



# Flora and Fauna Impact Assessment

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Residential Subdivision at  
292 Rosemont Road  
Boxers Creek  
NSW 2580

Report prepared for Taylor family

23 October 2024





|                      |   |
|----------------------|---|
| <b>Report:</b>       | Flora and Fauna<br>Impact Assessment<br>Residential Subdivision at<br>292 Rosemont Road<br>Boxers Creek<br>NSW 2580 |
| <b>Prepared for:</b> | Taylor family   |
| <b>Prepared by:</b>  | Land Eco Consulting Pty Ltd   |
| <b>Date:</b>         | 23 October 2024   |
| <b>Version:</b>      | Final 3.0   |

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## Report Certification

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## Document Control

| Revision  | Document Name   | Issue Date |
|-----------|---|------------|
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| Final 3.0 | Flora and Fauna<br>Impact Assessment<br>Residential Subdivision at<br>292 Rosemont Road<br>Boxers Creek<br>NSW 2580 | 23/10/2024 |

# Executive Summary

Land Eco Consulting Pty Ltd (Land Eco) was commissioned by M. Taylor ('the proponent') to prepare this Flora and Fauna Impact Assessment Report for proposed Planning Proposal and Development Application (DA) at 292 Rosemont Road Boxers Creek, NSW 2580 (hereafter referred to as the 'Subject Land'). The Planning Proposal is to rezone the land from RU6 to R5 Large Lot Residential and C2 Environmental Conservation (100m buffers from Riparian land) with a minimum lot size of 2 Hectares (R5) and 100 Hectare (C2). The DA is for a subdivision of the Subject Land into four (4) large residential lots.

The proposal site has been chosen is in a key position on the fringe of Goulburn township and provides an optimal setting for 'life-style' residential blocks which are in increasing demand but low supply. The Subject Land is an optimal location for development for the benefit of the town and community of Goulburn.

The Subject Land has been historically cleared and managed for agricultural purposes for over 100 years. Most of the Subject Land consists of non-native (exotic) pasture-improved and regularly grazed grassland. Small areas of the Subject Land contain native grassy woodland, however, it is severely weed-infested. No native vegetation will be directly impacted for the proposed subdivision.

The native grassy woodland vegetation belongs to one distinct plant community type (PCT):

- PCT 1330: Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion.

The area of PCT 1330 within the Subject Land comprises an occurrence of 'White Box Yellow Box Blakeley's Red Gum Woodland' which is listed as a Critically Endangered Ecological Community (CEEC) under the NSW *Biodiversity Conservation Act 2016*. The condition of this vegetation is poor. It is historically disturbed, isolated and weed infested.

No native vegetation belonging to this CEEC or any other identified native PCT will be removed for the proposal. Approximately 2.53 ha of exotic dominated grassland, approximately 20 mature exotic shrubs and two large, dead trees (stags) will be removed for the proposal. These dead trees contain small hollows that could provide shelter habitat for threatened fauna.

Upon completion of a Test of Significance, Land Eco Consulting are satisfied that the proposal will not incur significant effects to a local occurrence of 'White Box Yellow Box Blakeley's Red Gum Woodland' nor any potentially occurring threatened species or ecological community as listed under the NSW *Biodiversity Conservation Act 2016*.

Recommendations have been put forward to reduce impacts of the proposal upon biodiversity:

- Ensure all contractors employed to work within the Subject Land are suitably qualified, experienced and informed of the sensitive ecological features and potentially occurring threatened species;
- Assign a Project Ecologist to conduct and oversee all ecological compliance requirements associated with conducting a proposal in line with all relevant state and commonwealth legislation and guidelines;
- Implement all relevant biological hygiene protocols and requirements as per NSW Government guidelines to reduce the spread of priority weeds.
- Ensure ongoing management of priority weeds according to statutory requirements.
- Ensure all trees that occur outside of the development footprint are protected from harm during earthworks and construction.

During occupation of the subdivision there is potential for the proposal to indirectly impact surrounding vegetation and habitat values through:

- Introduction of weed propagules by vehicle and increased edge effects.
- Erosion and sedimentation because of runoff from hard stand areas.

These issues will be actively managed through designated plans that will be prepared to manage open space proposed as part of the development.

Chapter 3 'Koala Habitat Protection 2020' of the State Environmental Planning Policy (Biodiversity and Conservation) 2021 has been assessed, and the Subject Land does not contain 'Potential' or 'Core' Koala Habitat.

The proposal will be of no significant consequence to biodiversity in the locality, region or bioregion. Subject to the proponent implementing the mitigation measures proposed in this report, Land Eco Consulting hold the opinion that the proposal is suitable to the location and recommend this development for approval.

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# Glossary

| Acronym/<br>Term  | Definition   |
|---|--|
| <b>BAM</b>  | The NSW Biodiversity Assessment Method   |
| <b>BAMC</b>   | The NSW Biodiversity Assessment Method Calculator  |
| <b>BC Act</b>   | New South Wales Biodiversity Conservation Act 2016   |
| <b>BDAR</b>   | Biodiversity Development Assessment Report   |
| <b>Biodiversity credit report</b>                                 | The report produced by the Credit Calculator that sets out the number and class of biodiversity credits required to offset the remaining adverse impacts on biodiversity values at a development site, or on land to be biodiversity certified, or that sets out the number and class of biodiversity credits that are created at a biodiversity stewardship site. |
| <b>Biodiversity Offsets</b>                                       | Management actions that are undertaken to achieve a gain in biodiversity values on areas of land in order to compensate for losses to biodiversity from the impacts of development.  |
| <b>Biodiversity values</b>  | The composition, structure and function of ecosystems, including threatened species, populations and ecological communities, and their habitats.   |
| <b>BOS</b>  | NSW Biodiversity Offset Scheme   |
| <b>DA</b>   | Development Application  |
| <b>DCP</b>  | Development Control Plan   |
| <b>DPIE</b>   | NSW Department of Planning, Infrastructure and Environment   |
| <b>Ecosystem credit</b>   | A credit that relates to a vegetation type and the threatened species that are reliably predicted by that vegetation type (as a habitat surrogate).  |
| <b>EEC</b>  | Endangered Ecological Community  |
| <b>EPBC Act</b>   | Environment Protection and Biodiversity Conservation Act 1999  |
| <b>FFA</b>  | Flora and Fauna Report   |
| <b>Ha</b>   | Hectare  |
| <b>HTW</b>  | High Threat Weed   |
| <b>Km</b>   | Kilometre  |
| <b>LEP</b>  | Goulburn Local Environmental Plan 2009   |
| <b>LGA</b>  | Local Government Area  |
| <b>Locality</b>   | The area within a 10km radius of the Subject Land. The same meaning when describing a local population of a species or local occurrence of an ecological community.  |
| <b>M</b>  | metres   |
| <b>MNES</b>   | Matters of National Environmental Significance   |
| <b>Native Vegetation</b>  | means any of the following types of plants native to New South Wales:(a) trees (including any sapling or shrub or any scrub), (b) understorey plants, (c) groundcover (being any type of herbaceous vegetation), (d) plants occurring in a wetland.  |
| <b>NSW</b>  | The State of New South Wales   |
| <b>OEI</b>  | NSW Office of Environment and Heritage (now known as Department of Planning, Infrastructure and Environment)   |
| <b>PCT</b>  | NSW Plant Community Type   |
| <b>Priority weed</b>  | Priority weed in the South East bioregion as per the <i>Biosecurity Act 2015</i>   |
| <b>Proposal</b>   | The development, activity or action proposed.  |
| <b>SAIL</b>   | Serious and Irreversible Impacts   |
| <b>SAIL entity</b>  | Species and ecological communities that are likely to be the subject of serious and irreversible impacts (SAILs)   |
| <b>SEPP</b>   | State Environmental Planning Policy  |
| <b>Species Credit</b>   | The class of biodiversity credits created or required for the impact on threatened species that cannot be reliably predicted to use an area of land based on habitat surrogates. Species that require Species Credits are listed in the Threatened Biodiversity Data Collection.   |
| <b>Study Area</b>   | The area that was subject to a site survey and assessed for direct or indirect impacts arising from construction and operation of the proposal.  |
| <b>Subject Land</b>   | The location of the proposed activity (development footprint); the subject of this report.   |
| <b>Subject Property</b>   | Lots 117 & 118/-/DP126140 at 292 Rosemount Road Boxers Creek NSW 2580  |
| <b>The proponent</b>  | The developer of the property.   |
| <b>Threatened biota</b>   | Threatened species, populations or ecological communities listed under the BC Act and/or the EPBC Act.   |
| <b>Threatened species, populations and ecological communities</b> | Species, populations and ecological communities specified in Schedules 1, 1A and 2 and 'threatened species, population or ecological community' means a species, population or ecological community specified in any of those Schedules.   |
| <b>VIS Plot</b>   | Vegetation Integrity Survey Plot. A 50m x 20m area within which a botanist collects data on the prevailing vegetation.   |

# 1. Introduction

Land Eco Consulting Pty Ltd (Land Eco) was commissioned by M. Taylor ('the proponent') to prepare this Flora and Fauna Report for the proposed rezoning and residential subdivision of privately-owned land at 292 Rosemont Road Boxers Creek, NSW 2580 (Lots 117 & 118/-/DP126140) (hereafter referred to as the 'Subject Property') (**Figure 1; Figure 2**).

## 1.1 Site Description

The Subject Property is located within the Goulburn Mulwaree Council Local Government Area (LGA). The entirety of the property is zoned 'RU6: Transition'. The proposal is subject to the planning provisions of the Goulburn Mulwaree Council LGA, including the Goulburn Mulwaree Council Local Environment Plan 2009 (LEP), Development Control Plan 2009 (DCP) and associated plans, policies and guidelines. The minimum lot size of this property is currently 20 hectares. The proposed subdivision would result in lot sizes ranging from 2 ha to 25.12 ha.

Land Eco have produced this report to assess any potential impacts to terrestrial biodiversity associated with the proposed rezoning and subdivision and recommend appropriate measures to mitigate any potential impacts to terrestrial biodiversity in line with the requirements of the Goulburn Mulwaree Council, specifically those relating to the NSW *Biodiversity Conservation Act 2016*.

The development does not trigger the NSW Biodiversity Offset Scheme (BOS) and therefore does not need to be accompanied by a Biodiversity Development Assessment Report (BDAR). The proposal is not impacting upon any native vegetation mapped on the NSW Biodiversity Values (BV) Map, any mapped Coastal Wetland/Littoral Rainforest or any Area of Outstanding Biodiversity Value (AOBV). The clearing threshold for the property is outlined in the Biodiversity Assessment Method (BAM) as >0.5 hectares (**Table 1**). Native vegetation clearing thresholds are determined based on the minimum lot size, or actual lot size (where there is no minimum lot size provided for the relevant land under the LEP), of the property in which the development is situated.

**Table 1. Area Clearing Threshold as per Biodiversity Offsets Scheme entry requirements (OEH 2018)**

| Minimum lot size associated with the property | Threshold for clearing, above which the BAM and offsets scheme apply |
|---|--|
| Less than 1 ha                                | 0.25 ha or more  |
| <b>1 ha to less than 40 ha</b>                | <b>0.5 ha or more</b>  |
| 40 ha to less than 1000 ha                    | 1 ha or more   |
| 1000 ha or more                               | 2 ha or more   |

## 1.2 The Proposal

This report addresses the terrestrial biodiversity impacts of the proposed Planning Proposal to rezone the land from RU6 to R5 Large Lot Residential and C2 Environmental Conservation (100m buffers from Riparian land) with a minimum lot size of 2 Hectares (R5) and 100 Hectare (C2).

The report also addresses the impacts from the future subdivision of the Subject Land into four large residential lots. The subdivision includes four low-density residential lots, driveways and landscaping at 292 Rosemont Road Boxers Creek, NSW 2580 (Lots 17 & 18/-/DP126140) hereafter referred to as the 'Subject Land' (**Figure 1**).

The proposal footprint will not directly impact any native vegetation and will remain below the BOS threshold of 0.5 ha. The BOS is not triggered for this DA, therefore, the extent of biodiversity impact can be assessed under section 7.3 of the BC Act, which requires a 'Test of Significance' of impact from the development upon any threatened species, population or ecological community considered likely to be present on the Subject Property.



### 1.3 Avoid and minimise impacts (location and design)

The proposal is a new residential subdivision. It contributes to the housing demands for the growing population of Goulburn which includes commuters who work in the Australian Capital Territory.

The proponent has designed the subdivision to minimise clearing of native vegetation. All native vegetation communities will be retained. The Subject Property is dominated by exotic grassland with a low density of native species. While 2.53 ha of exotic grassland, including exotic shrubs, will be removed, these hold little biodiversity value.

### 1.4 Aim and Approach

This report has been prepared to:

- Describe the biodiversity values present within the Subject Land and surrounding area, including the extent of native vegetation, vegetation integrity and the presence of threatened ecological communities (TECs);
- Determine the habitat suitability within the Subject Land for candidate threatened species.
- Prepare an impact assessment to assess potential impacts of the proposal on biodiversity values in accordance with relevant state and/or Commonwealth legislation.
- Discuss and recommend efforts to avoid and minimise impacts on biodiversity values.

### 1.5 Sources of Information Used

A thorough literature review was undertaken to gain an understanding of the ecology within the locality and the Goulburn-Mulwaree LGA. Relevant data and literature reviewed in preparation of this report are detailed in the **References** section at the end of this document.

Online databases and literature reviews were utilised to gain an understanding of the natural environment and ecology of the Subject Land and its surrounds. Searches utilising NSW Wildlife Atlas (BioNet) (DCCEEW 2024b) and the Commonwealth Protected Matters Search Tool (DEE 2020) were conducted to identify threatened flora and fauna, including any migratory fauna, records within a 10km<sup>2</sup> search area centred on the Subject Land. The data was used to assist in establishing the presence or likelihood of any such ecological values as occurring on or adjacent to the Subject Land and help inform our Ecologists on what to look for during the site assessment.

### 1.6 IBRA Bioregions and Subregions

The Subject Land occurs within the 'South-Eastern Highlands' Interim Biogeographic Regionalisation (v7) for Australia (IBRA) bioregion and the 'Bungonia' IBRA (v7) subregion (Commonwealth of Australia 2016; **Figure 3**).

### 1.7 Mitchell Landscapes

NSW Landscapes Mapping: Background and Methodology (Mitchell 2002) groups ecosystems into meso-ecosystems representing larger natural entities based on topography and geology. The naming of ecosystems and meso-ecosystems was standardised so that each name provided location information and a meaningful descriptive landscape term. The Subject Land is within the 'Gunday Plains' Mitchell Landscape Ecosystem (**Figure 4**).

#### 1.7.1 Landscape Ecosystem – Gunday Plains

Wide open valleys with abandoned terraces and Quaternary lakebeds on lower Devonian siltstone, sandstone, andesite and quartz felspar porphyry. General elevation 75m, local relief <30m. Yellow, hard setting texture-contrast soils with distinct bleached A2 horizons. Grasslands of spear grass (*Austrostipa* sp.) and kangaroo grass (*Themeda triandra*) with small clumps of sparse snow gum (*Eucalyptus pauciflora*) on rounded rocky hills and sandy lunettes of former lakes. (Mitchell 2002).

## 1.8 Landscape features

This section details the landscape features and associated habitat values in and around the Subject Land. A table is provided which details the important landscape features that are present / absent from the Subject Land (**Table 2**).

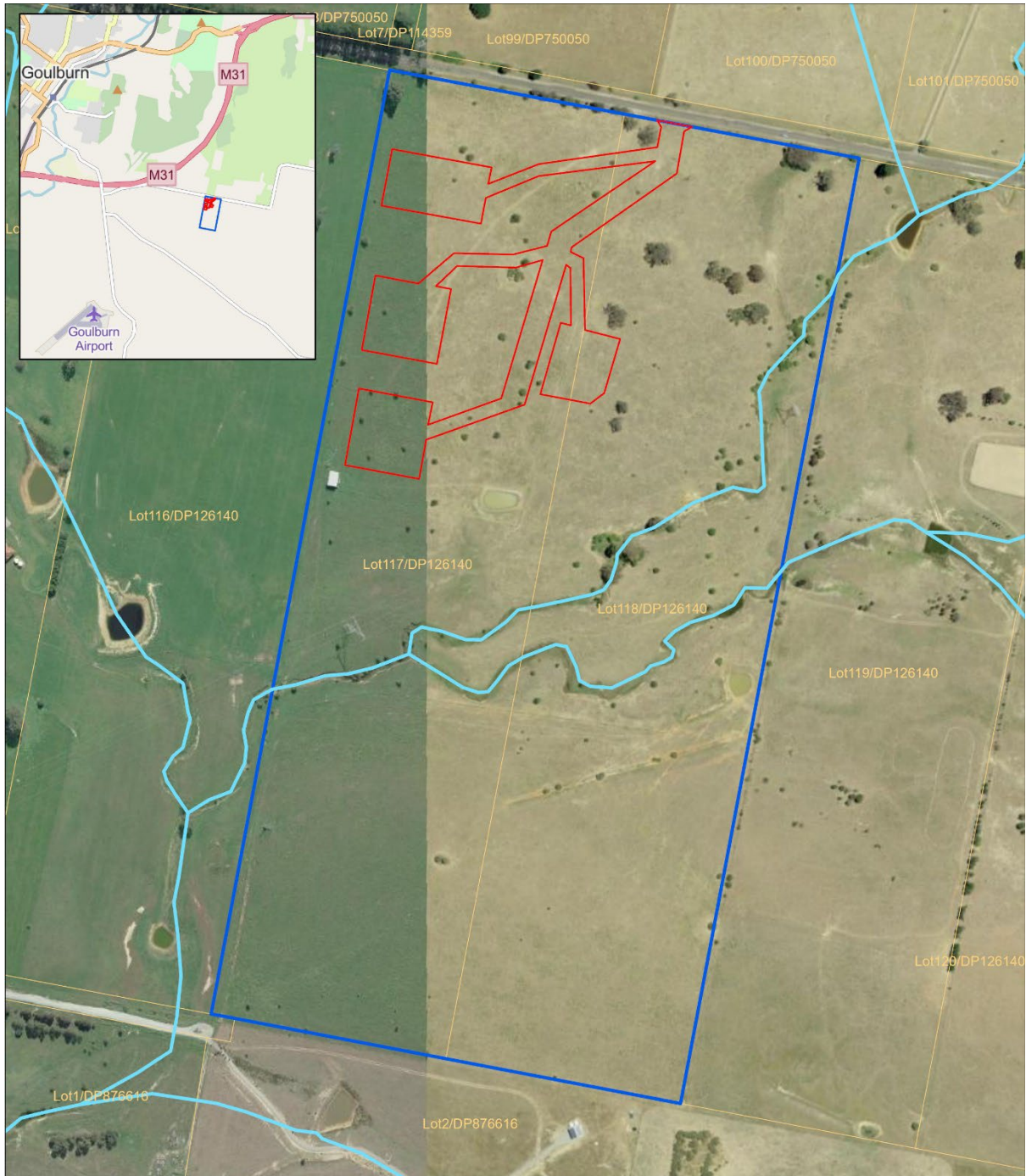
### 1.8.1 Topography, geology and soils

The Subject Land is situated predominantly on rolling slopes and flats descending to a divided waterway sprawling through the centre of the property. Elevation across the Subject Land occurs at approximately 652 – 678 m above mean sea level (AMSL).

The Subject is situated on a 'Bullamalita Soil Landscape'. Bullamalita is associated with Upper Silurian and Lower Devonian sediments wherever they occur in conjunction with footslopes and valley floors or on landform patterns with slope gradients generally <10%. Commonly acid to neutral yellow duplex soils, usually with bleached A2 horizons that set very hard on drying, occur on lower sideslopes, footslopes and drainage lines. These soils are similar to Soloths (Dy3.41, Dy3.42). However, they are more fertile than similar soils found in the Blakney Creek soil landscape. Red Podzolic Soils (Db1.21) are found on upper slopes whilst Yellow Solodic Soils (Dy3.42) and Alluvial Soils occur in some drainage lines.

**Table 2. Landscape features identified within and around the Subject Property**

| Landscape Feature   | Identification of Landscape Feature on Site  |
|---|--|
| Rivers and Streams (classified according to stream order) | A watercourse dissects the centre of the Subject Property and splits into two tributaries ( <b>Figure 1</b> ). This watercourse is a tributary of Gundry Creek.  |
| Wetlands (within, adjacent to and downstream of site)     | The Subject Property and the surrounding area do not contain any wetlands of national/international significance or areas of native vegetation identified as 'Coastal Wetlands' as per the State Environmental Planning Policy (Coastal Management) 2018.                              |
| Connectivity features                                     | There is no woody vegetation connectivity into the Subject Land. Few remnant trees, stags and shrubs remain scattered across the Subject Property, providing low quality 'habitat stepping stones' for fauna. These habitat features will remain in the Subject Land post subdivision. |
| Areas of geological significance and soil hazard features | No areas of geological significance (karsts, caves, crevices or cliffs) were identified within the Subject Property. This was determined as a result of a comprehensive site-based assessment.   |



**Legend**

- Subject Land
- Subject Property
- Lot Boundaries
- Hydroline



Date: 3/10/2024

Coordinate System: GDA 1994 MGA Zone 55

Imagery: NSW Public Imagery (SixMaps)  
Cadastral Data: NSW Six Maps

This map was produced for this report only.  
It is indicative, not survey-accurate.  
It should not be used for design  
or construction purposes.

**Figure 1. The location of the Subject Property, Subject Land and mapped hydrolines.**

Note: This plan is prepared in colour and should not be reproduced in black and white. Do not scale from this drawing. Refer any discrepancies to KMJ Surveying for clarification.

