C. Biodiversity Values Map and Threshold tool report

Department of Planning and Environment

Biodiversity Values Map and Threshold Report

This report is generated using the Biodiversity Values Map and Threshold (BMAT) tool. The BMAT tool is used by proponents to supply evidence to your local council to determine whether or not a Biodiversity Development Assessment Report (BDAR) is required under the Biodiversity Conservation Regulation 2017 (Cl. 7.2 & 7.3).

The report provides results for the proposed development footprint area identified by the user and displayed within the blue boundary on the map.

There are two pathways for determining whether a BDAR is required for the proposed development:

1. Is there Biodiversity Values Mapping?
2. Is the 'clearing of native vegetation area threshold' exceeded?

Biodiversity Values Map and Threshold Report

Date of Report Generation		23/08/2024 4:17 PM
1. Biodiversity Values (BV) Map - Results Summary (Biodiversity Conservation Regulation Section 7.3)		
1.1	**Does the development Footprint intersect with BV mapping?**	no
1.2	Was ALL BV Mapping within the development footprinted added in the last 90 days? (dark purple mapping only, no light purple mapping present)	no
1.3	**Date of expiry of dark purple 90 day mapping**	N/A
1.4	**Is the Biodiversity Values Map threshold exceeded?**	no
2. Area Clearing Threshold - Results Summary (Biodiversity Conservation Regulation Section 7.2)		
2.1	**Size of the development or clearing footprint**	1,241,179.6 sqm
2.2	**Native Vegetation Area Clearing Estimate (NVACE)** (within development/clearing footprint)	404,394.8 sqm
2.3	**Method for determining Minimum Lot Size**	LEP
2.4	**Minimum Lot Size** (10,000sqm = 1ha)	450 sqm
2.5	**Area Clearing Threshold** (10,000sqm = 1ha)	2,500 sqm
2.6	**Does the estimate exceed the Area Clearing Threshold?** (NVACE results are an estimate and can be reviewed using the Guidance)	yes

REPORT RESULT: Is the Biodiversity Offset Scheme (BOS) Threshold exceeded for the proposed development footprint area? (Your local council will determine if a BDAR is required)	**yes**

What do I do with this report?

• If the result above indicates the BOS Threshold has been exceeded, your local council may require a Biodiversity Development Assessment Report with your development application. Seek further advice from Council. An accredited assessor can apply the Biodiversity Assessment Method and prepare a BDAR for you. For a list of accredited assessors go to: https://customer.lmbc.nsw.gov.au/assessment/AccreditedAssessor.

• If the result above indicates the BOS Threshold has not been exceeded, you may not require a Biodiversity Development Assessment Report. This BMAT report can be provided to Council to support your development application. Council can advise how the area clearing threshold results should be considered. Council will review these results and make a determination if a BDAR is required. Council may ask you to review the area clearing threshold results. You may also be required to assess whether the development is '"likely to significantly affect threatened species" as determined under the test in Section 7.3 of the *Biodiversity Conservation Act 2016*.

• If a BDAR is not required by Council, you may still require a permit to clear vegetation from your local council.

• If all Biodiversity Values mapping within your development footprint was less than 90 days old, i.e. areas are displayed as dark purple on the BV map, a BDAR may not be required if your Development Application is submitted within that 90 day period. Any BV mapping less than 90 days old on this report will expire on the date provided in Line item 1.3 above.

For more detailed advice about actions required, refer to the Interpreting the evaluation report section of the Biodiversity Values Map Threshold Tool User Guide .

Review Options:

• If you believe the Biodiversity Values mapping is incorrect please refer to our BV Map Review webpage for further information.

• If you or Council disagree with the area clearing threshold estimate results from the NVACE in Line Item 2.6 above (i.e. area of Native Vegetation within the Development footprint proposed to be cleared), review the results using the Guide for reviewing area clearing threshold results from the BMAT Tool.

Acknowledgement

I, as the applicant for this development, submit that I have correctly depicted the area that will be impacted or likely to be impacted as a result of the proposed development.

Signature: _____ Date:_____

(Typing your name in the signature field will be considered as your signature for the purposes of this form)

23/08/2024 04:17 PM

Biodiversity Values Map and Threshold Tool

The Biodiversity Values (BV) Map and Threshold Tool identifies land with high biodiversity value, particularly sensitive to impacts from development and clearing.

The BV map forms part of the Biodiversity Offsets Scheme threshold, which is one of the factors for determining whether the Scheme applies to a clearing or development proposal. You have used the Threshold Tool in the map viewer to generate this BV Threshold Report for your nominated area. This report calculates results for your proposed development footprint and indicates whether Council may require you to engage an accredited assessor to prepare a Biodiversity Development Assessment Report (BDAR) for your development.

This report may be used as evidence for development applications submitted to councils. You may also use this report when considering native vegetation clearing under the State Environmental Planning Policy (Biodiversity and Conservation) 2021 - Chapter 2 vegetation in non-rural areas.

What's new? For more information about the latest updates to the Biodiversity Values Map and Threshold Tool go to the updates section on the Biodiversity Values Map webpage.

Map Review: Landholders can request a review of the BV Map where they consider there is an error in the mapping on their property. For more information about the map review process and an application form for a review go to the Biodiversity Values Map Review webpage.

If you need help using this map tool see our Biodiversity Values Map and Threshold Tool User Guide or contact the Map Review Team at map.review@environment.nsw.gov.au or on 1800 001 490.

Biodiversity Values Map

1,313.3 0 656.64 1,313.3 Metres

WGS_1984_Web_Mercator_Auxiliary_Sphere

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

Legend

- Biodiversity Values that have been mapped for more than 90 days
- Biodiversity Values added within last 90 days
- Native Vegetation Area Clearing Estimate (NVACE)
- Development area selected by proponent

23/08/2024 04:17 PM

The results provided in this tool are generated using the best available mapping and knowledge of species habitat requirements.

This map is valid as at the date the report was generated. Checking the Biodiversity Values Map viewer for mapping updates is recommended.

Appendix D. Matters of National Environmental Significance

An EPBC Act Protected Matters Search (accessed 22nd January 2024) was undertaken to generate a list of those Matters of National Environmental Significance (MNES) from within 10 km of the subject land. An assessment of those MNES relevant to biodiversity has been undertaken in accordance within EPBC Act Policy Statement 1.1 Significant Impact Guidelines Matters of National Environmental Significance (DoE, 2013). The Matters of National Environmental Significance protected under national environment law include:

- Listed threatened species and communities;
- Listed migratory species;
- Ramsar wetlands of international importance;
- Commonwealth marine environment;
- World heritage properties;
- National heritage places;
- The Great Barrier Reef Marine Park;
- Nuclear actions; and
- A water resource, in relation to coal seam gas development and large coal mining development.

Listed Threatened Species and Communities:

A total of 58 threatened species and seven (9) threatened ecological communities listed under the EPBC Act have been recorded on the protected matters search. A likelihood of occurrence assessment for these MNES has been completed below.

Threatened Species

21 threatened birds, ten (10) mammals, five (5) herpetofauna, and 20 plants were recorded on the protected matters search. Of these, one species was considered to have the potential to occur within subject land:

- *Callocephalon fimbriatum* – Gang-gang Cockatoo (EPBC Endangered)

This assessment concluded that the proposal is unlikely to have significant impacts to any of the listed threatened species or threatened ecological communities listed under the EPBC Act.

Listed Migratory Species:

The protected matters search nominated 17 migratory species or species habitat that may occur with the 10 km subject land buffer search area. No listed migratory species were observed within the subject land. The assessment concluded that, no habitat within the subject land or study area is critical to their survival. Therefore, it is unlikely that the proposal over the subject land will impact migratory species.

Wetlands of International Significance (declared Ramsar wetlands):

The subject land is not a wetland of international significance or declared Ramsar wetland. However, one identified Ramsar wetland is listed as being within close proximity to the site 10-20km downstream. This being the Hunter Estuary Wetlands.

The Hunter Estuary Wetlands Ramsar site supports species that are nationally and internationally listed. Importantly the green and golden bell frog (Litoria aurea) listed as vulnerable under the EPBC Act 1999 have been found within the Kooragang component of the Ramsar site. The Australasian bittern (Botaurus poiciloptilus) listed as endangered on both the EPBC Act and the IUCN Red List (Version 2009.1) has been found at both components of the Ramsar site. The Hunter Estuary Wetland Ramsar site supports 112 species of waterbirds and 45 species of migratory birds listed under international agreements, including the great egret (Ardea alba), cattle egret (Ardea ibis), terns (Sterna spp.), glossy ibis (Plegadis falcinellus) and white-breasted sea-eagle (Haliaeetus leucogaster).

These wetlands also provide refuge for waterbirds such as ducks and herons during periods of inland drought.

The Hunter Estuary Wetland Ramsar site regularly supports 1% of the population of the eastern curlew (Numenius madagascariensis) and the red-necked avocet (Recurvirostra novaehollandiae),

Commonwealth Marine Areas:

The subject land is not part of a Commonwealth Marine Area.

World Heritage Properties:

The subject land is not a World Heritage area and is not in close proximity to any such area.

National Heritage Places:

The subject land is not a National Heritage area and is not in close proximity to any such area.

Great Barrier Reef Marine Parks:

The subject land is not part of or within close proximity to any Great Barrier Reef Marine Park.

Nuclear Actions:

The proposal over the subject land is not and does not form part of a Nuclear action.

Water Resources in relation to Coal Mining and CSG:

The proposal over the subject land is related to commercial development and as such is not or does not form part of a coal mining and/or CSG proposal.

Summary - In summary, the proposed action is unlikely to have an impact to MNES assessed herewith based on the assessment criteria set out in relevant Commonwealth policies and advice as at the time of this assessment.

Appendix E. EPBC Likelihood of Occurrence

Scientific Name	Common Name	BC Act	EPBC Act	Records	Likelihood of Occurrence	Potential Impacts	ToS Req'd
Threatened Ecological Communities							
Central Hunter Valley eucalypt forest and woodland		-	CE	L	Low. Not recorded within the study area	Low	No
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community		-	E	L	Low. Not recorded within the study area	Low	No
Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland		-	E	M	Low. Not recorded within the study area	Low	No
Hunter Valley Weeping Myall (Acacia pendula) Woodland		-	CE	M	Low. Not recorded within the study area	Low	No
Kurri sand swamp woodland of the Sydney Basin bioregion		-	E	L	Low. Not recorded within the study area	Low	No
Lowland Rainforest of Subtropical Australia		-	CE	L	Low. Not recorded within the study area	Low	No
River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria		-	CE	L	Low. Not recorded within the study area	Low	No
Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions		-	E	L	Low. Not recorded within the study area	Low	No
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland		-	CE	L	Low. Not recorded within the study area	Low	No
Flora							
Acacia bynoeana	Bynoe's Wattle, Tiny Wattle	E	V	1	Low. One OEH BioNet record occurs within a 10km radius of the site. The site is degraded generally lacking a midstory, furthermore the species was not detected as present during surveys.	Low, habitat on site is degraded and mid-storey is generally absent. Surveys did not detect this species	No

