# Biodiversity Development Assessment Report

## Proposed subdivision and general industrial development, Lot 2 DP 1070888 & Lot 51 DP 130176, Bowman Road, Moss Vale.

Prepared by Ms Rebecca Hogan, BAAS17090

HAYES
ENVIRONMENTAL

**Final Report – April 2024**

Hayes Environmental reference: 24003

# Document control

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| 1 | 25/04/2024 | R. Hogan | Final report for Development Application |
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# Summary

The subject property is identified as 2 & 10 Bowman Road, Moss Vale, comprised of Lot 1 DP 103123, Lot 2 DP 1070888, and Lot 51 DP 130176. The subject land for this assessment (being the area subject to the proposed development) is the northern portions of Lot 2 DP 1070888 and Lot 51 DP 130176. The subject land is 11.6 hectares in size.

The development proposal is for subdivision and general industrial development. General industrial development would be located on land zoned for this purpose. The subdivision would align lot boundaries with current landuse zones, and with land severance resulting from construction of existing cadastral roads. The project is a development that requires consent under Part 4 of the EP&A Act.

The land has historically been cleared of native vegetation and managed for the grazing of dairy cattle. The land is relatively level with gentle falls to the north and to the south, towards ephemeral first order streams (Strahler classification).

A small area in the northwest of the subject land is included on the Biodiversity Values Map. The project would impact on native vegetation in this area and so would exceed the map threshold. The BOS area of clearing threshold for this land is 0.5 hectares. The extent of impact on native vegetation would be 0.2 hectares. The project would not exceed the area threshold.

The BAM 2020 streamlined assessment module (small area) threshold for this land is 2.0 hectares. The streamlined (small area) module has been applied to this assessment.

All native vegetation within the subject land has been assessed as aligning with the BioNet Vegetation Classification PCT 3302 *Southern Highlands Shale-Basalt Dry Forest*.

The vegetation has also conservatively been classed as *Southern Highlands Shale Woodlands in the Sydney Basin Bioregion*, a threatened ecological community listed as endangered under the BC Act. The vegetation does not meet the condition criteria for inclusion within the corresponding EPBC Act listed community.

Ten threatened 'ecosystem credit' fauna species are predicted to use the subject land.

No threatened 'species credit' species are known or assumed to use the subject land.

*Southern Highlands Shale Woodlands in the Sydney Basin Bioregion* is an entity listed to be at risk of Serious And Irreversible Impact (SAII). Further information is provided in Chapter 9, as required under the BAM.

The development proposal is for general industrial development. The development would occupy the entirety of land zoned for this purpose to achieve economic and orderly use of the land. There are no important or significant biodiversity values that warrant avoidance within this area. The proposal would be located immediately adjacent to existing industrial developments. The proposal does not involve works in the vicinity of Whites Creek.

The development has been designed to minimise impacts on biodiversity, as follows:

i. The stormwater design includes on-site detention (OSD) within each of the three new industrial lots. All stormwater run-off from each lot would be directed through a treatment train consisting of a Humeceptor gross pollutant trap (GPT) and Humefilter universal pollutant trap (UPT) prior to entering the OSD. MUSIC modelling of the above treatment trains show that development would achieve a neutral or beneficial effect on water quality compared to pre-development conditions, as per Sydney Water requirements. The OSD features an isolation valve that can be manually operated in the event of an on-site pollution incident that may affect water quality.

ii. Each of the three OSDs would gradually release water through the subdivision stormwater dam located on the southern side of Hutchison Road to ensure post-development flows do not exceed pre-development conditions. Prior to discharge into the new on-site dam, water would pass through a Humegard GPT to remove litter and course sediment (>2mm) and discharge via an energy dissipator to reduce the potential for erosion. All stormwater run-off from Bowman and Hutchison Roads would be directed to the stormwater dam via the Humegard GPT.

The development would directly impact 0.2 hectares of native vegetation (PCT 3302 in poor condition).

There are no prescribed impacts of relevance to the subject land or proposed development.

Residual indirect impacts are either unlikely to occur, short-term during construction, or are minor increases to existing impacts. Mitigation measures are proposed to manage indirect impacts where appropriate.

Mitigation measures include:

* Implementation of a Tree Removal Protocol for all removal of native trees within the subject land (set out in Ch 8.4.1 below) to minimise risk of injury to wildlife that may be sheltering in trees at the time of clearing;

* Site biosecurity control, including cleaning of machinery and equipment prior to entering the property, and use of screened soil and mulch products in landscaping works.

* Installation of sediment and erosion control features in accordance with the 'Blue Book' - *Managing Urban Stormwater: Soils and construction – Volume 1.* Landcom, 2004.

* Landscape screen planting along new lot boundaries.

* Implementation of a Vegetation Management Plan (Hayes Environmental, April 2024) within the riparian zone indicated to the south of the development footprint.

No additional offsets for indirect or prescribed impacts are warranted.

The vegetation integrity score for native vegetation within the subject land is 8.7, which is below the offsetting threshold. No biodiversity offset is required.

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| | |
|---|---|
| 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 |
| CEEC | critically endangered ecological community |
| DBH | diameter at breast height over bark |
| 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 |
| LLS Act | *Local Land Services Act 2013* (NSW) |
| MNES | matters of national environmental significance |
| NSW | New South Wales |
| PCT | plant community type |
| SAII | serious and irreversible impact |
| TBDC | Threatened Biodiversity Data Collection |
| TEC | threatened ecological community |

# Terms used in this BDAR

| | | |
|---|---|---|
| Assessment Area | 964.1 ha | The subject land and land within a 1500m buffer measured from the outside edge of the subject land. |
| Subject Property | 63.5 ha | 2 & 10 Bowman Road, Moss Vale, comprised of Lot 1 DP 103123, Lot 2 DP 1070888, and Lot 51 DP 130176. |
| Subject Land | 11.6 ha | Land that would be affected by the proposed development (including temporary impacts, indirect impacts, and mitigation works), comprised of the northern parts of Lot 2 DP 1070888 and Lot 51 DP 130176. |
| Development Footprint | 10.2 ha | Land to be directly impacted by the development (*ie* the footprint of earthworks, structures, and roads). |
| Riparian Zone | 2.1 ha | Road embankments in the southern part of the subject land, with an additional buffer extending out at least 20m from the toe of the embankment, as shown on Figure 2 (Site map). |

# 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:

Rebecca Hogan

Date: 25th April 2024

BAM Assessor Accreditation no: BAAS17090

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

## ii. Details and experience of author/s and contributors

### Authors and contributors

| Name | BAM Assessor Accreditation no. (if relevant) | Position/Role | Tasks performed | Relevant qualifications & experience |
|------|------|------|------|------|
| Ms Rebecca Hogan | BAAS17090 | Accredited Assessor Lead Ecologist Principal, Hayes Environmental | Project management; BDAR preparation & certification; BAM-C assessment; GIS work & figure preparation; BAM plot surveys (function attributes); Identification of Plant Community Type/s; Fauna habitat evaluation: Threatened bird surveys. | BSc (environmental biology), UTS Sydney, 1996 MEngMngt, UTS Sydney, 2000 Executive member of the Ecological Consultants Association of NSW. 26 years of ecological consulting experience in the Sydney and greater Sydney region. |
| Mr Daniel Clark | n/a | Project Botanist | BAM plot surveys; Review and assistance with identification of plant community type/s; Targeted threatened plant surveys. | BSc (Hons) (Botany), University of Sydney, 2010 Cert. IV in General Horticulture, 2005 Cert. II in Bushland Regeneration, 2000 Cert. IV in Workplace Training and Assessment, 2011 Grad. Plant Science Internship, National Herbarium of NSW, Royal Botanic Gardens, 2009 Practicing member of the Ecological Consultants Association of NSW. 22 years of field botanist experience in the Sydney and greater Sydney region. |

# 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:

Rebecca Hogan

Date:   25th April 2024

BAM Assessor Accreditation no:    BAAS17090

# Stage 1: Biodiversity assessment

## 1. Introduction

### 1.1 Proposed development

#### 1.1.1 Development overview

The development proposal is for subdivision and general industrial development. General industrial development would be located on land zoned for this purpose. The subdivision would align lot boundaries with current landuse zones, and with land severance resulting from construction of existing cadastral roads.

The project is a development that requires consent under Part 4 of the EP&A Act.

#### 1.1.2 Location

The subject property is identified as 2 & 10 Bowman Road, Moss Vale, comprised of Lot 1 DP 103123, Lot 2 DP 1070888, and Lot 51 DP 130176. The property is 63.5 hectares in size. It is located in the Moss Vale Enterprise Corridor on the western edge of the town of Moss Vale, in the Wingecarribee Local Government Area.

The subject land for this assessment (being the area subject to the proposed development) is the northern portions of Lot 2 DP 1070888 and Lot 51 DP 130176. The subject land is 11.6 hectares in size.

Refer to Figure 1 (Site map) and Figure 2 (Location map).

#### 1.1.3 Proposed development and the subject land

The subject land is primarily zoned E4 General Industrial under the Wingecarribee LEP 2010. A minimum lot size has not been assigned to this zone. The southern fringe of the subject land (required for landform and stormwater works) is zoned RU2 Rural Landscape, with a minimum lot size of 40 hectares.

The land is relatively level with gentle falls to the north and to the south, towards ephemeral first order streams (Strahler classification). Soils are shale-derived.

The land has historically been cleared of native vegetation and managed for the grazing of dairy cattle.

The development proposal would include:

* Subdivision to align lot boundaries with existing land use zones;

* Extension of Bowman Road and construction of Hutchison Road within existing cadastral road allocations;

* Stormwater and drainage works;

Proposed subdivision and general industrial development, Lot 2 DP 1070888 & Lot 51 DP 130176, Bowman Road, Moss Vale.

 * General industrial development on land zoned E4 General Industrial.

Refer to Figure 3 (Development layout).

### 1.1.4   Other documentation

Documents referred to and relied upon in this assessment include:

 * *Concept External Civil Works Plan* (Eclipse Consulting Engineers, Revision F - 03/04/2024).

 * *Concept Civil Works Plans* for Buildings 1, 2, & 3 (Eclipse Consulting Engineers, Revision E - 19/03/2024).

 * *Stormwater Management Plan Report* (Eclipse Consulting Engineers, 31/07/2023).

 * *Addendum to Stormwater Management Plan Report and Addendum to Flood Study Report* (Eclipse Consulting Engineers, 15/04/2024).

## 1.2    Biodiversity Offsets Scheme entry

A small area in the north of the subject land is included on the Biodiversity Values Map for reason of "*Threatened species or communities with potential for serious and irreversible impacts*".  The project would impact on a small patch of native vegetation within the mapped area.  The project would exceed the map threshold.

The majority of the subject land has not been assigned a minimum lot size.  In these circumstances, the actual lot size is used to determine the appropriate area of clearing threshold.  Actual lot sizes are 8.14 ha and 54.6 ha.  The southern part of the land has been assigned a minimum lot size of 40ha.  The BAM requires that the smallest lot size applicable to the subject land be used for the threshold assessment. In this case, it is 8.14ha.   The BOS area of clearing threshold for this development, therefore, is 0.5 hectare.  The development would result in loss of approximately 0.2 hectares of native vegetation.  The project would not exceed the area threshold.

The BAM 2020 streamlined assessment module (small area) threshold for this land is 2.0 hectares.  The project would be within the small area threshold.

In conclusion, the BOS applies to the project.  The BAM small area module has been applied to this assessment.

Refer to Figure 4 (Biodiversity Values Map).

## 1.3    Excluded impacts

There are no biodiversity values not assessed under BAM 2020 (listed in s1.5 of BAM 2020) of relevance to the subject land.  The LLS Act Category 1 – exempt land provisions do not apply to the subject land.

Proposed subdivision and general industrial development, Lot 2 DP 1070888 & Lot 51 DP 130176, Bowman Road, Moss Vale.

## 1.4    Matters of national environmental significance

No entities listed as threatened under the Commonwealth EPBC Act are known to occur on or use the subject land.

Four fauna species listed as threatened under the Commonwealth EPBC Act are predicted to occur (ecosystem credit species) within the PCT present.  These four species are mobile and wide-ranging and are not known to reside or breed within the subject land.

The proposed development would not be likely to have a significant impact on any matter of national environmental significance.   Separate referral of the project to the Commonwealth Department of Climate Change, Energy, Environment and Water (DCCEEW) under the EPBC Act is not required.

Refer to Appendix B (Matters of national environmental significance - MNES) for a summary of details provided throughout the BDAR.

## 1.5    Information sources

Relevant legislation and policies for this report include:

* Commonwealth Environment Protection & Biodiversity Conservation Act 1999 (EPBC Act);

* Amending Agreement No. 1 – Amending the Original Agreement relating to environmental assessment.  Commonwealth of Australia and the State of New South Wales. 2020;

* NSW Biodiversity Conservation Act 2016 (BC Act);

* NSW Biodiversity Conservation Regulation 2017 (BC Reg);

* NSW Biodiversity Assessment Method Order 2020 (BAM);

* Wingecarribee Local Environmental Plan 2010 (WLEP).

Relevant guidelines for this report include:

* *Biodiversity Assessment Method Operational Manual – Stage 1*.  State of NSW and Department of Planning, Industry & Environment (2020).

* *Biodiversity Assessment Method Operational Manual – Stage 2*.  State of NSW and Department of Planning and Environment (2023).

* *NSW Survey Guide for Threatened Frogs.*  Department of Planning, Industry & Environment (2020).

* *Threatened reptiles, Biodiversity Assessment Method survey guide*.  Department of Planning and Environment (2022).

* *NSW survey guide – 'Species credit' threatened bats and their habitats* (2018).

* *Surveying threatened plants and their habitats*.  NSW survey guide for the Biodiversity Assessment Method (2020).  Department of Planning, Industry & Environment (2020).

∗ *Flora species with specific survey requirements*.  NSW Office of Environment & Heritage.

∗ *Survey Guidelines for Australia's Threatened Orchids, Guidelines for detecting orchids listed as 'threatened' under the Environment Protection and Biodiversity Conservation Act 1999.* Commonwealth of Australia, 2013.

∗ *Guide for mapping threatened species for inclusion in the NSW regulatory framework.* Department of Planning, Industry & Environment (2020).

∗ *Threatened biodiversity survey and assessment: Guidelines for developments and activities*.  NSW Department of Environment and Conservation (2004, in draft).

Data sources researched include:

∗ NSW Bionet (www.bionet.nsw.gov.au):  Vegetation Classification tool, Threatened Biodiversity Data Collection (TBDC), and Atlas records.