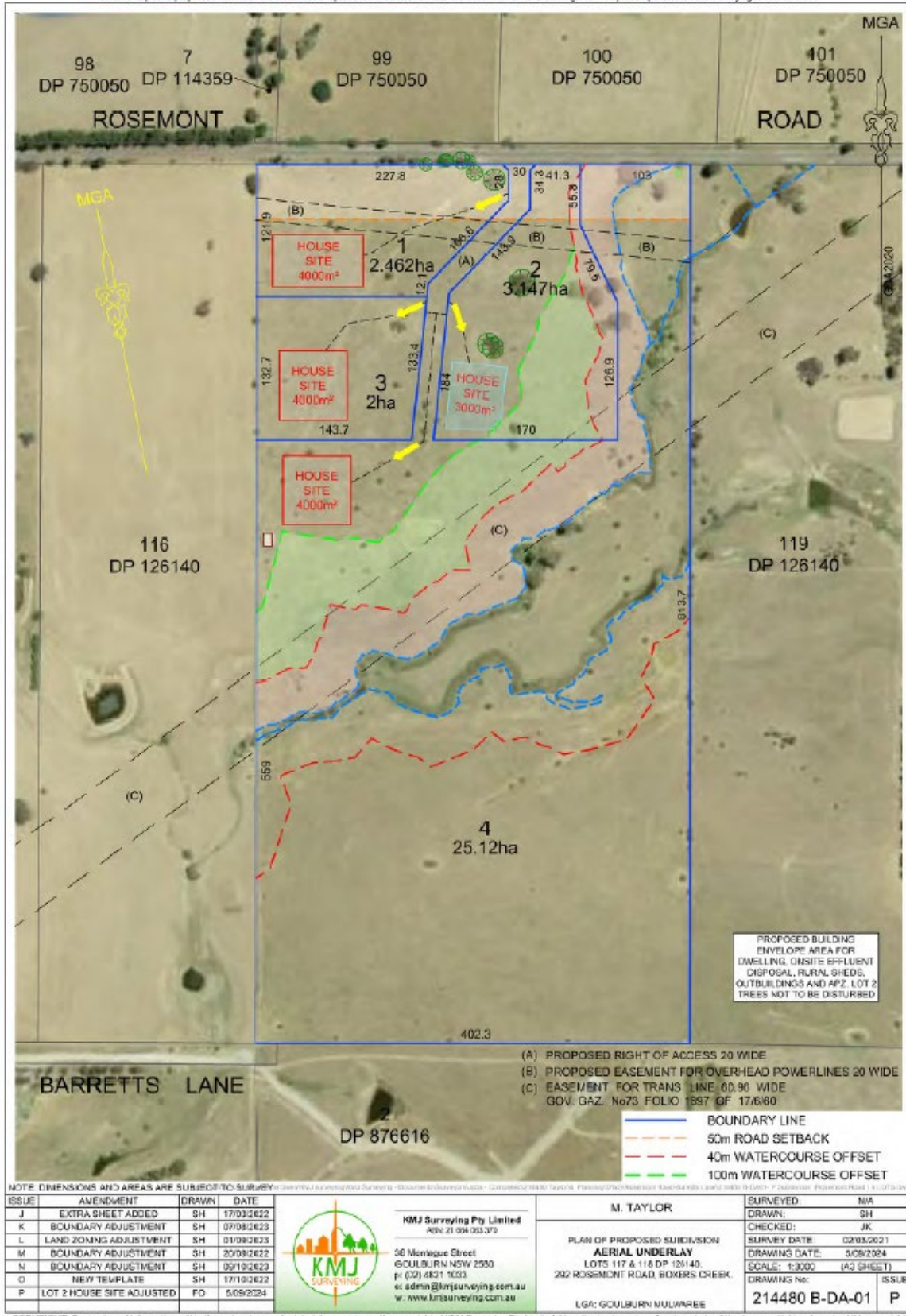
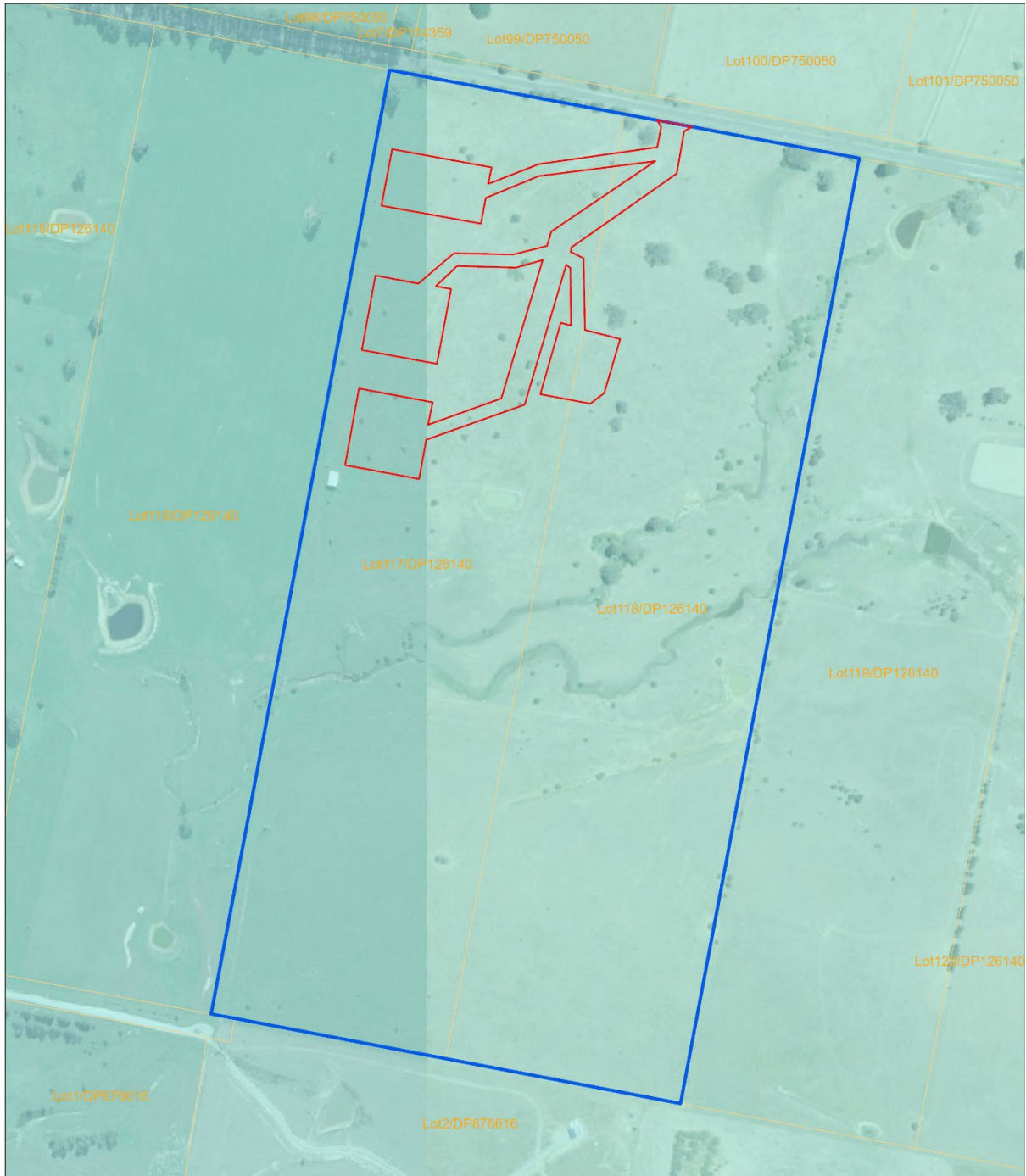


Figure 2. Site Plan of the Proposal (KMJ Surveying Pty Limited 2024)



**Legend**

- Subject Land
- Subject Property
- Lot Boundaries

**IBRA Sub-Region**

- Bungonia



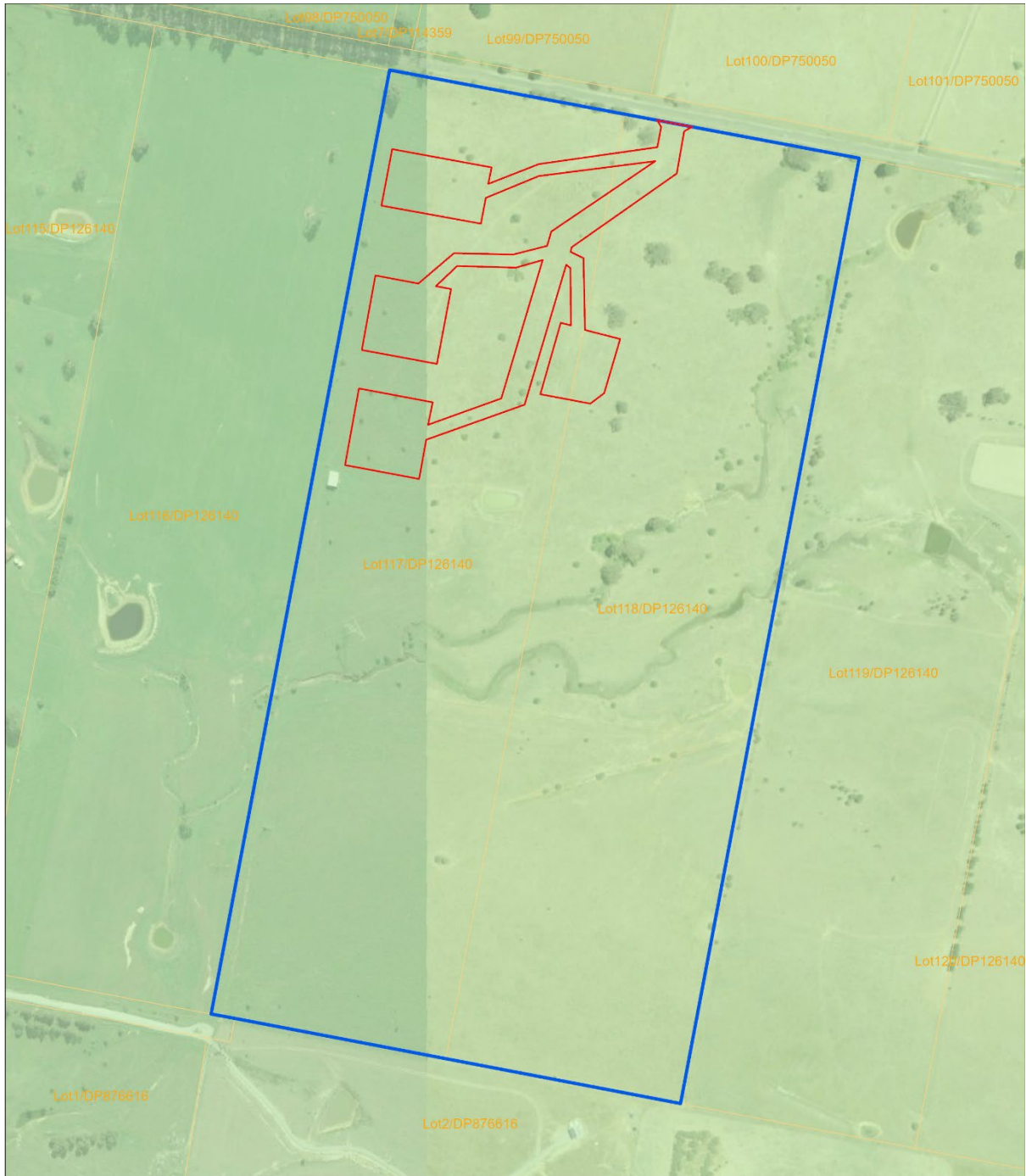
Date: 3/10/2024

Coordinate System: GDA 1994 MGA Zone 55

Imagery: NSW Public Imagery (SixMaps)  
Cadastral Data: NSW Six Maps

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**Figure 3. The Subject Property lies within the Bungonia IBRA 7 Subregion of the South-Eastern Highlands IBRA7 Bioregion.**



**Legend**

- Subject Land
- Subject Property
- Lot Boundaries

**Mitchell Landscape**

- Gunday Plains



Date: 3/10/2024

Coordinate System: GDA 1994 MGA Zone 55

Imagery: NSW Public Imagery (SixMaps)  
Cadastral Data: NSW Six Maps

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or construction purposes.

**Figure 4. The Mitchell Landscapes that comprise the Subject Property.**

## 1.9 Biodiversity Value Mapping

At the time of preparing this report, the Subject Property contained no land mapped as 'Biodiversity Value' (Figure 5).

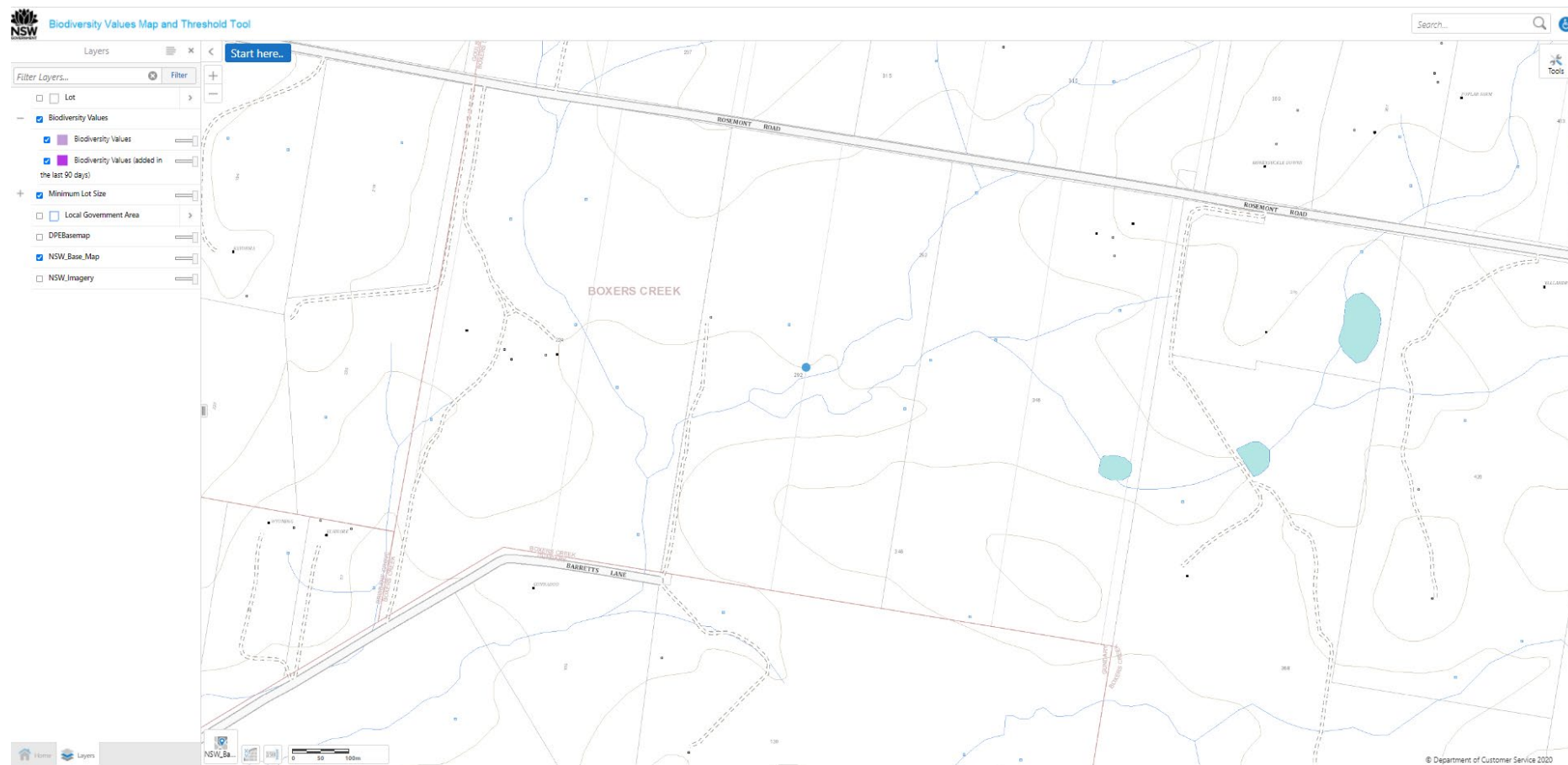


Figure 5. Biodiversity Values Map and Threshold Tool (DCCEW 2024a)

## 2. Vegetation

### 2.1 Historically Mapped Vegetation Communities

The only readily accessible historical dataset encompassing the Subject Land was Southeast NSW Native Vegetation Classification and Mapping - SCIVI. VIS\_ID 2230 (DPIE 2010) (**Figure 6**). The vegetation mapping in this dataset is broad, and inaccurate.

### 2.2 Plant Community Types confirmed in Subject Land

Field survey conducted by Land Eco confirmed one distinct PCT within the Subject Land (**Figure 7**) 1330: Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion.

#### 2.2.1 Selection Process for PCT 1330: Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion

The selection criteria listed within **Table 3** were selected to develop the PCT shortlist. PCT selection was undertaken using information and databases provided in the BioNet Vegetation Classification System (DCCEE 2024c). Entering the criteria into the BioNet Vegetation Classification System tool revealed a shortlist of candidate PCT.

**Table 3. Plant Community Type Selection Criteria**

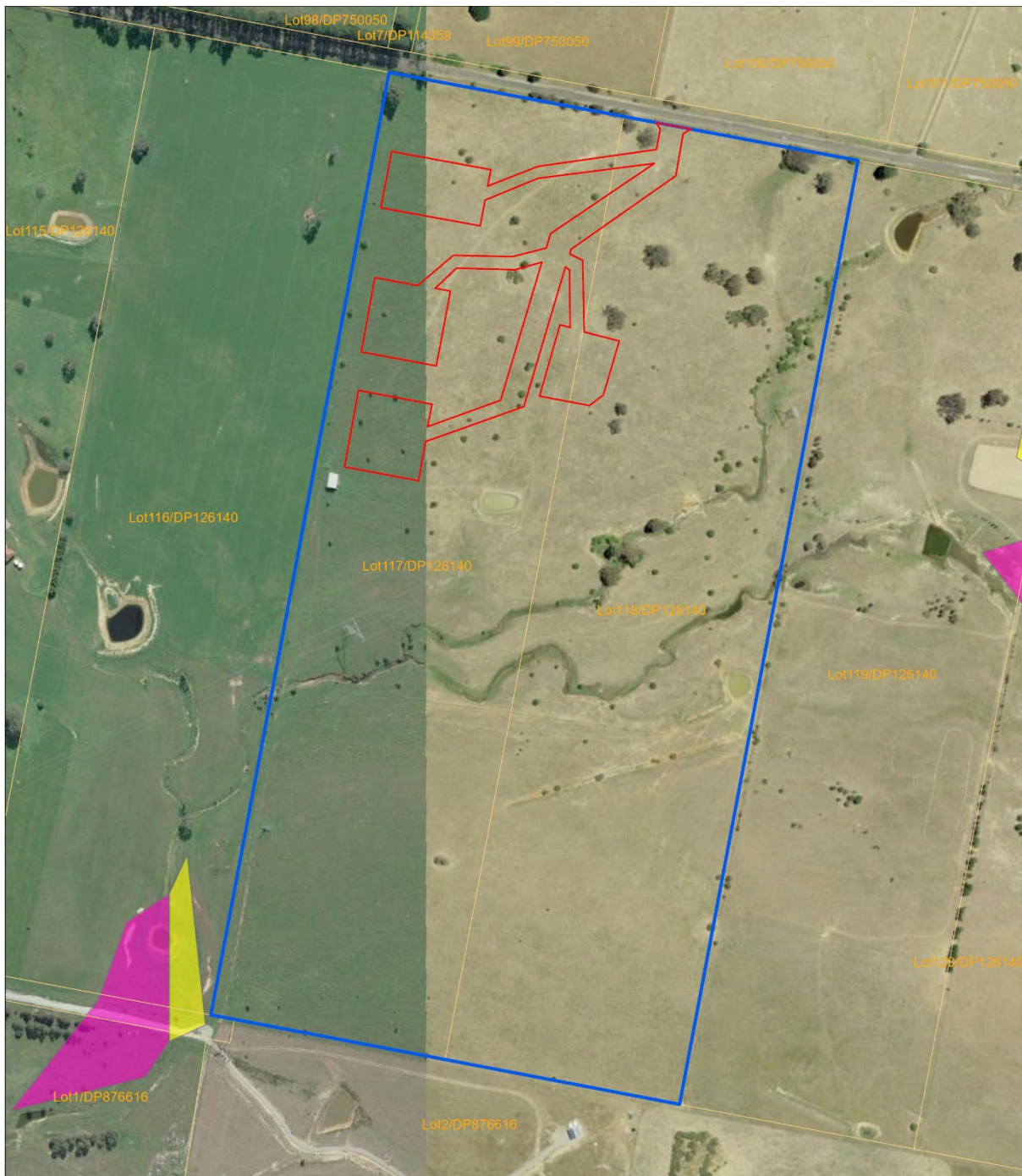
| Selection Criteria               | Search Tool   |
|----------------------------------|---|
| IBRA Bioregion                   | South Eastern Highlands   |
| IBRA Subregion                   | Bungonia  |
| Indigenous Upper Stratum Species | <i>Eucalyptus melliodora</i>  |
| Indigenous Mid Stratum Species   |   |
| Indigenous Ground Species        | <i>Austrostipa bigeniculata</i><br><i>Rumex brownie</i><br><i>Urtica incisa</i> |

This selection process delivered one candidate PCT:

1. 1330 Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion

The low species diversity within this ecosystem on the Subject Property is owing to the historic management of the land through clearing and grazing. However, the geological and geographic characteristics along with mature *Eucalyptus melliodora* (Yellow Box) confirmed the presence of this PCT.





**Legend**

- Subject Land
- Subject Property
- Lot Boundaries

**Vegetation Community (SouthCoast\_SCIVI\_v14\_E\_2230)**

- Cleared
- Tableland Grassy Box-Gum Woodland
- Tableland Swamp Flats Forest



Date: 4/10/2024

Coordinate System: GDA 1994 MGA Zone 55

Imagery: NSW Public Imagery (SixMaps)

Cadastral Data: NSW Six Maps

This map was produced for this report only.  
It is indicative, not survey-accurate.  
It should not be used for design  
or construction purposes.