Scientific Name	Common Name	BC Act	EPBC Act	Records	Likelihood of Occurrence	Potential Impacts	ToS Req'd
Arthraxon hispidus	Hairy-joint Grass		V	0	Low. No OEH BioNet records occur within a 10km radius of the site. The sites vegetation consists of dry sclerophyll forest which is not commensurate with this species habitat.	Low. Habitat degraded. Site ground-layer comprises grazed pasture with very limited native assemblage.	No
Caladenia tessellata	Thick-lipped Spider-orchid, Daddy Long-legs	E	V	0	Low. No OEH BioNet records present within a 10km radius. Unlikely to occur on site due to historical land clearance and agricultural use. No further assessment required.	Low. Habitat degraded. Site ground-layer comprises grazed pasture with very limited native assemblage.	No
Cryptostylis hunteriana	Leafless Tongue-orchid	V	V	0	Low. No OEH BioNet records present within a 10km radius. The species is typically found near coastal areas. The species is unlikely to occur on site due to its historical land clearance and agricultural use as well as the sites' location. No further assessment required.	Low. Habitat degraded. Site ground-layer comprises grazed pasture with very limited native assemblage.	No
Cynanchum elegans	White-flowered Wax Plant	E	E	0	Low. No OEH BioNet records present within a 10km radius. Unlikely to occur on site due to the species being found in rainforest which does not coincide with PCTs onsite. No further assessment required.	Low. Habitat degraded. Site ground-layer comprises grazed pasture with very limited native assemblage.	No

Scientific Name	Common Name	BC Act	EPBC Act	Records	Likelihood of Occurrence	Potential Impacts	ToS Req'd
Dichanthium setosum	bluegrass	V	V	0	Low. No OEH BioNet records present within a 10km radius. Unlikely to occur as it occurs on the New England Tablelands, North West Slopes, and Plains, and the Central Western Slopes of NSW. No further assessment required.	Low. Habitat degraded. Site ground-layer comprises grazed pasture with very limited native assemblage.	No
Eucalyptus glaucina	Slaty Red Gum	V	V	6	Low. Six OEH BioNet occur within a 10km radius. This species was not detected as present within the site during surveys.as such no further assessment is required.	Low. Surveys did not detect this species	No
Eucalyptus parramattensis subsp. decadens	Earp's Gum, Earp's Dirty Gum		V	1	Low. One OEH BioNet record occurs within a 10km radius of the site. The tree was not detected within the subject area during surveys and was unlikely to be overlooked, as such this tree is unlikely to occur within the site.	Low. Surveys did not detect this species	No
Euphrasia arguta	null	CE	CE	0	Low. No OEH BioNet records present within a 10km radius. Unlikely to occur on site due to the only known population is located in the Nundle State Forest (D Binns pers. Comm. February 2009). The species is unlikely to occur within the Subject Land, No further assessment required.	Low. Habitat degraded. Site ground-layer comprises grazed pasture with very limited native assemblage.	No
Grevillea parviflora subsp. parviflora	Small-flower Grevillea	V	V	1	Low. One OEH BioNet records located within a 10km radius of the subject site. Due to the heavy management of the of the Subject Land and no mature individuals being located, it is unlikely the species the species would occur within the Subject Land, no further assessment is required.	Low, habitat on site is degraded and mid-storey is generally absent. Surveys did not detect this species	No

Scientific Name	Common Name	BC Act	EPBC Act	Records	Likelihood of Occurrence	Potential Impacts	ToS Req'd
Persicaria elatior	Knotweed, Tall Knotweed	V	V	0	Low. No OEH BioNet records present within a 10km radius. Unlikely to occur on site as it requires damp places beside streams and lakes. Historic agricultural practices have reduced suitable habitat. The species was no observed within waterlines within the Subject Land. It is unlikely the species persists within the Subject Land, no further assessment required.	Low. Riparian habitat is degraded and survey of waterbodies did not detect this species or its congeners.	No
Persoonia pauciflora	North Rothbury Persoonia	CE	CE	0	Low. No OEH BioNet records occur within a 10km radius of the site. The species is unlikely to occur as its known range strictly occurs within North Rothbury and a 2.km radius. As the subject area lies outside of this range it is unlikely to occur within the site. No further assessment is required.	Low, habitat on site is degraded and mid-storey is generally absent. Surveys did not detect this species	No
Prostanthera cineolifera	null	V	V	0	Low. No OEH BioNet records present within a 10km radius. Unlikely to occur on site due to the species having a restrictive range being found in areas of exposed sandstone ridges which do not occur within the site.	Low, habitat on site is degraded and mid-storey is generally absent. Surveys did not detect this species	No
Pterostylis gibbosa	Illawarra Greenhood, Rufa Greenhood, Pouched Greenhood	E	E	1	Low. One OEH BioNet record within a 10km radius of the Subject Land. Unlikely to occur on site due to historical land clearance and agricultural usage on site.	Low. Habitat degraded. Site ground-layer comprises grazed pasture with very limited native assemblage.	No

Scientific Name	Common Name	BC Act	EPBC Act	Records	Likelihood of Occurrence	Potential Impacts	ToS Req'd
Rhizanthella slateri	Eastern Underground Orchid	V	E	0	Low. No OEH BioNet records present within a 10km radius.as the site consists of pasture lands with areas of scarce canopy the site does not offer potential habitat in the form of dense leaf litter, as such this species is unlikely to occur within the site..	Low. Habitat degraded. Site ground-layer comprises grazed pasture with very limited native assemblage.	No
Rhodamnia rubescens	Scrub Turpentine, Brown Malletwood	CE	CE	0	Low. No OEH BioNet records present within a 10km radius. There is no suitable habitat for the species. The species is typically found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forests. No further assessment required.	Low, habitat on site is degraded and mid-storey is generally absent. Surveys did not detect this species	No
Rhodomyrtus psidioides	Native Guava	CE	CE	1	Low. One OEH BioNet records present within a 10km radius. There is no suitable habitat for the species. The species is typically found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forests. No further assessment required.	Low, habitat on site is degraded and mid-storey is generally absent. Surveys did not detect this species	No
Rutidosis heterogama	Heath Wrinklewort	V	V	1	Moderate. One OEH BioNet records within a 10km radius of the subject land. This species has the potential to occur within the site as the species is known to inhabit disturbed paddocks and pasture lands.	Low. Habitat degraded. Site ground-layer comprises grazed pasture with very limited native assemblage.	No

Scientific Name	Common Name	BC Act	EPBC Act	Records	Likelihood of Occurrence	Potential Impacts	ToS Req'd
Syzygium paniculatum	Magenta Lilly Pilly,	E	V	1	Low. One OEH BioNet records found within a 10km radius of the subject land. Due to the species only occurring on gravels, sands, silts and clays in riverside gallery rainforests and remnant littoral rainforest communities the species is unlikely to occur. No further assessment required.	Low, habitat on site is degraded and mid-storey is generally absent. Surveys did not detect this species	No
Thesium australe	Austral Toadflax, Toadflax	V	V	0	Moderate. No OEH BioNet records present within a 10km radius. The species has the potential to occur within the site due to it inhabiting grasslands or woodlands.	Low. Habitat degraded. Site ground-layer comprises grazed pasture with very limited native assemblage.	No
Birds							
Anthochaera phrygia	Regent Honeyeater	CE	CE	2	Low. Two OEH BioNet records within a 10km radius of the Subject Land. The site has not been mapped as important habitat within the BAM Important Habitat Mapping. As such the species is unlikely to occur within the site and no further assessment is required.	Low	No
Botaurus poiciloptilus	Australasian Bittern	E	E	0	Low. No. OEH BioNet Due to the species occurring in densely vegetated wetlands it is unlikely to occur on site as no suitable habitat is present. No further assessment required.	Low	No

Scientific Name	Common Name	BC Act	EPBC Act	Records	Likelihood of Occurrence	Potential Impacts	ToS Req'd
Calidris ferruginea	Curlew Sandpiper	E	CE	0	Low. No OEH BioNet records present within a 10km radius. Unlikely to occur in the Subject Land due to the species occurring mainly on intertidal mudflats in sheltered coastal areas and are less often recorded inland near dams, waterholes. No further assessment required.	Low	No
Callocephalon fimbriatum	Gang-gang Cockatoo	E	E	0	Moderate. No. OEH BioNet records within a 10km radius of the site. Due to the limited suitable habitat for the species within the subject land and lack of recent records of the species in the area it is unlikely that the proposal will impact the species. No further assessment required.	Assumed present in BAM, suitable hollows available.	Yes
Calyptorhynchus lathami lathami	South-eastern Glossy Black-Cockatoo	V	V	1	Low. One. OEH BioNet records within a 10km radius of the site. The subject site does not contain potential foraging habitat in the form of Casuarina or Allocasuarina, therefore it is unlikely to occur within the site. No further assessment required.	Low. No Casuarina or Allocasuarina on the subject land.	No
Charadrius leschenaultii	Greater Sand Plover, Large Sand Plover	V	V	0	Low. No OEH BioNet records present within a 10km radius. Unlikely to occur on site due to its distribution being almost entirely coastal. No suitable habitat present. No further assessment required.	Low	No
Climacteris picumnus victoriae	Brown Treecreeper (south-eastern)	V	V	2	Moderate. Two OEH BioNet record within a 10km of the site. Due to the site contains eucalypt species with a grassy understory present the site contains potential foraging habitat in which the species may utilise.	Low. Habitat is degraded and fragmented, limited function for this woodland species.	No

Scientific Name	Common Name	BC Act	EPBC Act	Records	Likelihood of Occurrence	Potential Impacts	ToS Req'd
Erythrotriorchis radiatus	Red Goshawk	E	E	1	Low. One OEH BioNet record present within a 10km radius. The species is often found along coastal rivers and Melaleuca forests, as such habitat is not present within the site this species is not likely to occur.	Low	No
Falco hypoleucos	Grey Falcon	V	V	0	Low. No OEH BioNet records present within a 10km radius. Unlikely to occur on site due to the species being restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions. No further assessment required.	Low	No
Gallinago hardwickii	Latham's Snipe		V	0	Low. No OEH BioNet records occur within a 10km radius. The site does not provide potential habitat in the form of open freshwater wetland this species is unlikely to utilise the subject area, no further assessment required.	Low	No
Glossopsitta pusilla	Little Lorikeet	V		1	Low. One OEH BioNet record occurs within a 10km radius of the site	Low	No
Grantiella picta	Painted Honeyeater	V	V	0	Low. No OEH BioNet records present within a 10km radius. Unlikely to occur in the subject land as the species typically occurs on the inland slopes of the Great Dividing Range. No further assessment required.	Low	No

Scientific Name	Common Name	BC Act	EPBC Act	Records	Likelihood of Occurrence	Potential Impacts	ToS Req'd
Hirundapus caudacutus	White-throated Needletail	-	V	9	Low. There are nine (9) OEH BioNet records within a 10km radius of the subject site. There is potential the species may fly over the subject land, however, the species is almost exclusively aerial and unlikely to be affected by the proposal. No further assessment.	Low	No
Lathamus discolor	Swift Parrot	E	CE	0	Low. No OEH BioNet records occur within a 10km radius of the subject site, the site has not been mapped as containing important habitat on important habitat mapping. Coupled with the lack of structural complexity of the Subject Land indicates that this species would not occur within the site.	Low	No
Melanodryas cucullata cucullata	South-eastern Hooded Robin, Hooded Robin (south-eastern)	E	E	0	Low. There are no OEH BioNet records within a 10km radius of the subject land. Species occurrence is unlikely as it required structurally diverse habitats and native shrub layers and grasslands, which are not present within the subject land. No further assessment required.	Low	No
Neophema chrysostoma	Blue-winged Parrot	V	V	0	Low. No OEH BioNet records found within a 10km radius of the subject land. The species is uncommon in the area and is typically found in Victoria and southwest NSW. The species is unlikely to occupy the subject land, no further assessment required.	Low	No

Scientific Name	Common Name	BC Act	EPBC Act	Records	Likelihood of Occurrence	Potential Impacts	ToS Req'd
Numenius madagascariensis	Eastern Curlew, Far Eastern Curlew	-	CE	0	Low. No OEH BioNet records found within a 10km radius of the subject land. Due to the species typical habitat comprising of sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons it is unlikely the species occurs onsite. No further assessment required.	Low	No
Pycnoptilus floccosus	Pilotbird	-	V	0	Low. No OEH BioNet records found within a 10km radius of the subject land. No suitable habitat is present for the species as they are typically found on the ground of dense forests, with heavy undergrowth. No further assessment required.	Low	No
Rostratula australis	Australian Painted Snipe	E	E	0	Low. No OEH BioNet records within a 10km radius to the subject land. Due to the species occurring in swamps, dams, and marshy areas and require grass tussocks or reeds to nest in, it is unlikely the species occur onsite. No further assessment required.	Low	No