∗ Threatened biodiversity profiles.  NSW Office of Environment & Heritage.

∗ *A Directory of Important Wetlands in Australia*, Third Edition, Environment Australia (2001). http://www.environment.gov.au/water/wetlands/publications/directory-important-wetlands-australia-third-edition.

∗ SEED | Sharing and Enabling Environmental Data (www.seed.nsw.gov.au): NSW Interim Biogeographic Regions of Australia (IBRA) regions and subregions, NSW Mitchell Landscapes (version 3.1), State Vegetation Type Map – SVTM_NSW_Extant_PCT, Southeast NSW Native Vegetation.

∗ Aerial photography of the site: Department of Lands SIX Viewer, Google Maps 2024, and Nearmap (various dates up to 16th December 2023).

Proposed subdivision and general industrial development, Lot 2 DP 1070888 & Lot 51 DP 130176, Bowman Road, Moss Vale.

# 2. Methods

## 2.1 Site context methods

### 2.1.1 Landscape features

A general inspection of the subject property was undertaken by Ms Rebecca Hogan on the 5th March 2024. Site features were compared in the field to high resolution aerial images of the land (Nearmap, various dates up to 16/12/2023).

### 2.1.2 Native vegetation cover

The assessment area is located across gently undulating lands to the west of the town of Moss Vale. The landscape has historically been cleared of native vegetation for agriculture, and is increasingly being re-purposed for residential and industrial use.

Calculation of native forest cover in the assessment area was obtained through interpretation of aerial images (Nearmap, various dates up to 16/12/2023) and Ms Rebecca Hogan's knowledge of the local area.

In relation to grassland areas, it is not possible to ascertain the percent cover of native plants without intensive field survey beyond the feasible scope of this assessment. Grassland in the local area typically occupies land that was once forest but has historically been cleared and intensively managed as grazing pasture. It has been assumed that grassland areas do not comprise native vegetation.

There are no natural grassland PCTs that would be impacted by the project and as such, require an estimate of native grassland cover to apply threatened species filters.

## 2.2 Native vegetation, threatened ecological communities and vegetation integrity methods

### 2.2.1 Existing information

#### 2.2.1.1 Existing regional vegetation maps

Native vegetation within the subject land (and elsewhere across the assessment area) is shown on the regional vegetation map (SEED: SVTM_NSW_Extant_PCT) as PCT 3302 *Southern Highlands Shale-Basalt Dry Forest*.

A review was undertaken of the scientific description for this community within the BioNet Vegetation Classification database.

### 2.2.1.2 *Threatened Ecological Communities potentially relevant to the subject land*

Where PCT 3302 occurs on clay soils derived from Wianamatta Shale, it is associated with the following threatened ecological communities (Bionet Vegetation Classification Profile):

* BC Act – *Southern Highlands Shale Woodlands in the Sydney Basin Bioregion.* Endangered.

* EPBC Act – *Southern Highlands Shale Forest and Woodland in the Sydney Basin Bioregion.* Critically endangered.

The subject land is on clay soils, so both communities are potentially relevant.

## 2.2.2 Mapping native vegetation extent

Mapping of native vegetation extent and of vegetation zones within the subject land was based on:

* consideration of high resolution Nearmap aerial images spanning several years and seasons;

* site inspections by Ms Rebecca Hogan and Mr Daniel Clarke on the 5th March 2024, with a follow up inspection by Mr Daniel Clarke on 26th March 2024;

* random meanders and twenty-four botanical spot surveys by Mr Daniel Clark on the 5th March 2024.

Refer to Appendix C (Vegetation survey data) and Figure 5 (Field survey locations).

## 2.2.3 Plot-based vegetation survey

One BAM-VIS plot survey was undertaken within the subject land by Ms Rebecca Hogan and Mr Daniel Clark on the 5th March 2024.

The method uses a 20m x 20m plot to assess composition and structure, within a 20m x 50m plot to assess function attributes, with five 1m² sub-plots to assess litter cover, as set out in BAM 2020. Plot data was collected in accordance with BAM 2020 and is provided in Appendix C (Vegetation survey data).

The number of plots surveyed for each vegetation zone was based on the requirements in Table 3 of BAM 2020 Ch4.3.4.

Due to the very small extent of native vegetation present, the plot location and alignment was selected to fit within the vegetation zone.

Refer to Figure 5 (Field survey locations).

## 2.2.4 Vegetation integrity survey

Vegetation integrity scores were calculated using data obtained from the plot-based survey described in Ch 2.2.3 above and formulae embedded in the BAM-Calculator. The calculation used standard condition benchmarks within the BAM-Calculator (as at 25th April 2024).

## 2.3 Threatened flora survey methods

### 2.3.1 Review of existing information

The BAM-Calculator (Part 4 Developments – Small Area) was used to generate a list of relevant threatened species on the basis of IBRA subregion (Moss Vale SYB11), native vegetation cover class in the assessment area (0-10%) and patch size class (<5ha).

A review was undertaken of habitat and constraints information held in the TBDC in relation to the list of relevant species, and geographic and habitat constraints set out in the BAM-Calculator.

A search was also undertaken within the BioNet Atlas (sightings) database for records of all threatened species on and in the vicinity of the subject land.

### 2.3.2 Habitat constraints assessment

Site inspections were conducted by Ms Rebecca Hogan on the 5th March 2024, and by Mr Daniel Clarke on the 5th and 26th March 2024.

On all occasions, a primary purpose of the inspection was to identify habitat constraints and microhabitats of potential value for relevant threatened species.

### 2.3.3 Field surveys

Targeted field surveys were conducted for one candidate flora species that was added to the BAM-Calculator assessment:

∗ Paddy's River Box *Eucalyptus macarthurii*.

Targeted surveys were conducted within the subject property by Mr Daniel Clarke on the 5th and 26th March 2024:

∗ 5th March 2024 – random meander (based on Cropper 1993) and 24 spot surveys (to a radius of approximately 10m at each spot), over approximately 2.5 person-hours.

∗ 5th March 2024 – one comprehensive 20m x 20m plot survey within the small patch of native vegetation present.

∗ 26th March 2024 – further inspection of vegetation associated with drainage lines in the south of the subject land, over approximately 1.5 person-hours

Due to the predominantly cleared, managed, and exotic character of the subject land, parallel traverse surveys were not used. Instead, the few native trees present were individually targeted and identified during the course of the random meanders.

## 2.4    Threatened fauna survey methods

### 2.4.1    Review of existing information

The BAM-Calculator (Part 4 Developments – Small Area) was used to generate a list of relevant threatened species on the basis of IBRA subregion (Moss Vale SYB11), native vegetation cover class in the assessment area (0-10%) and patch size class (<5ha).

A review was undertaken of habitat and constraints information held in the TBDC in relation to the list of relevant species, and geographic and habitat constraints set out in the BAM-Calculator.

A search was also undertaken within the BioNet Atlas (sightings) database for records of threatened species on and in the vicinity of the subject land (25th April 2024).  The search found record of a pair of Little Eagles observed within the subject property in 2015.  This species was added to the list of species for assessment.

### 2.4.2    Habitat constraints assessment

A site inspection were conducted by Ms Rebecca Hogan across the subject land on the 5th March 2024.

The primary purpose of the inspection was to identify habitat constraints and microhabitats of potential value for relevant threatened species.

The habitat assessment included consideration of vegetation structure and diversity, identification of hollow-bearing trees (noting presence of medium and large hollows), and identification of other specific elements such as caves and rock habitat, watercourses and dams, presence of *Allocasuarina* species, mistletoes, termite mounds, quantity and size of fallen timber and logs, burrows etc.

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### 2.4.3    Field surveys

Searches were conducted opportunistically during the habitat assessment for fauna and for indirect evidence of fauna (such as nests, scats, diggings, scratches etc).  This evidence can persist on a site for some time.

No candidate threatened fauna species require targeted field survey for this assessment.  Targeted surveys were not conducted.

Refer to Appendix D (Fauna survey data) for a list of species recorded.

Proposed subdivision and general industrial development, Lot 2 DP 1070888 & Lot 51 DP 130176, Bowman Road, Moss Vale.

## 2.5  Weather conditions

**Table 1**    **Environmental conditions during threatened species surveys**

| Survey undertaken (e.g. method / targeted species) | Date | Time | Temperature (min. & max.) | Wind (light, mod…) | Rainfall (mm) | Other conditions relevant to the species |
|---|---|---|---|---|---|---|
| Random meander and spot surveys (flora) | 05/03/2024 | morning | range during survey from 15°C to 25°C | cool breeze | 0 | Partly cloudy ~3/8 |
| Site inspection fauna habitat assessment | 05/03/2024 | morning | | | | |
| BAM-VIS plot survey | 05/03/2024 | 10:00am | | | | |
| Random meander in riparian zone (flora) | 26/03/2024 | morning | 11°C | Light breeze | 0 | Not recorded. |

\*    weather data recorded on site at the time of surveys.

## 2.6  Limitations

### 2.6.1  Flora

Botanical surveys were conducted over two days during March 2024.  Whilst the surveys were thorough, it is noted some species are seasonal in appearance and may not have been visible at the time of the surveys, or able to be identified at the time of the surveys.

Targeted surveys for candidate threatened plant species were conducted in accordance with the TBDC designated timing and conditions.

The relative cover of species in grassland areas can vary seasonally and from year to year.  The survey was conducted during a good growing season to maximise detection of plant species.  Weather conditions were still warm for the region and grasses were in active growth phases.  The survey results are deemed to be of sufficient accuracy for the purpose of this assessment.

Surveyor Licences:

Mr Daniel Clark

    Scientific Licence, s132c of the NP&W Act 1974 (SL101495)

### 2.6.2   Fauna

No targeted fauna surveys are required for this assessment.

Observations and opportunistic records were recorded by Ms Rebecca Hogan whilst undertaking site inspections and BAM-VIS plot surveys.

Fauna data is augmented by historical local records within the Bionet (sightings) database, and through searches for indirect evidence of fauna (such as nests, feathers, scats etc), which can persist on a site for some time.

There is a high level of confidence in the accuracy and completeness of fauna data used for the assessment.

Surveyor Licences:

Ms Rebecca Hogan

Scientific Licence, s132c of the NP&W Act 1974 (SL100778)

DPI Animal Care & Ethics Committee Approval (exp. September 2024)

# 3. Site context

## 3.1 Assessment area

The assessment area is the subject land and land within a 1500m buffer measured from the outer boundary of the subject land.  Refer to Figure 2 (Location map).

## 3.2 Landscape features

Landscape features identified within the subject land and assessment area are shown on Figure 1 (Site map) and Figure 2 (Location map), respectively.

### 3.2.1 IBRA bioregions and IBRA subregions

Subject Land:

- ∗ IBRA bioregion:  Sydney Basin (SYB)
  - – IBRA subregion: Moss Vale (SYB11)

Assessment Area:

- ∗ IBRA bioregion:  Sydney Basin (SYB)
  - – IBRA subregion: Moss Vale (SYB11)

### 3.2.2 Rivers, streams, estuaries and wetlands

The whole of the assessment area is within the catchment of the Wingecarribee River.  Whites Creek, a notable tributary, runs to the west through the southern part of the assessment area, south of the subject land.

Several farm dams have been created on agricultural lands, including one within the subject land.  These are typically surrounded by open pasture and contain very limited aquatic or riparian vegetation.

There are no significant wetland areas, and no wetlands listed as important in the Directory of Important Wetlands Australia (DIWA).

### 3.2.3 Habitat connectivity

Habitat within the subject land is highly degraded, simplified, and very poorly connected to any area of intact native vegetation.

The subject land may provide a 'stepping stone' refuge for mobile and disturbance-tolerant fauna, but would not be of importance for connectivity through the landscape.

Proposed subdivision and general industrial development, Lot 2 DP 1070888 & Lot 51 DP 130176, Bowman Road, Moss Vale.

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

No karst, caves, or other such features occur within the subject land or assessment area.

#### 3.2.5 Areas of outstanding biodiversity value

Not applicable.

#### 3.2.6 NSW (Mitchell) landscape

Subject Land:

- *Moss Vale Highlands* (Mvh):  Landscape 54% cleared

Assessment Area:

- *Moss Vale Highlands* (Mvh):  Landscape 54% cleared

#### 3.2.7 Additional landscape features identified in SEARs

Not applicable.

#### 3.2.8 Soil hazard features

Not applicable.

## 3.3 Native vegetation cover

Approximately 25 hectares of native woodland and forest in variable condition occurs within the assessment area (based on woody vegetation cover evident on aerial images – Google Satellite 2024 and Nearmap, various dates).

Table 2 summarises the extent of native vegetation cover within the assessment area. Figure 2 (Location map) shows native vegetation cover within the assessment area.

**Table 2      Native vegetation cover in the assessment area**

| | |
|---|---|
| **Assessment area (ha)** | 958.2 ha |
| **Total area of native vegetation cover (ha)** | 24.8 ha |
| **Percentage of native vegetation cover (%)** | 3 % |
| **Class (0-10, >10-30, >30-70 or >70%)** | 0-10% |

# 4. Native vegetation, threatened ecological communities and vegetation integrity

## 4.1 Native vegetation extent

The subject land is 11.6 ha in size.  It supports a very small area (0.2ha) of remnant native vegetation in the northwest.  Other parts of the subject land are characterised by managed exotic pasture and weeds.

Refer to Figure 1 (Site map).

### 4.1.1 Changes to the mapped native vegetation extent

Not applicable.  Site inspection and field surveys during 2022 found that aerial images current at the time of the surveys represented the extent of native forest across the subject land.  It was observed that most native trees were in very poor health and at risk of death in the short to medium term.

### 4.1.2 Areas that are not native vegetation

The majority of the subject land consists of exotic pasture being actively managed as part of an ongoing long term dairy-farming operation.  No areas of grassland within the subject land met the criteria for classification as native vegetation (*ie* 15% or greater cover of native plants).

## 4.2 Plant community types

### 4.2.1 Overview

Native vegetation within the subject land has been assessed as aligning with the BioNet Vegetation Classification PCT 3302 *Southern Highlands Shale-Basalt Dry Forest*.  A detailed description of the PCT is provided in the following subsection.