**Figure 6. Historically Mapped Vegetation in the Vicinity of the Subject Land.**

## 2.2.2 Descriptions of the Plant Community Types located within the Subject Land

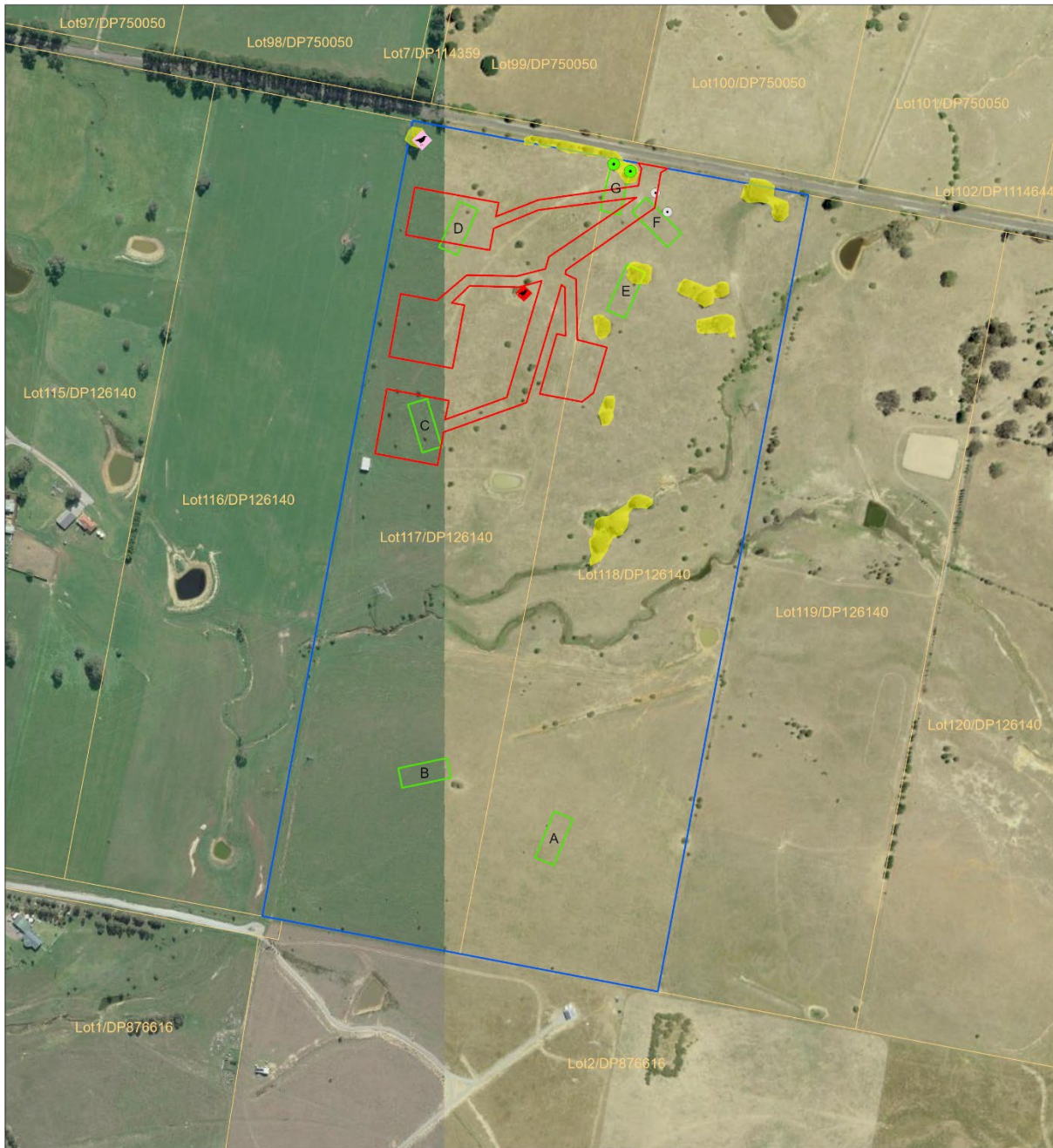
The vegetation communities identified and their condition at the time of survey, within the Subject Land is detailed in **Table 4** and **Figure 7**.

**Table 4. Floristic Summary of Native Vegetation in the Subject Property**

| PCT 1330 Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion  |   |
|---|---|
| <b>PCT Statistics</b>   |   |
| Estimated % Cleared: 94%<br>Vegetation Class: Southern Tableland Grassy Woodlands<br>Vegetation Formation: Grassy Woodlands   |   |
| <b>Description in VIS</b>   |   |
| Diagnostics Features: Woodland with a sparse shrub layer and dense grassy groundcover. Landscape Position: Occurs on loamy soils on undulating terrain between 500 and 900m on the tablelands.  |   |
| <b>Description of the Vegetation on Subject Land</b>  |   |
| One distinct condition class of PCT1330 was identified; mature woodland with severe weed infestation.   |   |
| The only canopy species present is <i>Eucalyptus melliodora</i> .   |   |
| The native shrub-layer/midstrata was absent.  |   |
| The ground layer displayed low diversity owing to over a century of clearing and management for agricultural purposes. <ul style="list-style-type: none"> <li>▪ <i>Austrostipa bigeniculata</i></li> <li>▪ <i>Rumex brownii</i></li> </ul>  |   |
| Groundcover on the Subject Land was dense though severely weed infested.  |   |
| A suite of exotic species, including HTE weeds were identified (full list for each plot sampled in <b>Appendix B</b> ). The most common species were <i>Nassella neesiana</i> , <i>Lolium perenne</i> , <i>Hirschfeldia incana</i> , <i>Bromus catharticus</i> , <i>Bromus hordeum</i> , <i>Lycium ferocissimum</i> , <i>Eleusine tristachya</i> and <i>Avena fatua</i> . |   |
| This vegetation has some habitat potential for common grassland-adapted fauna however it is not likely to provide any importance to any viable local populations of threatened flora or fauna species.  |   |
| <b>Condition Classes</b>  | Condition 1: Mature Canopy/Weed Infested  |
| <b>Approximate extent (ha) within Subject Property</b>  | 0.70  |
| <b>Approximate extent (ha) to be cleared for the proposed subdivision (Subject Land)</b>  | 0<br>(the Subject Land has been positioned to avoid all Yellow Box Grassy Woodland)   |
| <b>TEC Status (Biodiversity Conservation Act 2016)</b>  | The extent of this PCT on the Subject Land is considered to form part of the Critically Endangered Ecological Community 'White Box Yellow Box Blakeley's Red Gum Woodland'. |

**Table 5. Floristic Summary of Non-native Vegetation in the Subject Property**

| PCT NIL: Non-native Grassland  |  |
|--|--|
| <b>PCT Statistics</b>  |  |
| N/A  |  |
| <b>Description in VIS</b>  |  |
| Nil  |  |
| <b>Description of the Vegetation on Subject Land</b>   |  |
| <p>This non-native vegetation was dominated by &gt;50% non-native groundcover species. This was the dominant vegetation community across the Subject Land. It was derived from historical clearing of woodland from ridges and slopes, and the over-grazing and 'pasture improvement' of the native grassland that is considered likely to have dominated the lowland areas of the Subject Land.</p> <p>This community was represented by diverse suite of introduced pasture and weed grass and herb species, including HTW weeds. The species assemblage was diverse (<b>Appendix B</b>). The most common species were <i>Avena fatua</i>, <i>Nassella neesiana</i>, <i>Gnaphalium uliginosum</i>, <i>Eleusine tristachya</i>, <i>Trifolium subterraneum</i>, <i>Lolium perenne</i>, <i>Bromus hordeum</i> and <i>Trifolium arvense</i> among other species.</p> <p>This vegetation has some habitat potential for common grassland-adapted fauna however it is not likely to provide any importance to any viable local populations of threatened flora or fauna species.</p> |  |
| <b>Condition Classes</b>   | Condition 1: Non-native (Exotic) Grassland   |
| <b>Approximate extent (ha) within Subject Property</b>   | 31.4   |
| <b>Approximate extent (ha) to be cleared for the proposed subdivision (Subject Land)</b>   | 2.53   |
| <b>TEC Status (Biodiversity Conservation Act 2016)</b>   | This vegetation is non-native and does not meet the criteria to be considered any threatened ecological community. |



**Legend**

- Subject Property
  - Subject Land
  - Lot Boundaries
  - BAM VIS Plots
  - Yellow Box Grassy Woodland (CEEC)
  - Non-native Vegetation
- Threatened Species**
- ◆ Diamond Firetail (vulnerable)
  - ◆ Dusky Woodswallow (vulnerable)
- Important Habitat Features**
- Hollow-bearing Tree (Yellow Box)
  - Hollow-bearing Stag (dead tree)

0 40 80 160 240 320 400 Meters



Date: 4/10/2024

Coordinate System: GDA 1994 MGA Zone 55

Imagery: NSW Public Imagery (SixMaps)

Cadastral Data: NSW Six Maps

This map was produced for this report only.  
It is indicative, not survey-accurate.  
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or construction purposes.

**Figure 7. Field validated vegetation mapping within the Subject Land.**

## 3. Threatened Species

### 3.1 Habitat Features for Species and Ecosystem Credit Fauna Species

The Land Eco Consulting Ecologists compiled a detailed summary of potential habitat for threatened fauna species, including both Species Credit and Ecosystem Credit threatened fauna species (**Table 6**).

A complete list of the fauna species recorded opportunistically during the field survey effort is presented (**Appendix A**). Two threatened species were recorded in the Subject Land (**Figure 7**):

- Diamond Firetail (*Stagonopleura guttata*) – BC Act: Vulnerable
- Dusky Woodswallow (*Artamus cyanopterus cyanopterus*) – BC Act: Vulnerable

**Table 6. Fauna Habitat Values on the Subject Land**

| Habitat component                                       | Site values  |
|---|--|
| Coarse woody debris                                     | Smalls logs, hollow tree stumps and debris occur sparsely across the Subject Land.   |
| Rock outcrops and bush rock                             | Absent.  |
| Caves, crevices and overhangs                           | Absent.  |
| Culverts, bridges, mine shafts, or abandoned structures | Absent.  |
| Nectar/lerp-bearing Trees                               | <i>Eucalyptus melliodora</i> on the Subject Land have the potential to provide foraging habitat to nomadic nectivorous birds such as the Swift Parrot and Little Lorikeet when the trees are in flower. The Subject Property would not be able to support a population of either of these species.   |
| Mistletoes  | Absent   |
| Nectar-bearing shrubs                                   | Absent   |
| Koala browse  | <i>Eucalyptus melliodora</i> may provide foraging habitat for koalas. This Subject Property is unlikely to support a population of koalas and is not considered core koala habitat.  |
| Large stick nests                                       | A large stick nest was observed within a <i>Eucalyptus melliodora</i> in the north-east of the Subject Land. This likely belongs to a pair of Nankeen Kestrels observed nearby.  |
| Sap and gum sources                                     | Absent   |
| She-oak fruit (Glossy Black Cockatoo feed)              | Absent   |
| Seed-bearing trees and shrubs                           | Seed-bearing <i>Eucalyptus melliodora</i> occur on the Subject Land.   |
| Soft-fruit-bearing trees                                | Absent   |
| Dense shrubbery and leaf litter                         | Absent   |
| Tree hollows  | Four hollow-bearing trees including one stag were identified on the Subject Land with hollows ranging from <5cm to >10cm in diameter.  |
| Decorticating bark                                      | A small amount of decorticating bark occurs on the <i>Eucalyptus melliodora</i> trees on the Subject Land.   |
| Tree canopy and shrubbery (shelter and insect prey)     | The <i>Eucalyptus melliodora</i> trees on the Subject Land provide very sparse and isolated shelter. However, a pair of Diamond Firetails were observed nesting within a priority weed ( <i>Lycium ferocissimum</i> ), its thorny dense habit protecting the birds from feral cats, demonstrating the importance of all habitat features in sparse rural landscapes. |
| Wetlands, soaks and streams                             | A riparian corridor occurs through the centre of the Subject Land. None of this habitat will be impacted by the subdivision.   |
| Open water bodies                                       | Absent   |
| Estuarine, beach, mudflats, and rocky foreshores        | Absent.  |
| Open grassland  | The majority of the habitat in the Subject Land consists of open grassland with scattered paddock trees. This habitat provides foraging opportunities for common grassland birds, and a small suite, of nomadic threatened bird species.   |

## 3.2 Candidate Ecosystem Credit Species

Threatened fauna species (that are 'ecosystem credit species') are predicted associated with the Subject Land. These species are listed below in **Table 7**. Most of these species are not considered likely to occur on the Subject Land, and therefore, do not require further assessment. A test of significance' in accordance with section 7.3 of the BC Act has been undertaken to assess the impact of the DA upon each of these species (see **section 4.1**).

**Table 7. Candidate Ecosystem credits predicted to occur within the Subject Land.**

| Scientific Name  | BC Act Status         | Likelihood of Occurrence on Subject Land   | Test of Significance Required? |
|--|-----------------------|--|--------------------------------|
| <i>Anthochaera phrygia</i><br>Regent Honeyeater<br>(Foraging)          | Critically Endangered | Moderate potential to occur. May forage in mature <i>Eucalyptus melliodora</i> . Unlikely to remain in the locality for extended periods as the habitat is open and disturbed.   | Yes                            |
| <i>Artamus cyanopterus cyanopterus</i><br>Dusky Woodswallow            | Vulnerable            | Present. Observed on the Subject Land by Land Eco during the site visit.   | Yes                            |
| <i>Callocephalon fimbriatum</i><br>Gang-gang Cockatoo<br>(Foraging)    | Endangered            | Moderate potential to occur. May forage in mature <i>Eucalyptus melliodora</i> and the exotic <i>Crataegus monogyna</i> (Hawthorn).  | Yes                            |
| <i>Calyptorhynchus lathami</i><br>Glossy Black-Cockatoo<br>(Foraging)  | Vulnerable            | Not likely to occur. There is no suitable foraging or breeding habitat for this species. No suitable feed trees present.   | No                             |
| <i>Chthonicola sagittata</i><br>Speckled Warbler                       | Vulnerable            | Low potential to occur. Habitat too open. No suitable low shrub habitat or sparse grassy understorey to be removed. The exotic grassland is too dense for this species.  | No                             |
| <i>Climacteris picumnus victoriae</i><br>Brown Treecreeper             | Vulnerable            | Low potential to occur. Habitat too open and not enough woody debris.  | No                             |
| <i>Circus assimilis</i><br>Spotted Harrier                             | Vulnerable            | Moderate potential to occur. This raptor is highly mobile and not resident in the locality. May forage in the open exotic grassland and remaining tree canopy, though this will continue post development. No suitable nest trees will be cleared. | No                             |
| <i>Daphoenositta chrysoptera</i><br>Varied Sittella                    | Vulnerable            | Low potential to occur. Habitat too open. No suitable forest habitat will be removed.  | No                             |
| <i>Dasyurus maculatus</i><br>Spotted-tailed Quoll                      | Vulnerable            | Not likely to occur. There is no suitable foraging or breeding habitat for this species.   | No                             |
| <i>Ehphianura albifrons</i><br>White-fronted Chat                      | Vulnerable            | Low potential to occur. Habitat too open. No suitable low shrub habitat or sparse grassy understorey to be removed. The exotic grassland is too dense for this species.  | No                             |
| <i>Ephippiorhynchus asiaticus</i><br>Black-necked Stork                | Vulnerable            | Unlikely to occur. This species requires wetlands. Such habitat is absent from the Subject Land.   | No                             |
| <i>Falsistrellus tasmaniensis</i><br>Eastern False Pipistrelle         | Vulnerable            | Moderate potential to occur. May forage around canopies of mature <i>Eucalyptus melliodora</i> and roost/breed in hollows.   | Yes                            |
| <i>Grantiella picta</i><br>Painted Honeyeater                          | Vulnerable            | Not likely to occur. There is no suitable foraging or breeding habitat for this species. It requires woodland habitat with mistletoes which are not present in suitable density.   | No                             |
| <i>Glossopsitta pusilla</i><br>Little Lorikeet                         | Vulnerable            | Moderate potential to occur. May forage in mature <i>Eucalyptus melliodora</i> . Unlikely to breed as habitat is open and disturbed.   | Yes                            |
| <i>Haliaeetus leucogaster</i><br>White-bellied Sea-Eagle<br>(Foraging) | Vulnerable            | Moderate potential to occur. This raptor is highly mobile and not resident in the locality. May forage in the open exotic grassland and remaining tree canopy, though this will continue post development.   | No                             |
| <i>Hieraaetus morphnoides</i><br>Little Eagle (Foraging)               | Vulnerable            | Moderate potential to occur. This raptor is highly mobile and not resident in the locality. May forage in the open exotic grassland and remaining tree canopy, though this will continue post development.   | No                             |
| <i>Lathamus discolor</i><br>Swift Parrot (Foraging)                    | Endangered            | Moderate potential to occur. May forage in mature <i>Eucalyptus melliodora</i> . Unlikely to breed as habitat is open and disturbed.   | Yes                            |
| <i>Lophoictinia isura</i><br>Square-tailed Kite<br>(Foraging)          | Vulnerable            | Moderate potential to occur. This raptor is highly mobile and not resident in the locality. May forage in the open exotic grassland and remaining tree canopy, though this will continue post development.   | No                             |
| <i>Melithreptus gularis</i><br>Black-chinned Honeyeater                | Vulnerable            | Low potential to occur. Habitat too open. No suitable forest habitat will be removed. Unlikely to breed as habitat is open and disturbed.  | No                             |

| Scientific Name   | BC Act Status | Likelihood of Occurrence on Subject Land  | Test of Significance Required? |
|---|---------------|---|--------------------------------|
| <i>Melanodryas cucullata cucullata</i><br>Hooded Robin                    | Vulnerable    | Low potential to occur. Habitat too open. No suitable forest habitat will be removed. Unlikely to breed as habitat is open and disturbed.   | No                             |
| <i>Micronomus norfolkensis</i><br>Eastern Coastal Free-tailed Bat         | Vulnerable    | Moderate potential to occur. May forage around canopies of mature <i>Eucalyptus melliodora</i> and roost/breed in hollows.  | Yes                            |
| <i>Miniopterus australis</i><br>Little Bent-winged bat (Foraging)         | Vulnerable    | Low potential to occur. May occasionally forage around canopies of mature <i>Eucalyptus melliodora</i> . No suitable roost sites in the area. No suitable forage habitat will be impacted. Confirmed absent during bat surveys in November-December 2021. | No                             |
| <i>Miniopterus orianae oceanensis</i><br>Large Bent-winged bat (Foraging) | Vulnerable    | Low potential to occur. May occasionally forage around canopies of mature <i>Eucalyptus melliodora</i> . No suitable roost sites in the area. No suitable forage habitat will be impacted. Confirmed absent during bat surveys in November-December 2021. | No                             |
| <i>Neophema pulchella</i><br>Turquoise Parrot                             | Vulnerable    | Low potential to occur. Low abundance of native groundcover limited suitable foraging habitat. May breed in hollows though habitat is too open and disturbed.   | No                             |
| <i>Nyctophilus corbeni</i><br>Corben's Long-eared Bat                     | Vulnerable    | Moderate potential to occur. May forage around canopies of mature <i>Eucalyptus melliodora</i> and roost/breed in hollows.  | Yes                            |
| <i>Petaurus australis</i><br>Yellow-bellied Glider                        | Vulnerable    | Low likelihood of occurring. Limited suitable foraging or breeding habitat for this species. No connectivity to substantial habitat.  | No                             |
| <i>Petroica boodang</i><br>Scarlet Robin                                  | Vulnerable    | Moderate potential to forage on the Subject Land on occasion as it passes through on migration. Habitat is too disturbed for breeding by this species.  | Yes                            |
| <i>Petroica phoenicea</i><br>Flame Robin                                  | Vulnerable    | Moderate potential to forage on the Subject Land on occasion as it passes through on migration. Habitat is too disturbed for breeding by this species.  | Yes                            |
| <i>Phascolarctos cinereus</i><br>Koala (Foraging)                         | Endangered    | Not likely to occur. Limited suitable foraging or breeding habitat for this species. No connectivity to substantial habitat.  | No                             |
| <i>Pteropus poliocephalus</i><br>Grey-headed Flying-fox (Foraging)        | Vulnerable    | Low potential to occur. May forage in mature <i>Eucalyptus melliodora</i> . Edge of the natural range of this species, occurrences would be infrequent. No important forage habitat will be impacted.   | No                             |
| <i>Saccolaimus flaviventris</i><br>Yellow-bellied Sheathtail-bat          | Vulnerable    | Moderate potential to occur. May forage around canopies of mature <i>Eucalyptus melliodora</i> and roost/breed in hollows.  | Yes                            |
| <i>Stagonopleura guttata</i><br>Diamond Firetail                          | Vulnerable    | Present. Breeding pair observed within <i>Lycium ferocissimum</i> on the Subject Property.  | Yes                            |
| <i>Scoteanax rueppellii</i><br>Greater Broad-nosed Bat                    | Vulnerable    | Moderate potential to occur. May forage around canopies of mature <i>Eucalyptus melliodora</i> and roost/breed in hollows.  | Yes                            |
| <i>Varanus rosenbergi</i><br>Rosenberg's Goanna                           | Vulnerable    | Not likely to occur. There is no suitable foraging or breeding habitat for this species. No suitable vegetation or termite mounds.  | No                             |

### 3.3 Candidate Species Credit Species

This section provides a summary of the candidate Species Credit fauna (**Table 8**) and flora species (**Table 9**) for the Subject Land derived from a 10km BioNet Atlas Search (DCCEE 2024b). A summary of the targeted survey effort applied to each species is provided along with the results of the survey effort, specifically whether or not a survey is still required to assess the presence and extent of any of the candidate species (**Table 8**).