Scientific Name	Common Name	BC Act	EPBC Act	Records	Likelihood of Occurrence	Potential Impacts	ToS Req'd
Stagonopleura guttata	Diamond Firetail	V	V	0	Low. No BioNet records occur within a 10km radius of the site, the species is described as occurring grassy eucalypt woodlands and has the potential to occur in lightly wooded farmland. Despite this, the species requires dense shrubs to build its nest which are not present within the subject land. Further to this there are no records within a 10 km Bionet search of the subject land. It is unlikely that the species utilises the subject land. Therefore, no further assessment required. .	Low	No
Tringa nebularia	Common Greenshank, Greenshank	-	E	0	Low. No OEH BioNet records occur within a 10km radius of the site, this species is unlikely to be present within the site as it inhabits inland wetlands along with sheltered coastal habitats, the site would not provide foraging and or breeding habitat for this species, as such no further assessment is required.	Low	No
Mammals							
Chalinolobus dwyeri	Large-eared Pied Bat, Large Pied Bat	V	E	0	Low. No OEH BioNet records occur within 10km radius of the site. No caves or old mines, rocky areas, overhangs, escarpments, outcrops or crevices or culverts were present within the subject land or in close proximity to the subject land. Therefore, it is unlikely that the subject land contains suitable breeding habitat for the species or is regularly utilised for foraging. Therefore, no further survey is required.	Low	No

Scientific Name	Common Name	BC Act	EPBC Act	Records	Likelihood of Occurrence	Potential Impacts	ToS Req'd
Dasyurus maculatus maculatus	Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population)	V	E	4	Low. 4 OEH BioNet records within a 10km radius of the site, with only one (1) occurring in the last 15 years. Due to historical land clearing and agricultural usage on-site and the relative lack of canopy area within the Subject Land, it is unlikely the species will occur.	Low	No
Notamacropus parma	Parma Wallaby	V	V	0	Low. No OEH BioNet records found within a 10km radius of the subject site. The species is unlikely to occur as the species prefers moist eucalypt forests with thick shrubby understorey which is not present within the Subject Land. No further assessment required.	Low	No
Petauroides volans	Greater Glider		E	0	Low. No OEH Bionet records occur within a 10km radius of the site, this species requires large areas of continuous eucalypt forest with a High. canopy cover, as the site predominantly contains open agricultural pasture with scattered eucalypt canopy this species would not utilise the site as potential habitat.	Low	No
Petaurus australis	Yellow-bellied Glider	V	V	0	No OEH BioNet records found within a 10km radius of the subject site. Due to the species preference of mature old growth forests, the species would not occur within the site due to the lack of a mature canopy stratum. No further assessment is required.	Low	No

Scientific Name	Common Name	BC Act	EPBC Act	Records	Likelihood of Occurrence	Potential Impacts	ToS Req'd
Petrogale penicillata	Brush-tailed Rock-wallaby	E	V	0	Low. No OEH BioNet records found within a 10km radius of the Subject Land. The species typically occurs on rocky escarpments, outcrops and cliffs, which are not present within the Subject Land. It is unlikely the species occurs onsite. No further assessment required.	Low	No
Phascolarctos cinereus	Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory)	E	E	5	Low. There are 5 OEH BioNet records found within a 10km radius to the Subject Land. The site contains Koala use trees. Surveys were undertaken for this species and it was not detected.	Low	No
Potorous tridactylus tridactylus	Long-nosed Potoroo (northern)	V	V	0	No OEH BioNet records found within a 10km radius of the subject site. The species is generally restricted to coastal heaths and forests with a dense understory, as the site does not contain a dense understory it is unlikely that the species will occur within the site as suitable habitat is not present. No further assessment required.	Low	No
Pseudomys novaehollandiae	New Holland Mouse, Pookila	-	V	0	No OEH BioNet records found within a 10km radius of the subject site. Due to the species inhabiting open heathland, open woodland with a heathland understory and vegetated sand dunes, it is unlikely to occur on site. No further assessment required.	Low	No
Pteropus poliocephalus	Grey-headed Flying-fox	V	V	112	There are 112 OEH BioNet records found within a 10km radius, the land may represent marginal potential foraging habitat for the species, however the resource is very limited on the site in the context of the species range and ecology.	Low	No

Scientific Name	Common Name	BC Act	EPBC Act	Records	Likelihood of Occurrence	Potential Impacts	ToS Req'd
Herpetofauna							
Aprasia parapulchella	Pink-tailed Worm-lizard, Pink-tailed Legless Lizard	V	V	0	Low. No OEH BioNet records within a 10km radius of the subject site. The species typically inhabits sloping open woodland areas with predominately native grass ground layers. Other habitat features include well drained areas with rocky outcrops or scattered partially buried rocks. Due to the species habitat features not occurring within the Subject Land, it is unlikely the species would occur. No further assessment required.	Low	No
Delma impar	Striped Legless Lizard, Striped Snake-lizard	V	V	-	Low. No OEH BioNet records found within a 10km radius of the subject site. Due to the species habitat primarily consisting of native tussocking grass species such as kangaroo grass, (*Themeda australis)* and others, it is unlikely to occur on site due to historical agricultural usage and land clearance. No further assessment required.	Low	No
Litoria aurea	Green and Golden Bell Frog	E	V	7	Low. 7 OEH BioNet records within a 10km radius of the site. The site does not offer suitable habitat for this species. As onsite dams are lacking in structural native vegetation within the surrounding areas, due to agricultural land practices and the current grazing of livestock.	Low	No

Scientific Name	Common Name	BC Act	EPBC Act	Records	Likelihood of Occurrence	Potential Impacts	ToS Req'd
Mixophyes balbus	Stuttering Frog		V	0	Low. No OEH BioNet records occur within 10km radius of the site, this species is predominantly found within tall rainforests along with tall open wet forests, as the site does not contain habitat of this nature. It is unlikely that the site would offer foraging or breeding habitat for this species.	Low	No
Listed Migratory Species							
Actitis hypoleucos	Common Sandpiper			0	Low. No OEH BioNet atlas records occur within a 10km radius of the site as the species inhabits Wetland habitats it is unlikely to occur within the site as suitable foraging habitat does not occur. As such no further assessment is required.	Low	No
Apus pacificus	Fork-tailed Swift			1	Low. 1 OEH BioNet record occurs within a 10km radius of the site, as this species is almost exclusively areal the proposal would not impact upon the specie, no further assessment is required.	Low	No
Calidris acuminata	Sharp-tailed Sandpiper			1	Low. 1 OEH BioNet record occurs within a 10km radius of the site due to this species inhabiting predominantly terrestrial wetlands it is unlikely to occur within the site as this habitat feature is not present.	Low	No

Scientific Name	Common Name	BC Act	EPBC Act	Records	Likelihood of Occurrence	Potential Impacts	ToS Req'd
Calidris ferruginea	Curlew Sandpiper	E	CE	0	No OEH BioNet records present within a 10km radius. Unlikely to occur in the Subject Land due to the species occurring mainly on intertidal mudflats in sheltered coastal areas and are less often recorded inland near dams, waterholes. No further assessment required.	Low	No
Calidris melanotos	Pectoral Sandpiper			2	2 OEH BioNet records occur within a 10km radius, this species prefers shallow. fresh to saline water wetlands, as no such habitat occurs within the site this species is unlikely to occur.	Low	No
Charadrius leschenaultii	Greater Sand Plover, Large Sand Plover	V	V	0	Low. No OEH BioNet records occur within a 10km radius of the site. The site does not consist of sheltered sandy shelly or muddy beaches or large intertidal mudflats as such the species is unlikely to occur within the site due to a lack of suitable habitat.	Low	No
Cuculus optatus	Oriental Cuckoo, Horsfield's Cuckoo			3	Low. 3 OEH Bionet records occur within a 10km radius of the site, the site does not contain deciduous or coniferous forest habitat in which the species will occur, as such the species is unlikely to occur within the site.	Low	No
Hirundapus caudacutus	White-throated Needletail	-	V	9	Low. There are nine (9) OEH BioNet records within a 10km radius of the subject site. Due to the species being almost exclusively aerial it is possible the species may fly over the Subject Land, however, it is unlikely it would perch within the Subject Land. No further assessment required.	Low	No

Scientific Name	Common Name	BC Act	EPBC Act	Records	Likelihood of Occurrence	Potential Impacts	ToS Req'd
Monarcha melanopsis	Black-faced Monarch	-	-	0	Low. No OEH BioNet records found within a 10km radius of the subject site. Due to the species inhabiting rainforests it is unlikely it occurs on site. No further assessment required.	Low	No
Motacilla flava	Yellow Wagtail	-	-	-	Low. No OEH BioNet records found within a 10km radius of the subject site. The site does not contain foraging habitat for this species.	Low	No
Myiagra cyanoleuca	Satin Flycatcher	-	-	-	Low. No OEH BioNet records found within a 10km radius of the subject site. Due to the species inhabiting heavily vegetated gullies in eucalyptus-dominated forests and taller woodlands, it is unlikely to occur on site as this is not present. No further assessment required.	Low	No
Numenius madagascariensis	Eastern Curlew, Far Eastern Curlew		CE	0	Low. No OEH BioNet records found within a 10km radius of the site. due to the coastal distribution of the site and the lack of sheltered coast or intertidal mudflats this species is highly unlikely to occur within the site.	Low	No
Pandion haliaetus	Osprey			4	Low. 4 OEH BioNet records found within a 10km radius of the site the site does not contain potential breeding habitat, the species is unlikely to occur within the site. No further assessment is required.	Low	No

Scientific Name	Common Name	BC Act	EPBC Act	Records	Likelihood of Occurrence	Potential Impacts	ToS Req'd
Rhipidura rufifrons	Rufous Fantail	-	-	-	Low. No OEH BioNet records found within a 10km radius of the subject site. Due to the species occurring in wet sclerophyll forests it is unlikely to occur onsite as this community is not present. No further assessment required.	Low	No
Symposiachrus trivirgatus	Spectacled Monarch	-	-	-	Low. No OEH BioNet records found within a 10km radius of the subject site. Due to the species requiring thick understories in rainforests, wet gullies, waterside vegetation, and mangroves, it is unlikely to occur onsite. No further assessment required.	Low	No
Tringa nebularia	Common Greenshank, Greenshank	-	-	0	Low. There is one OEH BioNet record within a 10km radius of the subject site. Due to the species not breeding in Australia and only occurring in different types of wetlands, it is unlikely to occur on site. No further assessment required.	Low	No

Key:

V = Vulnerable M = Migratory A= Marine

E = Endangered CE = Critically Endangered P=Protected

K = Known where there are confirmed records, specimens or otherwise verified sightings in any CMA subregion overlapping the search area

P = Predicted where there is high expectation by relevant experts that a species is likely to be present in any CMA subregion overlapping the search area, based on known presence of suitable habitat and distribution with adjoining subregions

1 – NSW BioNet Atlas, Office of Environment and Heritage (Accessed 21-08-2024).