**Table 3      PCTs identified within the development footprint**

| PCT ID | PCT name | Development Footprint area (ha) |
|--------|----------|--------------------------------|
| 3302 | *Southern Highlands Shale-Basalt Dry Forest* | 0.2 ha |
| | **Total area** | 0.2 ha |

### 4.2.2   PCT 3302:  Southern Highlands Shale-Basalt Dry Forest

#### 4.2.2.1  PCT overview

**Table 4      PCT 3302**

| PCT ID | 3302 |
|---|---|
| **PCT name** | Southern Highlands Shale-Basalt Dry Forest |
| **Vegetation formation** | Wet Sclerophyll Forests (grassy sub-formation) |
| **Vegetation class** | Southern Tableland Wet Sclerophyll Forests |
| **Per cent cleared value (%)** | 89.7 % |
| **Extent within development footprint (ha)** | 0.2 ha |

Native vegetation within the subject land consists of a small stand of mostly dead Narrow-leaved Peppermint *Eucalyptus radiata* in the northwest, several isolated and nearly dead individuals of Narrow-leaved Peppermint, and an isolated small Black Wattle *Acacia melanoxylon* located on the margin of the existing dam in the south.

No native shrubs were found.  Several individuals of the exotic Hawthorne *Crataegus monogyna* are scattered through paddocks.  Thickets of Blackberry *Rubus anglocandicans* occur in some areas.  Black Willow *Salix fragilis* is present in the area around the existing dam.

Some native groundlayer plants are present, but with very low cover and abundance.  These include Finger Rush *Juncus subsecundus*, Knob Sedge *Carex inversa*, Water Couch *Paspalum distichum*, and Weeping Meadow Grass *Microlaena stipoides*.

Dominant exotic groundlayer species recorded include Paspalum *Paspalum dilatatum*, Yorkshire Fog *Holcus lanatus*, Meadow Fescue *Festuca pratensis*, Cocksfoot Grass *Dactylis glomerata*, White Clover *Trifolium repens*, Catsear *Hypochaeris radicata*, Rye Grass *Lolium rigidum,* Kikuyu *Cenchrus clandestinus*, Kentucky Blue Grass *Poa compressa*, Bristlegrass *Setaria parviflora* and Spear Thistle *Cirsium vulgare*.

#### 4.2.2.2  Condition states

PCT 3302 within the subject land is present as a single condition state:

∗    Poor condition.

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**Photo 1        PCT 3302, zone a – poor condition**



**Photo 2        Exotic grassland within the subject land.**

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**Photo 3      Existing dam in the south.**

### 4.2.2.3   Justification of PCT selection

There are insufficient native plant species present to enable meaningful application of the BioNet Vegetation Classification filter tool.

The single tree species present, *Eucalyptus radiata*, is a characteristic and dominant species within the PCT that has been mapped (SEED: SVTM_NSW_Extant_PCT) as occurring on the site and elsewhere in the assessment area (PCT 3302).  Native groundcover species recorded are consistent with this PCT. The PCT also meets the location, landform and distribution attributes of the subject land.

On the basis of the above, it was determined that PCT 3302 was the appropriate PCT to use for this assessment.

### 4.2.2.4   Alignment with TECs

Where PCT 3302 occurs on clay soils derived from Wianamatta Shale, it is associated with the following threatened ecological community (Bionet Vegetation Classification Profile):

∗   *Southern Highlands Shale Woodlands in the Sydney Basin Bioregion.*  Endangered.

The subject land is on clay soils, so it is conservatively assumed that this community is present in a small patch in the north of the subject land.

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### 4.2.2.5 Alignment with EPBC Act listed ECs

Where PCT 3302 occurs on clay soils derived from Wianamatta Shale, it is associated with the following EPBC Act listed ecological community (Bionet Vegetation Classification Profile):

∗ *Southern Highlands Shale Forest and Woodland in the Sydney Basin Bioregion.* Critically endangered.

The subject land is on clay soils so this community is potentially relevant. However, the EPBC listing sets out condition criteria for patches of vegetation to be included in the listing. The Approved Conservation Advice states "*It is intended that the condition thresholds will exclude the more highly degraded patches on farms and other properties. For instance, those patches that now exist as isolated paddock trees or small, narrow stands of trees over exotic pastures*".

Vegetation within the subject land does not meet the minimum condition criteria for the understorey, which requires at least 30% cover of native species, or at least 15 native understorey species per 0.5ha.

The vegetation is not part of the EPBC Act listed ecological community.

## 4.3    Threatened ecological communities

**Table 1        TECs within the subject land**

| TEC name | Profile ID (from TBDC) | BC Act status | EPBC Act status | Associated vegetation zones within the subject land | Area within subject land (ha) |
|---|---|---|---|---|---|
| Southern Highlands Shale Woodlands in the Sydney Basin Bioregion | 10766 | E | n/a | 1 – 3302a | 0.2 ha |

Refer to Figure 1 (Site Map).

## 4.4    Vegetation zones

Native vegetation within the subject land has been classed as a single vegetation zone:

i.    PCT 3302a – forest in poor condition (0.2ha).

Patch size was identified using aerial images (Google 2023, and Nearmap, various dates up to 16th December 2023).

Refer to Table 6 (Vegetation zones and patch sizes). Refer to Figure 1 (Site map) and Figure 2 (Location map).

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**Table 6     Vegetation zones and patch sizes**

| Vegetation zone ID | PCT ID number and name | Condition / other defining feature | Area (ha) | Patch size class (select multiple if areas of native vegetation are discontinuous) | No. vegetation integrity plots required | No. vegetation integrity plots completed | No. vegetation integrity plots used in assessment | Plot IDs of vegetation integrity plots used in assessment |
|---|---|---|---|---|---|---|---|---|
| 1 | 3302: Southern Highlands Shale-Basalt Dry Forest | Poor condition | 0.2 | ☒ <5 ha<br>☐ 5–24 ha<br>☐ 25–100 ha<br>☐ >100 ha | 1 | 1 | 1 | BAM-VIS Plot 1 |

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## 4.5 Vegetation integrity (vegetation condition)

### 4.5.1 Vegetation integrity survey plots

One plot has been sampled within the vegetation zone, in accordance with BAM Table 3.  The plot occupies nearly the entire zone.  No additional plots are warranted.

### 4.5.2 Scores

**Table 7 Vegetation integrity scores**

| Vegetation zone ID | Composition condition score | Structure condition score | Function condition score (where relevant) | Vegetation integrity score | Hollow bearing trees present? |
|---|---|---|---|---|---|
| 3302a – poor condition | 23.8 | 1.0 | 26.7 | 8.7 | Yes |

### 4.5.3 Use of benchmark data

Standard condition benchmarks within the BAM-Calculator (as at 25$^{th}$ April 2024) were used to assess the vegetation integrity attributes for the vegetation zone.

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# 5. Habitat suitability for threatened species

## 5.1 Identification of threatened species for assessment

### 5.1.1 Ecosystem credit species

**Table 8** **Predicted ecosystem credit species**

| Common name | Scientific 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 | | | | | | |
| Dusky Woodswallow | *Artamus cyanopterus cyanopterus* | V | - | No | ☒ BAM-C <br> ☐ TBDC <br> ☐ Previous survey <br> ☐ Current survey | Yes | n/a | 3302a | Moderate |
| Glossy Black Cockatoo (foraging) | *Calyptorhynchus lathami* | V | V | Yes | ☒ BAM-C <br> ☐ TBDC <br> ☐ Previous survey <br> ☐ Current survey | No | 2 – Habitat constraints (further detail provided below this table). | n/a | High |
| Spotted-tailed Quoll | *Dasyurus maculatus* | V | E | No | ☒ BAM-C <br> ☐ TBDC <br> ☐ Previous survey <br> ☐ Current survey | Yes | n/a | 3302a | High |
| Little Lorikeet | *Glossopsitta pusilla* | V | - | No | ☒ BAM-C <br> ☐ TBDC <br> ☐ Previous survey <br> ☐ Current survey | Yes | n/a | 3302a | High |

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| Common name | Scientific 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 | | | | | | |
| White-bellied Sea-Eagle (foraging) | *Haliaeetus leucogaster* | V | - | Yes | ☒ BAM-C<br>☐ TBDC<br>☐ Previous survey<br>☐ Current survey | Yes | n/a | 3302a | High |
| Little Eagle (foraging) | *Hieraaetus morphnoides* | V | - | Yes | ☐ BAM-C<br>☒ TBDC<br>☐ Previous survey<br>☐ Current survey | Yes | n/a | 3302a | Moderate |
| White-throated Needletail | *Hirundapus caudacutus* | - | V | No | ☒ BAM-C<br>☐ TBDC<br>☐ Previous survey<br>☐ Current survey | Yes | n/a | 3302a | High |
| Swift Parrot (foraging) | *Lathamus discolor* | E | CE | Yes | ☒ BAM-C<br>☐ TBDC<br>☐ Previous survey<br>☐ Current survey | Yes | n/a | 3302a | Moderate |
| Scarlet Robin | *Petroica boodang* | V | - | No | ☒ BAM-C<br>☐ TBDC<br>☐ Previous survey<br>☐ Current survey | Yes | n/a | 3302a | Moderate |
| Flame Robin | *Petroica phoenicea* | V | - | No | ☒ BAM-C<br>☐ TBDC<br>☐ Previous survey<br>☐ Current survey | Yes | n/a | 3302a | Moderate |

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| Common name | Scientific 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 | | | | | | |
| Grey-headed Flying-fox (foraging) | *Pteropus poliocephalus* | V | V | Yes | ☒ BAM-C<br>☐ TBDC<br>☐ Previous survey<br>☐ Current survey | Yes | n/a | 3302a | High |

### 5.1.1.1  Predicted ecosystem credit species excluded from assessment:

One ecosystem credit species predicted in the BAM-Calculator was excluded from assessment for reason of habitat constraints:

* South-eastern Glossy Black Cockatoo – the subject land does not contain any *Allocasuarina* or *Casuarina* species.

### 5.1.1.2  Ecosystem credit species added to assessment:

One ecosystem credit species was added to the BAM-Calculator generated list for assessment:

* Little Eagle – there is a Bionet record from 2015 of a pair of Little Eagles observed within the subject land.  The observer noted it may be a breeding pair.

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### 5.1.2   Species credit species

**Table 9        Predicted flora species credit species**

| Common name | Scientific 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 | | | | |
| Paddy's River Box | *Eucalyptus macarthurii* | E | E | ☐ BAM-C<br>☒ TBDC<br>☐ Previous survey<br>☐ Current survey | Yes | n/a | 3302a |

#### 5.1.2.1   Predicted fauna species credit species excluded from assessment:

No flora species credit species are listed in the BAM-Calculator as relevant to the assessment.

#### 5.1.2.2   Flora species credit species added to the assessment:

No threatened flora species are known to occur within the subject land.

One flora species credit species has been added to the BAM-Calculator for assessment:

* Paddy's River Box – this species is known to occur in the vicinity as part of this PCT and is commonly recorded as isolated trees in highly degraded agricultural landscapes.

Proposed subdivision and general industrial development, Lot 2 DP 1070888 & Lot 51 DP 130176, Bowman Road, Moss Vale.

**Table 10      Predicted fauna species credit species**

| Common name | Scientific 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 | | | | | |
| Swift Parrot (breeding) | *Lathamus discolor* | E | CE | Yes | ☒ BAM-C<br>☐ TBDC<br>☐ Previous survey<br>☐ Current survey | No | 2 – Habitat constraints<br>(further detail provided below this table). | n/a |

### 5.1.2.3   Predicted fauna species credit species excluded from assessment:

One fauna species credit species has been removed from the BAM-Calculator generated list for assessment on the basis of habitat constraints:

∗   Swift Parrot (breeding) – the subject land is not part of an important mapped area.

### 5.1.2.4   Fauna species credit species added to the assessment:

No fauna species credit species were added to the BAM-Calculator generated list for assessment.

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## 5.2 Presence of candidate species credit species

Candidate flora species requiring further assessment are listed in Table 10.

No candidate fauna species require further assessment.

**Table 11    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 | | | |
| Paddy's River Box | *Eucalyptus macarthurii* | E | E | Targeted threatened species survey | No | No |

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## 5.3    Threatened species surveys

**Table 12    Threatened species surveys for candidate flora species credit species on the subject land**

| Common name | Scientific name | Threatened flora species surveys | | | Present | Further assessment required | Compliance with TBDC requirements & DPIE (2020) guidelines |
|---|---|---|---|---|---|---|---|
| | | Survey method (transects or grids) | Timing of survey – within rec. period? (BAM-C/TBDC) | Effort (hours & no. people) | | | |
| Paddy's River Box | *Eucalyptus macarthurii* | Random meander; Area (spot) surveys; Plot survey. | ☒ Yes  ☐ No | Approx 4 person-hours | No | No | TBDC survey:  all year.<br><br>05/03/2024 – random meander including 24 x area surveys (each area survey ~300m$^2$).<br><br>05/03/2024 – 1 x comprehensive plot survey (400m$^2$).<br><br>26/03/2024 – additional random meander in the riparian zone in the south of the subject land.<br><br>This species is a tall tree that can readily be seen and identified all year.<br><br>Due to the predominantly cleared, managed, and exotic character of the subject land, parallel traverse surveys were not used.  Instead, the few native trees present were individually targeted and identified during the course of the random meanders.<br><br>Survey method and effort is sufficient to detect this species on this site if present. |

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## 5.4   Expert reports

No Expert Reports have been used or relied upon for this assessment.

## 5.5   More appropriate local data (where relevant)

No local data has been used in this assessment.

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

No species credit species are known or assumed to use the subject land.

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# 6. Identifying prescribed impacts

**Table 13    Prescribed impacts identified**

| Feature | Present | 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 | ☐Yes / ☒No | The subject land does not contain geological features of significance. | n/a |
| Human-made structures | ☒Yes / ☐No | There are existing dairy sheds within the property that would be removed. | These are shallow open structures in regular use and do not provide likely habitat for threatened species.  No bats were observed during the site inspection. |
| Non-native vegetation | ☒Yes / ☐No | Non-native vegetation within the subject land consists of scattered Hawthorne, Blackberry and stands of Willow. | These are not known or likely to provide habitat for threatened species. |
| Habitat connectivity | ☐Yes / ☒No | Habitat within the subject land is highly degraded, simplified, and very poorly connected to any area of intact native vegetation. | The habitat may provide a 'stepping stone' refuge for mobile and disturbance-tolerant fauna, but would not be of importance for connectivity through the landscape. |
| Waterbodies, water quality and hydrological processes | ☒Yes / ☐No | Several ephemeral first order streams occur within the subject land.  These are shallow swales dominated by exotic pasture.<br><br>An existing farm dam is located in the south of the subject land. | These features are not known or likely to provide habitat or support for any threatened entities. |
| Wind turbine strikes (wind farm development only) | ☐Yes / ☒No | n/a | n/a |
| Vehicle strikes | ☒Yes / ☐No | The proposed development would result in increased traffic on the existing local and industrial road network, and would extend these roads adjacent to the proposed new general industrial development sites. | The impact would be a minor increase on an already busy network.  New roads do not pass through or near areas of TEC and are not likely to bisect movement routes for native fauna.  The development would not increase the risk of vehicle strike. |

# 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 development proposal is for general industrial development. It would be located on land zoned for this purpose, adjacent to existing industrial development, and within the established Moss Vale Enterprise Corridor.