**Table 8. Candidate Fauna Species Credits predicted to occur within the Subject Land.**

| Scientific Name   | NSW BC Act (2016) listing status | Suitable Habitat Present within/around the Subject Land?  | Likelihood of Occurrence of Species Credit on Subject Land                                 | Test of Significance Required? |
|---|----------------------------------|---|--|--------------------------------|
| <i>Aprasia parapulchella</i><br>(Pink-tailed Legless Lizard)        | Vulnerable                       | No suitable rock outcrop nor coarse woody debris for this species to shelter, breed or forage under.  | Unlikely. No suitable rock habitat.  | No                             |
| <i>Anthochaera phrygia</i><br>Regent Honeyeater (Breeding)          | Critically Endangered            | There is no suitable nesting habitat, only foraging habitat. The Subject Land is not included on the map of important areas for Regent Honeyeater.  | Unlikely. Too disturbed and dominated by aggressive birds.                                 | No                             |
| <i>Burhinus grallarius</i><br>Bush Stone-curlew                     | Endangered                       | Subject Land contains no suitable habitat as it is disturbed grassland. No suitable coarse woody debris present.  | Unlikely. No suitable shelter or coarse woody debris.                                      | No                             |
| <i>Callocephalon fimbriatum</i><br>Gang-gang Cockatoo (Breeding)    | Endangered                       | This species requires large trees hollows for breeding. No suitable hollows large hollows in forest or woodland. Not likely to nest.  | Unlikely. No suitable nest trees.  | No                             |
| <i>Calyptorhynchus lathami</i><br>Glossy Black- Cockatoo (Breeding) | Vulnerable                       | This species requires living or dead trees with hollows greater than 15cm diameter and greater than 5m above ground for breeding. The hollows on the Subject Land are unlikely to be suitable for breeding. No hollows will be removed.   | Unlikely. No suitable nest trees.  | No                             |
| <i>Chalinolobus dwyeri</i><br>Large-eared Pied Bat                  | Endangered                       | The Subject Land occurs within 2km of rocky areas containing caves, overhangs, escarpments, outcrops, or crevices. Suitable foraging habitat occurs around the mature <i>Eucalyptus melliodora</i> . This habitat will not be impacted. It may also forage over open grassland. Targeted surveys were conducted with Anabat Express deployed November-December 2021. This survey revealed no individuals. | Low. May forage or fly-over on occasion.   | No                             |
| <i>Delma impar</i><br>Striped Legless Lizard                        | Vulnerable                       | No suitable rock outcrop nor coarse woody debris for this species to shelter, breed or forage under.  | Unlikely. No coarse woody debris or rock.  | No                             |
| <i>Haliaeetus leucogaster</i><br>White-bellied Sea-Eagle (Breeding) | Vulnerable                       | This species builds a stick nest in tall trees. No suitable nest trees will be cleared for the proposal.  | Unlikely. May nest in trees along the creek however these are outside of the Subject Land. | No                             |
| <i>Heleioporus australiacus</i><br>Giant Burrowing Frog             | Vulnerable                       | This species is dependent on flowing creeks, drainage lines and hanging swamps on the top of sandstone plateaus and deeply dissected gullies. There were creeks and wet areas in the Subject Land. The Subject Land is metasediments (ancient metamorphosed sedimentary rock). There are no recent proximal records.  | Unlikely. No suitable spring or sandstone habitat.   | No                             |



| Scientific Name   | NSW BC Act (2016) listing status | Suitable Habitat Present within/around the Subject Land?  | Likelihood of Occurrence of Species Credit on Subject Land   | Test of Significance Required? |
|---|----------------------------------|---|--|--------------------------------|
| <i>Hieraetus morphnoides</i><br>Little Eagle (Breeding)                   | Vulnerable                       | This species builds a stick nest in tall trees. No suitable nest trees will be cleared for the proposal.  | Unlikely. May nest in trees along the creek however these are outside of the Subject Land.                           | No                             |
| <i>Lathamus discolor</i><br>Swift Parrot (Breeding)                       | Endangered                       | The Subject Land provides foraging habitat for Swift Parrot. The species does not breed on mainland Australia. This Subject Land is not located in the 'important areas' mapping.   | Unlikely. Does not breed on mainland Australia.  | No                             |
| <i>Litoria aurea</i><br>Green and Golden Bell Frog                        | Endangered                       | The Green and Golden Bell Frog requires marshes, dams and stream-sides, particularly those containing bulrushes ( <i>Typha</i> spp.) or spike rushes ( <i>Eleocharis</i> spp.) for breeding. No suitable breeding habitat occurs within the Subject Land. The Green and Golden Bell Frog may forage in open grassy areas, away from water during wet conditions but will retreat back to water during dry times. The proposed subdivision has been deliberately located outside of the 40m wide 'waterfront land'. The dry exotic grassland in the Subject Land is dense and not-suitable for Green and Golden Bell Frog. | Unlikely. Has not been recorded in Goulburn for multiple decades. No suitable habitat.                               | No                             |
| <i>Lophoictinia isura</i><br>Square-tailed Kite (Breeding)                | Vulnerable                       | This species builds a stick nest in tall trees. May breed in mature <i>Eucalypts melliodora</i> as trees of this size are rare across the landscape. This habitat will not be impacted.   | Unlikely. May nest in trees along the creek however these are outside of the Subject Land.                           | No                             |
| <i>Macropus parma</i><br>Parma Wallaby                                    | Vulnerable                       | This species requires dense wet sclerophyll forest or rainforest with a dense shrub layer. Such habitat does not occur on the Subject Land.   | Unlikely. No suitable habitat.   | No                             |
| <i>Miniopterus australis</i><br>Little Bent-winged Bat (Breeding)         | Vulnerable                       | This species breeds in caves, tunnels, mine shafts, culverts and outcrops. None of which occur in or near the Subject Land or nearby.   | Unlikely. No suitable breeding habitat (no escarpments, caves, or human structures) within 100m of the Subject Land. | No                             |
| <i>Miniopterus orianae oceanensis</i><br>Large Bent-winged Bat (Breeding) | Vulnerable                       | This species breeds in caves, tunnels, mine shafts, culverts and outcrops. None of which occur in or near the Subject Land or nearby.   | Unlikely. No suitable breeding habitat (no escarpments, caves, or human structures) within 100m of the Subject Land. | No                             |
| <i>Myotis macropus</i><br>Southern Myotis                                 | Vulnerable                       | No riparian habitat or waterbodies suitable for foraging by this species will be impacted by the subdivision of the Subject Land. No suitable shelter habitat (e.g. caves, crevices or culverts) are proposed to be impacted for the subdivision.   | Unlikely. No suitable foraging habitat in the Subject Land. No caves or similar roost structures will be impacted.   | No                             |
| <i>Ninox connivens</i><br>Barking Owl                                     | Vulnerable                       | This species requires living or dead trees with hollows greater than 20 cm diameter and greater than 4m above the ground for breeding. The hollows on the Subject Land are not of suitable dimension.   | Unlikely.  | No                             |

| Scientific Name  | NSW BC Act (2016) listing status | Suitable Habitat Present within/around the Subject Land?   | Likelihood of Occurrence of Species Credit on Subject Land | Test of Significance Required? |
|--|----------------------------------|--|--|--------------------------------|
| <i>Ninox strenua</i><br>Powerful Owl                               | Vulnerable                       | This species requires living or dead trees with hollows greater than 20 cm diameter for breeding. The hollows on the Subject Land are not of suitable dimension.                                 | Unlikely. No suitable hollows.                             | No                             |
| <i>Petaurus norfolcensis</i><br>Squirrel Glider                    | Vulnerable                       | This species requires suitable forage and shelter trees in forest or woodland. Limited such habitat occurs on the Subject Land with no connectivity to more substantial habitat.                 | Unlikely. No hollow-bearing trees.                         | No                             |
| <i>Phascolarctos cinereus</i><br>Koala (Breeding)                  | Endangered                       | This species requires suitable forage trees in forest or woodland. Substantial suitable habitat capable of supporting a population is absent from the Subject Land.                              | Unlikely. No trees in the Subject Land.                    | No                             |
| <i>Phascogale tapoatafa</i><br>(Brush-tailed Phascogale)           | Vulnerable                       | This species requires living or dead trees with hollows 2.5-4 cm diameter. While suitable hollows occur, the habitat on the Subject Property is open and disturbed, unsuitable for this species. | Unlikely. No hollow-bearing trees.                         | No                             |
| <i>Pteropus poliocephalus</i><br>Grey-headed Flying-fox (Breeding) | Vulnerable                       | No suitable breeding habitat.  | Unlikely. No roost colony on Subject Land.                 | No                             |
| <i>Synemon plana</i><br>Golden Sun Moth                            | Endangered                       | The subject site is located east of the Lake George Range. There are no proximal records of Goulburn Sun Moth in the Goulburn area.  | Unlikely. No proximal records of this species.             | No                             |

**Table 9. Candidate Flora Species Credits predicted to occur within the Subject Land.**

| Scientific Name                                    | NSW BC Act (2016) listing status | Targeted Survey Conducted   | Habitat Present on Subject Land / Proximity of Species Records  | Biodiversity Risk Weighting | Test of Significance Required?  |
|--|----------------------------------|---|---|-----------------------------|---|
| <i>Dichanthium setosum</i><br>Bluegrass            | Endangered                       | A targeted survey was undertaken in October, November and December 2021 at an appropriate time of year after recent rain. This species was not found. | Bluegrass occurs on the New England Tablelands, North West Slopes and Plains and the Central Western Slopes of NSW, extending to northern Queensland. It occurs widely on private property, including in the Inverell, Guyra, Armidale and Glen Innes areas.  | High – 2                    | Targeted survey confirmed absence. No further impact assessment required. |
| <i>Bossiaea oligosperma</i><br>Few-seeded Bossiaea | Vulnerable                       | A targeted survey was undertaken in October, November and December 2021 at an appropriate time of year after recent rain. This species was not found. | Known from two disjunct areas - the lower Blue Mountains in the Warragamba area (Wollondilly, Allum, Tonalli River catchments) and the Windellama area in Goulburn Mulwaree Shire, where it is locally abundant. A 1960s record for the Araluen valley south of Braidwood is credible but has not been relocated.   | High – 2                    | Targeted survey confirmed absence. No further impact assessment required. |
| <i>Calotis glandulosa</i><br>Mauve Burr Daisy      | Vulnerable                       | A targeted survey was undertaken in October, November and December 2021 at an appropriate time of year after recent rain. This species was not found. | The distribution of the Mauve Burr-daisy is centred on the Monaro and Kosciusko regions. There are three known sites in the upper Shoalhaven catchment. There are old and possibly dubious records from near Oberon, the Dubbo area and Mt Imlay. Found in montane and subalpine grasslands in the Australian Alps. Found in subalpine grassland (dominated by <i>Poa</i> spp.), and montane or natural temperate grassland dominated by Kangaroo Grass ( <i>Themeda australis</i> ) and Snow Gum ( <i>Eucalyptus pauciflora</i> ) Woodlands on the Monaro and Shoalhaven area. Appears to be a coloniser of bare patches, which explains why it often occurs on roadsides. Apparently common on roadsides in parts of the Monaro, though it does not persist for long in such sites. Does not persist in heavily-grazed pastures of the Monaro or the Shoalhaven area. | High – 2                    | Targeted survey confirmed absence. No further impact assessment required. |
| <i>Diuris aequalis</i><br>Buttercup Doubletail     | Endangered                       | A targeted survey was undertaken in October, November and December 2021 at an appropriate time of year after recent rain. This species was not found. | Has been recorded in Kanangra-Boyd National Park, Gurnang State Forest, towards Wombeyan Caves, the Taralga - Goulburn area, and the ranges between Braidwood, Tarago and Bungendore. The type location (from the 19th Century) is Liverpool, west of Sydney. However, this and other questionable records from the Sydney metropolitan area are unlikely based on current knowledge of the species. Flowering occurs between mid-October and mid-November in the southern part of its range, and between mid-November and early December in the populations north of the Abercrombie River.  | High – 2                    | Targeted survey confirmed absence. No further impact assessment required. |
| <i>Swainsona sericea</i><br>Silky Swainson-pea     | Vulnerable                       | A targeted survey was undertaken in October, November and December 2021 at an appropriate time of year after recent rain. This                        | Silky Swainson-pea has been recorded from the Northern Tablelands to the Southern Tablelands and further inland on the slopes and plains. There is one isolated record from the far north-west of NSW. Its stronghold is on the Monaro. Also found in South Australia, Victoria and Queensland. It emerges and flowers in spring.   | High – 2                    | Targeted survey confirmed absence. No further impact assessment required. |

| Scientific Name  | NSW BC Act (2016) listing status | Targeted Survey Conducted   | Habitat Present on Subject Land / Proximity of Species Records  | Biodiversity Risk Weighting | Test of Significance Required?  |
|--|----------------------------------|---|---|-----------------------------|---|
|  |                                  | species was not found.  |   |                             |   |
| <i>Swainsona recta</i><br>Small Purple-pea               | Endangered                       | A targeted survey was undertaken in October, November and December 2021 at an appropriate time of year after recent rain. This species was not found. | Small Purple-pea was recorded historically from places such as Carcoar, Culcairn and Wagga Wagga where it is probably now extinct. Populations still exist in the Queanbeyan and Wellington-Mudgee areas. Over 80% of the southern population grows on a railway easement. It is also known from the ACT. | High – 2                    | Targeted survey confirmed absence. No further impact assessment required. |
| <i>Rutidosia leptorrhynchoides</i><br>Button Wrinklewort | Endangered                       | A targeted survey was undertaken in October, November and December 2021 at an appropriate time of year after recent rain. This species was not found. | Local populations at Goulburn, the Canberra - Queanbeyan area and at Michelago. Other populations occur in Victoria.  | High – 2                    | Targeted survey confirmed absence. No further impact assessment required. |

## 4. Impact Summary

This chapter of the report details the type and extent of impacts to biodiversity that will occur as a result of the proposal.

### 4.1 Vegetation Clearing

While no native vegetation belonging to an identified PCT will be removed for the proposal, approximately 2.53 ha of exotic dominated grassland as well as approximately 20 mature exotic shrubs providing nesting and foraging habitat to threatened birds will be removed. Additionally, two large hollow-bearing stags are likely to be removed for the proposal.

### 4.2 Test of Significance

Threatened species impact assessment is an integral part of environmental impact assessment for DA projects that involve the clearing of any habitat for threatened species, populations or ecological communities listed under the BC Act. The objective of section 7.3 of the *Biodiversity Conservation Act 2016* (BC Act), the test of significance (ie. 5-part test), is to provide standardised and transparent consideration of threatened species and ecological communities, and their habitats, through the development assessment process.

The list of potential species should be provided to a consent authority/determining authority along with the test of significance. Reasons should be provided to show how the list was derived and why any threatened species recorded or predicted to occur have been omitted. A species does not have to be considered as part of the test of significance if recent and reliable data, relating to the study area and subject site and derived from field surveys consistent with OEH guidelines, clearly show that the species:

- does not occur in the study area, and
- will not use on-site habitats on occasion, and
- will not be influenced by off-site impacts of the proposal.

Justification for excluding a species from the assessment must be provided with the test of significance to the consent authority, including details of supporting surveys or studies. Otherwise all species likely to occur in the study area, and known to use that type of habitat, should be considered in the rationale that determines the list of threatened species and ecological communities for the test of significance.

Land Eco provide rationale for exclusion of any threatened species from the 'test of significance'. Some species have been excluded based on an assessment of habitat, other species were excluded following targeted survey (**Table 7;Table 8;Table 9**).

A Test of Significance (**Appendix C**) has been prepared for the following species and communities that are known to occur or considered likely to occur on the Subject Land:

#### Nomadic Nectarivores:

1. *Anthochaera phrygia* Regent Honeyeater (BC Act: Critically Endangered)
2. *Glossopsitta pusilla* Little Lorikeet (BC Act: Vulnerable)
3. *Lathamus discolor* Swift Parrot (BC Act: Endangered)

#### Resident Woodland Birds:

1. *Artamus cyanopterus cyanopterus* Dusky Woodswallow (BC Act: Vulnerable)
2. *Stagonopleura guttata* Diamond Firetail (BC Act: Vulnerable)

#### Nomadic Woodland Birds:

1. *Callocephalon fimbriatum* Gang-gang Cockatoo (BC Act: Endangered)
2. *Petroica boodang* Scarlet Robin (BC Act: Vulnerable)
3. *Petroica phoenica* Flame Robin (BC Act: Vulnerable)

#### Hollow-dwelling Microbats:

1. *Falsistrellus tasmaniensis* Eastern False Pipistrelle (BC Act: Vulnerable)
2. *Nyctophilus corbeni* Corben's Long-eared Bat (BC Act: Vulnerable)
3. *Scoteanax rueppellii* Greater Broad-nosed Bat (BC Act: Vulnerable)
4. *Micronomus norfolkensis* Eastern Coastal Free-tailed Bat (BC Act: Vulnerable)
5. *Saccolaimus flaviventris* Yellow-bellied Sheath-tail-bat (BC Act: Vulnerable)

### Threatened Ecological Communities:

1. White Box Yellow Box Blakeley's Red Gum Grassy Woodland (BC Act: Critically Endangered)

## 4.3 Indirect Impacts

Indirect impacts occur when the proposal or activities relating to the construction or operation of the proposal affect native vegetation, threatened ecological communities and threatened species habitat beyond the Subject Land. Impacts may also result from changes to land-use patterns, such as an increase in vehicular access and human activity on native vegetation, threatened ecological communities and threatened species habitat. The indirect impacts of this proposal are outlined in **Table 10**.

**Table 10. Indirect Impacts Summary**

| Indirect Impact  | Impacted entities (threatened species and/or threatened ecological communities and their habitats)    | Extent and duration  | Consequences of the impacts for the bioregional persistence of the threatened species, threatened ecological communities and their habitats. |
|--|---|--|--|
| <b>(a) inadvertent impacts on adjacent habitat or vegetation</b>                   | White Box Yellow Box Blakeley's Red Gum Woodland<br><br>All potentially occurring threatened species. | The proposal may increase surface run-off into the adjacent habitat which may in turn increase weed infestations within the habitat.<br><br>Accidental damage to mature <i>Eucalyptus melliodora</i> during construction.  | Weed intensity may reduce native vegetation integrity.<br><br>Loss of mature hollow-bearing trees.   |
| <b>(b) reduced viability of adjacent habitat due to edge effects</b>               | White Box Yellow Box Blakeley's Red Gum Woodland<br><br>All potentially occurring threatened species. | The proposed subdivision may lead to enhanced weed infiltration into adjacent habitat by enhanced edge effects, however, the effects of this will be low owing to the extremely high density and species richness of weeds already present.  | Edge effects may increase weed intensity and reduce vegetation integrity.  |
| <b>(c) reduced viability of adjacent habitat due to noise, dust or light spill</b> | White Box Yellow Box Blakeley's Red Gum Woodland<br><br>All potentially occurring threatened species. | Earthworks may cause increase in dust, vibration and noise. However, as the vegetation is located in a disturbed area that is a working cattle and sheep farm, such issues are already present within the Subject Land and surrounds. It is therefore unlikely the proposed works will significantly exacerbate any of these issues. | N/A  |
| <b>(d) transport of weeds and pathogens from the site to adjacent vegetation</b>   | White Box Yellow Box Blakeley's Red Gum Woodland<br><br>All potentially occurring threatened species. | The proposed construction and operation of the subdivision may lead to enhanced weed infiltration into adjacent habitat by enhanced edge effects. This impact is likely to be restricted to the immediate area surrounding the development to a couple of metres.  | Edge effects may increase weed intensity and reduce vegetation integrity.  |
| <b>(e) increased risk of starvation, exposure and loss of shade or shelter</b>     | All potentially occurring threatened species.   | No substantial vegetation will be removed for the proposal. 2.53 ha of exotic grassland will be removed exposing animals that have adapted to utilise this dense grassland.  | Exposure and loss of shelter for limited number of reptiles and birds that may utilise the exotic grassland.                                 |
| <b>(f) loss of breeding habitats</b>   | All potentially occurring threatened species.   | The proposal will not remove any important breeding habitats as the site is already highly disturbed and historically cleared. All substantial habitat features including hollow-bearing trees will be retained.   | N/A  |
| <b>(g) trampling of threatened flora species</b>                                   | Nil   | No threatened flora species were identified within the Subject Land. It is unlikely that any threatened flora occur.   | N/A  |

| Indirect Impact  | Impacted entities (threatened species and/or threatened ecological communities and their habitats) | Extent and duration   | Consequences of the impacts for the bioregional persistence of the threatened species, threatened ecological communities and their habitats. |
|--|--|---|--|
| <b>(h) inhibition of nitrogen fixation and increased soil salinity</b>                                 | Nil  | It is unlikely that these issues affect the Subject Land, nor is it likely that the proposal will exacerbate such impacts.  | N/A  |
| <b>(i) fertiliser drift</b>  | White Box Yellow Box<br>Blakeley's Red Gum<br>Woodland   | This issue is not likely to affect the vegetation on the Subject Land. Fertiliser has already been applied extensively across the Subject Land as a result of historical agricultural pursuits.   | N/A  |
| <b>(j) rubbish dumping</b>   | White Box Yellow Box<br>Blakeley's Red Gum<br>Woodland   | This issue is not expected to be exacerbated as a result of the proposal. Rubbish disposal will be managed via standard council-administered process for residential dwellings.   | N/A  |
| <b>(k) wood collection</b>   | White Box Yellow Box<br>Blakeley's Red Gum<br>Woodland   | This is not an issue on the Subject Land as there is low amounts of coarse woody debris.  | N/A  |
| <b>(l) bush rock removal and disturbance</b>   | Nil  | This issue is not relevant to the Subject Land as there is no bush rock.  | N/A  |
| <b>(m) increase in predatory species populations</b>   | Nil  | The Subject Land and surrounds are already inhabited by predatory pest species, most notably fox. Therefore, it is unlikely that the proposed works will increase predatory species populations.  | N/A  |
| <b>(n) increase in pest animal populations</b>   | Nil  | The Subject Land and surrounds already supports a population of house mouse, black rat, house sparrow, common myna, European blackbird, red fox, brown hare and common rabbit, therefore, it is unlikely that the proposed works will significantly increase pest species populations on the Subject Land or surrounds. | N/A  |
| <b>(o) increased risk of fire</b>  | Nil  | It is unlikely that the proposal will increase risk of fire to any bushland in or around the Subject Land.  | N/A  |
| <b>(p) disturbance to specialist breeding and foraging habitat, e.g. beach nesting for shorebirds.</b> | Nil  | The proposal will not result in the removal of any important breeding or foraging habitat for threatened species. All substantial habitat features including mature trees will be retained.   | N/A  |

## 4.4 Prescribed and Uncertain Impacts

This list of impacts includes all of those impacts on biodiversity values not caused by direct vegetation clearing or development that have been prescribed by the *Biodiversity Conservation Regulation 2017*.