2 – Commonwealth Protected Matters Search Tool, Department of the Environment (Accessed 22-01-2024)

Appendix F. EPBC Assessments of Significance

EPBC Listed Endangered and Critically Endangered Species

Gang-gang Cockatoo	
Significant Impact Guideline	Assessment
Lead to a long-term decrease in the size of an important population of a species	The proposal will look to remove approximately 3.71 ha of native vegetation comprising of associated vegetation communities (PCT 3433, 3446). However, this vegetation is in a poor condition state consisting of scattered paddock trees and lacking a functional mid-stratum. This species is known to forage and breed within tall wet sclerophyll forests dominated by eucalypt species with dense shrub understories. The proposal will require the removal of marginal foraging habitat along with potential breeding habitat in the form of hollow bearing trees. The species is highly mobile and able to forage over large distances, the removal of 3.71ha of poor-quality marginal foraging habitat is unlikely to lead to long term decline of any single population
Reduce the area of occupancy of the species	Unlikely the proposal will modify/remove approximately 3.71ha of vegetation however due to the poor condition of the vegetation found within the site, it is unlikely that any population of the species would utilise this habitat, furthermore due to the highly mobile nature of this species the removal of marginal habitat in the from of scattered paddock trees is unlikely to have a significant impact upon the species.
Fragment an existing important population into two or more populations	The proposal would not significantly fragment vegetation within the local areas as the proposal aims to avoid fragmentation through avoidance measures. Associated proposal is unlikely to cause fragmentation through-out the broader landscape, it is also unlikely to isolate any population into two or more populations at the regional scale due to the highly mobile nature of the species.
Adversely affect habitat critical to the survival of a species	The proposal is unlikely to adversely affect critical habitat of the species, this is due to the highly mobile nature of the species along with larger areas of more intact native vegetation occurring to the West of the site.
Disrupt the breeding cycle of an important population	The species is not known to breed in the locality of the proposal. The limited foraging resources on the lands proposed are unlikely to represent a resource important to the breeding cycle of an important population.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will remove/modify up to 3.71 ha of associated PCTs for the Gang – Gang cockatoo. This reduction of habitat will have limited impacts on the fragmentation of the surrounding vegetation. It is highly unlikely that the removal of this habitat will lead to the decline any population.
Result in invasive species that are harmful to an endangered or critically endangered species becoming established in the endangered or critically endangered' habitat	The subject site is likely already habitat for a range of pest species, including foxes (*Vulpes vulpes*), rabbits (*Oryctolagus cuniculus*). The proposal would likely facilitate the movement of some of these species, which are known to use road corridors while traversing landscapes; however, not to the extent that it would impact the species. Additionally, some weed species were recorded on the subject land. The proposal may spread these weeds or lead to the establishment of new weeds via earthworks, movement of soil, and attachment of seed (and other propagules) to vehicles and machinery. Recommendations are in place to reduce these risks to a low level.

Gang-gang Cockatoo	
Significant Impact Guideline	Assessment
Introduce disease that may cause the species to decline, or	Machinery used on site can potentially act as a transport mechanism for biosecurity risks. Recommendations are in place to reduce these risks.
Interfere with the recovery of the species.	Listed threats to the species are loss and alterations to foraging and nesting habitat, primarily through land clearing and practises such as forestry, developments, prevention of regeneration and alterations to fire regimes. Also noted impacts are aggressive exclusion from habitat by noisy miners, Psittacine cirovirus disease (PCD) and alterations to habitat structure, composition and resources availability due to climate change. The proposal contributes to loss and alteration of marginal foraging habitat and potential breeding habitat for the species, however, impacts from the proposal are not solely likely to interfere with the recovery of the species due to the proposal impacting upon less viable habitat for the species,
Conclusion	Non-significant impact

Appendix G. SEPP (Biodiversity & Conservation) 2021

The *State Environmental Planning Policy (Biodiversity and Conservation) 2021* commenced on 1 March 2022 and combines 11 separate SEPPs into one consolidated document. SEPP (Biodiversity and Conservation) 2021 replaces and repeals those consolidated SEPPs, which includes amongst others, both the SEPP (Koala Habitat protection) 2020 and SEPP (Koala Habitat protection) 2021. The Biodiversity and Conservation SEPP 2021 provides the existing provisions as separate chapters.

The principles of the Biodiversity and Conservation SEPP 2021 are unchanged from the previous Koala SEPP 2020 and 2021 and aim to:

- Encourage the proper conservation and management of areas of natural vegetation that provide habitat for koalas to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline.
- Help reverse the decline of koala populations by ensuring koala habitat is properly considered during the development assessment process.
- Provide a process for councils to strategically manage koala habitat through the development of koala plans of management.

The Biodiversity and Conservation SEPP 2021 reflects the policy framework of previous Koala SEPP 2020 (Chapter 3) and 2021 (Chapter 4) for Local Government Areas (LGA) in NSW. At this stage:

- In nine of these LGAs – Metropolitan Sydney (Blue Mountains, Campbelltown, Hawkesbury, Ku-Ring-Gai, Liverpool, Northern Beaches, Hornsby, Wollondilly) and the Central Coast LGA – **Chapter 4** of the Biodiversity and Conservation SEPP 2021 applies to **all zones**.
- In all other identified LGAs, **Chapter 3** of the Biodiversity and Conservation SEPP 2021 **applies** to land zoned RU1 Primary Production, RU2 Rural Landscape or RU3 Forestry.

The SEPP applies in accordance with *Part 4.2 Clause 4.9 – Development assessment process – no approved koala plan of management for land.*

(1) This clause applies to land to which this policy applies if the land –

a) Has an area of at least 1 hectare (including adjoining land within the same ownership, and

The lot in which the subject land occurs is > 1 ha.

b) Does not have an approved koala plan of management applying to the land.

No koala plan of management occurs within the Maitland LGA.

Additionally, trees belonging to the koala use trees species listed in Schedule 3 for the relevant koala management area (Central Coast) occur within the subject land and are to be removed.

A Koala Assessment Report has been produced (Refer to **Appendix H**).

Four (4) SATs were undertaken over the subject land within areas where these Schedule 3 trees occur with more than a 15% canopy cover and nocturnal spotlighting was conducted (over two nights). No individuals or secondary indications were observed during the surveys.

Appendix H. Koala Assessment Report (KAR)

1 Introduction

This Koala Assessment Report (KAR) has been prepared by MJD Environmental alongside the Biodiversity Development Assessment Report (BDAR) (MJD, 2024) to accompany a Concept Development Application for the land at Lots 55 in DP 874170 and 177 in DP 874171, 559 Anambah Road, Gosforth. This assessment is to be assessed by Maitland City Council under Part 4 of the EP&A Act.

1.1 Proposal Description

The Project is for a Concept Development Application (CDA) seeking concept approval for the staged development of the concept master plan, and for which detailed proposals for the Site or for separate parts of the site are to be subject of subsequent Development Applications (DAs), apart from stage 1.

The masterplan creates a new urban subdivision within the Anambah Urban Release Area accommodating a mix of housing types with approximately 900 residential lots, and incorporates open space, roads, pedestrian networks, utilities and services, intersection upgrades and drainage infrastructure.

The application includes a development application for stage 1, which is made up of approximately 240 lots. This stage includes the subdivision of the land, construction of the lots including roads, services, bulk earth works and dedication of reserves. The application includes all works associated with access via Anambah Road which has an intersection with the New England Highway together with an emergency flood access to be constructed via the unformed River Road.

Refer to **Appendix B** of BDAR for Concept Masterplan Layout.

1.2 Application of the SEPP

The Chapter 4 of the SEPP (Biodiversity and Conservation) 2021 applies due to:

- the land being located within the Maitland LGA which is listed under the SEPP [*Part 4.1 Clause 4.4(1)* and Schedule 1];
- there being no approved Koala Plan of Management for the Subject Site;
- the land contains trees listed under the Schedule 3 Koala use tree species; and
- the land has an area of more than 1 ha (including adjoining land within the same ownership).

1.3 Aims and Objectives

This KAR has been developed to address the requirements of the SEPP (Biodiversity and Conservation) 2021. In doing this the KAR must address the stated key principles and their associated detailed criteria and assess the subject site for its potential to be defined as ‘Core Koala Habitat’.

1.4 Suitably Qualified Person

This report has been prepared by Stephanie Sheehy (B. Env. Sc. & Mgmt), under the guidance of Director Matt Doherty (BAAS# 17044) of MJD Environmental.

Matt Doherty’s tertiary qualification and experience spanning 20 years in the field of ecological consulting – including undertaking general ecological field surveys for NSW flora and fauna (including the Koala) and the associated reporting – satisfies the SEPP criteria defining a suitably qualified and experienced person [*Part 4.11 Clause 4.2 (1)*].

2 Koala Assessment Report

2.1 Koala Habitat Value (criteria 1 and 2)

A review of the OEH BioNet Atlas using a search of the locality, revealed the site, on which the proposed development is to occur, has no records occurring within 2.5 km in the last 18 years or historic records within 10km. However, when cross referenced with a Sydney-Hunter Sub-IBRA region Bionet search there are six (6) records within a 10km buffer of the site. Koala use tree species listed under Schedule 3 of the SEPP occur within the development footprint and constitute at least 15% of the total number of trees in the upper stratum, therefore 'koala habitat' is present in accordance with the SEPP definition.

2.1.1 Site Description

The Site is situated on Lot 177/DP874171 and Lot 55/DP874170, 559 Anambah Road, Gosforth, NSW, and is situated over R1 General Residential zoned land and RU2 Rural Landscape (APZ only). The Subject Land is situated over predominantly cleared pastures with scattered trees.

The subject land is approximately 76.53 ha in size, of which 3.71 ha was observed as native vegetation. The extent of native vegetation has been interpreted using API and ground truthing during field survey works.

The vegetation within the subject land has been broadly cleared historically for grazing. The historic land use has resulted in a pasture landscape composed of native and exotic species, including high threat exotic species (HTE). The subject land contains a number of large mature eucalypt paddock trees, and some small stands of late regeneration eucalypt.

On this basis, two Plant Community Types (PCT's) were identified within the Site:

- 3446 Lower North Foothills Ironbark-Box-Gum Grassy Forest
- 3433 Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest

The vegetation exists as a highly disturbed and fragmented community in a broadly cleared agricultural landscape. As such, the variability within the PCTs on the subject land is not considered substantial enough to warrant separation into multiple Vegetation Zones.

Vegetation within the Site is characterised by a canopy of *Corymbia* maculata (Spotted Gum), *Eucalyptus crebra* (Narrow Leaved Ironbark) and *Eucalyptus moluccana* (Grey Box), with scattered *Eucalyptus fibrosa* (Broad-leaved Ironbark). The site occurs over gentle undulating hills containing grassland that is predominantly non-native. The site has been heavily grazed by beef cattle and has been almost completely cleared since at least 1954 (NSW Historic Aerial Imagery).

The BAR found that the proposal will remove/modify up to:

- An area of 3.26 ha 3446 Lower North Foothills Ironbark-Box-Gum Grassy Forest
- An area of 0.45 ha of 3433 Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest

559 ANAMBAH ROAD, GOSFORTH

FIGURE 1: SITE LOCATION

Legend

- Subject Land
- Study Area
- Proposed Asset Protection Zone
- Cadastral Boundary

N
W E
S

0 150 300 450 600

Metres
1:12000

MJD Environmental

Aerial: Nearmap (2024) | Data: MJD Environmental, Northrop, Torque Projects, NSW Spatial Services (2024) | Datum/Projection: GDA2020 / MGA zone 56 | Date: 2024-08-29 | Version: 1 | Z:\23071 - 559 Anambah Road, Gosforth | This plan should not be relied upon for critical design dimensions.

2.1.2 Targeted Koala Surveys

During the Biodiversity Assessment carried out by MJD Environmental, formal surveys were undertaken to target the Koala. Field surveys were undertaken on the 5th June, 4th and 25th July 2024. The prevailing weather conditions during the surveys are presented in a **Table 1** below. The dates preceding SAT surveys are included to demonstrate compliance with climatic constraints.