The proposal would occupy the entirety of land zoned for industrial use, to achieve economic and orderly use of the land. There are no important or significant biodiversity values that warrant avoidance within this area. The proposal does not involve works in the vicinity of Whites Creek.

The subdivision component of the application would align lot boundaries with current landuse zones, and with land severance resulting from construction of existing cadastral roads.

Refer to Figure 3 (Development layout).

#### 7.1.2 Project design

The development has been designed to minimise indirect impacts on adjacent areas.

Specific features and controls proposed to further avoid and minimise impacts:

i.   The stormwater design includes on-site detention (OSD) within each of the three new industrial lots. All stormwater run-off from each lot would be directed through a treatment train consisting of a Humeceptor gross pollutant trap (GPT) and Humefilter universal pollutant trap (UPT) prior to entering the OSD. MUSIC modelling of the above treatment trains show that development would achieve a neutral or beneficial effect on water quality compared to pre-development conditions, as per Sydney Water requirements. The OSD features an isolation valve that can be manually operated in the event of an on-site pollution incident that may affect water quality.

ii.  Each of the three OSDs would gradually release water through the subdivision stormwater dam located on the southern side of Hutchison Road to ensure post-development flows do not exceed pre-development conditions. Prior to discharge into the new on-site dam, water would pass through a Humegard GPT to remove litter and course sediment (>2mm) and discharge via an energy dissipator to reduce the potential for erosion. All stormwater run-off from Bowman and Hutchison Roads would be directed to the stormwater dam via the Humegard GPT.

Refer to Figure 3 (Development layout).

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## 7.2 Avoid and minimise prescribed impacts

### 7.2.1 Project location

There are no prescribed impacts of relevance to the proposed development.

### 7.2.2 Project design

There are no prescribed impacts of relevance to the proposed development.

## 7.3 Other measures considered

No other measures have been considered and not implemented for this development.

## 7.4 Summary of measures to avoid and minimise impacts

**Table 14    Avoidance and minimisation for direct, indirect and prescribed impacts**

| Action | Description | Outcome | Timing | Responsibility |
|---|---|---|---|---|
| Design of the development. | Stormwater design and OSD features, as described in Ch 7.1.2 | Ensure flows do not exceed pre-development conditions and that water quality objectives are met or exceeded. | Development application | Development proponent |

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# 8. Impact assessment

## 8.1 Direct impacts

### 8.1.1 Residual direct impacts

The extent of residual direct impacts on native vegetation is shown on Figure 6 (Thresholds for assessment and offsetting).

**Table 15     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, rehabilitation) | Extent (ha, number of individuals) |
|---|---|---|---|---|---|
| Removal of vegetation (PCT 3302) from the development footprint. | Endangered | - | No | Construction | 0.2 ha |

### 8.1.2 Change in vegetation integrity score

**Table 16     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 score | Change in VI score |
| 1 | 3302a | n/a | 0.2 | 23.8 | 1.0 | 26.7 | 8.7 | 0 | 0 | 0 | 0 | -8.7 |

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## 8.2    Indirect impacts

There is potential for construction and ongoing industrial use of the property to indirectly impact watercourses and habitats beyond the development footprint.

Potential indirect impacts are identified and discussed in Table 16 below.

**Table 17    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 physical damage to adjacent vegetation | n/a | n/a | n/a | n/a | n/a | There is no native vegetation being retained adjacent or proximate to the development site at risk from inadvertent damage. |
| Reduced viability of habitat due to edge effects | n/a | n/a | n/a | n/a | n/a | There is no native vegetation being retained adjacent or proximate to the development site that is not already substantially and entirely affected by edge effects. |
| Reduced viability of habitat due to noise, dust or light spill | PCT 3302 | n/a | n/a | ongoing | construction, occupation | The remainder of the remnant patch of native vegetation to the northwest of the subject land would be subject to increased noise and light spill, and a short term increased risk of dust during construction. These impacts are not new to the patch, |

| 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 |
|---|---|---|---|---|---|---|
| | | | | | | and are not likely to notably affect species which are current present or using the patch. A Light Spill Impact Assessment has been prepared for the proposed development. The proposed lighting strategy meets the relevant Australian Standards for light spill at 10m from the Site boundaries. Impacts would be mitigated through landscape screen planting along new lot boundaries. |
| Spread of diseases and weeds | PCT 3302 | n/a | n/a | short-term risk | construction | Low risk, to be managed through biosecurity mitigation measures. |
| Loss of food and shelter for fauna | n/a | n/a | n/a | n/a | n/a | No further loss from indirect impacts. |
| Loss of breeding habitat | n/a | n/a | n/a | n/a | n/a | No further loss from indirect impacts. |
| Trampling of threatened flora species | n/a | n/a | n/a | n/a | n/a | Not relevant. |
| Inhibition of nitrogen fixation and increased soil salinity | n/a | n/a | n/a | n/a | n/a | Not relevant. |

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| 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 |
|---|---|---|---|---|---|---|
| Fertiliser drift | n/a | n/a | n/a | n/a | n/a | Not relevant.  There would be a reduction in existing risk from current pasture management practices. |
| Rubbish dumping | n/a | n/a | n/a | n/a | construction, occupation | Unlikely impact. |
| Wood collection | n/a | n/a | n/a | n/a | n/a | Not relevant. |
| Removal of rocks | n/a | n/a | n/a | n/a | n/a | Not relevant. |
| Increase in predators | n/a | n/a | n/a | n/a | n/a | Unlikely impact. |
| Increase in pest animal populations | n/a | n/a | n/a | n/a | n/a | Unlikely impact. |
| Changed fire regime | n/a | n/a | n/a | n/a | n/a | Unlikely impact. |
| Disturbance to specialist breeding and foraging habitat | n/a | n/a | n/a | n/a | n/a | Not relevant. |

## 8.3   Prescribed impacts

There are no prescribed impacts of relevance to the proposed development.

## 8.4   Mitigating residual impacts – management measures and implementation

Mitigation measures are proposed to minimise, mitigate and compensate for impacts of the development.  Measures include:

* Implementation of a Tree Removal Protocol for all removal of native trees within the subject land (set out in Ch 8.4.1 below) to minimise risk of injury to wildlife that may be sheltering in trees at the time of clearing;

* Site biosecurity control, including cleaning of machinery and equipment prior to entering the property, and use of screened soil and mulch products in landscaping works.

* Installation of sediment and erosion control features in accordance with the 'Blue Book' - *Managing Urban Stormwater: Soils and construction – Volume 1.*  Landcom, 2004.

* Landscape screen planting along new lot boundaries.

* Implementation of a Vegetation Management Plan (Hayes Environmental, April 2024) within the riparian zone indicated to the south of the development footprint.

### 8.4.1   Tree Removal Protocol

1) A licensed ecologist or wildlife rescuer shall be engaged to be present during tree removal works to spot and rescue wildlife injured or trapped in vegetation.

2) Trees (including dead trees) shall initially be 'bumped' using machinery to encourage any roosting fauna to evacuate on their own accord.  For trees with visible hollows, 'bumping' shall be repeated at 1 minute intervals for approximately 5 minutes per tree.  Care shall be taken to place the machinery such that it is not likely to be hit by falling branches.

3) Hollow sections of trees or limbs that are found to be hollow shall be left on the ground until the next working day to provide further opportunity for fauna to evacuate, and then shall be relocated and placed on the ground in the managed riparian zone within the subject property.

4) Any injured native fauna shall be rescued and transferred to the care of WIRES or an equivalent wildlife rescue agency.  In the event that native fauna requires medical treatment by a vet, or long-term care by a wildlife rescue agency, all costs shall be covered by the proponent for the development.  Note that microchiropteran bats carry lethal diseases and should not be handled by untrained and unvaccinated persons.

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## 8.5 Adaptive management strategy for uncertain impacts (where relevant)

There are no significant uncertain impacts likely to result from the development.  An adaptive management strategy is not warranted.

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# 9. Serious and irreversible impacts

**Table 18    Entities at risk of an SAII**

| Common name | Scientific name | Reason for inclusion in assessment |
|---|---|---|
| Southern Highlands Shale Woodlands in the Sydney Basin Bioregion | Southern Highlands Shale Woodlands in the Sydney Basin Bioregion | Included in current list of entities at risk of an SAII and is likely to be impacted by the proposal |

### 9.1.1    Additional impact assessment provisions for TECs at risk of an SAII

#### 9.1.1.1    Southern Highlands Shale Woodlands in the Sydney Basin Bioregion

*1.    Actions to avoid and minimise direct and indirect impacts*

Refer to Chapter 7 of the BDAR.  All native vegetation within the site is SHSW.  All actions described are directly relevant to SHSW.

*2.    Current status (excluding impacts of the proposal)*

**Table 19    Current status – Robertson Basalt Tall Open Forest in the Sydney Basin and Southern Eastern Highlands Bioregions**

| Criteria | Data/ information | Data sources | Details of data deficiency, assumptions, reasons for low confidence in information |
|---|---|---|---|
| Current total geographic extent (ha) of the TEC in NSW | 2,000 ha | NSW Scientific Committee – Final Determination (2011) | TBDC does not contain this information.  The Final Determination is least 13 years out of date. |
| Estimated reduction in geographic extent of the TEC since 1970 | >=80% in 10 years or three generations | TBDC | Specific details and extents not provided. |
| **Extent of reduction in ecological function, describing the degree of environmental degradation or disruption to biotic processes (Principle 2)** | | | |
| Much of the remaining area of Southern Highlands Shale Woodlands is highly fragmented with much of it occurring on private land. Many remnants are in poor condition, including in some reserves, with aging trees, lack of regeneration and weed invasion (NSW Scientific Committee – Final Determination, 2011). | | | |

Proposed subdivision and general industrial development, Lot 2 DP 1070888 & Lot 51 DP 130176, Bowman Road, Moss Vale.

| Criteria | Data/ information | Data sources | Details of data deficiency, assumptions, reasons for low confidence in information |
|---|---|---|---|
| **Evidence of restricted geographic distribution (Principle 3) based on the TEC's geographic range in NSW** | | | |
| Extent of occurrence (ha) | 2,000 ha | NSW Scientific Committee – Final Determination (2011) | TBDC does not contain this information. The Final Determination is least 13 years out of date. |
| Area of occupancy (ha) | Broadly equivalent to the Wingecarribee LGA – approximately 2,700m$^2$ | NSW Scientific Committee – Final Determination (2011). Wingecarribee Shire Council website. | TBDC does not contain this information. Distribution is well documented. Reasonable confidence in estimate. |
| Number of threat-defined locations | Most remnants are small isolated pockets in poor condition and are considered to be under threat. | NSW Scientific Committee – Final Determination (2011). Author knowledge. | TBDC does not contain this information. |

## 3.   Impact assessment

**Table 20    Impact assessment – Southern Highlands Shale Woodlands in the Sydney Basin Bioregion**

| Criteria | Data/ information | Data sources | Details of data deficiency, assumptions, reasons for low confidence in information |
|---|---|---|---|
| **Impact on the geographic extent of the TEC (Principles 1 and 3)** | | | |
| Area of TEC to be impacted by the proposal (ha) | 0.2 ha | N/A | N/A |
| Area of TEC to be impacted by the proposal as a % of the current geographic extent in NSW (%) | 0.0001 % | N/A | N/A |

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| Criteria | Data/ information | Data sources | Details of data deficiency, assumptions, reasons for low confidence in information |
|---|---|---|---|
| Direct/indirect impacts likely as a result of the proposal to contribute to loss of flora/fauna species characteristic of the TEC | Complete loss within subject land. No additional indirect impacts are likely. | N/A | N/A |
| **Impacts likely to contribute to further environmental degradation or disruption of biotic processes (Principle 2)** | | | |
| Remaining extent of isolated areas of TEC (ha) | Patch size is approximately 4 ha. The extent of loss is essentially a single live tree in poor condition, several dead stags, and a very low cover of native groundlayer plants within the patch, and several isolated trees that are not part of the patch. The impact on the patch would be negligible. | Aerial images (Google 2024, and Nearmap 16th December 2023). SEED: SVTM_NSW_Extant_PCT. | Extrapolation of site data onto adjacent lands using regional vegetation mapping and aerial images as a guide. |
| Average distance between remaining remnants – remnant is retained (m) | not applicable | | |
| Average distance between remaining remnants – remnant is removed (m) | not applicable | | |
| Estimated maximum dispersal distance of species associated with the TEC (km) | not applicable | | |
| Area to perimeter ratio of remaining remnants (ratio) | 3.8 ha : 1.1km negligible change | | |
| **Vegetation integrity analysis** | | | |
| Vegetation Zone 3302a (Composition score) | 23.8 | N/A | N/A |

Proposed subdivision and general industrial development, Lot 2 DP 1070888 & Lot 51 DP 130176, Bowman Road, Moss Vale.

| Criteria | Data/ information | Data sources | Details of data deficiency, assumptions, reasons for low confidence in information |
|---|---|---|---|
| Vegetation Zone 3302a (Structure score) | 1.0 | N/A | N/A |
| Vegetation Zone 3302a (Function score) | 26.7 | N/A | N/A |

### 9.1.2 Additional impact assessment provisions for threatened species at risk of an SAII

Not applicable.

# 10. Impact summary

## 10.1 Determine an offset requirement for impacts

### 10.1.1 Direct impacts

There are no impacts that require an offset.

**Table 21        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 |
|---|---|---|---|---|---|---|
| 1 – 3302a | Southern Highlands Shale-Basalt Dry Forest | Southern Highlands Shale Woodlands | 0.2 ha | | Yes | 8.7 |

### 10.1.2 Indirect and prescribed impacts

Residual indirect impacts are either unlikely to occur, short-term during construction, or are minor increases to existing impacts.  Mitigation measures are proposed to manage indirect impacts where appropriate.