Prescribed biodiversity impacts require an assessment of the impacts of development on the habitat of threatened species or ecological communities associated with karst, caves, crevices, cliffs and other features of geological significance. This is discussed in **Table 11** below.

**Table 11. Prescribed and Uncertain Impacts.**

| Will there be impacts on any of the following   | Yes/No | Details   |
|---|--------|---|
| Species or ecological communities associated with karst, caves, crevices, cliffs and other features of geological significance  | No     | There are no karst, caves, crevices, cliffs and other features of geological significance on or near the Subject Land.  |
| Habitat of threatened species or ecological communities associated with rocks   | No     | There are no rocks important to threatened species or ecological communities on the Subject Land.   |
| Habitat of threatened species or ecological communities associated with human made structures   | No     | There are no threatened species or ecological communities located within the Subject Land that are associated with human made structures.   |
| Habitat of threatened species or ecological communities associated with non-native vegetation   | Yes    | Non-native vegetation within the Subject Land consisted of degraded paddocks infested with environmental weeds. A pair of Diamond Firetails ( <i>Stagonopleura guttata</i> ) were observed sheltering, potentially nesting, within an African Boxthorn ( <i>Lycium ferocissimum</i> ) which is listed as a Weed of National Significance. This habitat is likely to be cleared for the proposal. Additionally, approximately 2.53 ha of exotic grassland offering foraging habitat to threatened birds will also be removed for the proposal. |
| Connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range  | Yes    | The proposal will not impact upon habitat of threatened species that facilitates the movement of those species across their range. The habitat to be impacted is restricted to exotic, weed-infested grassland which offers low quality, temporary foraging habitat for threatened species. The species likely to utilise the habitat are highly mobile and not likely to be impacted by impacts to 2.53 ha of exotic grassland.  |
| Movement of threatened species that maintains their life cycle  | Yes    | While potential breeding habitat was identified on the Subject Land and threatened species were recorded within the Subject Land, all substantial habitat features including hollow-bearing trees will be retained. The habitat to be impacted is of low quality and condition such that it is not considered to be important to the bioregional persistence of any threatened species that may occur. The species likely to utilise the habitat are highly mobile and not likely to be impacted by impacts to 2.53 ha of exotic grassland.   |
| Water quality, water bodies and hydrological processes that sustain threatened species and threatened ecological communities (including subsidence or upsidence resulting from underground mining or other development) | No     | No watercourses, waterbodies, groundwater or catchments will be impacted by the proposal.   |
| Wind turbine strikes on protected animals   | No     | There are no wind turbines proposed on the Subject Land.  |
| Vehicle strikes on threatened species of animals or on animals that are part of a TEC   | No     | It is unlikely that vehicle strikes will be an issue given the proposal consists of a residential estate with a designated, slow speed limit.   |



## 5. Avoid and Minimise Impacts

### 5.1 Impact Mitigation and Minimisation Measures

This section of the report details recommended efforts to avoid and minimise impact on biodiversity values associated with the proposal. Measures to be implemented before, during and post construction to avoid and minimise the impacts of the project are detailed in (Table 12). The final project footprint including construction and operation is presented as the 'Subject Land' (Figure 1; Figure 2).

Considering the nature and scale of the proposal; the character of the study area; the historic disturbance and fragmentation, and maintenance of vegetation within the Subject Property in conjunction with the proposed impact mitigation measures, there are unlikely to be any appreciable indirect impacts on biodiversity arising from the proposal that have not been addressed in Table 12 below.

**Table 12. Table of measures to be implemented before, during and after construction to avoid and minimise the impacts of the project**

| Impact / Action                                     | Outcome  | Timing                             | Responsibility  |
|---|--|------------------------------------|---|
| <b>Project Location</b>                             | The project location lies between an area that has been historically cleared and maintained through historical clearing, pasture improvement and grazing. Owing to the project location, the proposal is unlikely to significantly exacerbate the fragmentation of native vegetation, or impact on any preferential fauna habitat. The Ecologist site assessment revealed that there are minimal alternative locations available for the project location within the Subject Property without compromising the viability of the project.   | Pre-construction phase             | Proponent   |
| <b>Project Design</b>                               | The proposal requires the clearing 2.53 ha of exotic grassland which offers low biodiversity value. This impact will result in minimal loss to regional biodiversity due to the location of the site within a historically cleared/ degraded area.   | Pre-construction phase             | Proponent   |
| <b>Vegetation Clearing</b>                          | A qualified Ecologist should be present to supervise all substantial vegetation clearing including mature shrubs and hollow-bearing stags. The Ecologist will be available to salvage and relocate any bird nests or other native fauna that is displaced during the clearing process.   | Construction phase                 | Proponent<br>Project Ecologist                                |
| <b>Coarse Woody Debris</b>                          | Relocate all felled trees to the riparian corridor so that these trees can continue to provide habitat in the form of 'coarse woody debris' which is an essential habitat component in the Yellow Box Grassy Woodland ecosystem, and necessary for the survival of threatened woodland birds.  | Construction Phase                 | Proponent<br>Construction Contractor                          |
| <b>Erosion and Sedimentation</b>                    | Appropriate erosion and sediment control must always be erected and maintained during construction in order to avoid the potential of incurring indirect impacts on biodiversity values. As a minimum, such measures should comply with the relevant industry guidelines such as 'the Blue Book' (Landcom 2004).   | Construction phase                 | Proponent<br>Construction Contractor<br>Construction Engineer |
| <b>Storage and Stockpiling (Soil and Materials)</b> | Allocate all storage, stockpile and laydown sites away from any native vegetation that is planned to be retained. Avoid importing any soil from outside the site as this can introduce weeds and pathogens to the site in order to avoid the potential of incurring indirect impacts on biodiversity values.   | Construction phase                 | Construction Contractors                                      |
| <b>Stormwater and Wastewater</b>                    | All stormwater and sewage disposal and transport systems must be appropriately designed by Engineers. Potential impacts relating to stormwater and runoff will be managed during construction and operation phases in accordance with engineers plans. The CEMP will guide stormwater management during the construction phase of development.   | During and Post-construction phase | Proponent<br>Construction Engineer                            |
| <b>Revegetation of Woodland Bird Habitat</b>        | The Subject Land is partially mapped as containing 'Terrestrial Biodiversity' (Figure 8) and is subject to clause 7.2 of the Goulburn-Mulwaree LEP aimed at protecting native flora and fauna, and encouraging the recovery of threatened species. It is recommended that revegetation of native flora is carried-out to replace Diamond Firetail, Dusky Woodswallow and Gang-gang Cockatoo habitat removed for the development. The loss of 20 of the exotic mature shrubs should be replaced with at least 40 tubestock of shrubs representative of White Box Yellow Box Blakely's Red Gum Grassy Woodland flora assemblage at a (replacement ratio of 1:2) along the riparian corridor within the Subject Land. | Post-construction phase            | Proponent<br>Project Ecologist<br>Landscape Contractors       |

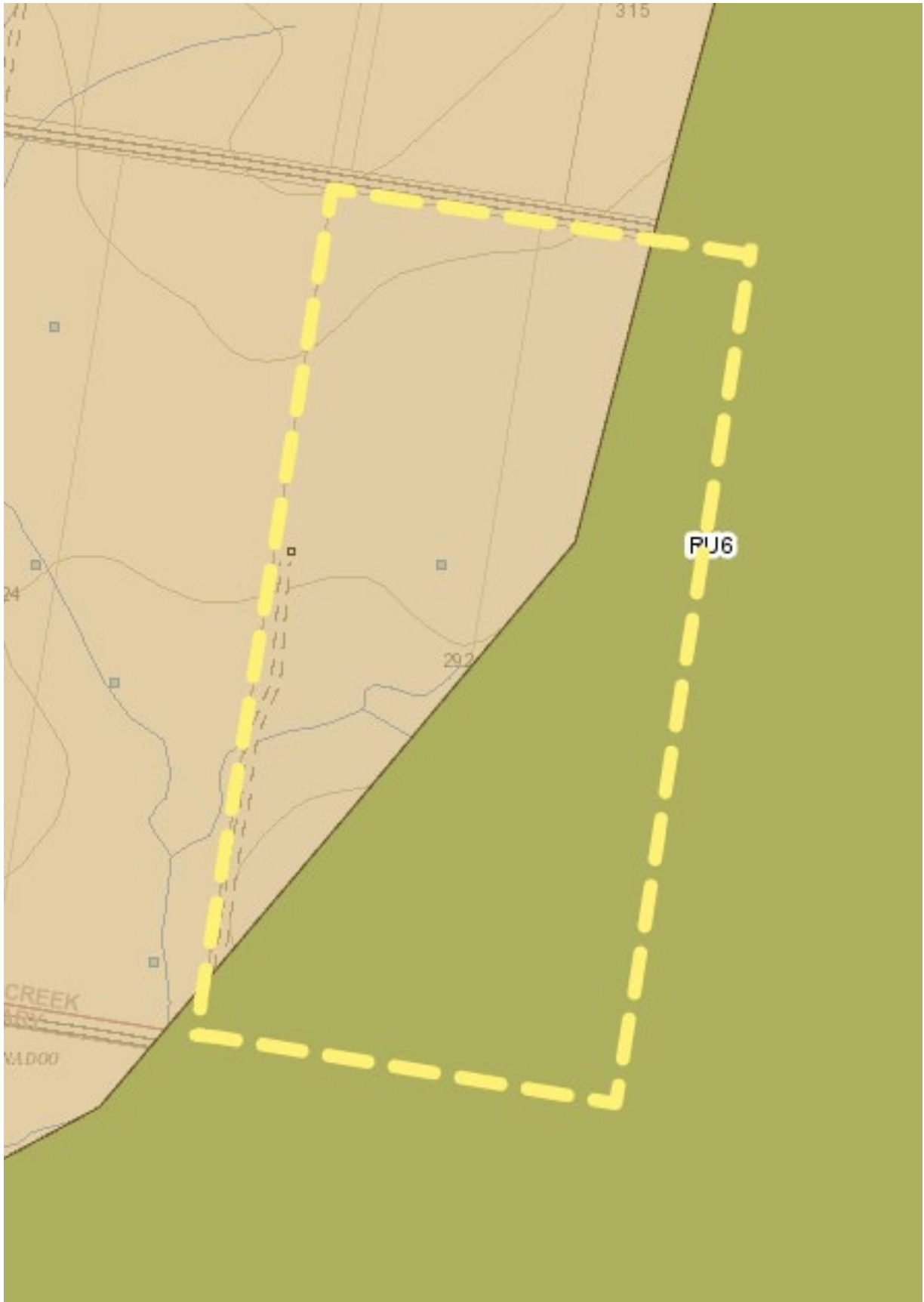


Figure 8. Land mapped as containing 'Terrestrial Biodiversity' within the Subject Property

## 6. Other Relevant Legislation, Plan & Policies Requiring Address

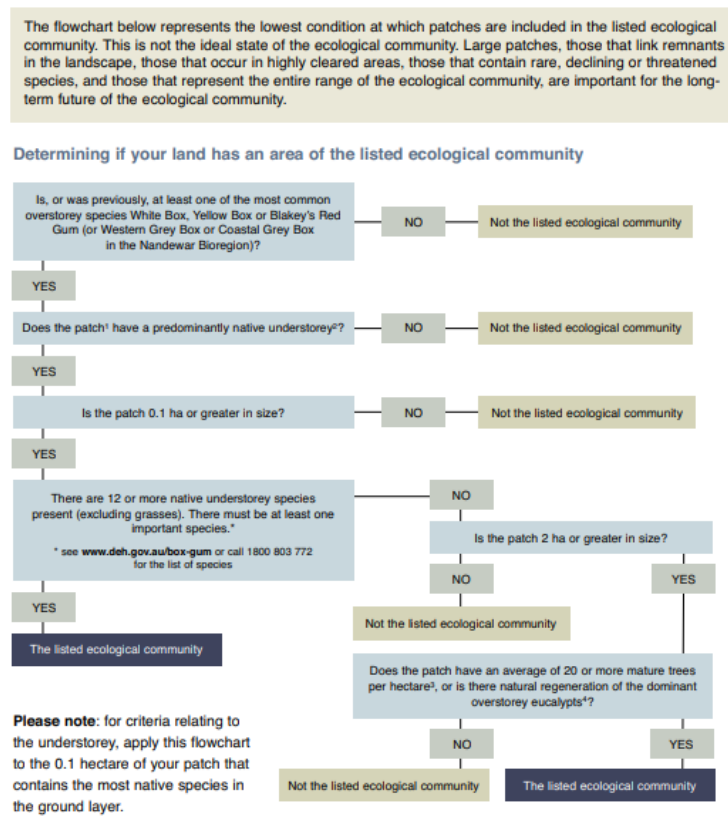
### 6.1 Commonwealth Environment Protection and Biodiversity Conservation Act 1999

One EPBC Act listed Critically Endangered Ecological Community (CEEC) was located within the Subject Land, *White Box Yellow Box Blakeley's Red Gum Woodland*.

The vegetation on the Subject Land has a sparse, mature remnant canopy though a predominantly exotic understorey with just four native understorey species from the Commonwealth "White Box-Yellow Box-Blakeley's Red Gum Grassy Woodland and Derived Native Grassland Ecological Community Important Species List" (**Table 13**).

As such, the vegetation in the Subject Land does not meet the criteria to be assessed under the EPBC Act.

**Table 13. Flowchart to determine if a patch meets the criteria to be assessed as White Box Yellow Box Blakeley's Red Gum Woodland under Commonwealth legislation (Commonwealth DEH 2006)**



<sup>1</sup> Patch – a patch is a continuous area containing the ecological community (areas of other ecological communities such as woodlands dominated by other species are not included in a patch). In determining patch size it is important to know what is, and is not, included within any individual patch. The patch is the larger of:

- an area that contains five or more trees in which no tree is greater than 75 m from another tree, or
- the area over which the understorey is predominantly native.

Patches must be assessed at a scale of 0.1 ha (1000m<sup>2</sup>) or greater.

<sup>2</sup> A predominantly native ground layer is one where at least 50 per cent of the perennial vegetation cover in the ground layer is made up of native species. The best time of the year to determine this is late autumn when the annual species have died back and have not yet started to regrow. (At other times of the year, you can determine whether something is perennial or not if it is difficult to pull out of the soil. Annual species pull out very easily.)

<sup>3</sup> Mature trees are trees with a circumference of at least 125 cm at 130 cm above the ground.

<sup>4</sup> Natural regeneration of the dominant overstorey eucalypts when there are mature trees plus regenerating trees of at least 15 cm circumference at 130 cm above the ground.

Suitable habitat for several EPBC Act (Commonwealth) threatened fauna species was also present in the Subject Land. It is not considered likely that this small area of impact to vegetation that is historically disturbed and cleared, could significantly affect any threatened or migratory species that is listed under the EPBC Act.

## 6.2 Groundwater Dependent Ecosystems

The Commonwealth Groundwater Dependent Ecosystem (GDE) Policy defines GDEs as ecosystems, which have their species composition and their natural ecological processes determined by groundwater (DLWC 2002). The Policy defines groundwater as the water beneath the earth's surface that has filtered down to the zone where the earth or rocks are fully saturated (DLWC 2002). Ecosystems vary dramatically in the degree of dependency of groundwater, from having no apparent dependence through to being entirely dependent on it (DLWC 2002). The Australian Government Atlas of Groundwater Dependent Ecosystems (BOM 2019a) was used to identify any previously mapped GDEs that occur in or near the Subject Land. This atlas identifies GDEs reliant on surface groundwater (rivers, springs and wetlands) and subsurface groundwater (vegetation).

The GDE Atlas was reviewed and it was identified that the Subject Land does not contain a GDE (DLWC 2002). During on-ground surveys no GDE were evident.

## 6.3 State Environmental Planning Policy (Biodiversity and Conservation) 2021

Chapter 3 'Koala Habitat Protection 2020' of the SEPP (Biodiversity and Conservation) 2021 only applies to land which:

- (i) has an area of more than 1 hectare; or
- (ii) has, together with any adjoining land in the same ownership, an area of more than 1 hectare whether or not the development application applies to the whole, or only part, of the land.

The SEPP Koala Habitat Protection does not apply to the Subject Property because no native trees will be impacted by the development.

## 6.4 State Environmental Planning Policy No 19 - Bushland in Urban Areas (SEPP 19)

The Subject Land does not directly border any Council-mapped Bushland Reserves or land designated for Open Space.

## 6.5 State Environmental Planning Policy Coastal Management

The Subject Land is not located within the Coastal Zone and as a result, does not require further assessment as per this SEPP (SEPP Coastal Management 2018).

## 6.6 Goulburn-Mulwaree Local Environmental Plan 2009

### 6.6.1 Zoning

Under the Goulburn-Mulwaree Local Environmental Plan (2009), the Subject Land is zoned 'RU6 Transition'.

Zone RU6 Transition

#### 1 Objectives of zone

- To protect and maintain land that provides a transition between rural and other land uses of varying intensities or environmental sensitivities.
- To minimise conflict between land uses within this zone and land uses within adjoining zones.

The proposal is permitted with consent.

## 6.7 Goulburn-Mulwaree Development Control Plan 2009

The proponent will adhere to all controls listed in the DCP that relate to the Subject Land. The following controls are relevant to biodiversity, and therefore provided in verbatim here.

### 6.7.1 Landscaping (3.5)

#### Objective

Provide well-designed, constructed and maintained landscapes that are an asset to the community. Well-designed landscapes contribute to the attractiveness of outdoor spaces, to the protection of the natural environment and to the health and well being of the community. Promote good landscape design. Good design is critical in producing environmentally sustainable landscapes. Provide attractive landscapes that are consistent with the visual character of the landscapes within the Goulburn Mulwaree local government area. Provide for public safety by allowing for passive surveillance and other management techniques. Provide open space for recreation within residential developments. Provide for privacy, summer shade and winter solar access. Promote the use of local native plant species to provide habitat for native fauna, to minimise water usage, to decrease the need for insecticide and pesticide for exotic plant species and to achieve biodiversity objectives. Ensure that landscaping is an integral part of the site planning process and that it suits the proposal. Ensure that the positive landscape values of the site are not compromised.

### 6.7.2 Tree and vegetation preservation (3.9)

#### Objective

The objective of these provisions is to preserve the amenity, biodiversity and ecology of the area through the preservation of trees and other vegetation.

#### Controls

#### Definitions

Tree means: a perennial plant with:

- (i) one or more self-supporting trunks, any one of which has a circumference of 30cm or more (at a height of 40 cm above existing ground level), or
- (ii) a height of 2.5 metres or more, or a branch spread of more than 2.5 metres.

Other Vegetation means:

Remnant Native Vegetation including:

- (i) trees,
- (ii) understorey plants,
- (iii) ground cover,
- (iv) plants occurring in a wetland.

Note: Native Vegetation has the same meaning as in the Native Vegetation Act 2003. General Clause 5.9 of the LEP 2009 applies to all trees and shrubs in Heritage Conservation Areas, on land that contains a Heritage Item and land identified as 'Biodiversity Hot Spots' and mapped wetlands. Heritage Conservation Areas are shown on the LEP 2009 Heritage Maps. Heritage Items are listed in Schedule 5 to the LEP 2009. 'Biodiversity Hot spots' are identified in figure 3.9 and mapped wetlands in figure 3.8 (of the DCP)

A person must not ringbark, cut down, top, lop, remove, injure or wilfully destroy any tree or other vegetation identified above without the authority conferred by a development consent or a permit granted by the Council. Any removal of native vegetation including trees, shrubs and other vegetation that occurs in an area zoned non-urban and non-industrial, may require consent under the Native Vegetation Act unless an exemption applies. Applicants should contact the NSW Local Land Services – South East for details.

## 7. Conclusion

The proposal site has been chosen as it is located in a key position on the fringe of Goulburn township and provides an optimal setting for 'life-style' residential blocks which are in increasing demand but low supply. The Subject Land is an optimal location for development for the benefit of the town and community of Goulburn.

The Subject Land has been historically cleared and managed for agricultural purposes for over 100 years. Most of the Subject Land consists of non-native (exotic) pasture-improved and regularly grazed grassland. A small area in the north-east of the Subject Land contains native grassy woodland, however, it is severely weed-infested. No native vegetation will be directly impacted for the proposed rezoning and subdivision.

The native grassland vegetation belongs to one distinct plant community type (PCT):

- PCT 1330: Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion.

The area of PCT 1330 within the Subject Land comprises an occurrence of 'White Box Yellow Box Blakeley's Red Gum Woodland' which is listed as a Critically Endangered Ecological Community under the NSW *Biodiversity Conservation Act 2016*. The condition of this vegetation is poor. It is historically disturbed, isolated and weed infested.

Upon completion of a Test of Significance, Land Eco Consulting are satisfied that the proposal will not incur significant effects to a local occurrence of 'White Box Yellow Box Blakeley's Red Gum Woodland' nor any potentially occurring threatened species or ecological community as listed under the NSW *Biodiversity Conservation Act 2016*.

Recommendations have been put forward to reduce impacts of the proposal upon biodiversity:

- Ensure all contractors employed to work within the Subject Land are suitably qualified, experienced and informed of the sensitive ecological features and potentially occurring threatened species;
- Assign a Project Ecologist to conduct and oversee all ecological compliance requirements associated with conducting a proposal in line with all relevant state and commonwealth legislation and guidelines;
- Ensure an Ecologist is present during the clearing of all vegetation both native and exotic related to the proposed activity;
- Implement all relevant biological hygiene protocols and requirements as per NSW Government guidelines.
- Ensure ongoing management of priority weeds according to statutory requirements.
- Ensure all trees that occur outside of the development footprint are protected from harm during earthworks and construction.
- Remediate the small patches of White Box Yellow Box Blakeley's Red Gum Woodland and revegetate the riparian corridor with locally indigenous flora

During occupation of the subdivision there is potential for the proposal to indirectly impact surrounding vegetation and habitat values through:

- Introduction of weed propagules by vehicle and increased edge effects.
- Erosion and sedimentation as a result of runoff from hard stand areas.

These issues will be actively managed through designated plans that will be prepared to manage open space proposed as part of the development.

State Environmental Planning Policy (Koala Habitat Protection) has been assessed, and the Subject Land does not contain 'Potential' or 'Core' Koala Habitat.