Table 1 Prevailing Weather Conditions

Date	Survey	Min Temp (°C)	Max Temp (°C)	Rain (mm)	Wind (km/h)	Sunrise-Sunset
5th June 2024	Nocturnal	5.9	17.4	0	Calm to NE 4km/h	0650-1656
4th July 2024	Nocturnal	6.2	18.0	2	SSW 7 km/hr - SSE 20 km/hr	0656 – 1659
23rd July 2024	N/A	5.8	19.2	0	WNW 13 km/hr – WNW 15 km/hr	0649 – 1709
24th July 2024	N/A	1.9	20.04	0	NW 9 km/hr – NW 13 km/hr	0648 - 1709
25th July 2024	SAT	3.5	23.2	0	NNW 6 km/hr - SSE 2 km/hr	0648-1710

Sources: http://www.bom.gov.au/climate/dwo/IDCJDW0200.shtml

http://www.ga.gov.au/bin/geodesy/run/sunrisenset

In accordance with the Biodiversity and Conservation SEPP 2021, the following survey activities were undertaken to determine the presence of Koalas:

- Spot Assessment Technique – SAT search (following Phillips and Callaghan 2011). The standard method is 30 trees per 250m x 250m area. Given the small extent of the extremities of the Subject Site, all Koala use trees within/on the boundary of the footprint extremities were searched for faecal pellet presence / absence on the 25th July 2024 (refer to **Figure 2**). A minimum of 30 trees were then searched in the main footprint area (refer to **Figure 1**). In keeping with the survey guidelines, the area had not experienced heavy rain in the three (3) days prior to the survey, which was reinforced by the rainfall record from the nearest weather station (refer to **Table 1**).
- Koala use tree species present within the Subject Site included *Corymbia maculata, Eucalyptus crebra, Eucalyptus fibrosa* and *Eucalyptus tereticornis.*
- During the SAT search, and in addition to the required survey effort, secondary indications of Koala usage / occupation of local trees was carried out. This included searching trees for Koala signs such as trunk scratches, fur and urine stains.
- Spotlighting. Conducted over three nights on the 5th June and 4th July 2024 (refer to **Attachment 2**), all trees within the Subject Site were checked in line with Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC), 2011, *Survey Guidelines for Australia's Threatened Mammals.*

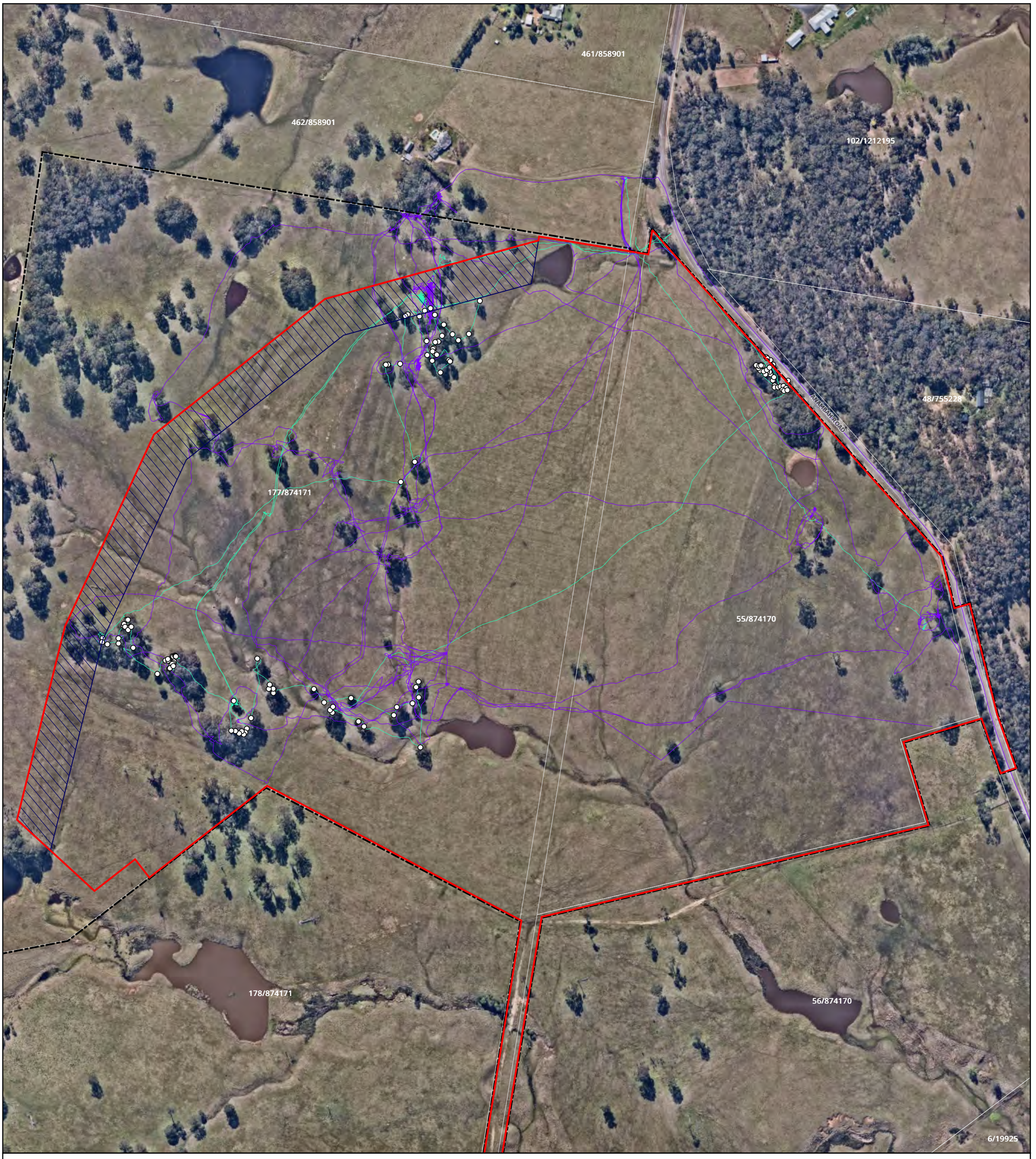
There were no scratch marks displayed on trees within the site and no recent secondary indications such as belly rubs, loose fur nor scats were detected. Despite presence of suitable habitat (through Koala use tree species), there was no recent evidence of Koala presence in or around the Site observed during any of the survey efforts. No Koalas were observed during spotlighting and / or opportunistic observation, and no Koala scats were identified around the base of any Koala use trees during the SAT search.

2.1.3 Site Context

The surrounding environment of the Subject Site consists of a mosaic of land clearings, roads, rural and agricultural properties. The native vegetation cover of the Subject Site and 1,500m buffer was carried out by API of high-quality aerial photography using GIS Software (QGIS). The native vegetation cover has been assessed at 33%.

The proposal will remove areas of remnant vegetation in a semi-fragmented state with connectivity being limited due to the large open areas of derived native grassland over the site. Nonetheless, the proposal will not result in new points of fragmentation.

There have been no recorded koala sightings within 2.5 km of the area within the last 18 years and, the Site is not considered to be important to the recovery of the koala.



559 ANAMBAH ROAD, GOSFORTH

FIGURE 2: SURVEY EFFORT

Legend

- Subject Land
- Study Area
- Proposed Asset Protection Zone
- Cadastral Boundary
- Nocturnal Survey Transects
- Koala SAT Search Transects
- Koala SAT

0 70 140 210 280

Metres
1:4500

N W E S

MJD Environmental

Aerial: Nearmap (2024) | Data: MJD Environmental, Northrop, Torque Projects, NSW Spatial Services (2024) | Datum/Projection: GDA2020 / MGA zone 56 | Date: 2024-08-29 | Version: 1 | Z:\23071 - 559 Anambah Road, Gosforth | This plan should not be relied upon for critical design dimensions.

2.2 Measures taken to avoid impacts to koalas – (criteria 3, 4, 5, 6, 7, & 8)

The project location is part of the Anambah Urban Release Area. This area was chosen to be part of the urban release plan as biodiversity constraints within the Area and local area were determined to be minimal. The proposed development within 559 Anambah Rd was chosen due to the limited extent of native vegetation found within the subject land, as the land consists predominantly of pastoral land with limited canopy cover in the form of scattered paddock trees. The proposal avoids impact to TECs and ECs as the PCT's within the subject land have been assessed as not commensurate with any BC or EPBC Act listed communities.

The project location and design are predicated on a substantial history of assessment informing the Anambah Urban Release Area, which identified the predominantly cleared pastoral lands for residential development and avoided remnant native vegetation to the west associated with Lower Hunter Spotted Gum Ironbark communities. The project constrains all infrastructure to R1 zoned lands and avoids construction in RU2 lands which tend to increasing native vegetation cover to the west.

Precautionary measures were taken to determine the likelihood of koalas occurring on site in accordance with the SEPP 2021. No evidence of koalas was observed.

2.3 Analysis of potential impacts (criteria 9)

The ecological field assessment found that the proposal will remove / modify up to:

- An area of 3.26 ha 3446 Lower North Foothills Ironbark-Box-Gum Grassy Forest
- An area of 0.45 ha of 3433 Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest

In addition, the following indirect impacts may occur because of the development:

- Vehicle Strike - The proposal will create additional roads and there will be increased vehicle movement during construction.
- Introduction or spread of disease - Increased vehicle movement will be likely during the construction phase that has potential to increase the risk of introduction of *Phytophthora cinnamomi* to the study area via ground disturbance and construction activity combined with machinery bringing spores into the area. Note that mitigation measures have been proposed within the BAR for the duration of construction period.

2.4 Plan to manage and protect koalas and their habitat (criteria 10, 11, 12 & 13)

Impact	Management measures
Vehicle strike	Traffic speed limits throughout the site during construction (10-20 km/hr) and 50km thereafter.
Noise and light disturbance	Suitably qualified ecologist or similar to inspect vegetation for all fauna (Inc. Koalas) before development commences, including surrounding trees to Subject Site. If a koala is identified during construction, temporary suspension of works that might disturb the koala and / or prevent from moving itself to adjacent undisturbed habitat.
Introduction or spread of disease, Edge effects	Ensure that all equipment is free of plant material and soil that may contain weed seeds or soil-borne diseases prior to entering the subject site. Vehicles should be washed down at an appropriate location where weeds are regularly managed prior to commencing work. If machinery is transported from an area of confirmed infection of *Phytophthora cinnamomi* or Exotic Rust Fungi to the subject site, stringent wash down must be completed before leaving the area, removing all soil and vegetative material from cabins, trays, and under carriages;
Disturbance to Koala habitat	Ensure the extent of clearing is clearly marked in the field prior to the commencement of vegetation clearing. Ensure that only the minimum vegetation clearing required is undertaken. Suitably qualified ecologist or similar to inspect vegetation for all fauna (Inc. Koalas) before development commences. If a koala is identified during construction, temporary suspension of works that might disturb the koala and / or prevent from moving itself to adjacent undisturbed habitat

3 Conclusion

This Koala Assessment Report (KAR) has been prepared by MJD Environmental alongside the Biodiversity Development Assessment Report (BDAR) (MJD, 2024) to accompany a Concept Development Application for the land at Lots 55 in DP 874170 and 177 in DP 874171, 559 Anambah Road, Gosforth. This assessment is to be assessed by Maitland City Council under Part 4 of the EP&A Act.

Owing to the lack of evidence of Koala use within the Site and the lack of Koala records within the locality, it is not considered necessary to prescribe monitoring/adaptive management plans or compensatory measures for the proposal. The proposal should not impact the connectivity of the Site within the wider area, nor the ability of any Koala's present to move through the surrounding landscape.