The development is not likely to result in indirect impacts that warrant biodiversity offsets.

There are no prescribed impacts of relevance to the proposed development.

## 10.2 Impacts that do not need further assessment

**Table 22        Impacts that do not need further assessment for ecosystem credits**

| Impact | Location within subject land | Justification why no further assessment is required |
|---|---|---|
| Removal of exotic vegetation | majority of subject land. | Not native vegetation, and does not provide habitat for threatened species. |

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# 11. Biodiversity credit report

Refer to Appendix E (Credit reports).

## 11.1 Ecosystem credits

Not relevant.

## 11.2 Species credits

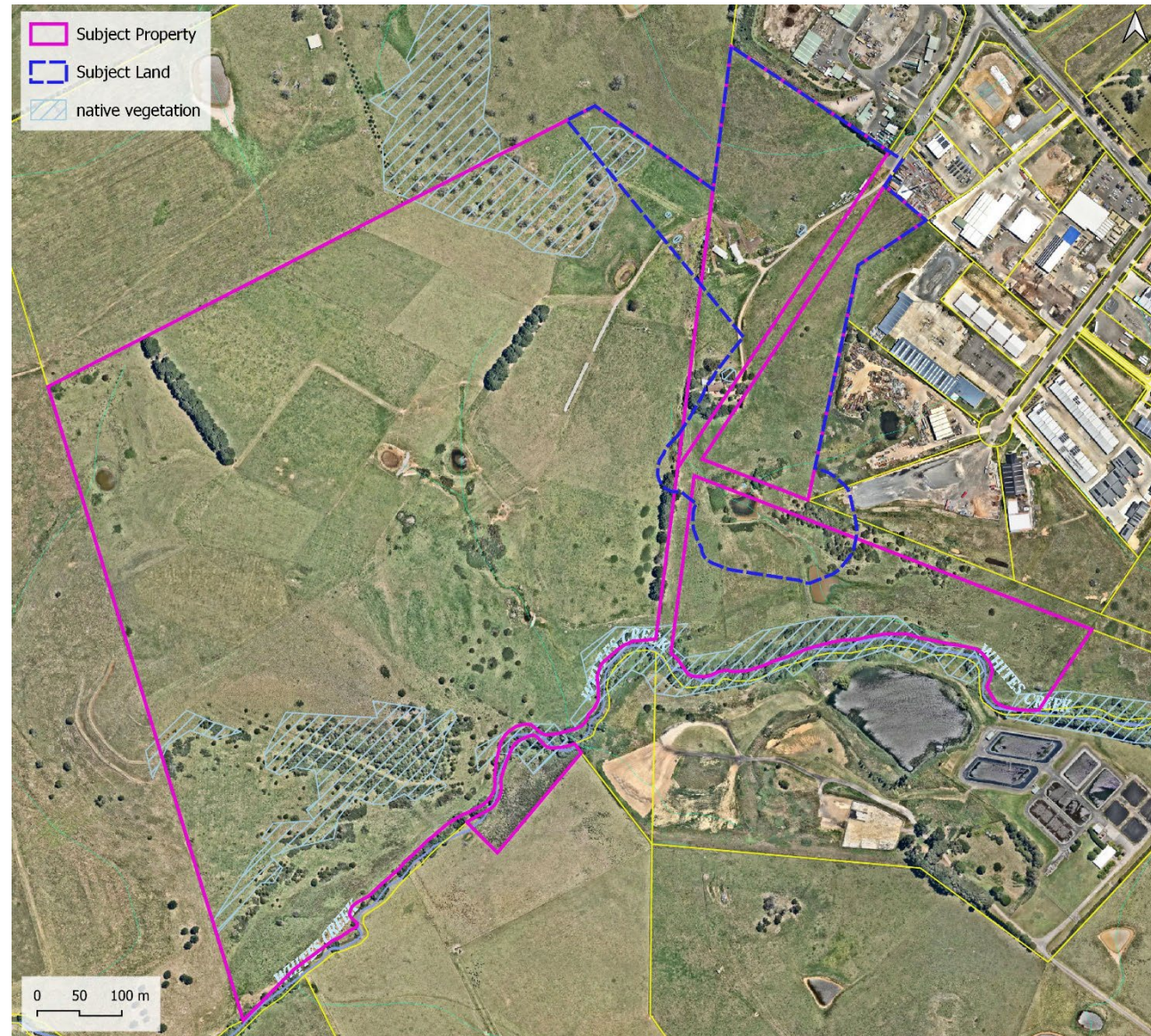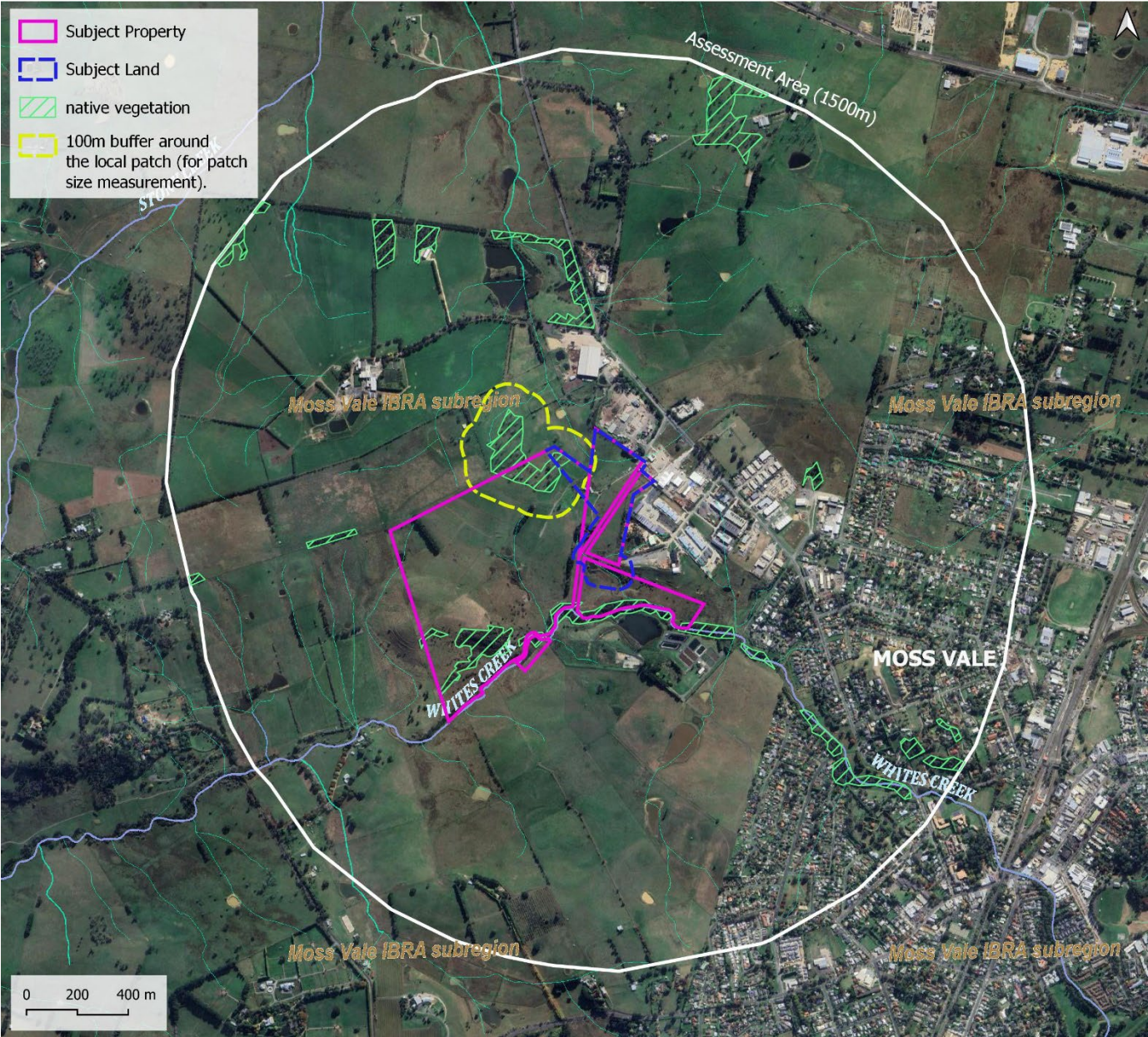Not relevant.

Proposed subdivision and general industrial development, Lot 2 DP 1070888 & Lot 51 DP 130176, Bowman Road, Moss Vale.

# 12.   Figures

Figure 1      Property map.

Aerial image is from Nearmap (16/12/2023).

The entire map area is within the Wingecarribee Local Government Area, the Moss Vale IBRA (v7) subregion, and the Moss Vale Highlands Mitchell Landscape (v3.1).

Proposed subdivision and general industrial development, Lot 2 DP 1070888 & Lot 51 DP 130176, Bowman Road, Moss Vale.

Figure 2    Site map.

Aerial image is from Nearmap (16/12/2023). The entire map area is within the Wingecarribee Local Government Area, the Moss Vale IBRA (v7) subregion, and the Moss Vale Highlands Mitchell Landscape (v3.1).
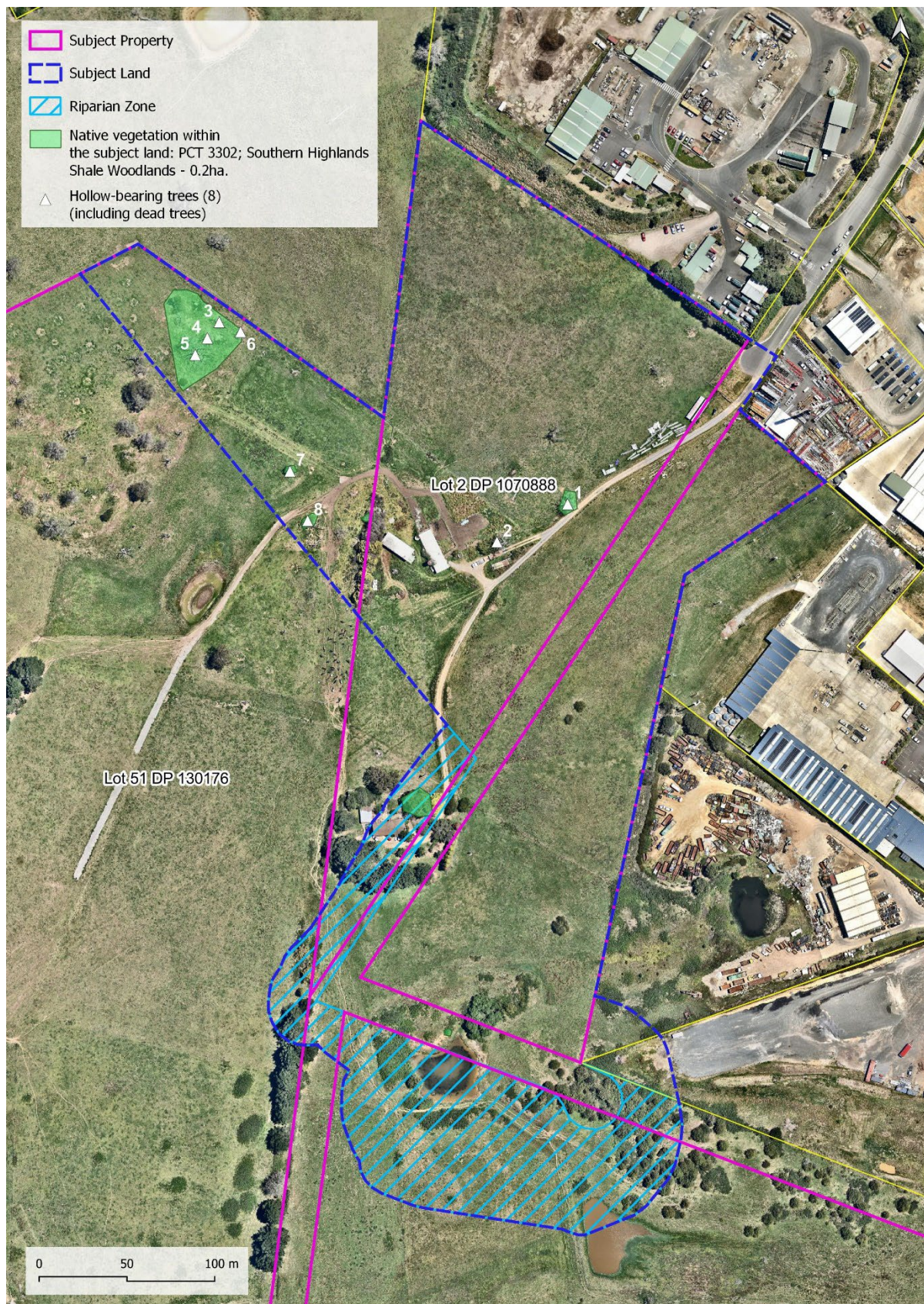
Proposed subdivision and general industrial development, Lot 2 DP 1070888 & Lot 51 DP 130176, Bowman Road, Moss Vale.

Figure 3     Location map.

Aerial image is from Google Satellite ©2024.

The entire map area is within the Wingecarribee Local Government Area, the Moss Vale IBRA (v7) subregion, and the Moss Vale Highlands Mitchell Landscape (v3.1).

Proposed subdivision and general industrial development, Lot 2 DP 1070888 & Lot 51 DP 130176, Bowman Road, Moss Vale.

Figure 4    Development layout.

Aerial image is from Nearmap (16/12/2023).

Proposed subdivision and general industrial development, Lot 2 DP 1070888 & Lot 51 DP 130176, Bowman Road, Moss Vale.

Figure 5     Biodiversity Values Map.

Aerial image is from Nearmap (16/12/2023).

Proposed subdivision and general industrial development, Lot 2 DP 1070888 & Lot 51 DP 130176, Bowman Road, Moss Vale.

Figure 6    Field survey locations.

Aerial image is from Nearmap (16/12/2023).

Proposed subdivision and general industrial development, Lot 2 DP 1070888 & Lot 51 DP 130176, Bowman Road, Moss Vale.

Figure 7　　　Thresholds for assessment and offsetting.