The proposal will be of no significant consequence to biodiversity in the locality, region or bioregion. Subject to the proponent implementing the mitigation measures proposed in this report, Land Eco Consulting hold the opinion that the proposal is suitable to the location and recommend this development for approval.

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## 9. Appendices

**Appendix A. Fauna recorded within the Subject Land**

**Appendix B. Flora Lists and Vegetation Condition Data (BAM VIS Field Survey Forms)**

**Appendix C. Tests of Significance**

**Appendix D. Weather Conditions During Survey Period**

## Appendix A. Fauna recorded on Subject Land during Site Assessments

| Class     | Scientific Name                   | Common Name              | NSW Biodiversity Conservation Act 2016 Status |
|-----------|-----------------------------------|--------------------------|---|
| Amphibia  | <i>Crinia signifera</i>           | Common Eastern Froglet   | Protected                                     |
| Amphibia  | <i>Uperoleia laevisgata</i>       | Smooth Toadlet           | Protected                                     |
| Amphibia  | <i>Limnodynastes tasmaniensis</i> | Spotted Marsh Frog       | Protected                                     |
| Amphibia  | <i>Limnodynastes peronii</i>      | Striped Marsh Frog       | Protected                                     |
| Amphibian | <i>Litoria quiritatus</i>         | Bleating Tree Frog       | Protected                                     |
| Aves      | <i>Anthus novaeseelandiae</i>     | Australasian Pipit       | Protected                                     |
| Aves      | <i>Gymnorhina tibicen</i>         | Australian Magpie        | Protected                                     |
| Aves      | <i>Corvus coronoides</i>          | Australian Raven         | Protected                                     |
| Aves      | <i>Acrocephalus australis</i>     | Australian Reed-Warbler  | Protected                                     |
| Aves      | <i>Elanus axillaris</i>           | Black-shouldered Kite    | Protected                                     |
| Aves      | <i>Ocyphaps lophotes</i>          | Crested Pigeon           | Protected                                     |
| Aves      | <i>Platycercus elegans</i>        | Crimson Rosella          | Protected                                     |
| Aves      | <i>Platycercus eximius</i>        | Eastern Rosella          | Protected                                     |
| Aves      | <i>Eolophus roseicapillus</i>     | Galah                    | Protected                                     |
| Aves      | <i>Rhipidura albiscapa</i>        | Grey Fantail             | Protected                                     |
| Aves      | <i>Colluricincla harmonica</i>    | Grey Shrike-thrush       | Protected                                     |
| Aves      | <i>Mirafra javanica</i>           | Horsfield's Bushlark     | Protected                                     |
| Aves      | <i>Corvus mellori</i>             | Little Raven             | Protected                                     |
| Aves      | <i>Grallina cyanoleuca</i>        | Magpie-lark              | Protected                                     |
| Aves      | <i>Artamus personatus</i>         | Masked Woodswallow       | Protected                                     |
| Aves      | <i>Falco cenchroides</i>          | Nankeen Kestrel          | Protected                                     |
| Aves      | <i>Philemon corniculatus</i>      | Noisy Friarbird          | Protected                                     |
| Aves      | <i>Anas superciliosa</i>          | Pacific Black Duck       | Protected                                     |
| Aves      | <i>Cuculus pallidus</i>           | Pallid Cuckoo            | Protected                                     |
| Aves      | <i>Strepera graculina</i>         | Pied Currawong           | Protected                                     |
| Aves      | <i>Anthochaera carunculata</i>    | Red Wattlebird           | Protected                                     |
| Aves      | <i>Psephotus haematonotus</i>     | Red-rumped Parrot        | Protected                                     |
| Aves      | <i>Pardalotus striatus</i>        | Striated Pardalote       | Protected                                     |
| Aves      | <i>Coturnix pectoralis</i>        | Stubble Quail            | Protected                                     |
| Aves      | <i>Cacatua galerita</i>           | Sulphur-crested Cockatoo | Protected                                     |
| Aves      | <i>Malurus cyaneus</i>            | Superb Fairy-wren        | Protected                                     |
| Aves      | <i>Smicrornis brevirostris</i>    | Weebill                  | Protected                                     |
| Aves      | <i>Hirundo neoxena</i>            | Welcome Swallow          | Protected                                     |
| Aves      | <i>Artamus superciliosus</i>      | White-browed Woodswallow | Protected                                     |
| Aves      | <i>Egretta novaehollandiae</i>    | White-faced Heron        | Protected                                     |
| Aves      | <i>Rhipidura leucophrys</i>       | Willie Wagtail           | Protected                                     |
| Aves      | <i>Acanthiza nana</i>             | Yellow Thornbill         | Protected                                     |
| Aves      | <i>Lichenostomus chrysops</i>     | Yellow-faced Honeyeater  | Protected                                     |
| Aves      | <i>Acanthiza chrysorrhoa</i>      | Yellow-rumped Thornbill  | Protected                                     |
| Aves      | <i>Acridotheres tristis</i>       | Common Myna              | Unprotected                                   |
| Aves      | <i>Sturnus vulgaris</i>           | Common Starling          | Unprotected                                   |
| Aves      | <i>Alauda arvensis</i>            | Eurasian Skylark         | Unprotected                                   |
| Aves      | <i>Turdus merula</i>              | European Blackbird       | Unprotected                                   |

| Class    | Scientific Name               | Common Name           | NSW Biodiversity Conservation Act 2016 Status |
|----------|-------------------------------|-----------------------|---|
| Aves     | <i>Carduelis carduelis</i>    | European Goldfinch    | Unprotected                                   |
| Aves     | <i>Passer domesticus</i>      | House Sparrow         | Unprotected                                   |
| Aves     | <i>Stagonopleura guttata</i>  | Diamond Firetail      | Vulnerable; Protected                         |
| Aves     | <i>Artamus cyanopterus</i>    | Dusky Woodswallow     | Vulnerable; Protected                         |
| Mammalia | <i>Lepus europeus</i>         | Brown Hare            | Unprotected                                   |
| Mammalia | <i>Oryctolagus cuniculus</i>  | European Rabbit       | Unprotected                                   |
| Mammalia | <i>Chalinolobus gouldii</i>   | Gould's Wattled-bat   | Protected                                     |
| Mammalia | <i>Chalinolobus morio</i>     | Chocolate Wattled-bat | Protected                                     |
| Mammalia | <i>Vespadelus darlingtoni</i> | Large Forest Bat      | Protected                                     |
| Mammalia | <i>Vespadelus vulturnus</i>   | Little Forest Bat     | Protected                                     |
| Reptilia | <i>Egernia cunninghamii</i>   | Cunningham's Skink    | Protected                                     |
| Reptilia | <i>Pseudonaja textilis</i>    | Eastern Brown Snake   | Protected                                     |

Appendix B. Flora Lists and Vegetation Condition Data (BAM VIS Field Survey Forms copied from electronic data sheet)

| BAM Site - Field Survey Form |   |                                  |                   |                                     |                    |   |
|------------------------------|---|----------------------------------|-------------------|-------------------------------------|--------------------|---|
| <b>Date:</b>                 | 14.12.21                                | <b>Plot ID:</b>                  | <b>Box Plot A</b> | <b>Photo #:</b>                     |                    | Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living. |
| <b>Zone:</b>                 | 55H                                     | <b>Plot Dimensions:</b>          | 20x50             | <b>Easting:</b>                     | 752910             |   |
| <b>Datum:</b>                | GDA94                                   | <b>Middle Bearing (o) at Om:</b> | 60                | <b>Northing:</b>                    | 6147201            |   |
| <b>PCT:</b>                  | Exotic Grassland                        | <b>Condition Class</b>           |                   | <b>Ecologists:</b>                  |                    |   |
| Growth Form                  | Scientific Name                         | Cover                            | Abundance         | DBH                                 | # Tree Stems Count | Number of Hollow-bearing Trees  |
| HTE                          | Nassella neesiana                       | 70                               | N/A               | 80+cm                               | 0                  | 0   |
| Grass & grasslike (GG)       | Austrostipa bigeniculata                | 10                               | N/A               | 50-79cm                             |                    |   |
| Non-native                   | Hirschfeldia incana                     | 0.5                              | 30                | 30-49cm                             |                    |   |
| Forb (FG)                    | Euchiton sphaericus                     | 0.1                              | 2                 | 20-29cm                             |                    |   |
| Non-native                   | Gnaphalium uliginosum                   | 3                                | 600               | 10-19cm                             |                    |   |
| Non-native                   | Eleusine tristachya                     | 5                                |                   | 5-9cm                               |                    |   |
| Non-native                   | Trifolium subterraneum                  | 2                                | 200               | <5cm                                |                    |   |
| Grass & grasslike (GG)       | Rytidosperma racemosum subsp. racemosum | 8                                | N/A               |                                     |                    | For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.  |
| Non-native                   | Lolium perenne                          | 30                               | N/A               | Length of Logs (m)                  | 0                  |   |
| Non-native                   | Gnaphalium japonicum                    | 0.5                              | 20                | (≥10 cm diameter, >50 cm in length) |                    |   |
| Non-native                   | Trifolium campestre                     | 0.2                              | 100               |                                     |                    |   |
| Forb (FG)                    | Erodium crinitum                        | 0.1                              | 2                 | BAM Attribute (1 x 1m plots)        | Litter Cover (%)   |   |
| Non-native                   | Sonchus asper                           | 0.1                              | 10                | 1                                   | 2                  |   |
| Forb (FG)                    | Dysphania spp.                          | 0.1                              | 30                | 2                                   | 40                 |   |
| HTE                          | Nassella trichotoma                     | 0.2                              | 10                | 3                                   | 5                  |   |
| Non-native                   | Erodium cicutarium                      | 0.1                              | 30                | 4                                   | 5                  |   |
| Forb (FG)                    | Rumex brownii                           | 0.1                              | 3                 | 5                                   | 15                 |   |



**BAM Site - Field Survey Form**

|               |                  |                                  |                   |                    |         |
|---------------|------------------|----------------------------------|-------------------|--------------------|---------|
| <b>Date:</b>  | 14.12.21         | <b>Plot ID:</b>                  | <b>Box Plot B</b> | <b>Photo #:</b>    |         |
| <b>Zone:</b>  | 55H              | <b>Plot Dimensions:</b>          | 20x50             | <b>Easting:</b>    | 752795  |
| <b>Datum:</b> | GDA94            | <b>Middle Bearing (o) at 0m:</b> | 220               | <b>Northing:</b>   | 6147251 |
| <b>PCT:</b>   | Exotic Grassland | <b>Condition Class</b>           |                   | <b>Ecologists:</b> |         |

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

| Growth Form            | Scientific Name                         | Cover | Abundance | DBH                                 | # Tree Stems Count | Number of Hollow-bearing Trees   |
|------------------------|---|-------|-----------|-------------------------------------|--------------------|--|
| HTE                    | Nassella neesiana                       | 35    |           | 80+cm                               | 0                  | 0  |
| Grass & grasslike (GG) | Austrostipa bigeniculata                | 20    |           | 50-79cm                             |                    |  |
| Non-native             | Hirschfeldia incana                     | 0.5   | 50        | 30-49cm                             |                    |  |
| Forb (FG)              | Euchiton sphaericus                     | 0.1   | 5         | 20-29cm                             |                    |  |
| Non-native             | Gnaphalium uliginosum                   | 2     | 1000      | 10-19cm                             |                    |  |
| Non-native             | Eleusine tristachya                     | 2     | 500       | 5-9cm                               |                    |  |
| Non-native             | Trifolium subterraneanum                | 5     |           | <5cm                                |                    |  |
| Grass & grasslike (GG) | Rytidosperma racemosum subsp. racemosum | 6     |           |                                     |                    |  |
| Non-native             | Lolium perenne                          | 50    |           | Length of Logs (m)                  | 0                  | For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs. |
| Non-native             | Gnaphalium japonicum                    | 0.2   | 100       | (≥10 cm diameter, >50 cm in length) |                    |  |
| Non-native             | Trifolium campestre                     | 1     | 400       |                                     |                    |  |
| Forb (FG)              | Erodium crinitum                        | 0.1   | 1         | BAM Attribute (1 x 1m plots)        | Litter Cover (%)   |  |
| Non-native             | Sonchus asper                           | 0.2   | 20        | 1                                   | 10                 |  |
| Non-native             | Leontodon saxatilis                     | 0.1   | 10        | 2                                   | 10                 |  |
| HTE                    | Nassella trichotoma                     | 1     | 100       | 3                                   | 5                  |  |
| Non-native             | Erodium cicutarium                      | 0.1   | 3         | 4                                   | 2                  |  |
| Forb (FG)              | Rumex brownii                           | 0.2   | 10        | 5                                   | 2                  |  |

|            |                      |     |     |   |                         |                       |
|------------|----------------------|-----|-----|---|-------------------------|-----------------------|
| Non-native | Trifolium arvense    | 6   |     | Average (#no./5)  | 5.8                     |                       |
| Non-native | Aira spp.            | 0.1 | 5   |   |                         |                       |
| Non-native | Hordeum leporinum    | 1   | 200 |   |                         |                       |
| Non-native | Bromus hordeum       | 5   |     |   |                         |                       |
| Non-native | Trifolium glomeratum | 0.2 | 40  |   |                         |                       |
| Non-native | Vulpia myuros        | 0.5 | 50  |   |                         |                       |
| Forb (FG)  | Crassula sieberiana  | 0.1 | 6   |   |                         |                       |
|            |                      |     |     |   |                         |                       |
|            |                      |     |     | <b>Growth Form</b>  | <b>Composition Data</b> | <b>Structure Data</b> |
|            |                      |     |     | <b>Tree</b>   | <b>0</b>                | <b>0</b>              |
|            |                      |     |     | <b>Shrub</b>  | <b>0</b>                | <b>0</b>              |
|            |                      |     |     | <b>Grass</b>  | <b>2</b>                | <b>26</b>             |
|            |                      |     |     | <b>Forb</b>   | <b>4</b>                | <b>0.5</b>            |
|            |                      |     |     | <b>Fern</b>   | <b>0</b>                | <b>0</b>              |
|            |                      |     |     | <b>Other</b>  | <b>0</b>                | <b>0</b>              |
|            |                      |     |     | <b>H.T.E</b>  | <b>2</b>                | <b>36</b>             |
|            |                      |     |     | Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m |                         |                       |
|            |                      |     |     | Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...   |                         |                       |



**BAM Site - Field Survey Form**

|               |                  |                                  |            |                    |         |
|---------------|------------------|----------------------------------|------------|--------------------|---------|
| <b>Date:</b>  | 14.12.21         | <b>Plot ID:</b>                  | Box Plot C | <b>Photo #:</b>    |         |
| <b>Zone:</b>  | 55H              | <b>Plot Dimensions:</b>          | 20x50      | <b>Easting:</b>    | 752766  |
| <b>Datum:</b> | GDA94            | <b>Middle Bearing (o) at Om:</b> | 100        | <b>Northing:</b>   | 6147614 |
| <b>PCT:</b>   | Exotic Grassland | <b>Condition Class</b>           |            | <b>Ecologists:</b> |         |

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

| Growth Form            | Scientific Name          | Cover | Abundance | DBH                                 | # Tree Stems Count | Number of Hollow-bearing Trees |
|------------------------|--------------------------|-------|-----------|-------------------------------------|--------------------|--------------------------------|
| HTE                    | Nassella neesiana        | 85    |           | 80+cm                               | 0                  | 0                              |
| Grass & grasslike (GG) | Austrostipa bigeniculata | 15    |           | 50-79cm                             |                    |                                |
| Non-native             | Hirschfeldia incana      | 0.5   | 50        | 30-49cm                             |                    |                                |
| Non-native             | Avena fatua              | 2     | 200       | 20-29cm                             |                    |                                |
| Non-native             | Phalaris aquatica        | 25    |           | 10-19cm                             |                    |                                |
| Non-native             | Bromus hordeum           | 10    |           | 5-9cm                               |                    |                                |
| Non-native             | Cirsium vulgare          | 0.2   | 50        | <5cm                                |                    |                                |
| Non-native             | Bromus catharticus       | 6     |           |                                     |                    |                                |
| Non-native             | Hypochaeris radicata     | 5     |           | Length of Logs (m)                  | 0.5                |                                |
| Non-native             | Vulpia myuros            | 5     |           | (≥10 cm diameter, >50 cm in length) |                    |                                |
| Non-native             | Dactylis glomerata       | 0.1   | 10        |                                     |                    |                                |
| Forb (FG)              | Rumex brownii            | 0.1   | 2         | BAM Attribute (1 x 1 m plots)       | Litter Cover (%)   |                                |
| Non-native             | Hypochaeris glabrata     | 5     |           | 1                                   | 100                |                                |
| Non-native             | Lolium perenne           | 1     | 300       | 2                                   | 100                |                                |
| Non-native             | Trifolium campestre      | 0.5   | 100       | 3                                   | 100                |                                |
|                        |                          |       |           | 4                                   | 100                |                                |
|                        |                          |       |           | 5                                   | 100                |                                |
|                        |                          |       |           | Average (#no./5)                    | 100                |                                |

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



**BAM Site - Field Survey Form**

|               |                  |                                  |                   |                    |         |
|---------------|------------------|----------------------------------|-------------------|--------------------|---------|
| <b>Date:</b>  | 14.12.21         | <b>Plot ID:</b>                  | <b>Box Plot D</b> | <b>Photo #:</b>    |         |
| <b>Zone:</b>  | 55H              | <b>Plot Dimensions:</b>          | 20x50             | <b>Easting:</b>    | 752816  |
| <b>Datum:</b> | GDA94            | <b>Middle Bearing (o) at Om:</b> | 200               | <b>Northing:</b>   | 6147811 |
| <b>PCT:</b>   | Exotic Grassland | <b>Condition Class</b>           |                   | <b>Ecologists:</b> |         |

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

| Growth Form            | Scientific Name          | Cover | Abundance | DBH                                 | # Tree Stems Count | Number of Hollow-bearing Trees |
|------------------------|--------------------------|-------|-----------|-------------------------------------|--------------------|--------------------------------|
| HTE                    | Nassella neesiana        | 65    |           | 80+cm                               | 0                  | 0                              |
| Grass & grasslike (GG) | Austrostipa bigeniculata | 20    |           | 50-79cm                             |                    |                                |
| Non-native             | Hirschfeldia incana      | 0.2   | 20        | 30-49cm                             |                    |                                |
| Non-native             | Avena fatua              | 15    |           | 20-29cm                             |                    |                                |
| HTE                    | Crataegus monogyna       | 2     | 1         | 10-19cm                             |                    |                                |
| Non-native             | Bromus hordeum           | 6     |           | 5-9cm                               |                    |                                |
| Non-native             | Cirsium vulgare          | 0.1   | 10        | <5cm                                |                    |                                |
| Non-native             | Gnaphalium uliginosum    | 0.1   | 40        |                                     |                    |                                |
| Non-native             | Hypochaeris radicata     | 0.5   | 100       | Length of Logs (m)                  | 0                  |                                |
| Non-native             | Vulpia myuros            | 0.2   | 100       | (≥10 cm diameter, >50 cm in length) |                    |                                |
| Non-native             | Dactylis glomerata       | 0.1   | 5         |                                     |                    |                                |
| Non-native             | Holcus lanatus           | 0.1   | 3         | BAM Attribute (1 x 1 m plots)       | Litter Cover (%)   |                                |
| Non-native             | Hypochaeris glabrata     | 0.1   | 10        | 1                                   | 100                |                                |
| Non-native             | Lolium perenne           | 8     |           | 2                                   | 98                 |                                |
| Non-native             | Trifolium campestre      | 0.1   | 40        | 3                                   | 100                |                                |
| Non-native             | Lactuca serriola         | 0.1   | 10        | 4                                   | 100                |                                |
| Non-native             | Hordeum leporinum        | 0.2   | 20        | 5                                   | 100                |                                |
| Forb (FG)              | Rumex brownii            | 0.1   | 3         | Average (#no./5)                    | 99.6               |                                |

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



**BAM Site - Field Survey Form**

|               |                            |                                  |            |                    |         |
|---------------|----------------------------|----------------------------------|------------|--------------------|---------|
| <b>Date:</b>  | 15.12.21                   | <b>Plot ID:</b>                  | Box Plot E | <b>Photo #:</b>    |         |
| <b>Zone:</b>  | 55H                        | <b>Plot Dimensions:</b>          | 20x50      | <b>Easting:</b>    | 752987  |
| <b>Datum:</b> | GDA94                      | <b>Middle Bearing (o) at 0m:</b> | 210        | <b>Northing:</b>   | 6147751 |
| <b>PCT:</b>   | Yellow Box Grassy Woodland | <b>Condition Class</b>           |            | <b>Ecologists:</b> |         |

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

| Growth Form            | Scientific Name          | Cover | Abundance | DBH                                 | # Tree Stems Count | Number of Hollow-bearing Trees |
|------------------------|--------------------------|-------|-----------|-------------------------------------|--------------------|--------------------------------|
| Tree (TG)              | Eucalyptus melliodora    | 35    |           | 80+cm                               | 1                  | 1                              |
| HTE                    | Lycium ferocissimum      | 10    |           | 50-79cm                             |                    |                                |
| Non-native             | Cirsium vulgare          | 0.5   | 20        | 30-49cm                             |                    |                                |
| Non-native             | Hirschfeldia incana      | 1     | 40        | 20-29cm                             |                    |                                |
| Non-native             | Malva parviflora         | 0.2   | 10        | 10-19cm                             |                    |                                |
| Non-native             | Onopordum acanthum       | 0.5   | 20        | 5-9cm                               |                    |                                |
| Non-native             | Sonchus asper            | 0.2   | 10        | <5cm                                |                    |                                |
| Non-native             | Lolium perenne           | 20    |           |                                     |                    |                                |
| HTE                    | Nassella neesiana        | 60    |           | Length of Logs (m)                  | 0.5                |                                |
| Grass & grasslike (GG) | Austrostipa bigeniculata | 10    |           | (≥10 cm diameter, >50 cm in length) |                    |                                |
| Non-native             | Bromus catharticus       | 15    |           |                                     |                    |                                |
| Non-native             | Hordeum leporinum        | 5     |           | BAM Attribute (1 x 1 m plots)       | Litter Cover (%)   |                                |
| Non-native             | Rumex crispus            | 0.1   | 2         | 1                                   | 80                 |                                |
| Non-native             | Bromus hordeum           | 10    |           | 2                                   | 85                 |                                |
| Non-native             | Polygonum aviculare      | 0.1   | 3         | 3                                   | 60                 |                                |
| Non-native             | Chenopodium murale       | 0.1   | 5         | 4                                   | 10                 |                                |
| HTE                    | Senecio madagascarensis  | 0.1   | 5         | 5                                   | 15                 |                                |
| Non-native             | Eleusine tristachya      | 2     | 400       | Average (#no./5)                    | 50                 |                                |