4 References

Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) (2011), *Survey Guidelines for Australia's Threatened Mammals*

MJD Environmental (2022), *Biodiversity Assessment Report*

NSW Environment Energy and Science (2020a) BioNet Atlas: http://www.bionet.nsw.gov.au/ (accessed February 2022)

NSW Environment Energy and Science (2020b) *Threatened Species Profile Search* - http://www.environment.nsw.gov.au/threatenedSpeciesApp/ (accessed February 2022)

NSW Department of Planning, Industry and Environment (2021) *Koala Habitat Protection SEPP* https://www.planning.nsw.gov.au/Policy-and-Legislation/Environment-and-Heritage/Koala-Habitat-Protection-SEPP, DPIE 8 March 2021 (accessed February 2022)

NSW Department of Planning, Industry and Environment (2019) *Koala Habitat Protection SEPP – Koala Habitat Protection Guideline: Implementing State Environmental Planning Policy*

Phillips and Callaghan (2011). The Spot Assessment Technique: A tool for determining localised levels of habitat use by Koalas Phascolarctos cinereus. *Australian Zoologist* 35(3)

State Environmental Planning Policy (Biodiversity and Conservation) 2021 www.legislation.nsw.gov.au

State Environmental Planning Policy (Koala Habitat Protection) 2021 www.legislation.nsw.gov.au

Appendix I. Vegetation survey data

Table 32 includes BAM plot data.

Field Data Sheets follow Error! Reference source not found..

Data from plot-based vegetation surveys and vegetation integrity survey plots is submitted in electronic format (MS Excel) in data package.

Table 32. Vegetation survey data and locations

plot	pct	area	patchsize	condition class	zone	easting	northing	bearing	compTree	compShrub	compGrass	compForbs	compFerns	compOther	strucTree	strucShrub	strucGrass	strucForbs	strucFerns	strucOther	funLargeTrees	funHollowtrees	funLitterCover	funLenFallenLogs	funTreeStem5to9	funTreeStem10to19	funTreeStem20to29	funTreeStem30to49	funTreeStem50to79	funTreeRegen	funHighThreatExotic	Plot-based vegetation survey?	Vegetation integrity survey?
B01	*3446*	*66.84*	*101*	*Pasture*	*56*	*358294*	*6384790*	*310*	*0*	*1*	*5*	*3*	*0*	*1*	*0*	*0.1*	*15.3*	*0.3*	*0*	*0.1*	*0*	*0*	*55*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*30.3*	*Y*	*Y*
B02	*3446*	*66.84*	*101*	*Pasture*	*56*	*358268*	*6384470*	*290*	*0*	*2*	*6*	*2*	*0*	*0*	*0*	*0.3*	*56.9*	*0.2*	*0*	*0*	*0*	*0*	*42*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*10.7*	*Y*	*Y*
B03	*3446*	*66.84*	*101*	*Pasture*	*56*	*358049*	*6384691*	*10*	*0*	*0*	*5*	*4*	*0*	*1*	*0*	*0*	*10.4*	*0.4*	*0*	*0.1*	*0*	*0*	*59*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*50.3*	*Y*	*Y*
B04	3446	3.26	101	Canopy	56	357942	6384879	44	2	0	7	5	0	0	40	0	10.7	0.5	0	0	5	1	8	0	0	0	1	1	0	0	15.2	Y	Y
B05	3446	3.26	101	Canopy	56	357518	6384538	110	2	0	3	6	0	0	40	0	20.2	9.1	0	0	3	6	6	20	0	0	1	1	0	0	5	Y	Y
B06	3433	0.45	101	Canopy	56	357899	6384424	27	1	1	3	6	0	1	15	0.5	40.2	0.7	0	0.1	3	1	11	0	0	0	0	1	0	0	6	Y	Y
B07	3446	3.26	101	Canopy	56	358400	6384821	322	3	3	8	6	0	1	30	0.3	11.6	0.7	0	0.1	2	1	49	0	0	1	1	1	0	0	10	Y	Y

Italic plots (B01-03) were carried out as per descriptions in **Sections 2.2.3** and **4.5** and this data has **not** been carried in the BAM-C.

BAM Plot - Field Survey Sheet

Date 10.7.24	**Survey Name** Thirdi Arambak		
Recorders CS, SLY		**Plot ID #** BOS B7	**Zone ID**
Photo #		**Plot dimensions**	
Datum	**Zone**	**Plot bearing along midline** 110° /322	
Easting	**Northing**	Record magnetic bearing along midline from 0 m point	

Record easting, northing at plot marker (0 m point), Photos taken vertically and horizontally at 0m point and 50 m point, looking into plot

IBRA region	
Subregion	
Likely Vegetation Class	
Plant Community Type	**Condition state**

Floristics plot is centred on the midline, at 0 m point, 10 m either side

BAM Composition / Structure plot (400m²)

Dimensions (circle applicable size): 20 x 20 m | 10 x 40 m

		Sum values*
Native Richness (count of native species)	**Trees**	
	Shrubs	
	Grasses etc	
	Forbs	
	Ferns	
	Other	
Cover (sum of cover of natives species)	**Trees**	
	Shrubs	
	Grasses etc	
	Forbs	
	Ferns	
	Other	
High threat weed cover		

*These values summarise the floristic data for input into BAM calculator

Function plot is an extention of floristics plot out to 50 m along midline (or equiv. area)

BAM Function plot (1000m²)

Dimensions (circle applicable size): 20 x 50 m | 10 x 100 m

Tree stem DBH (cm)

>80	(#) 3	
50 - 79	(#) 3	2
30 - 49	(+/-) 6	11
20 - 29	(+/-) 1	1
10 - 19	(+/-) -	1
5 - 9	(+/-) ~	0
< 5	(+/-) ~	0

Notes on function attributes:
- Stem size class records # large trees (cf. benchmark)
- Record stems for living trees only, and for all species
- For multistemmed trees, record only the largest stem
- Presence of <5cm stems records regeneration
- Record # trees with hollows, not number of hollows
- Count as one stem where tree is multistemmed
- Hollow bearing stem may be a dead stem (incl. stag)

# Trees with hollows 6	<20cm	**Total #**
	>20cm** 1	
Length of logs 20 0		**Total (m)**

Measure length of logs >10cm, fully or partly in contact with the ground, and within the plot.

**Hollows of >20cm are recorded for habitat for some threatened species

BAM Litter/ Groundcover (1 x 1 m plots) Litter cover is used for BAM, other attributes are useful for recording site condition in general

		1	2	3	4	5	Average
Sub-plot score (% cover)	**Litter**	10	5	5	5	5	6
	Bare ground	45	45	75	65	15	
	Cryptogam						
	Rock						

Litter / groundcover plots are located at 5, 15, 25, 35, 45 m (alternating sides) along the midline of Function plot

Other plot information (not essential for BAM)

Disturbance	Severity	Timing	Landform
Clearing (incl. logging)			Microrelief
Cultivation			Slope
Grazing (native / stock)			Aspect
Soil erosion			Soil surface texture
Firewood removal			Soil colour
Fire (ground stratum, mid, canopy burnt?)			Site drainage
Storm damage			Distance to nearest water
Weediness			Distance to nearest rock outcrop /cave

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

Timing code: R = recent (<3y), NR = not recent, O = old/historic

Notes

BAM Plot - Field Survey Sheet

Date 10.7.24	Survey Name Thridi Anambah				
Recorders CJ + SLY		Plot ID # 5 ~~5~~ 7		Zone ID	
GF code	Genus species (tick if photographed or sample taken)	Cover %	Abund (count)	N, E, HTE	Stratum
T	C. mac. T. CMac.	15	3	20	14
T	E. fib. T. EMol.	25	6	5	1
	Solanum. T. ECre	1	100	5	2
	Dichondra S. Hiss. Sting	5	10K.		5
	Commelina S. Ozo. dio	2	1K		5
	Couch. Themed. str.	20	10K	1	500
	Oxalis p. Austrostipa		500		100
	Cyp. gracilis Micro		100		20
	Hob. purp. Juncus. us.	1	1K		2100
	Einadia hastata S. Bregnia		50		5
	Juncus us. Hob. purp		10	0.5	1000
	Lom. long.				100
	Sporob. virg.				100
	Couch.			10	10K
	Glycine				50
	Einadia				50
	Baumeella				50
	Veronica plebe.				50
	Dichondra			0.2	1000
Lantana	Afr. olive		10		10
Cestrum p.	Senecio mad.		20		100
Senecio mad.	Ehr. er.		50	10	1K
Ehrharta	Wint. gass	5	1K	15	10K
Winter gass	Plantago	35	10K		100
Bindii	Aster		200		10
Sida	Bindii		100		50
Trifolium	Axon.		200		50
Cirsium vulgare	Indens.		10		20
Hypo			50		
	Oxalis p.				50
	Cyath. cinda				10

Growth Form (see BAM Appendix 4) - Tree (TG), Shrub (SG), Grass & grasslike (GG), Forb (FG), Fern (EG), Other (OG)
Cover: 0.1, 0.2, 0.3, ... 1, 2, 3, ...10, 15, 20, 25, ...100% (incl. leaf, branch, stem cover per species).
Abundance for each species with ≤5% cover: 1, 2, 3, 4, ... 10, 20, 30, ... 100, 500, 1000, 1500, 2000 stems
N=native, E=exotic, HTE=high threat exotic
All species in a plot must be recorded. If you can only ID to genus, separate different species by unique identifiyer e.g. *Genus* sp1, *Genus* sp2 etc
Identify top 3 dominants in each stratum (use own stratum definitions) Cover area examples: 0.1% = 63x63cm, 0.5% = 1.4x1.4m, 1% =2x2 m, 5%=4x5m, 25%=10x10m

BAM Plot - Field Survey Sheet

Date ~~B04~~ 10/07/24	Survey Name Anambah 23071		
Recorders CS, SLY		Plot ID # B04	Zone ID
Photo #		Plot dimensions 20×50	
Datum	Zone	Plot bearing along midline 44	
Easting	Northing	Record magnetic bearing along midline from 0 m point	

Record easting, northing at plot marker (0 m point), Photos taken vertically and horizontally at 0m point and 50 m point, looking into plot

IBRA region	
Subregion	
Likely Vegetation Class	
Plant Community Type	Condition state

Floristics plot is centred on the midline, at 0 m point, 10 m either side

BAM Composition / Structure plot (400m²)

Dimensions (circle applicable size): 20 x 20 m / 10 x 40 m

		Sum values*
Native Richness (count of native species)	Trees	
	Shrubs	
	Grasses etc	
	Forbs	
	Ferns	
	Other	
Cover (sum of cover of natives species)	Trees	
	Shrubs	
	Grasses etc	
	Forbs	
	Ferns	
	Other	
High threat weed cover		

*These values summarise the floristic data for input into BAM calculator

Function plot is an extention of floristics plot out to 50 m along midline (or equiv. area)

BAM Function plot (1000m²)

Dimensions (circle applicable size): 20 x 50 m / 10 x 100 m

Tree stem DBH (cm)		
>80	(#)	
50 - 79	(#)	5
30 - 49	(+/-)	5
20 - 29	(+/-)	7
10 - 19	(+/-)	|
5 - 9	(+/-)	|
< 5	(+/-)	|

Notes on function attributes:
- Stem size class records # large trees (cf. benchmark)
- Record stems for living trees only, and for all species
- For multistemmed trees, record only the largest stem
- Presence of <5cm stems records regeneration
- Record # trees with hollows, not number of hollows
- Count as one stem where tree is multistemmed
- Hollow bearing stem may be a dead stem (incl. stag)

# Trees with hollows	<20cm	Total #
1 *	>20cm**	
Length of logs		Total (m)
0		

Measure length of logs >10cm, fully or partly in contact with the ground, and within the plot.