Aerial image is from Nearmap (16/12/2023).
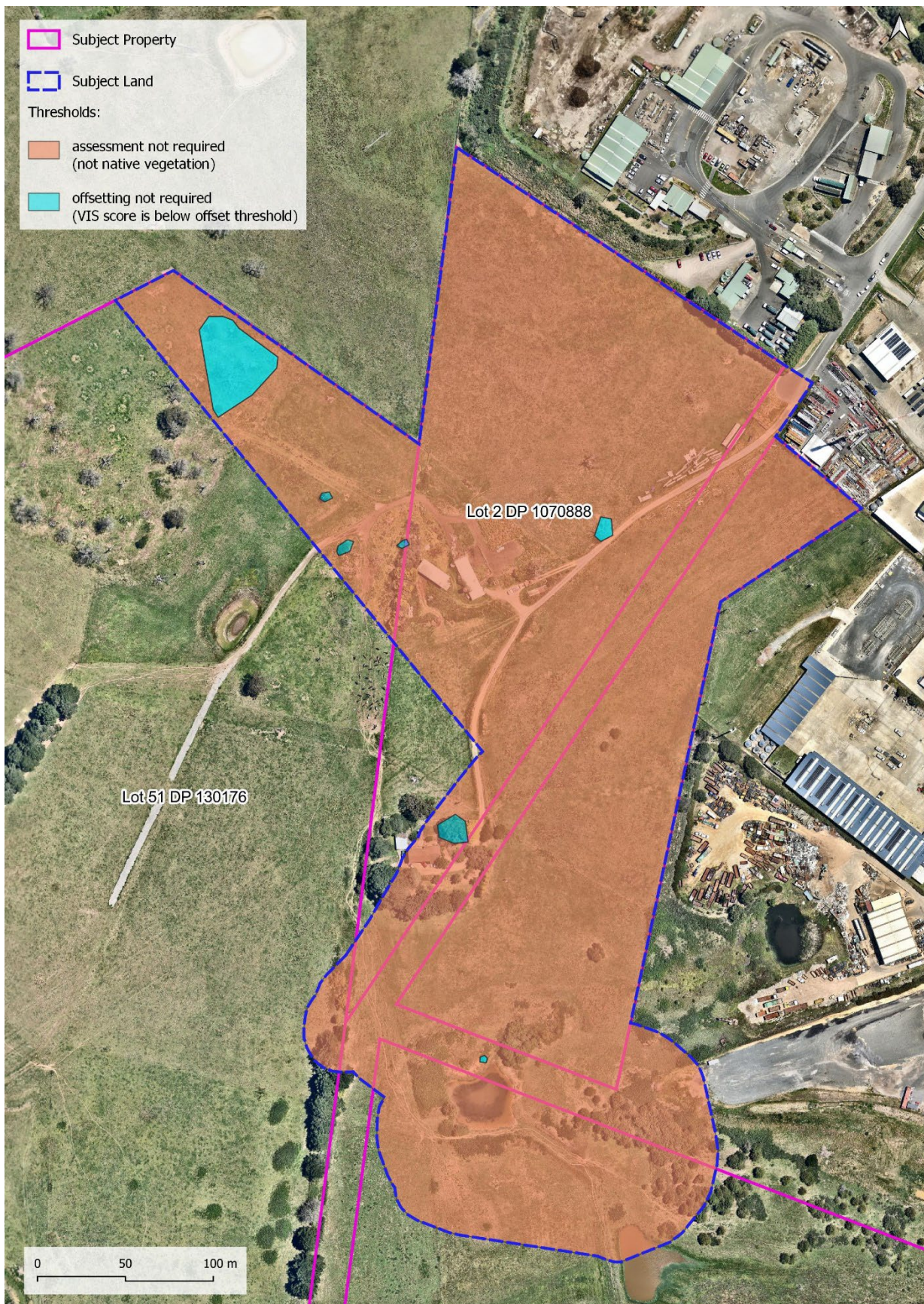
# Appendix A: BDAR requirements compliance

**Table 23    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 | Ch 1.1.1 |
| | | ☒ identification of subject land boundary, including: | Ch 1.1.3 |
| | | ☒ operational footprint | |
| | | ☒ construction footprint indicating clearing associated with temporary/ancillary construction facilities and infrastructure | |
| | | ☒ general description of the subject land | Ch 1.1.3 |
| | | ☒ sources of information used in the assessment, including reports and spatial data | Ch 1.1.4 & Ch 1.5 |
| | | ☒ identification and justification for entering the BOS | Ch 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 | Figures 2 & 4 |

Proposed subdivision and general industrial development, Lot 2 DP 1070888 & Lot 51 DP 130176, Bowman Road, Moss Vale.

| BDAR section | BAM ref. | BAM requirement | Page reference(s) in the BDAR |
|---|---|---|---|
| Landscape | Sections 3.1 and 3.2, Appendix E | **Information** | |
| | | Identification of site context components and landscape features, including: | – |
| | | ☒ general description of subject land topographic and hydrological setting, geology and soils | Ch 1.1.3 & Ch 3.2 |
| | | ☒ per cent native vegetation cover in the assessment area (as described in BAM Section 3.2) | Ch 3.3 |
| | | ☒ IBRA bioregions and subregions (as described in BAM Subsection 3.1.3(2.)) | Ch 3.2.1 |
| | | ☒ rivers and streams classified according to stream order (as described in BAM Subsection 3.1.3(3.) and Appendix E) | Ch 3.2.2 |
| | | ☒ wetlands within, adjacent to and downstream of the site (as described in BAM Subsection 3.1.3(3.)) | Ch 3.2.2 |
| | | ☒ connectivity of different areas of habitat (as described in BAM Subsection 3.1.3(5–6.)) | Ch 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.)) | Ch 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.)) – *not applicable* | Ch 3.2.5 |
| | | ☐ any additional landscape features identified in any SEARs for the proposal – *not applicable* | Ch 3.2.7 |
| | | ☒ NSW (Mitchell) landscape on which the subject land occurs | Ch 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) | Ch 2.1 |
| | | **Maps and tables** | |
| | | ☒ Site Map<br>　☒ Property boundary<br>　☒ Boundary of subject land<br>　☒ Cadastre of subject land (including labelling of Lot and DP or section plan if relevant)<br>　☒ Landscape features identified in BAM Subsection 3.1.3 | Figures 1, 2 & 3 |
| | | ☒ Location Map<br>　☒ Digital aerial photography at 1:1,000 scale or finer<br>　☒ Boundary of subject land | Figure 3 |

| 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)<br>☒ Landscape features identified in BAM Subsection 3.1.3<br>☒ 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<br>☒ rivers, streams and estuaries<br>☐ wetlands and important wetlands – *none relevant*<br>☐ connectivity of different areas of habitat – *not relevant*<br>☐ karst, caves, crevices, cliffs, rocks and other geological features of significance and if required, soil hazard features - *none relevant*<br>☐ areas of outstanding biodiversity value occurring on the subject land and assessment area – *none relevant*<br>☐ any additional landscape features identified in any SEARs for the proposal – *none relevant*<br>☒ NSW (Mitchell) landscape on which the subject land occurs | Figure 1; Figure 2; & Figure 3 |
| | | **Data** | |
| | | ☒ All report maps as separate jpeg files | uploaded |
| | | Individual digital shape files of | Uploaded zip file |
| | | ☒ 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 – *no features other than base hydrology, IBRA & Mitchell layers (SEED)* | |

| BDAR section | BAM ref. | BAM requirement | Page reference(s) in the BDAR |
|---|---|---|---|
| Native vegetation | Chapter 4, Appendix A and Appendix H | **Information** | |
| | | ☒ 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) | Ch 4.1 |
| | | ☒ Provide justification for all parts of the subject land that do not contain native vegetation (as described in BAM Subsection 4.1.2) | Ch 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) | Ch 2.2.1 |
| | | ☒ Describe the systematic field-based floristic vegetation survey undertaken in accordance with BAM Section 4.2 | Ch 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) – *not relevant* | |
| | | For each PCT within the subject land, describe: | – |
| | | ☒ PCT name and ID | Ch 4.2.1 |
| | | ☒ vegetation class | Ch 4.2.2 – Table 4 |
| | | ☒ extent (ha) within subject land | Ch 4.2.2 – Table 4 |
| | | ☒ evidence used to identify a PCT including any analyses undertaken, references/sources, existing vegetation maps (BAM Section 4.2(1–3.)) | Ch 2.2; & Ch 4.2.2.3 |
| | | ☒ plant species relied upon for identification of the PCT and relative abundance of each species | Ch 4.2.2.1 & 4.2.2.3 & Appendix C |
| | | ☒ if relevant, TEC status including evidence used to determine vegetation is the TEC (BAM Subsection 4.2.2(1–2.)) - | Ch 4.2.2.4 & 4.2.2.5 |
| | | ☒ estimate of per cent cleared value of PCT (BAM Subsection 4.2.1(5.)) | Ch 4.2.2 – Table 4 |
| | | Describe the vegetation integrity assessment of the subject land, including: | – |
| | | ☒ identification and mapping of vegetation zones (as described in BAM Subsection 4.3.1) | Ch 4.4 |

| BDAR section | BAM ref. | BAM requirement | Page reference(s) in the BDAR |
|---|---|---|---|
| | | | |
| | | ☒ description of vegetation zones within the subject land (as described in Operational Manual Stage 1 Table 2 and Subsection 3.3.2) | Ch 4.4 |
| | | ☒ area (ha) of each vegetation zone | Ch 4.4 |
| | | ☒ assessment of patch size (as described in BAM Subsection 4.3.2) | Table 6 |
| | | ☒ survey effort (i.e. number of vegetation integrity survey plots) as described in BAM Subsection 4.3.4(1–2.) | Table 6 |
| | | ☒ use of relevant benchmark data from BioNet Vegetation Classification (as described in BAM Subsection 4.3.3(5.)) | Ch 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): - *not relevant* | – |
| | | ☐ 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) | |
| | | ☐ provide justification for use of local data rather than BioNet Vegetation Classification benchmark values | |
| | | ☐ provide written confirmation from the decision-maker that they support the use of local benchmark data | |
| | | **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 2 |
| | | ☒ Map of PCTs within the subject land (as described in BAM Section 4.2(1.)) | Figure 2 |
| | | ☒ Map of vegetation zones within the subject land (as described in BAM Subsection 4.3.1) | Figure 2 |
| | | ☒ Map the location of floristic vegetation survey plots and vegetation integrity survey plots relative to PCT boundaries | Figure 6 |
| | | ☒ Map of TEC distribution on the subject land and table of TEC listing, status and area (ha) – | Figure 2 |
| | | ☒ Map of patch size locations for each native vegetation zone and table of patch size areas (as described in BAM Subsection 4.3.2) | Figure 3; Table 6 |

| BDAR section | BAM ref. | BAM requirement | Page reference(s) in the BDAR |
|---|---|---|---|
| | | Table of current vegetation integrity scores for each vegetation zone within the site and including: | – |
| | | ☒ composition condition score | Table 7 |
| | | ☒ structure condition score | |
| | | ☒ function condition score | |
| | | ☒ presence of hollow bearing trees | |
| | | **Data** | |
| | | ☒ All report maps as separate jpeg files | uploaded. |
| | | ☐ Plot field data (MS Excel format) - *not available in this format, not needed due to survey scale.* | |
| | | ☒ Plot field datasheets | Appendix C |
| | | Digital shape files of: | Uploaded Zip file |
| | | ☒ 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** | |
| | | 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.)) | Ch 5.1.1 – Table 8 |
| | | ☒ 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) | Ch 5.1.1.1 |
| | | ☒ justification for addition of any ecosystem credit species to the list | Ch 5.1.1.2 |
| | | 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) | Ch 5.1.2 - Table 9 |
| | | ☒ 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) | Ch 5.1.2.1 & 5.1.2.3 |
| | | ☒ 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) | Ch 5.1.2.1 & 5.1.2.3 |

| BDAR section | BAM ref. | BAM requirement | Page reference(s) in the BDAR |
|---|---|---|---|
| | | ☒ justification for addition of any species credit species to the list | Ch 5.1.2.2 & 5.1.2.4 |
| | | 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.)) – *not relevant*<br>☐ 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.)) – *not relevant*<br>☒ species for which targeted surveys are to be completed to determine species presence (BAM Subsection 5.2.4(2.b.))<br>☐ species for which an expert report is to be used to determine species presence (BAM Subsection 5.2.4(2.c.)) - *not relevant* | Ch 5.2 – Table 11 |
| | | Present the outcomes of species credit species assessments from: | – |
| | | ☒ threatened species survey (as described in BAM Section 5.2.4) | Ch 5.3 - Table 12 |
| | | ☐ 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) – *not relevant* | |
| | | Where survey has been undertaken include detailed information on: | – |
| | | ☒ survey method and effort (as described in BAM Section 5.3) | Ch 2.3 & Ch 2.4 |
| | | ☒ 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 | Ch 2.3 & Ch 2.4 |
| | | ☒ 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 | Ch 5.3 – Table 12 |
| | | ☒ survey personnel and relevant experience | Declarations |
| | | ☒ describe any limitations to surveys and how these were addressed/overcome | Ch 2.6 |
| | | Where an expert report has been used in place of survey (as described in BAM Section 5.3, Box 3), include: - *not relevant* | – |
| | | ☐ 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 | |
| | | Where use of local data is proposed (BAM Subsection 1.4.2): - *not relevant* | – |

| BDAR section | BAM ref. | BAM requirement | Page reference(s) in the BDAR |
|---|---|---|---|
| | | ☐ 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 | |
| | | ☐ provide written confirmation from the decision-maker that they support the use of local data | |
| | | 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: - *not relevant* | - |
| | | ☐ the unit of measure for each species is documented | |
| | | for species assessed by area: | |
| | | ☐ the polygon includes the extent of suitable habitat for the target species within the subject land (as described in BAM Subsection 5.2.5) | |
| | | ☐ 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 | |
| | | for species assessed by counts of individuals: - *not relevant* | – |
| | | ☐ the number of individual plants present on the subject land (as described in BAM Subsection 5.2.5(3.)) | |
| | | ☐ the method used to derive this number (i.e. threatened species survey or expert report) and evidence-based justification for the approach taken | |
| | | ☐ 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 | |
| | | ☐ Identify the biodiversity risk weighting for each species credit species identified as present within the subject land (as described in BAM Section 5.4) – *not relevant* | - |
| | | **Maps and tables** | |
| | | ☒ Table showing ecosystem credit species in accordance with BAM Subsection 5.1.1, and identifying: | Table 8 |
| | | ☒ the ecosystem credit species removed from the list - | Table 8 |
| | | ☒ the sensitivity to gain class of each species | Table 8 |
| | | ☒ Table detailing species credit species in accordance with BAM Section 5.2 and identifying: | 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 - *not relevant* | |