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



**BAM Site - Field Survey Form**

|               |                  |                                  |                   |                    |         |
|---------------|------------------|----------------------------------|-------------------|--------------------|---------|
| <b>Date:</b>  | 15.12.21         | <b>Plot ID:</b>                  | <b>Box Plot F</b> | <b>Photo #:</b>    |         |
| <b>Zone:</b>  | 55H              | <b>Plot Dimensions:</b>          | 20x50             | <b>Easting:</b>    | 753030  |
| <b>Datum:</b> | GDA94            | <b>Middle Bearing (o) at Om:</b> | 295               | <b>Northing:</b>   | 6147796 |
| <b>PCT:</b>   | Exotic Grassland | <b>Condition Class</b>           |                   | <b>Ecologists:</b> |         |

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

| Growth Form            | Scientific Name          | Cover | Abundance | DBH                                 | # Tree Stems Count | Number of Hollow-bearing Trees |
|------------------------|--------------------------|-------|-----------|-------------------------------------|--------------------|--------------------------------|
| HTE                    | Nassella neesiana        | 80    |           | 80+cm                               | 0                  |                                |
| Grass & grasslike (GG) | Austrostipa bigeniculata | 6     |           | 50-79cm                             |                    | 2                              |
| Non-native             | Hirschfeldia incana      | 1     | 25        | 30-49cm                             |                    |                                |
| Non-native             | Avena fatua              | 10    |           | 20-29cm                             |                    |                                |
| Forb (FG)              | Rumex brownii            | 0.2   | 10        | 10-19cm                             |                    |                                |
| Non-native             | Bromus hordeum           | 5     |           | 5-9cm                               |                    |                                |
| Non-native             | Cirsium vulgare          | 1     | 20        | <5cm                                |                    |                                |
| Non-native             | Phalaris aquatica        | 2     | 30        |                                     |                    |                                |
| Non-native             | Hypochoeris radicata     | 1     | 300       | Length of Logs (m)                  | 0                  |                                |
| Non-native             | Vulpia myuros            | 0.2   | 500       | (≥10 cm diameter, >50 cm in length) |                    |                                |
| Non-native             | Hordeum leporinum        | 0.5   | 500       |                                     |                    |                                |
| Non-native             | Vulpia bromioides        | 0.2   | 200       | BAM Attribute (1 x 1 m plots)       | Litter Cover (%)   |                                |
| HTE                    | Lycium ferocissimum      | 1.5   | 20        | 1                                   | 100                |                                |
| Non-native             | Malva parviflora         | 0.2   | 15        | 2                                   | 100                |                                |
|                        |                          |       |           | 3                                   | 100                |                                |
|                        |                          |       |           | 4                                   | 100                |                                |
|                        |                          |       |           | 5                                   | 100                |                                |
|                        |                          |       |           | Average (#no./5)                    | 100                |                                |

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





**BAM Site - Field Survey Form**

|               |                            |                                  |            |                    |         |
|---------------|----------------------------|----------------------------------|------------|--------------------|---------|
| <b>Date:</b>  | 15.12.21                   | <b>Plot ID:</b>                  | Box Plot G | <b>Photo #:</b>    |         |
| <b>Zone:</b>  | 55H                        | <b>Plot Dimensions:</b>          | 20x50      | <b>Easting:</b>    | 752972  |
| <b>Datum:</b> | GDA94                      | <b>Middle Bearing (o) at 0m:</b> | 195        | <b>Northing:</b>   | 6147854 |
| <b>PCT:</b>   | Yellow Box Grassy Woodland | <b>Condition Class</b>           |            | <b>Ecologists:</b> |         |

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

| Growth Form            | Scientific Name          | Cover | Abundance | DBH                                 | # Tree Stems Count | Number of Hollow-bearing Trees |
|------------------------|--------------------------|-------|-----------|-------------------------------------|--------------------|--------------------------------|
| Tree (TG)              | Eucalyptus melliodora    | 25    |           | 80+cm                               | 1                  | 1                              |
| HTE                    | Lycium ferocissimum      | 0.2   | 4         | 50-79cm                             | 1                  | 1                              |
| Non-native             | Cirsium vulgare          | 0.1   | 5         | 30-49cm                             |                    |                                |
| Non-native             | Hirschfeldia incana      | 5     |           | 20-29cm                             |                    |                                |
| Non-native             | Malva parviflora         | 0.2   | 5         | 10-19cm                             |                    |                                |
| Non-native             | Onopordum acanthum       | 0.2   | 3         | 5-9cm                               |                    |                                |
| Non-native             | Sonchus asper            | 0.5   | 10        | <5cm                                |                    |                                |
| Non-native             | Lolium perenne           | 25    |           |                                     |                    |                                |
| HTE                    | Nassella neesiana        | 65    |           | Length of Logs (m)                  | 11                 |                                |
| Grass & grasslike (GG) | Austrostipa bigeniculata | 15    |           | (≥10 cm diameter, >50 cm in length) |                    |                                |
| Non-native             | Bromus catharticus       | 15    |           |                                     |                    |                                |
| Non-native             | Hordeum leporinum        | 3     | 400       | BAM Attribute (1 x 1 m plots)       | Litter Cover (%)   |                                |
| Non-native             | Rumex crispus            | 0.1   | 2         | 1                                   | 80                 |                                |
| Non-native             | Bromus hordeum           | 5     |           | 2                                   | 60                 |                                |
| Non-native             | Polygonum aviculare      | 0.1   | 5         | 3                                   | 90                 |                                |
| Non-native             | Chenopodium murale       | 0.1   | 1         | 4                                   | 90                 |                                |
| Non-native             | Lactuca serriola         | 0.1   | 3         | 5                                   | 95                 |                                |
| Non-native             | Eleusine tristachya      | 1     | 100       | Average (#no./5)                    | 83                 |                                |

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



## Appendix C. Tests of Significance

| Test of Significance<br>(Five Part Test)<br>s.7.3 of the Biodiversity Conservation Act 2016  |   |  |
|--|---|--|
| For<br>Nomadic Nectarivores  |   |  |
| 1. <i>Anthochaera phrygia</i> Regent Honeyeater (BC Act: Critically Endangered)<br>2. <i>Glossopsitta pusilla</i> Little Lorikeet (BC Act: Vulnerable)<br>3. <i>Lathamus discolor</i> Swift Parrot (BC Act: Endangered)                                |   |  |
| <b>Ecology</b>   | <p>The Swift Parrot and Little Lorikeet are nomadic nectarivorous birds which travel across New South Wales following food availability. The main sources of food are nectar from flowering Eucalyptus/Corymbia and lerp (psyllid bug exudate) on Eucalyptus/Corymbia/Angophora leaves.</p> <p>The Swift Parrot only breeds in Tasmania and migrates to mainland NSW in the autumn-winter months to forage. The Little Lorikeet is known to nest in smooth-barked trees.</p> <p>The Regent Honeyeater is a flagship threatened woodland bird whose conservation will benefit a large suite of other threatened and declining woodland fauna. The species inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River Sheoak. Regent Honeyeaters inhabit woodlands that support a significantly high abundance and species richness of bird species. These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes.</p> |  |
| <b>Extent of Habitat Impacted on Subject Site</b>  | <p>These nomadic nectarivores may occasionally forage on the mature <i>Eucalyptus melliodora</i> trees on the Subject Land. None of this habitat will be directly impacted for the proposal. Unintentional impacts may occur from accidental clearing or damage to the mature trees, and the added indirect pressures of increased presence of people and the hazards associated with man-made structures.</p> <p>These species are unlikely to breed within the Subject Land as it is open and disturbed, and outside of the breeding range of the Swift Parrot.</p> <p>All of these species are mobile and capable of travelling large distances. They are unlikely to rely heavily on the foraging habitat within the Subject Land. It is expected that the habitat present on the Subject Land would only be used in supplement to more important areas of remnant habitat, such as remnant forests and bushland in the region.</p>   |  |
| <b>(a) in the case of a threatened species, whether the proposal or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,</b> | <p>The proposal is not likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.</p> <p>The habitat to be impacted consists entirely of historically cleared, pasture-improved, managed grassland that has been grazed for over 100 years and is severely weed infested.</p> <ul style="list-style-type: none"> <li>Each of these species is wide-ranging, and likely to only utilise the habitat on the Subject Land in supplement to larger remnant areas.</li> <li>No suitable breeding habitat will be impacted by the proposal.</li> <li>Light spill is not expected to cause significant disturbance to foraging nocturnal fauna as light is not likely to extend significantly above existing base levels associated with the surrounding urban and industrial areas.</li> </ul>  |  |
| <b>(b) in the case of an endangered ecological community or , whether the proposal or activity:</b>  | <b>(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or</b>  | NA   |
|  | <b>(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,</b>  | NA   |
| <b>(c) in relation to the habitat of a threatened species or ecological community:</b>   | <b>(i) the extent to which habitat is likely to be removed or modified as a result of the proposal or activity, and</b>   | Approximately 2.53ha of exotic dominated grassland will be removed for the proposal. No foraging or breeding habitat will be directly or intentionally impacted. |
|  | <b>(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposal or activity, and</b>  | The habitat is already highly fragmented and isolated from more substantial habitat. The proposal will not alter this reality.                                   |

| <b>Test of Significance<br/>(Five Part Test)<br/>s.7.3 of the Biodiversity Conservation Act 2016</b>  |   |
|---|---|
| <b>For<br/>Nomadic Nectarivores</b>   |   |
| 1. <i>Anthochaera phrygia</i> Regent Honeyeater (BC Act: Critically Endangered)<br>2. <i>Glossopsitta pusilla</i> Little Lorikeet (BC Act: Vulnerable)<br>3. <i>Lathamus discolor</i> Swift Parrot (BC Act: Endangered)   |   |
| <b>(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,</b>  | <p>It is not expected that this patch of historically cleared, managed and weed-infested habitat surrounded by rural residential and agricultural land use is important to the survival of these wide-ranging, mobile species in the locality. Especially since it is unlikely that any potential breeding habitat will be impacted.</p>  |
| <b>(d) whether the proposal or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),</b>   | <p>The development proposed is not likely to have an adverse effect on any declared area of outstanding biodiversity value, directly or indirectly.</p>   |
| <b>(e) whether the proposal or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.</b>  | <p>The proposal is part of the following key threatening process (KTP) listed under section 4.31. of the NSW Biodiversity Conservation Act 2016:</p> <ol style="list-style-type: none"> <li>Clearing of native vegetation (as defined and described in the final determination of the Scientific Committee to list the key threatening process)</li> <li>Removal of dead wood and dead trees</li> </ol> |
| <b>Conclusion</b><br><p>The proposal will not significantly impact on a viable local population of these species, therefore no further impact assessment, such as a Biodiversity Development Assessment Report (BDAR) is necessary for this project to proceed.</p> |   |

| <b>Test of Significance<br/>(Five Part Test)<br/>s.7.3 of the Biodiversity Conservation Act 2016</b>  |  |
|---|--|
| <b>For<br/>Resident Woodland Birds</b>  |  |
| 1. <i>Artamus cyanopterus</i> Dusky Woodswallow (BC Act: Vulnerable)<br>2. <i>Stagonopleura guttata</i> Diamond Firetail (BC Act: Vulnerable) |  |
| <b>Ecology</b>  | <p>The Dusky Woodswallow primarily inhabits dry, open eucalypt forests and woodlands, including mallee associations. Primarily eats invertebrates, mainly insects, which are captured whilst hovering or sallying above the canopy or over water. Nest is an open, cup-shape, made of twigs, grass, fibrous rootlets and occasionally casuarina needles, and may be lined with grass. Nest sites vary greatly, but generally occur in shrubs or low trees, living or dead, horizontal or upright forks in branches, spouts, hollow stumps or logs, behind loose bark or in a hollow in the top of a wooden fence post. Nest sites may be exposed or well concealed by foliage.</p> <p>The Diamond Firetail is found in grassy eucalypt woodlands, including Box-Gum Woodlands and Snow Gum Eucalyptus pauciflora Woodlands. Often found in riparian areas (rivers and creeks), and sometimes in lightly wooded farmland. Feeds exclusively on the ground, on ripe and partly-ripe grass and herb seeds and green leaves, and on insects (especially in the breeding season). Nests are globular structures built either in the shrubby understorey, or higher up, especially under hawk's or raven's nests. Birds roost in dense shrubs or in smaller nests built especially for roosting.</p> |
| <b>Extent of Habitat Impacted on Subject Site</b>   | <p>Both of these woodland birds were identified on the Subject Land by Land Eco.</p> <p>A breeding pair of Diamond Firetails were observed nesting in an African Boxthorn (<i>Lycium ferocissimum</i>). This species is a Weed of National Significance and approximately 20 mature exotic shrubs of this species will be removed for the proposal. Approximately 2.53ha of foraging habitat in the form of exotic grassland will also be removed.</p> <p>The Dusky Woodswallow will also be impacted by the loss of potential nesting and perching habitat in large stags and loss of foraging habitat in the exotic grassland.</p> <p>Furthermore, altered vegetation structure through ornamental plants may attract more aggressive species such as the Noisy Miner which may exclude these woodland birds.</p>  |

**Test of Significance  
(Five Part Test)  
s.7.3 of the Biodiversity Conservation Act 2016**

**For  
Resident Woodland Birds**

1. *Artamus cyanopterus cyanopterus* Dusky Woodswallow (BC Act: Vulnerable)  
2. *Stagonopleura guttata* Diamond Firetail (BC Act: Vulnerable)

|  |   |  |
|--|---|--|
| <b>(a) in the case of a threatened species, whether the proposal or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,</b> | <p>The proposal will impact known breeding habitat of the Diamond Firetail, observed nesting in an African Boxthorn, and potential breeding habitat for the Dusky Woodswallow. African Boxthorn is an exotic thorny species and the only semblance of an understorey across the Subject Property, offering protection from feral predators such as cats. Removing this habitat will make it unlikely that either of these species will breed on the Subject Land.</p> <p>Revegetating the riparian corridor will offer a preferential alternative to this weedy habitat and is an appropriate offset that will minimise the likelihood of an adverse effect on the life cycle of these species.</p> |  |
| <b>(b) in the case of an endangered ecological community or , whether the proposal or activity:</b>  | <b>(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or</b>  | NA   |
|  | <b>(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,</b>  | NA   |
| <b>(c) in relation to the habitat of a threatened species or ecological community:</b>   | <b>(i) the extent to which habitat is likely to be removed or modified as a result of the proposal or activity, and</b>   | Approximately 20 mature exotic shrubs representing known and potential breeding habitat will be removed for the proposal. Approximately 2.53ha of foraging habitat in the form of exotic grassland will also be removed.   |
|  | <b>(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposal or activity, and</b>  | The habitat is already highly fragmented and isolated from more substantial habitat. The proposal will not alter this reality.   |
|  | <b>(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,</b>  | It is not expected that this patch of historically cleared, managed and weed-infested habitat surrounded by rural residential and agricultural land use is important to the survival of these mobile species in the locality. However, these species demonstrate the adaptability and utility of exotic flora in a sparse rural landscape. |
| <b>(d) whether the proposal or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),</b>  | The development proposed is not likely to have an adverse effect on any declared area of outstanding biodiversity value, directly or indirectly.  |  |
| <b>(e) whether the proposal or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.</b>   | <p>The proposal is part of the following key threatening process (KTP) listed under section 4.31. of the NSW Biodiversity Conservation Act 2016:</p> <ol style="list-style-type: none"> <li>1. Clearing of native vegetation (as defined and described in the final determination of the Scientific Committee to list the key threatening process)</li> <li>2. Removal of dead wood and dead trees</li> <li>3. Aggressive exclusion of birds from woodland and forest habitat by abundant Noisy Miners <i>Manorina melanocephala</i>.</li> </ol>  |  |

**Conclusion**

The proposal will not significantly impact on a viable local population of these species, therefore no further impact assessment, such as a Biodiversity Development Assessment Report (BDAR) is necessary for this project to proceed.

**Test of Significance  
(Five Part Test)  
s.7.3 of the Biodiversity Conservation Act 2016**

**For  
Nomadic Woodland Birds**

1. *Callocephalon fimbriatum* Gang-gang Cockatoo (BC Act: Vulnerable)
2. *Petroica boodang* Scarlet Robin (BC Act: Vulnerable)
3. *Petroica phoenicea* Flame Robin (BC Act: Vulnerable)

|  |  |   |
|--|--|---|
| <b>Ecology</b>   | <p>The Gang-gang Cockatoo is distributed from southern Victoria through south- and central-eastern New South Wales. In spring and summer, generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In autumn and winter, the species often moves to lower altitudes in drier more open eucalypt forests and woodlands, particularly box-gum and box-ironbark assemblages, or in dry forest in coastal areas and often found in urban areas. Favours old growth forest and woodland attributes for nesting and roosting. Nests are located in hollows that are 10 cm in diameter or larger in eucalypts.</p> <p>The Scarlet Robin lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs. This species lives in both mature and regrowth vegetation. This species' nest is an open cup made of plant fibres and cobwebs and is built in the fork of tree usually more than 2 metres above the ground; nests are often found in a dead branch in a live tree, or in a dead tree or shrub.</p> <p>The Flame Robin breeds in upland tall moist eucalypt forests and woodlands, often on ridges and slopes. Prefers clearings or areas with open understoreys. The groundlayer of the breeding habitat is dominated by native grasses and the shrub layer may be either sparse or dense. Nests are often near the ground and are built in sheltered sites, such as shallow cavities in trees, stumps or banks.</p> |   |
| <b>Extent of Habitat Impacted on Subject Site</b>  | <p>Foraging resources for the Gang-gang cockatoo in the form of approximately 20 exotic shrubs (African Boxthorn and Hawthorn) will be removed for the proposal. Approximately 2.53ha of foraging habitat for the Scarlet Robin and Flame Robin as they pass through on migration in the form of exotic grassland will also be removed.</p> <p>No highly suitable breeding habitat for any of these species will be removed.</p>   |   |
| <b>(a) in the case of a threatened species, whether the proposal or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,</b> | <p>The proposal is not likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.</p> <p>The habitat to be impacted consists entirely of historically cleared, pasture-improved, managed grassland that has been grazed for over 100 years and is severely weed infested.</p> <ul style="list-style-type: none"> <li>• Each of these species is wide-ranging, and likely to only utilise the habitat on the Subject Land in supplement to larger remnant areas.</li> <li>• No suitable breeding habitat will be impacted by the proposal.</li> </ul>   |   |
| <b>(b) in the case of an endangered ecological community or , whether the proposal or activity:</b>  | <b>(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or</b>   | NA  |
|  | <b>(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,</b>   | NA  |
| <b>(c) in relation to the habitat of a threatened species or ecological community:</b>   | <b>(i) the extent to which habitat is likely to be removed or modified as a result of the proposal or activity, and</b>  | <p>Approximately 20 mature exotic shrubs and approximately 2.53ha of exotic grassland representing foraging habitat for these species will be removed for the proposal.</p> <p>No native trees or possible nesting sites will be cleared.</p> |
|  | <b>(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposal or activity, and</b>   | The habitat is already highly fragmented and isolated from more substantial habitat. The proposal will not alter this reality.  |
|  | <b>(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or</b>   | It is not expected that this patch of historically cleared, managed and weed-infested habitat surrounded by rural residential and agricultural land use is important to the survival of these mobile species in the locality.                 |

| <b>Test of Significance<br/>(Five Part Test)<br/>s.7.3 of the Biodiversity Conservation Act 2016</b>   |  |
|--|--|
| <b>For<br/>Nomadic Woodland Birds</b>  |  |
| 1. <i>Callocephalon fimbriatum</i> Gang-gang Cockatoo (BC Act: Vulnerable)<br>2. <i>Petroica boodang</i> Scarlet Robin (BC Act: Vulnerable)<br>3. <i>Petroica phoenicea</i> Flame Robin (BC Act: Vulnerable)   |  |
|  | <b>ecological community in the locality,</b>   |
| <b>(d) whether the proposal or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),</b>  | The development proposed is not likely to have an adverse effect on any declared area of outstanding biodiversity value, directly or indirectly.   |
| <b>(e) whether the proposal or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.</b>   | <p>The proposal is part of the following key threatening process (KTP) listed under section 4.31. of the NSW Biodiversity Conservation Act 2016:</p> <ol style="list-style-type: none"> <li>1. Clearing of native vegetation (as defined and described in the final determination of the Scientific Committee to list the key threatening process)</li> <li>2. Removal of dead wood and dead trees</li> <li>3. Aggressive exclusion of birds from woodland and forest habitat by abundant Noisy Miners <i>Manorina melanocephala</i>.</li> </ol> |
| <b>Conclusion</b><br>The proposal will not significantly impact on a viable local population of these species, therefore no further impact assessment, such as a Biodiversity Development Assessment Report (BDAR) is necessary for this project to proceed. |  |

| <b>Test of Significance<br/>(Five Part Test)<br/>s.7.3 of the Biodiversity Conservation Act 2016</b>  |   |
|---|---|
| <b>For<br/>Hollow-dwelling Microbats</b>  |   |
| 1. <i>Falsistrellus tasmaniensis</i> Eastern False Pipistrelle (BC Act: Vulnerable)<br>2. <i>Nyctophilus corbeni</i> Corben's Long-eared Bat (BC Act: Vulnerable)<br>3. <i>Scoteanax rueppellii</i> Greater Broad-nosed Bat (BC Act: Vulnerable)<br>4. <i>Micronomus norfolkensis</i> Eastern Coastal Free-tailed Bat (BC Act: Vulnerable)<br>5. <i>Saccolaimus flaviventris</i> Yellow-bellied Sheathtail-bat (BC Act: Vulnerable) |   |
| <b>Ecology</b>  | <p>The Eastern False Pipistrelle is found on the south-east coast and ranges of Australia, from southern Queensland to Victoria and Tasmania. Prefers moist habitats, with trees taller than 20 m. Generally roosts in eucalypt hollows, but has also been found under loose bark on trees or in buildings.</p> <p>Corben's Long-eared Bat Inhabits a variety of vegetation types, including mallee, bullock Allocasuarina leuhmanni and box eucalypt dominated communities, but it is distinctly more common in box/ironbark/cypress-pine vegetation that occurs in a north-south belt along the western slopes and plains of NSW and southern Queensland. Roosts in tree hollows, crevices, and under loose bark.</p> <p>The Greater Broad-nosed utilises a variety of habitats from woodland through to moist and dry eucalypt forest and rainforest, though it is most commonly found in tall wet forest. Although this species usually roosts in tree hollows, it has also been found in buildings.</p> <p>The Eastern Coastal Free-tailed Bat occurs in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range. Roosts mainly in tree hollows but will also roost under bark or in man-made structures. Usually solitary but also recorded roosting communally, probably insectivorous.</p> <p>The Yellow-bellied Sheathtail-bat roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows. When foraging for insects, they fly high and fast over the forest canopy, but lower in more open country. Breeding has been recorded from December to mid-March, when a single young is born. Seasonal movements are unknown; there is speculation about a migration to southern Australia in late summer and autumn.</p> |
| <b>Extent of Habitat Impacted on Subject Site</b>   | <p>Two large hollow-bearing stags that have the potential to provide shelter to a small roosting colony to these species of hollow-dwelling microbats will be removed for the proposal. These stags contain small hollows and narrow fissures.</p> <p>Approximately 2.53ha of exotic grassland foraging habitat will also be removed.</p>   |