**Hollows of >20cm are recorded for habitat for some threatened species

BAM Litter/ Groundcover (1 x 1 m plots) Litter cover is used for BAM, other attributes are useful for recording site condition in general

		1	2	3	4	5	Average
Sub-plot score (% cover)	Litter	5	5	10	10	10	10
	Bare ground						
	Cryptogam						
	Rock						

Litter / groundcover plots are located at 5, 15, 25, 35, 45 m (alternating sides) along the midline of Function plot

Other plot information (not essential for BAM)

Disturbance	Severity	Timing	Landform
Clearing (incl. logging)			Microrelief dmend HBI based
Cultivation			Slope on tlBT / ha.
Grazing (native / stock)			Aspect
Soil erosion			Soil surface texture
Firewood removal			Soil colour
Fire (ground stratum, mid ...			Site drainage
Storm damage			Distance to nearest water
Weediness			Distance to nearest rock outcrop /cave

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

Timing code: R = recent (<3y), NR = not recent, O = old/historic

Notes

BAM Plot - Field Survey Sheet

Date	Survey Name				
Recorders		Plot ID # 604		Zone ID	
GF code	*Genus species* (tick if photographed or sample taken)	Cover %	Abund (count)	N, E, HTE	Stratum
T	C. mac.	35	8		
T.	E. creb.	5	1		
G.	Th. tr.	0.2	60		
C.	Cy. dac.	10			
	Ox. per.		100		
	hem. gracilis		10		
	Jun. Kl.		200		
	Muc. stip.		20		
	Senec.		20		
	Lob. per.	<0.1	10		
	Austrodan.		10		
	Forbs.		10		
	Swamp dock.		10		
	Exo Stricta		10		
HTE	S. mad.	15			
	Trif. repens	0.1	200		
HTE	Eh. erecta	0.1	200		
	Poa annua winter grass	30			
	Cirsis lamb ear. Plantago	0.5			
	Sporob. fert afr.	0.1	20		
	Bindii	0.2	1000		
	Hypochaeris	60.1	60		
	Lantana		10		
	Lysimachia		100		
	Sida		10		

Growth Form (see BAM Appendix 4) - Tree (TG), Shrub (SG), Grass & grasslike (GG), Forb (FG), Fern (EG), Other (OG)

Cover: 0.1, 0.2, 0.3, ... 1, 2, 3, ...10, 15, 20, 25, ...100% (incl. leaf, branch, stem cover per species).

Abundance for each species with ≤5% cover: 1, 2, 3, 4, ... 10, 20, 30, ... 100, 500, 1000, 1500, 2000 stems

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

All species in a plot must be recorded. If you can only ID to genus, separate different species by unique identifiyer e.g. *Genus* sp1, *Genus* sp2 etc

Identify top 3 dominants in each stratum (use own stratum definitions) Cover area examples: 0.1% = 63x63cm, 0.5% = 1.4x1.4m, 1% =2x2 m, 5%=4x5m, 25%=10x10m

BAM Plot - Field Survey Sheet

Date 10/07/24	**Survey Name** 23071 Anambah		
Recorders CS / SLY		**Plot ID #** B06	**Zone ID**
Photo #		**Plot dimensions** 20 x 50	
Datum	**Zone**	**Plot bearing along midline** 27	
Easting	**Northing**	Record magnetic bearing along midline from 0 m point	

Record easting, northing at plot marker (0 m point), Photos taken vertically and horizontally at 0m point and 50 m point, looking into plot

IBRA region	
Subregion	
Likely Vegetation Class	
Plant Community Type	**Condition state**

Floristics plot is centred on the midline, at 0 m point, 10 m either side

BAM Composition / Structure plot (400m^2)

Dimensions (circle applicable size)
20 x 20 m 10 x 40 m

		Sum values*
Native Richness (count of native species)	**Trees**	
	Shrubs	
	Grasses etc	
	Forbs	
	Ferns	
	Other	
Cover (sum of cover of natives species)	**Trees**	
	Shrubs	
	Grasses etc	
	Forbs	
	Ferns	
	Other	
High threat weed cover		

*These values summarise the floristic data for input into BAM calculator

Function plot is an extention of floristics plot out to 50 m along midline (or equiv. area)

BAM Function plot (1000m^2)

Dimensions (circle applicable size)
20 x 50 m 10 x 100 m

Tree stem DBH (cm)

>80	(#) –	Stem size class records # large trees (cf. benchmark)
50 - 79	(#) 3	Record stems for living trees only, and for all species
30 - 49	(+/-) 2	For multistemmed trees, record only the largest stem
20 - 29	(+/-) –	Presence of <5cm stems records regeneration
10 - 19	(+/-) –	Record # trees with hollows, not number of hollows
5 - 9	(+/-) –	Count as one stem where tree is multistemmed
< 5	(+/-) –	Hollow bearing stem may be a dead stem (incl. stag)

Notes on function attributes:

# Trees with hollows –	<20cm	Total #
	>20cm**	
Length of logs –		Total (m)

Measure length of logs >10cm, fully or partly in contact with the ground, and within the plot.

**Hollows of >20cm are recorded for habitat for some threatened species

BAM Litter/ Groundcover (1 x 1 m plots) Litter cover is used for BAM, other attributes are useful for recording site condition in general

		1	2	3	4	5	Average
Sub-plot score (% cover)	**Litter**	10	15	25	0	5	
	Bare ground						
	Cryptogam						
	Rock						

Litter / groundcover plots are located at 5, 15, 25, 35, 45 m (alternating sides) along the midline of Function plot

Other plot information (not essential for BAM)

Disturbance	Severity	Timing	Landform
Clearing (incl. logging)			Microrelief
Cultivation			Slope
Grazing (native / stock)			Aspect
Soil erosion			Soil surface texture
Firewood removal			Soil colour
Fire (ground stratum, mid, canopy burnt)			Site drainage
Storm damage			Distance to nearest water
Weediness			Distance to nearest rock outcrop /cave

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

Timing code: R = recent (<3y), NR = not recent, O = old/historic

Notes

BAM Plot - Field Survey Sheet

Date	**Survey Name**

Tree 10-15
Ground ~~90~~ 80

BOG – 23071 – 10/07/24

	Spp.	Cover	Abundance
TG	E. molucana	15	2
SG	Daviesa ~~ulicifolia~~ genistifolia	0.5	25
	~~Shrub 1 – pointy – fine leaf~~		
	~~Shrub 2 – pointy – longer leaf~~		
GG/FG	Trifolium pratense	0.2	500
	Jenecio Mad	1	100
	Plantago lanceolata	1	500
	Hypocharis	0.1	50
	Lobelia purp	0.2	250
	Microlaena	0.1	50
	Winter grass	~~15~~ 20	500
	Sporobolus africanus	1	250
	Couch	40 ~~30~~ 35	1000
	~~Tremeda~~ Poa	0.1	20
	Lysimachea	0.1	100
	Glycine	0.1	10
	Forb 1 – forked (Pic)	0.1	50
	Forb 2 – succulent (Pic)	0.1	50
	Bindi	0.1	50
	Thistle	0.2	10
	Wahalembergia / Blue bell	0.1	~~20~~ 10
	Daisy	0.1	~~20~~ 10
	Dichondra repens	0.1	50
	Paspalum dilatatum	5	~~150~~ 100

Appendix J. Credit reports

Appended copies of the following Finalised BAM-C credit reports follow:

- Credits summary report
- Biodiversity credit report (Like-for-like)
- Candidate threatened species report
- Predicted species report.

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id
00044960/BAAS17044/23/00044961

Proposal Name
559 Anambah Rd Gosforth

BAM data last updated *
14/03/2024

Assessor Name
Matt Doherty

Assessor Number
BAAS17044

BAM Data version *
67

Proponent Names

Report Created
30/08/2024

BAM Case Status
Finalised

Assessment Revision
9

Assessment Type
Part 4 Developments (General)

Date Finalised
30/08/2024

BOS entry trigger
BOS Threshold: Area clearing threshold

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
Nil		

Species
Nil

Additional Information for Approval

BAM Biodiversity Credit Report (Like for like)

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
Calyptorhynchus lathami lathami / South-eastern Glossy Black-Cockatoo

Ecosystem Credit Summary (Number and class of biodiversity credits to be retired)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest	Not a TEC	3.3	65	0	65
3433-Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest	Not a TEC	0.5	6	0	6

3433-Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	Hunter-Macleay Dry Sclerophyll Forests This includes PCT's: 1608, 3431, 3433, 3436, 3437, 3439, 3442, 3444, 3446	Hunter-Macleay Dry Sclerophyll Forests >=50% and <70%	3433_Canopy	Yes	6	Hunter, Ellerston, Karuah Manning, Kerrabee, Liverpool Range, Peel, Tomalla, Upper Hunter, Wyong and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Hunter-Macleay Dry Sclerophyll Forests This includes PCT's: 3431, 3442, 3446	Hunter-Macleay Dry Sclerophyll Forests >=70% and <90%	3446_Canopy	Yes	65	Hunter, Ellerston, Karuah Manning, Kerrabee, Liverpool Range, Peel, Tomalla, Upper Hunter, Wyong and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

BAM Biodiversity Credit Report (Like for like)

Species Credit Summary

Species	Vegetation Zone/s	Area / Count	Credits
Callocephalon fimbriatum / Gang-gang Cockatoo	**3446_Canopy, 3433_Canopy**	3.7	72.00
Myotis macropus / Southern Myotis	**3446_Canopy, 3433_Canopy**	2.0	37.00
Ninox connivens / Barking Owl	**3446_Canopy, 3433_Canopy**	3.7	72.00
Petaurus norfolcensis / Squirrel Glider	**3446_Canopy, 3433_Canopy**	3.6	71.00
Phascogale tapoatafa / Brush-tailed Phascogale	**3446_Canopy, 3433_Canopy**	3.6	71.00

Credit Retirement Options

Like-for-like credit retirement options

Callocephalon fimbriatum / Gang-gang Cockatoo	Spp	IBRA subregion
	Callocephalon fimbriatum / Gang-gang Cockatoo	Any in NSW
Myotis macropus / Southern Myotis	Spp	IBRA subregion
	Myotis macropus / Southern Myotis	Any in NSW
Ninox connivens / Barking Owl	Spp	IBRA subregion
	Ninox connivens / Barking Owl	Any in NSW
Petaurus norfolcensis / Squirrel Glider	Spp	IBRA subregion
	Petaurus norfolcensis / Squirrel Glider	Any in NSW

Phascogale tapoatafa / Brush-tailed Phascogale	Spp	IBRA subregion
	Phascogale tapoatafa / Brush-tailed Phascogale	Any in NSW

BAM Candidate Species Report

Proposal Details

Assessment Id 00044960/BAAS17044/23/00044961	Proposal Name 559 Anambah Rd Gosforth	BAM data last updated * 14/03/2024
Assessor Name Matt Doherty	Report Created 30/08/2024	BAM Data version * 67
Assessor Number BAAS17044	Assessment Type Part 4 Developments (General)	BAM Case Status Finalised
Assessment Revision 9	Date Finalised 30/08/2024	BOS entry trigger BOS Threshold: Area clearing threshold

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

List of Species Requiring Survey

Name	Presence	Survey Months
Acacia bynoeana Bynoe's Wattle	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Angophora inopina Charmhaven Apple	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Burhinus grallarius Bush Stone-curlew	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☑ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Callistemon linearifolius Netted Bottle Brush	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Callocephalon fimbriatum Gang-gang Cockatoo	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☑ May ☑ Jun ☑ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Eucalyptus castrensis Singleton Mallee	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☑ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Eucalyptus glaucina Slaty Red Gum	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☑ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Eucalyptus parramattensis subsp. decadens Eucalyptus parramattensis subsp. decadens	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☑ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Eucalyptus pumila Pokolbin Mallee	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☑ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Grevillea parviflora subsp. parviflora Small-flower Grevillea	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☑ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Haliaeetus leucogaster White-bellied Sea-Eagle	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☑ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Hieraaetus morphnoides Little Eagle	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☑ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Lophoictinia isura Square-tailed Kite	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☑ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Myotis macropus Southern Myotis	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Ninox connivens Barking Owl	Yes (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☑ May ☑ Jun ☑ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Ninox strenua Powerful Owl	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☑ May ☑ Jun ☑ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Petaurus norfolcensis Squirrel Glider	Yes (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☑ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Phascogale tapoatafa Brush-tailed Phascogale	Yes (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☑ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Phascolarctos cinereus Koala	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☑ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Pomaderris queenslandica Scant Pomaderris	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☑ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Prostanthera cineolifera Singleton Mint Bush	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☑ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Tyto novaehollandiae Masked Owl	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☑ May ☑ Jun ☑ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Threatened species Manually Added