| BDAR section | BAM ref. | BAM requirement | Page reference(s) in the BDAR |
|---|---|---|---|
| | | ☒ the candidate species credit species not recorded on the subject land as determined by targeted survey, expert report or important habitat map | 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) – *not relevant* | - |
| | | ☐ 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) – *not relevant* | - |
| **Data** | | | |
| | | ☐ Digital shape files of suitable habitat identified for survey for each candidate species credit species – *not relevant* | - |
| | | ☒ Survey locations including GPS coordinates of any plots, transects, grids | Figure 6 |
| | | ☐ Digital shape files of each species polygon including GPS coordinates of located individuals – *not relevant* | - |
| | | ☐ Species polygon map in jpeg format – *not relevant* | - |
| | | ☐ Expert reports and any supporting data used to support conclusions of the expert report – *not relevant* | |
| | | ☒ Field datasheets detailing survey information including prevailing conditions, date, time, equipment used, etc. | Appendix C |

| BDAR section | BAM ref. | BAM requirement | Page reference(s) in the BDAR |
|---|---|---|---|
| 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) – *not relevant* | Ch 6 Table 13 |
| | | ☒ 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) - *not relevant* | |
| | | ☒ waterbodies or any hydrological processes that sustain threatened entities (as described in BAM Subsection 6.1.4) | |
| | | ☐ 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) – *not relevant* | |
| | | ☐ 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) – *not relevant* | |
| | | ☐ Identify a list of threatened entities that may be dependent upon or may use habitat features associated with any of the prescribed impacts – *not relevant* | |
| | | ☐ 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) - *not relevant* | |
| | | Where the proposed development is for a wind farm: – *not relevant* | – |
| | | ☐ 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) | |
| | | ☐ provide details of targeted survey for candidate species of wind farm developments undertaken in accordance with BAM Subsection 6.1.5(2–3.) | |
| | | ☐ 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.)) | |

| BDAR section | BAM ref. | BAM requirement | Page reference(s) in the BDAR |
|---|---|---|---|
| | | 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 - | |
| | | **Maps and tables** | |
| | | ☐ Map showing location of any prescribed impact features (i.e. karst, caves, crevices, cliffs, rocks, human-made structures, etc.) – *not relevant* | |
| | | ☐ Map showing location of potential vehicle strike locations – *no specific locations identified.* | |
| | | ☐ 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) – *not relevant* | |
| | | **Data** | |
| | | ☐ Digital shape files of prescribed impact feature locations – *not relevant* | |
| | | ☐ Prescribed impact features map in jpeg format - *not relevant* | |
| Avoid and minimise impacts | Chapter 7 | **Information** | |
| | | 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: | Ch 7 |
| | | ☒ modes or technologies that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed mode or technology – | Ch 7.1.2 |
| | | ☐ routes that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed route – *not relevant* | |
| | | ☒ alternative locations that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed location | Ch 7.1.1 |
| | | ☒ 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 | Ch 7.1.1 |
| | | ☒ 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) | Ch 7.1.2 & 7.2.2 |
| | | ☒ 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.)) | Ch 7.1 & 7.2 |
| | | ☐ Detail measures or options considered but not implemented because they are not feasible and/or practical (e.g. due to site constraints) - *not relevant* | Ch 7.3 |

| BDAR section | BAM ref. | BAM requirement | Page reference(s) in the BDAR |
|---|---|---|---|
| | | **Maps and tables** | |
| | | ☒ Table of measures to be implemented to avoid and minimise the impacts of the proposal, including action, outcome, timing and responsibility | Table 14 |
| | | ☐ Map of alternative footprints considered to avoid or minimise impacts on biodiversity values; and of the final proposal footprint, including construction and operation – *not applicable* | |
| | | ☒ Maps demonstrating indirect impact zones where applicable | Figure 4 |
| | | **Data** | |
| | | Digital shape files of: - | Uploaded Zip file |
| | | ☐ alternative and final proposal footprint - *not applicable* | – |
| | | ☒ direct and indirect impact zones - | – |
| | | ☒ Maps in jpeg format - | Figure 4 |
| 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) | Ch 8.1 – Table 15 |
| | | Assessment of indirect impacts on vegetation and threatened species and their habitat including (as described in BAM Section 8.2): | Ch 8.2 - Table 17 |
| | | ☒ description of the nature, extent, frequency, duration and timing of indirect impacts of the proposal | Table 17 |
| | | ☒ documenting the consequences to vegetation and threatened species and their habitat including evidence-based justifications | Table 17 |
| | | ☒ reporting any limitations or assumptions, etc. made during the assessment | Ch 2.6 & Table 17 |
| | | ☒ identification of the threatened entities and their habitat likely to be affected – | Table 17 |
| | | Assessment of prescribed biodiversity impacts (as described in BAM Section 8.3) including: - | Ch 8.3 |
| | | 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 – | |
| | | ☐ human-made structures | |
| | | ☐ non-native vegetation | |

| BDAR section | BAM ref. | BAM requirement | Page reference(s) in the BDAR |
|---|---|---|---|
| | | ☐ connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range - | |
| | | ☐ movement of threatened species that maintains their life cycle | |
| | | ☐ water quality, waterbodies and hydrological processes that sustain threatened species and threatened ecological communities | |
| | | ☐ assessment of the impacts of wind turbine strikes on protected animals - *not relevant* | |
| | | ☐ assessment of the impacts of vehicle strikes on threatened species of animals or on animals that are part of a TEC - *not relevant* | |
| | | ☐ evaluate the consequences of prescribed impacts - *not relevant* | Ch 8.3 |
| | | ☒ describe impacts that are uncertain | throughout relevant sections & Ch 8.5 |
| | | ☒ document limitations to data, assumptions and predictions | throughout relevant sections |
| | | **Maps and tables** | |
| | | ☒ Table showing change in vegetation integrity score for each vegetation zone as a result of identified impacts | Table 16 |
| | | **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: | Ch 8.4 |
| | | ☒ techniques, timing, frequency and responsibility | |
| | | ☒ identify measures for which there is risk of failure | |
| | | ☒ evaluate the risk and consequence of any residual impacts | |
| | | ☒ document any adaptive management strategy proposed – *not a specific separate strategy but is incorporated into protocols.* | Ch 8.4.1 |
| | | Identification of measures for mitigating impacts related to: | |
| | | ☒ displacement of resident fauna (as described in BAM Subsection 8.4.1(2.)) | Ch 8.4.1 |

| BDAR section | BAM ref. | BAM requirement | Page reference(s) in the BDAR |
|---|---|---|---|
| | | ☒ 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) - *not relevant* | |
| | | ☐ Details of the adaptive management strategy proposed to monitor and respond to impacts on biodiversity values that are uncertain (BAM Section 8.5) - *not a specific separate strategy but is incorporated into protocols.* | |
| | | **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 | Protocol set out in Ch 8.4.1 Refer to separate VMP |
| | | **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: - | Ch 9 |
| | | ☒ addressing all criteria in Subsection 9.1.1 for each TEC listed as at risk of an SAII present on the subject land | |
| | | ☒ for each TEC, report the extent of the TEC in NSW | |
| | | ☒ addressing all criteria in Subsection 9.1.2 for each threatened species at risk of an SAII present on the subject land - | |
| | | ☐ for each threatened species, report the population size in NSW - *not relevant* | |
| | | ☒ documenting assumptions made and/or limitations to information | |
| | | ☒ documenting all sources of data, information, references used or consulted | |
| | | ☒ clearly justifying why any criteria could not be addressed | |
| | | ☒ Identification of impacts requiring offset in accordance with BAM Section 9.2 | Ch 10.1 Table 17 |
| | | ☒ Identification of impacts not requiring offset in accordance with BAM Subsection 9.2.1(3.) | Ch 10.1 |
| | | ☒ Identification of areas not requiring assessment in accordance with BAM Section 9.3 | Ch 10.2 |
| | | **Maps and tables** | |
| | | ☒ Map showing the extent of TECs at risk of an SAII within the subject land - | Figure 2 |
| | | ☐ Map showing location of threatened species at risk of an SAII within the subject land – *not relevant* | |

| BDAR section | BAM ref. | BAM requirement | Page reference(s) in the BDAR |
|---|---|---|---|
| | | Map showing location of: | |
| | | ☐ impacts requiring offset - *not relevant* | |
| | | ☒ impacts not requiring offset | Figure 7 |
| | | ☒ areas not requiring assessment | Figure 7 |
| | | **Data** | |
| | | Digital shape files of: | Uploaded Zip file |
| | | ☒ 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 – *not relevant* | |
| | | ☐ boundary of impacts requiring offset - *not relevant* | |
| | | ☒ boundary of impacts not requiring offset | |
| | | ☒ boundary of areas not requiring assessment | |
| | | ☒ Maps in jpeg format - | Figures 2 & 7 |
| Impact summary | Chapter 10 | **Information** | |
| | | Ecosystem credits and species credits that measure the impact of the development on biodiversity values, including: *not required (based on DCCEEW BDAR template)* | |
| | | ☐ 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) | |
| | | ☐ biodiversity risk weighting for each | |
| | | ☐ number of required species credits for each candidate threatened species that is directly impacted on by the proposal (BAM Subsection 10.1.3) | |
| | | **Maps and tables** | |
| | | ☐ Table of PCTs requiring offset and the number of ecosystem credits required - *not relevant* | |
| | | ☐ Table of threatened species requiring offset and the number of species credits required – *not relevant* | |
| | | **Data** | |
| | | ☒ Submitted proposal in the BAM Calculator | finalised 25th April 2024 |

Proposed subdivision and general industrial development, Lot 2 DP 1070888 & Lot 51 DP 130176, Bowman Road, Moss Vale.

| 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) *not relevant* | |
| | | ☒ BAM credit report in pdf format | Appendix E |
| | | **Maps and tables** | |
| | | ☐ Table of credit class and matching credit profile - *not relevant* | |
| | | **Data** | |
| | | ☒ BAM credit report in pdf format | Appendix E |

Proposed subdivision and general industrial development, Lot 2 DP 1070888 & Lot 51 DP 130176, Bowman Road, Moss Vale.

# Appendix B: Matters of national environmental significance

*MNES relevant to the project:*

No entities listed as threatened under the Commonwealth EPBC Act are known to occur on or use the subject land.

Four fauna species listed as threatened under the Commonwealth EPBC Act are predicted to occur (ecosystem credit species) within the PCT present.  These four species are mobile and wide-ranging and are not known to reside or breed within the subject land (refer to Ch 5.1.1 and Table 8):

* Spotted-tailed Quoll *Dasyurus maculatus*;
* White-throated Needletail *Hirundapus caudacutus*;
* Swift Parrot (foraging) *Lathamus discolor*;
* Grey-headed Flying-fox (foraging) *Pteropus poliocephalus*.

A number of migratory bird species listed under the EPBC Act are known to occur in the region.  Many of these species could fly over the subject land on occasions, and could opportunistically use features present.

It is not likely, however, that any migratory species would use the subject land regularly or be reliant upon it in any way.  The proposed development would not be likely to affect any migratory species listed under the EPBC Act.

*Measures to avoid and minimise impacts on MNES:*

Measures to avoid and minimise impacts on biodiversity and MNES are described in Chapter 7 of this BDAR.

*Impacts to MNES:*

The proposed development would result in a loss of approximately 0.2 ha of native forest providing theoretical habitat for the four predicted MNES ecosystem credit species.  Refer to Chapters 8.1 and 8.2.

*Mitigation measures relevant to MNES:*

Mitigation measures are discussed in Chapter 8.4.

*Final offset requirements for MNES:*

Based on current BAM-Calculator outputs, there is no offset requirement for this development proposal.  Refer to Chapter 10.1.

# Appendix C: Vegetation survey data

**Table 24      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? |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3302 | 0.2 | <5 | poor | 56 | 256923 | 6175324 | 160 | 1 | 0 | 6 | 4 | 0 | 0 | 3 | 0 | 4.4 | 0.4 | 0 | 0 | 1 | 3 | 5 | 30 | x | x | x | x | x | x | 6.2 | ☒ Yes ☐ No | ☒ Yes ☐ No |

# BAM Plot – Field Survey Form

| | Site Sheet no: 1 of |
|---|---|

-34.535100  150.35|427

| | Survey Name | Plot Identifier | Recorders |
|---|---|---|---|
| Date  5/3/24 | #2400 3 Bowtan Road | | RHogan  D Clarke |

| Zone 56 | Datum MGA | IBRA region MossVale | Photo # 1 | Zone ID |
|---|---|---|---|---|

| Easting 256923 | Northing 6175324 | Plot Dimensions (e.g. 20 x 20 in 20 x 50) 20x20  20x50 | Orientation of midline from the 0 m point. 160° Mag S |
|---|---|---|---|

| Likely Vegetation Class | woodland. | | Confidence: H **M** L |
|---|---|---|---|
| Plant Community Type | SHSW | EEC: ✓ | Confidence: H **M** L |

Record easting and northing from the plot marker. If applicable, orient picket so that perforated rib points along direction of midline.
Dimensions (Shape) of 0.04 ha base plot inside 0.1 ha FA plot should be identified, magnetic bearing taken along midline.

| BAM Attribute (400 m² plot) | | Sum values |
|---|---|---|
| Count of Native Richness | Trees | 1 |
| | Shrubs | 0 |
| | Grasses etc. | 6 |
| | Forbs | 4 |
| | Ferns | 0 |
| | Other | 0 |
| Sum of Cover of native vascular plants by growth form group | Trees | 3 5 |
| | Shrubs | 0 |
| | Grasses etc. | 4.4 |
| | Forbs | 0.4 |
| | Ferns | 0 |
| | Other | 0 |
| High Threat Weed cover % | | 6.2 |

This table may be completed after entering data into available tools. It is not required while in the field

| BAM Attribute (20 x 50 m plot) | Stem Classes and Hollows | | |
|---|---|---|---|
| dbh | Euc* | Non Euc | Hollows† |
| 80 + cm | 1 | | 3 (including those in dead trees) |
| 50 – 79 cm | — | | |
| 30 – 49 cm | — | | Hollows 20cm+ |
| 20 – 29 cm | — | | |
| 10 – 19 cm | — | | ≢ |
| 5 – 9 cm | — | | |
| < 5 cm | — | | This size class records tree regeneration |
| Length of logs (m) (≥10 cm diameter, >50 cm in length)  30 | | | total  30M |

Record living eucalypt* (Euc*) and living native non-eucalypt (Non Euc) stems separately

Data needed is presence only (tick) unless a 'large tree' for that veg class.

* includes all species of *Eucalyptus*, *Corymbia*, *Angophora*, *Lophostemon* and *Syncarpia*

† For hollows count only the presence of a stem containing hollows, not the count of hollows in that stem. Only count as 1 stem per tree where tree is multi-stemmed. The hollow-bearing stem may be a dead stem.

Each size class is noted as present by the living tree stems only. Depending on the Vegetation Class, DBH values and counts may be needed for a size class. For a multi-stemmed tree, only the largest living stem is included in the count/estimate if it is required by the large tree category for that vegetation class.

Hollows at least 20cm across are recorded for the purposes of habitat of some threatened species.

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

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots located on alternate sides and 5 m from the plot midline at the locations 5, 15, 25, 35, and 45 m along the midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Within these 1 m x 1 m plots assessors may also record the cover of rock, bare ground and cryptogam soil crusts. Collection of these data is optional - the data do not currently contribute to assessment scores, they hold potential value for future vegetation integrity assessment attributes and benchmarks, and for enhancing PCT description

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

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

| Plot Disturbance | Severity code | Age code |
|---|---|---|
| Clearing (inc. logging) | | |
| Cultivation (inc. pasture) | | |
| Soil erosion | | |
| Firewood / CWD removal | | |
| Grazing (identify native/stock) | | |
| Fire damage | | |
| Storm damage | | |
| Weediness | | |
| Other | | |

**Free Text Section for brief site description**

old dairy paddock
ē small stand of dead
and one almost dead tree.
exotic ground cover.

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe    Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Form version designed 15 September 2017                    Printed 26 November 2023

| | Survey Name | Plot Identifier | Recorders |
|---|---|---|---|
| **Date** **5/3/2024** | **2 Bowman Rd, Moss Vale** | **Hayes-001** | **Dan Clarke** |

| | GF Code | *Species name* | N, E or HTE | Cover | Abundance | Stratum |
|---|---|---|---|---|---|---|
| | | **NATIVES** | | | | |
| TG | T | *Eucalyptus radiata* | N | 3 | 1 | Upper |
| GG | R | *Juncus tenuius* | N | 1 | 20 | Ground |
| GG | G | *Microlaena stipoides* | N | 3 | 200 | Ground |
| FG | F | *Geranium solanderi* | N | 0.1 | 10 | Ground |
| FG | F | *Dysphania carinata* | N | 0.1 | 50 | Ground |
| GG | V | *Carex inversa* | N | 0.1 | 200 | Ground |
| FG | F | *Oxalis exilis* | N | 0.1 | 5 | Ground |
| FG | F | *Portulaca oleracea* | N | 0.1 | 20 | Ground |
| GG | R | *Juncus subsecundus* | N | 0.1 | 20 | Ground |
| GG | G | *Lachnagrostis filiformis* | N | 0.1 | 50 | Ground |
| GG | G | *Paspalum distichum* | N | 0.1 | 10 | Ground |
| | | | | | | |
| | G | *\*Holcus lanatus* | E | 3 | 200 | Ground |
| | F | *\*Solanum nigrum* | E | 0.1 | 20 | Ground |
| | F | *\*Cirsium vulgare* | E | 0.1 | 20 | Ground |
| | G | *\*Paspalum dilatatum* | E | 5 | 250 | Ground |
| | F | *\*Cichorium intybus* | E | 1 | 500 | Ground |
| | G | *\*Dactylis glomerata* | E | 5 | 500 | Ground |
| | F | *\*Brassica oleracea* | E | 0.1 | 100 | Ground |
| | F | *\*Amaranthus powellii* | E | 0.1 | 50 | Ground |
| | G | *\*Lolium rigidum* | E | 1 | 500 | Ground |
| | F | *\*Trifolium repens* | E | 0.1 | 250 | Ground |
| HTE | G | *\*Sporobolus fertilis* | E | 0.1 | 10 | Ground |
| | G | *\*Bromus catharticus* | E | 3 | 500 | Ground |
| | F | *\*Arenaria leptoclados* | E | 0.1 | 10 | Ground |
| | F | *\*Sonchus oleraceus* | E | 0.1 | 10 | Ground |
| | F | *\*Solanum chenopodioides* | E | 0.1 | 10 | Ground |
| | F | *\*Capsella bursa-pastoris* | E | 0.1 | 20 | Ground |
| HTE | S | *\*Rubus anglocandicans* | E | 1 | 20 | Ground |
| | F | *\*Hypochaeris radicata* | E | 0.1 | 100 | Ground |
| | F | *\*Silybum marianum* | E | 0.1 | 5 | Ground |
| | F | *\*Stellaria media* | E | 0.1 | 100 | Ground |
| HTE | V | *\*Cyperus eragrostis* | E | 0.1 | 20 | Ground |
| | F | *\*Taraxacum offcinale* | E | 0.1 | 20 | Ground |
| | F | *\*Arctotheca calendula* | E | 0.1 | 100 | Ground |
| | F | *\*Rumex acetosella* | E | 0.1 | 500 | Ground |
| | G | *\*Eleusine indica* | E | 0.1 | 500 | Ground |
| HTE | D | *\*Cenchrus clandestinus* | E | 5 | 10 | Ground |
| | **Total species** | | **11 NATIVE** | **26 EXOTIC** | | |

| Free Text Section for brief site description |
|---|
| Highly degraded farmland-paddock with some alive trees of *Eucalyptus radiata*. Some patches of M*icrolaena* but minimal. Uneven soil surface with cattle divots or ploughing. |

# Appendix D: Fauna survey data

*General habitat description*

A relatively intact patch of regenerating native woodland.  The majority of trees are juvenile to semi-mature and are not currently of sufficient size to contain hollows.  Shrubs are sparse and do not form a structural layer.  The groundcover is grassy with moderate quantities of light fallen timber.

*Specific resources*

| Habitat Features: | |
|---|---|
| Hollow-bearing trees | Yes, there are eight hollow-bearing trees within the subject land (Refer to Figure 2, and photos provided below), with each tree appearing to contain hollows of various sizes.  Most are dead trees or dead stems with hollows broken and exposed to the elements and showing no signs of current or previous use.<br><br>The isolated eucalypt on the driveway contains a medium hollow high in the canopy that appeared to be in use by a pair of Galahs. |
| Large trees | Yes |
| Large stags | Yes |
| Logs, fallen debris | A single pile in the patch of native vegetation in the north of the subject land. |
| Mistletoe | No |
| *Casuarina or Allocasuarina* spp | No |
| Termite mounds | No |
| Water | Some boggy areas in grassy drainage swales.  Farm dam on southern edge of the subject land. |
| Caves, culverts etc | No |
| Surface rock | No |
| Other | No |

Proposed subdivision and general industrial development, Lot 2 DP 1070888 & Lot 51 DP 130176, Bowman Road, Moss Vale.

*HBT 1*

*Mostly dead – one small live branch*



*HBT 2*

*Dead*



*HBTs*

*4, 5, & 6*

*Dead*



*HBT 7*

*Senescent*



*HBT 8*

*Mostly dead – one live branch*

Proposed subdivision and general industrial development, Lot 2 DP 1070888 & Lot 51 DP 130176, Bowman Road, Moss Vale.

| Signs of fauna: | |
|---|---|
| Diggings | Rabbit |
| Scratches/chews on trees | No |
| Scats | Rabbit |
| Burrows/dens | No |
| Nests | No |
| Chewed cones | No |
| Other | No |

**Table 25     Fauna species recorded within the subject land.**

| Common Name | Family and Scientific Name | Detection method |
|---|---|---|
| MAMMALS | | |
| | Leporidae | |
| *Rabbit | *Oryctolagus cuniculus* | Scats & diggings |
| BIRDS | | |
| | Cacatua | |
| Galah | *Eolophus roseicapillus* | Observed investigating a tree hollow in the isolated tree on the driveway. |
| | Sturnidae | |
| Common Myna | *Acridotheres tristis* | Observed & Heard |

# Appendix E: Credit reports

Attached (reports dated 25th April 2024):

∗ Credits summary report

∗ Biodiversity credit report (Like-for-like)

∗ Candidate threatened species report

∗ Predicted species report.

# BAM Credit Summary Report

## Proposal Details

| | | |
|---|---|---|
| **Assessment Id** | **Proposal Name** | **BAM data last updated *** |
| 00046646/BAAS17090/24/00046647 | Proposed subdivision and general industrial development | 14/03/2024 |
| **Assessor Name** | **Report Created** | **BAM Data version *** |
| Rebecca  Hogan | 25/04/2024 | 67 |
| **Assessor Number** | **BAM Case Status** | **Date Finalised** |
| BAAS17090 | Finalised | 25/04/2024 |
| **Assessment Revision** | **Assessment Type** | **BOS entry trigger** |
| 0 | Part 4 Developments (Small Area) | BOS Threshold: Biodiversity Values Map |

\* 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | |

# BAM Credit Summary Report

**Southern Highlands Shale-Basalt Dry Forest**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3302_poor | Southern Highlands Shale Woodlands in the Sydney Basin Bioregion | 8.7 | 8.7 | 0.2 | Population size | High Sensitivity to Gain | Endangered Ecological Community | Not Listed | 2.00 | True | 0 |
| | | | | | | | | | | **Subtotal** | | 0 |
| | | | | | | | | | | **Total** | | 0 |

## 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 |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |

# BAM Biodiversity Credit Report (Like for like)

## Proposal Details

| | | |
|---|---|---|
| Assessment Id | Proposal Name | BAM data last updated * |
| 00046646/BAAS17090/24/00046647 | Proposed subdivision and general industrial development | 14/03/2024 |
| Assessor Name | Assessor Number | BAM Data version * |
| Rebecca Hogan | BAAS17090 | 67 |
| Proponent Names | Report Created | BAM Case Status |
| | 25/04/2024 | Finalised |
| Assessment Revision | Assessment Type | Date Finalised |
| 0 | Part 4 Developments (Small Area) | 25/04/2024 |
| BOS entry trigger | | |
| BOS Threshold: Biodiversity Values Map | | |

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## Potential Serious and Irreversible Impacts

| Name of threatened ecological community | Listing status | Name of Plant Community Type/ID |
|---|---|---|
| Southern Highlands Shale Woodlands in the Sydney Basin Bioregion | Endangered Ecological Community | 3302-Southern Highlands Shale-Basalt Dry Forest |

| 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 |
| --- | --- | --- | --- | --- | --- |
| 3302-Southern Highlands Shale-Basalt Dry Forest | Southern Highlands Shale Woodlands in the Sydney Basin Bioregion | 0.2 | 0 | 0 | 0 |

| 3302-Southern Highlands Shale-Basalt Dry Forest | Like-for-like credit retirement options | | | | | |
|---|---|---|---|---|---|---|
| | Name of offset trading group | Trading group | Zone | HBT | Credits | IBRA region |
| | Southern Highlands Shale Woodlands in the Sydney Basin Bioregion This includes PCT's: 3222, 3223, 3302 | - | 3302_poor | Yes | 0 | Moss Vale, Burragorang, Ettrema, Illawarra and Sydney Cataract. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site. |
| | | | | | | |

## Species Credit Summary

No Species Credit Data

## Credit Retirement Options

Like-for-like credit retirement options

# BAM Candidate Species Report

## Proposal Details

| | | |
|---|---|---|
| Assessment Id | Proposal Name | BAM data last updated * |
| 00046646/BAAS17090/24/00046647 | Proposed subdivision and general industrial development | 14/03/2024 |
| Assessor Name | Report Created | BAM Data version * |
| Rebecca Hogan | 25/04/2024 | 67 |
| Assessor Number | Assessment Type | BAM Case Status |
| BAAS17090 | Part 4 Developments (Small Area) | Finalised |
| Assessment Revision | Date Finalised | BOS entry trigger |
| 0 | 25/04/2024 | BOS Threshold: Biodiversity Values Map |

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## List of Species Requiring Survey

| Name | Presence | Survey Months |
|---|---|---|
| *Eucalyptus macarthurii* Paddys River Box, Camden Woollybutt | No (surveyed) | ☐ Jan ☐ Feb ☑ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months? |

### Threatened species Manually Added

| Common Name | Scientific Name |
|---|---|
| Paddys River Box, Camden Woollybutt | Eucalyptus macarthurii |

### Threatened species assessed as not on site
Refer to BAR for detailed justification

| Common name | Scientific name | Justification in the BAM-C |
|---|---|---|
| Swift Parrot | Lathamus discolor | Habitat constraints |

Assessment Id

00046646/BAAS17090/24/00046647

Proposal Name

Proposed subdivision and general industrial
development

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# BAM Predicted Species Report

## Proposal Details

| | | |
|---|---|---|
| **Assessment Id** | **Proposal Name** | **BAM data last updated *** |
| 00046646/BAAS17090/24/00046647 | Proposed subdivision and general industrial development | 14/03/2024 |
| **Assessor Name** | **Report Created** | **BAM Data version *** |
| Rebecca Hogan | 25/04/2024 | 67 |
| **Assessor Number** | **Assessment Type** | **BAM Case Status** |
| BAAS17090 | Part 4 Developments (Small Area) | Finalised |
| **Assessment Revision** | **BOS entry trigger** | **Date Finalised** |
| 0 | BOS Threshold: Biodiversity Values Map | 25/04/2024 |

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## 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) |
|---|---|---|
| Dusky Woodswallow | Artamus cyanopterus cyanopterus | 3302-Southern Highlands Shale-Basalt Dry Forest |
| Flame Robin | Petroica phoenicea | 3302-Southern Highlands Shale-Basalt Dry Forest |
| Grey-headed Flying-fox | Pteropus poliocephalus | 3302-Southern Highlands Shale-Basalt Dry Forest |
| Little Lorikeet | Glossopsitta pusilla | 3302-Southern Highlands Shale-Basalt Dry Forest |
| Scarlet Robin | Petroica boodang | 3302-Southern Highlands Shale-Basalt Dry Forest |
| Spotted-tailed Quoll | Dasyurus maculatus | 3302-Southern Highlands Shale-Basalt Dry Forest |
| Swift Parrot | Lathamus discolor | 3302-Southern Highlands Shale-Basalt Dry Forest |
| White-bellied Sea-Eagle | Haliaeetus leucogaster | 3302-Southern Highlands Shale-Basalt Dry Forest |
| White-throated Needletail | Hirundapus caudacutus | 3302-Southern Highlands Shale-Basalt Dry 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 | 3302-Southern Highlands Shale-Basalt Dry 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 | Habitat constraints |