None added

Threatened species assessed as not on site

Refer to BAR for detailed justification

Common name	Scientific name	Justification in the BAM-C
Black-eyed Susan	Tetratheca juncea	Habitat degraded
Broad-billed Sandpiper	Limicola falcinellus	Habitat constraints
Brush-tailed Rock-wallaby	Petrogale penicillata	Habitat constraints
Common Planigale	Planigale maculata	Habitat degraded Species is vagrant
Eastern Cave Bat	Vespadelus troughtoni	Habitat constraints
Eastern Osprey	Pandion cristatus	Habitat constraints
Eastern Pygmy-possum	Cercartetus nanus	Habitat degraded
Emu population in the New South Wales North Coast Bioregion and Port Stephens local government area	Dromaius novaehollandiae - endangered population	Refer to BAR
Green and Golden Bell Frog	Litoria aurea	Habitat degraded
Green-thighed Frog	Litoria brevipalmata	Habitat degraded Species is vagrant
Grey-headed Flying-fox	Pteropus poliocephalus	Habitat constraints
Heath Wrinklewort	Rutidosis heterogama	Habitat degraded

Large Bent-winged Bat	Miniopterus orianae oceanensis	Habitat constraints
Large-eared Pied Bat	Chalinolobus dwyeri	Habitat constraints
Little Bent-winged Bat	Miniopterus australis	Habitat constraints
Magenta Lilly Pilly	Syzygium paniculatum	Habitat degraded
Mahony's Toadlet	Uperoleia mahonyi	Habitat degraded Species is vagrant
North Rothbury Persoonia	Persoonia pauciflora	Refer to BAR
Pterostylis chaetophora	Pterostylis chaetophora	Habitat degraded
Red Helmet Orchid	Corybas dowlingii	Refer to BAR
Regent Honeyeater	Anthochaera phrygia	Habitat constraints
Scrub Turpentine	Rhodamnia rubescens	Habitat degraded
Spyridium burragorang in the Cessnock local government area	Spyridium burragorang - endangered population	Refer to BAR
Stephens' Banded Snake	Hoplocephalus stephensii	Habitat degraded
Striped Legless Lizard	Delma impar	Habitat degraded
Swift Parrot	Lathamus discolor	Habitat constraints
Wallum Froglet	Crinia tinnula	Habitat degraded Species is vagrant

BAM Credit Summary Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00044960/BAAS17044/23/00044961	559 Anambah Rd Gosforth	14/03/2024
Assessor Name	Report Created	BAM Data version *
Matt Doherty	30/08/2024	67
Assessor Number	BAM Case Status	Date Finalised
BAAS17044	Finalised	30/08/2024
Assessment Revision	Assessment Type	BOS entry trigger
9	Part 4 Developments (General)	BOS Threshold: Area clearing threshold

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Ecosystem credits for plant communities types (PCT), ecological communities & threatened species habitat

Zone	Vegetation zone name	TEC name	Current Vegetation integrity score	Change in Vegetation integrity (loss / gain)	Area (ha)	Sensitivity to loss (Justification)	Species sensitivity to gain class	BC Act Listing status	EPBC Act listing status	Biodiversity risk weighting	Potential SAII	Ecosystem credits
Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest												
2	3433_Canopy	Not a TEC	31.4	31.4	0.45	PCT Cleared - 69%	High Sensitivity to Gain			1.75		6
											Subtotal	**6**

Lower North Foothills Ironbark-Box-Gum Grassy Forest												
1	3446_Canopy	Not a TEC	39.8	39.8	3.3	PCT Cleared - 75%	High Sensitivity to Gain			2.00		65
											Subtotal	**65**
											Total	**71**

Species credits for threatened species

Vegetation zone name	Habitat condition (Vegetation Integrity)	Change in habitat condition	Area (ha)/Count (no. individuals)	Sensitivity to loss (Justification)	Sensitivity to gain (Justification)	BC Act Listing status	EPBC Act listing status	Potential SAII	Species credits
Callocephalon fimbriatum / Gang-gang Cockatoo (Fauna)									
3446_Canopy	39.8	39.8	3.3	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Endangered	False	65
3433_Canopy	31.4	31.4	0.45	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Endangered	False	7
								Subtotal	**72**

Myotis macropus / Southern Myotis (Fauna)									
3446_Canopy	39.8	39.8	1.6	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	32
3433_Canopy	31.4	31.4	0.34	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	5
								Subtotal	**37**
Ninox connivens / Barking Owl (Fauna)									
3446_Canopy	39.8	39.8	3.3	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	65
3433_Canopy	31.4	31.4	0.45	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	7
								Subtotal	**72**
Petaurus norfolcensis / Squirrel Glider (Fauna)									
3446_Canopy	39.8	39.8	3.3	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	65

3433_Canopy	31.4	31.4	0.37	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	6
								Subtotal	**71**
Phascogale tapoatafa / Brush-tailed Phascogale (Fauna)									
3446_Canopy	39.8	39.8	3.3	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	65
3433_Canopy	31.4	31.4	0.37	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	6
								Subtotal	**71**

BAM Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00044960/BAAS17044/23/00044961	559 Anambah Rd Gosforth	14/03/2024
Assessor Name	**Report Created**	**BAM Data version ***
Matt Doherty	30/08/2024	67
Assessor Number	**Assessment Type**	**BAM Case Status**
BAAS17044	Part 4 Developments (General)	Finalised
Assessment Revision	**BOS entry trigger**	**Date Finalised**
9	BOS Threshold: Area clearing threshold	30/08/2024

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Threatened species reliably predicted to utilise the site. No surveys are required for these species. Ecosystem credits apply to these species.

Common Name	Scientific Name	Vegetation Types(s)
Black Bittern	Ixobrychus flavicollis	3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3433-Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest
Black Falcon	Falco subniger	3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3433-Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest
Black-chinned Honeyeater (eastern subspecies)	Melithreptus gularis gularis	3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3433-Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest
Black-necked Stork	Ephippiorhynchus asiaticus	3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3433-Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest
Broad-billed Sandpiper	Limicola falcinellus	3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3433-Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest
Brown Treecreeper (eastern subspecies)	Climacteris picumnus victoriae	3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3433-Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest

Corben's Long-eared Bat	Nyctophilus corbeni	3433-Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest
Diamond Firetail	Stagonopleura guttata	3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3433-Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest
Dusky Woodswallow	Artamus cyanopterus cyanopterus	3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3433-Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest
Eastern Coastal Free-tailed Bat	Micronomus norfolkensis	3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3433-Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest
Eastern False Pipistrelle	Falsistrellus tasmaniensis	3433-Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest
Eastern Grass Owl	Tyto longimembris	3433-Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest
Eastern Osprey	Pandion cristatus	3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3433-Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest
Flame Robin	Petroica phoenicea	3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3433-Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest
Gang-gang Cockatoo	Callocephalon fimbriatum	3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3433-Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest
Greater Broad-nosed Bat	Scoteanax rueppellii	3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3433-Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest
Grey-crowned Babbler (eastern subspecies)	Pomatostomus temporalis temporalis	3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3433-Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest
Grey-headed Flying-fox	Pteropus poliocephalus	3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3433-Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest
Large Bent-winged Bat	Miniopterus orianae oceanensis	3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3433-Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest
Little Bent-winged Bat	Miniopterus australis	3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest

Little Bent-winged Bat	Miniopterus australis	3433-Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest
Little Eagle	Hieraaetus morphnoides	3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3433-Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest
Little Lorikeet	Glossopsitta pusilla	3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3433-Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest
New Holland Mouse	Pseudomys novaehollandiae	3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3433-Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest
Regent Honeyeater	Anthochaera phrygia	3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3433-Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest
Rose-crowned Fruit-Dove	Ptilinopus regina	3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
Scarlet Robin	Petroica boodang	3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3433-Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest
Speckled Warbler	Chthonicola sagittata	3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3433-Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest
Spotted Harrier	Circus assimilis	3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3433-Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest
Spotted-tailed Quoll	Dasyurus maculatus	3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3433-Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest
Square-tailed Kite	Lophoictinia isura	3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3433-Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest
Swift Parrot	Lathamus discolor	3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3433-Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest
Turquoise Parrot	Neophema pulchella	3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3433-Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest

Varied Sittella	Daphoenositta chrysoptera	3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3433-Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest
White-bellied Sea-Eagle	Haliaeetus leucogaster	3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3433-Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest
White-throated Needletail	Hirundapus caudacutus	3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3433-Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest
Yellow-bellied Glider	Petaurus australis	3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3433-Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest
Yellow-bellied Sheathtail-bat	Saccolaimus flaviventris	3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3433-Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest

Threatened species Manually Added

None added

Threatened species assessed as not within the vegetation zone(s) for the PCT(s)

Common Name	Scientific Name	Plant Community Type(s)
South-eastern Glossy Black-Cockatoo	Calyptorhynchus lathami lathami	3446-Lower North Foothills Ironbark-Box-Gum Grassy Forest
		3433-Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest

Threatened species assessed as not within the vegetation zone(s) for the PCT(s)

Refer to BAR for detailed justification

Common Name	Scientific Name	Justification in the BAM-C
South-eastern Glossy Black-Cockatoo	Calyptorhynchus lathami lathami	Refer to BAR

Appendix K. Staff Qualifications

Name	Title	Qualifications	Roles
Matt Doherty	Director	▪ BAM Assessor (#BAAS17044) ▪ B. Landscape Management and Conservation (Soil and Water Management) ▪ Bush Regeneration Cert IV	▪ Approval of BDAR for submission ▪ Review of BDAR and BAM-C
Chris Spraggon	Senior Ecologist	▪ B. Science (Honours) ▪ Conservation & Land Management Cert III	▪ Undertake BAM assessment, preparation of BDAR. ▪ Targeted species field survey methodology determination ▪ Vegetation determination and field work including BAM floristic plots and threatened fauna surveys
Dr Simone-Louise Yasui	Ecologist	▪ B: Biological Sciences (Hons) ▪ Msc: Ecology and Evolutionary Biology ▪ PhD: Biological and Environmental Sciences	▪ Review of BDAR. ▪ Field work including BAM floristic plots
Stephanie Sheehy	Ecologist	▪ B. Environmental Science and Management	▪ Preparation of BDAR ▪ Field work including threatened fauna surveys
Kurtis Mumford	Ecologist	▪ B. Environmental Science and Management	▪ Preparation of BDAR ▪ Field work including threatened fauna surveys
Mathew Grassi	Ecologist	▪ B. Environmental Science and Management (Ecosystems and Biodiversity)	▪ Field work
Marcus Lulham	Field Ecologist	▪ Msc: Environmental Management	▪ Field work
Justin Croft	Field Ecologist	▪ Assoc Deg in Environmental Science ▪ NSW Biosecurity Legislation Online Certificate	▪ Field work
Laidlaw Puha	GIS Officer	▪ B. Science ▪ QGIS for Geologists ▪ Cert IV in Information Technology	▪ Mapping & assisting with BDAR production (Figures & mapping)
Ellen Saxon	GIS Coordinator	▪ B. Environmental Science and Management ▪ Diploma Conservation & Land Management	▪ Produce figures for BDAR and Spatial Data Management for Project