**Test of Significance  
(Five Part Test)  
s.7.3 of the Biodiversity Conservation Act 2016**

**For  
Hollow-dwelling Microbats**

1. *Falsistrellus tasmaniensis* Eastern False Pipistrelle (BC Act: Vulnerable)
2. *Nyctophilus corbeni* Corben's Long-eared Bat (BC Act: Vulnerable)
3. *Scoteanax rueppellii* Greater Broad-nosed Bat (BC Act: Vulnerable)
4. *Micronomus norfolkensis* Eastern Coastal Free-tailed Bat (BC Act: Vulnerable)
5. *Saccolaimus flaviventris* Yellow-bellied Sheath-tail-bat (BC Act: Vulnerable)

|  |  |   |
|--|--|---|
| <b>(a) in the case of a threatened species, whether the proposal or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,</b> | The proposal is not likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction. While potential shelter for a small roosting colony of microbats will be removed, the habitat is of low quality, occurring in a cleared, weed-infested paddock lacking in structural diversity.   |   |
| <b>(b) in the case of an endangered ecological community or , whether the proposal or activity:</b>  | <p>The habitat to be impacted consists entirely of historically cleared, pasture-improved, managed grassland that has been grazed for over 100 years and is severely weed infested.</p> <ul style="list-style-type: none"> <li>• Each of these species is wide-ranging, and likely to only utilise the habitat on the Subject Land in supplement to larger remnant areas.</li> <li>• Light spill is not expected to cause significant disturbance to foraging nocturnal fauna as light is not likely to extend significantly above existing base levels associated with the surrounding urban and industrial areas.</li> </ul> |   |
| <b>(b) in the case of an endangered ecological community or , whether the proposal or activity:</b>  | <b>(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or</b>   | NA  |
| <b>(b) in the case of an endangered ecological community or , whether the proposal or activity:</b>  | <b>(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,</b>   | NA  |
| <b>(c) in relation to the habitat of a threatened species or ecological community:</b>   | <b>(i) the extent to which habitat is likely to be removed or modified as a result of the proposal or activity, and</b>  | Two large hollow-bearing dead trees (stags) representing possible shelter to a small microbat colony and approximately 2.53ha of exotic grassland representing foraging habitat for these species will be removed for the proposal. |
| <b>(c) in relation to the habitat of a threatened species or ecological community:</b>   | <b>(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposal or activity, and</b>   | The habitat is already highly fragmented and isolated from more substantial habitat. The proposal will not alter this reality.  |
| <b>(c) in relation to the habitat of a threatened species or ecological community:</b>   | <b>(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,</b>   | It is not expected that this patch of historically cleared, managed and weed-infested habitat surrounded by rural residential and agricultural land use is important to the survival of these mobile species in the locality.       |
| <b>(d) whether the proposal or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),</b>  | The development proposed is not likely to have an adverse effect on any declared area of outstanding biodiversity value, directly or indirectly.   |   |
| <b>(e) whether the proposal or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.</b>   | <p>The proposal is part of the following key threatening process (KTP) listed under section 4.31. of the NSW Biodiversity Conservation Act 2016:</p> <ol style="list-style-type: none"> <li>1. Clearing of native vegetation (as defined and described in the final determination of the Scientific Committee to list the key threatening process)</li> <li>2. Removal of dead wood and dead trees</li> </ol>  |   |



**Test of Significance  
(Five Part Test)  
s.7.3 of the Biodiversity Conservation Act 2016**

- For  
Hollow-dwelling Microbats**
1. *Falsistrellus tasmaniensis* Eastern False Pipistrelle (BC Act: Vulnerable)
  2. *Nyctophilus corbeni* Corben's Long-eared Bat (BC Act: Vulnerable)
  3. *Scoteanax rueppellii* Greater Broad-nosed Bat (BC Act: Vulnerable)
  4. *Micronomus norfolkensis* Eastern Coastal Free-tailed Bat (BC Act: Vulnerable)
  5. *Saccolaimus flaviventris* Yellow-bellied Sheathtail-bat (BC Act: Vulnerable)

**Conclusion**

The proposal will not significantly impact on a viable local population of these species, therefore no further impact assessment, such as a Biodiversity Development Assessment Report (BDAR) is necessary for this project to proceed.

**Test of Significance  
(Five Part Test)  
s.7.3 of the Biodiversity Conservation Act 2016**

**White Box Yellow Box Blakely's Red Gum Woodland**

**Critically Endangered Ecological Community**

|  |   |   |
|--|---|---|
| <b>Extent of Habitat Impacted on Subject Site</b>  | No native vegetation belonging to the White Box Yellow Box Blakely's Red Gum Woodland will be directly or intentional removed for the proposal. Unintentional impacts may occur from accidental clearing or damage to the mature trees, or increased sedimentation from earthworks. |   |
| <b>(a) in the case of a threatened species, whether the proposal or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,</b> | NA  |   |
| <b>(b) in the case of an endangered ecological community or , whether the proposal or activity:</b>  | <b>(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or</b>  | <p>The condition of this CEEC on the Subject Land is extremely poor. The patch is not connected to other patches in the area, as it is surrounded by dense non-native grassland.</p> <p>The extent of this TEC across both the IBRA subregion and IBRA region is expected to be &gt;500ha. The proposal will not remove any of this ecosystem.</p> <p>Thus, the proposal is not likely to place the ecological community at risk of extinction.</p>                                 |
|  | <b>(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,</b>  | <p>The condition of this CEEC on the Subject Land is extremely poor. The patch is isolated from other patches as it is surrounded by dense non-native grassland.</p> <p>The composition of the vegetation is of low species diversity with severe weed-infestation.</p> <p>It is unlikely that the proposed DA will substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.</p> |
| <b>(c) in relation to the habitat of a threatened species or ecological community:</b>   | <b>(i) the extent to which habitat is likely to be removed or modified as a result of the proposal or activity, and</b>   | None of this CEEC on the Subject Land is likely to be removed or modified.  |
|  | <b>(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposal or activity, and</b>  | An area of habitat is not likely to become fragmented as a result of the development.   |
|  | <b>(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or</b>  | The area of this CEEC in the Subject Land is of low quality and not important to the long-term survival of the species or ecological community in the locality, as the community is locally extensive and there is over 500ha in the IBRA subregion.  |

**Test of Significance  
(Five Part Test)  
s.7.3 of the Biodiversity Conservation Act 2016**

**White Box Yellow Box Blakely's Red Gum Woodland**

**Critically Endangered Ecological Community**

|   |   |  |
|---|---|--|
|   | <b>ecological community in the locality,</b>  |  |
| <b>(d) whether the proposal or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),</b> | The development proposed is not likely to have an adverse effect on any declared area of outstanding biodiversity value, directly or indirectly.  |  |
| <b>(e) whether the proposal or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.</b>                | <p>The proposal is part of the following key threatening process (KTP) listed under section 4.31. of the NSW Biodiversity Conservation Act 2016:</p> <ol style="list-style-type: none"> <li>1. Clearing of native vegetation (as defined and described in the final determination of the Scientific Committee to list the key threatening process)</li> </ol> |  |

**Conclusion**

The proposal will not significantly impact on a local occurrence of White Box Yellow Box Blakley Red Gum Woodland, therefore no further impact assessment, such as a Biodiversity Development Assessment Report (BDAR) is necessary for this project to proceed.

## Appendix D. Weather Conditions During the Survey Period

Land Eco Consulting carried out on-site surveys in and surrounding the Subject Land for flora and fauna over the following dates:

- 15th December 2021
- 14th December 2021
- 30th November 2021
- 19th November 2021
- 10th November 2021
- 9th November 2021
- 10th October 2021

Weather data (BOM 2021) from this period is presented (**Table 14-17**).

The weather conditions were considered suitable to capture spring-flowering herbs and native grasses. Weather data from Goulburn NSW weather station is presented (**Table 14-17**).

**Table 14. Weather Conditions During Survey Period December 2021.**

| Date       | Day | Temps |      | Rain | Evap | Sun | Max wind gust |     |       | 9 am |       |      | 3 pm |                 |        |      |    |      |                 |      |        |
|------------|-----|-------|------|------|------|-----|---------------|-----|-------|------|-------|------|------|-----------------|--------|------|----|------|-----------------|------|--------|
|            |     | Min   | Max  |      |      |     | Dir           | Spd | Time  | Temp | RH    | Cl d | Dir  | Spd             | MSLP   | Temp | RH | Cl d | Dir             | Spd  | MSLP   |
|            |     | °C    | °C   |      |      |     | mm            | mm  | hours | km/h | local | °C   | %    | 8 <sup>th</sup> | km/h   | hPa  | °C | %    | 8 <sup>th</sup> | km/h | hPa    |
| December 1 | We  | 13.9  | 25.4 | 0    | 4.4  |     | SE            | 39  | 16:49 | 19.0 | 79    | 7    | NE   | 9               | 1016.3 | 24.7 | 57 |      | NNE             | 20   | 1013.5 |
| 2          | Th  | 9.5   | 28.4 | 0    | 3.4  |     | ENE           | 26  | 19:26 | 19.4 | 77    | 2    | SSE  | 4               | 1016.7 | 27.3 | 35 |      | SW              | 9    | 1014.0 |
| 3          | Fr  | 13.4  | 29.1 | 0    | 5.2  |     | E             | 41  | 16:08 | 22.9 | 56    | 0    | S    | 6               | 1015.0 | 21.2 | 76 |      | E               | 24   | 1013.6 |
| 4          | Sa  | 12.3  | 24.4 | 1.8  | 5.2  |     | ESE           | 41  | 16:41 | 14.5 | 96    | 7    | NNE  | 2               | 1013.3 | 20.1 | 61 |      | E               | 24   | 1011.5 |
| 5          | Su  | 9.9   | 15.9 | 0.2  | 5.4  |     | ESE           | 41  | 10:51 | 11.9 | 80    | 7    | ESE  | 19              | 1020.5 | 12.8 | 76 |      | E               | 28   | 1020.4 |
| 6          | Mo  | 8.9   | 19.9 | 0    | 1.8  |     | ENE           | 39  | 08:16 | 14.5 | 63    | 2    | NE   | 26              | 1018.5 | 18.1 | 59 |      | NE              | 19   | 1015.0 |
| 7          | Tu  | 10.5  | 26.0 | 0    | 1.8  |     | SW            | 46  | 15:08 | 19.9 | 71    | 1    | NW   | 13              | 1011.6 | 23.7 | 54 |      | W               | 26   | 1009.0 |
| 8          | We  | 12.7  | 14.6 | 0.8  | 3.6  |     | ESE           | 30  | 10:35 | 13.2 | 95    | 8    | E    | 15              | 1012.8 | 12.9 | 96 |      | ENE             | 9    | 1011.8 |
| 9          | Th  | 11.3  | 21.0 | 7.8  | 2.0  |     | NE            | 46  | 13:32 | 14.6 | 95    | 8    | ENE  | 9               | 1009.3 | 13.7 | 96 |      | N               | 17   | 1007.5 |
| 10         | Fr  | 9.9   | 13.2 | 37.0 | 3.4  |     | SSW           | 61  | 05:33 | 10.2 | 99    | 8    | SW   | 15              | 1006.4 | 10.6 | 98 |      | WSW             | 20   | 1007.8 |
| 11         | Sa  | 6.4   | 19.6 | 33.6 | 3.2  |     | S             | 44  | 08:47 | 12.9 | 69    | 7    | S    | 24              | 1014.8 | 18.3 | 53 |      | SE              | 28   | 1013.9 |
| 12         | Su  | 4.8   | 20.9 | 0.2  | 3.0  |     | SE            | 30  | 16:44 | 14.3 | 63    | 1    | SE   | 15              | 1017.6 | 18.4 | 52 |      | E               | 9    | 1014.8 |
| 13         | Mo  | 5.8   | 26.3 | 0    | 4.2  |     | SSW           | 31  | 13:42 | 11.0 | 92    | 8    | NE   | 7               | 1015.6 | 24.1 | 33 |      | WSW             | 17   | 1012.1 |
| 14         | Tu  | 6.3   | 27.8 | 0    | 4.2  |     | SSE           | 35  | 10:26 | 19.1 | 74    | 1    | N    | 2               | 1014.2 | 26.8 | 32 |      | ESE             | 13   | 1013.2 |
| 15         | We  | 8.3   | 31.1 | 0    | 4.8  |     | WSW           | 69  | 15:50 | 21.6 | 55    | 0    | NW   | 7               | 1012.6 | 30.0 | 31 |      | WNW             | 26   | 1009.2 |
| 16         | Th  | 14.2  | 25.9 | 0    | 6.0  |     | E             | 37  | 17:18 | 19.9 | 72    | 1    | E    | 4               | 1012.3 | 22.9 | 61 |      | ESE             | 22   | 1011.3 |
| 17         | Fr  | 12.2  | 28.1 | 0    | 5.8  |     | NE            | 31  | 21:04 | 17.5 | 66    | 1    | NE   | 20              | 1015.8 | 26.9 | 37 |      | NNW             | 19   | 1012.8 |
| 18         | Sa  | 13.1  | 31.3 | 0    | 5.8  |     | W             | 89  | 19:29 | 25.6 | 53    | 1    | NW   | 26              | 1012.8 | 28.7 | 45 |      | NW              | 22   | 1010.9 |
| 19         | Su  | 15.6  | 25.8 | 7.8  | 6.0  |     | NW            | 87  | 17:07 | 22.0 | 65    | 7    | NNW  | 24              | 1008.7 | 19.2 | 79 |      | NW              | 41   | 1007.7 |
| 20         | Mo  | 14.0  | 26.4 | 1.2  | 2.6  |     | W             | 46  | 13:16 | 19.7 | 42    | 2    | NW   | 19              | 1013.4 | 25.3 | 28 |      | WNW             | 28   | 1012.3 |

|                                     |    |      |      |       |       |  |        |       |      |    |   |         |        |      |    |         |        |
|-------------------------------------|----|------|------|-------|-------|--|--------|-------|------|----|---|---------|--------|------|----|---------|--------|
| 21                                  | Tu | 6.0  | 29.1 | 0     | 6.4   |  | W 39   | 12:36 | 20.5 | 48 | 0 | WN W 17 | 1013.3 | 28.6 | 24 | WN W 24 | 1011.2 |
| 22                                  | We | 9.0  | 30.3 | 0     | 6.8   |  | ESE 39 | 15:50 | 17.1 | 89 | 4 | Calm    | 1012.1 | 29.7 | 30 | WN W 13 | 1009.0 |
| 23                                  | Th | 14.9 | 26.3 | 0     | 5.8   |  | SW 56  | 13:06 | 18.0 | 97 | 7 | NE 13   | 1012.0 | 20.3 | 97 | E 11    | 1009.5 |
| 24                                  | Fr | 14.1 | 25.2 | 11.8  | 6.4   |  | ENE 30 | 17:40 | 15.9 | 97 | 8 | E 9     | 1015.0 | 23.3 | 65 | SSW 13  | 1012.1 |
| 25                                  | Sa | 13.5 | 30.5 | 0.2   | 3.2   |  | ENE 59 | 18:51 | 22.2 | 74 | 1 | NNW 6   | 1014.3 | 29.9 | 31 | SSW 11  | 1012.0 |
| 26                                  | Su | 13.4 | 21.7 | 0.6   | 6.6   |  | ESE 56 | 16:14 | 19.8 | 88 | 7 | E 13    | 1014.4 | 16.2 | 98 | E 11    | 1013.4 |
| 27                                  | Mo | 10.5 | 18.2 | 7.0   | 3.0   |  | SE 41  | 16:20 | 12.1 | 88 | 8 | SE 19   | 1018.3 | 16.5 | 62 | SE 24   | 1017.2 |
| 28                                  | Tu | 9.5  | 18.3 | 0     | 2.8   |  | SE 33  | 23:19 | 13.3 | 67 | 4 | ESE 19  | 1019.9 | 16.6 | 56 | ESE 17  | 1017.8 |
| 29                                  | We | 2.9  | 23.9 | 0     | 2.6   |  | E 26   | 16:54 | 13.1 | 78 | 1 | N 6     | 1018.7 | 21.1 | 46 | NE 9    | 1015.3 |
| 30                                  | Th | 8.0  | 27.0 | 0     | 4.8   |  | NE 26  | 15:26 | 14.0 | 99 | 1 | Calm    | 1016.7 | 26.2 | 28 | E 13    | 1014.1 |
| 31                                  | Fr | 6.9  | 29.2 | 0     | 4.8   |  | NE 46  | 14:49 | 19.4 | 72 | 0 | N 2     | 1015.4 | 28.7 | 25 | ESE 11  | 1012.1 |
| <b>Statistics for December 2021</b> |    |      |      |       |       |  |        |       |      |    |   |         |        |      |    |         |        |
| Mean                                |    | 10.4 | 24.5 |       | 4.4   |  |        |       | 17.1 | 76 | 3 | 11      | 1014.5 | 22.0 | 55 | 18      | 1012.5 |
| Lowest                              |    | 2.9  | 13.2 | 0     | 1.8   |  |        |       | 10.2 | 42 | 0 | Calm    | 1006.4 | 10.6 | 24 | # 9     | 1007.5 |
| Highest                             |    | 15.6 | 31.3 | 37.0  | 6.8   |  | W 89   |       | 25.6 | 99 | 8 | # 26    | 1020.5 | 30.0 | 98 | NW 41   | 1020.4 |
| Total                               |    |      |      | 110.0 | 135.0 |  |        |       |      |    |   |         |        |      |    |         |        |

Table 15. Weather Conditions During Survey Period November 2021.

| Date          | Day | Temps |      | Rain | Eva p | Sun | Max wind gust |         |       | 9 am |       |      | 3 pm    |                 |      |      |    |         |                 |      |      |
|---------------|-----|-------|------|------|-------|-----|---------------|---------|-------|------|-------|------|---------|-----------------|------|------|----|---------|-----------------|------|------|
|               |     | Min   | Max  |      |       |     | Dir           | Sp d    | Time  | Temp | RH    | Cl d | Dir     | Sp d            | MSLP | Temp | RH | Cl d    | Dir             | Sp d | MSLP |
|               |     | °C    | °C   |      |       |     | mm            | mm      | hours | km/h | local | °C   | %       | 8 <sup>th</sup> | km/h | hPa  | °C | %       | 8 <sup>th</sup> | km/h | hPa  |
| November 2021 | 1   | Mo    | 2.8  | 22.0 | 0     | 4.0 |               | WN W 37 | 14:32 | 9.3  | 99    | 7    | Calm    | 1025.8          | 21.2 | 42   |    | WN W 17 | 1022.8          |      |      |
|               | 2   | Tu    | 3.0  | 23.0 | 0     | 3.2 |               | ENE 41  | 16:21 | 16.7 | 62    | 0    | NE 17   | 1026.7          | 22.2 | 40   |    | E 19    | 1024.5          |      |      |
|               | 3   | We    | 10.2 | 23.6 | 0     | 5.0 |               | NNE 28  | 06:38 | 15.7 | 70    | 2    | NNE 19  | 1025.2          | 22.9 | 47   |    | WN W 2  | 1020.8          |      |      |
|               | 4   | Th    | 13.6 | 16.7 | 3.0   | 3.2 |               | ENE 28  | 20:05 | 15.2 | 99    | 8    | NNE 6   | 1021.1          | 15.7 | 98   |    | ESE 7   | 1019.5          |      |      |
|               | 5   | Fr    | 12.2 | 16.6 | 23.0  | 1.0 |               | E 30    | 05:40 | 13.6 | 92    | 8    | ENE 19  | 1021.0          | 15.1 | 92   |    | E 15    | 1018.3          |      |      |
|               | 6   | Sa    | 12.2 | 24.1 | 3.8   | 1.0 |               | NW 31   | 14:03 | 15.8 | 85    | 4    | N 9     | 1014.8          | 22.9 | 50   |    | W 11    | 1009.9          |      |      |
|               | 7   | Su    | 13.3 | 24.0 | 17.6  | 3.8 |               | SW 39   | 17:04 | 17.3 | 91    | 3    | NNW 13  | 1008.6          | 22.3 | 54   |    | NNW 15  | 1006.7          |      |      |
|               | 8   | Mo    | 13.3 | 23.6 | 1.0   | 2.8 |               | NNW 39  | 15:12 | 16.5 | 83    | 5    | WN W 20 | 1008.0          | 22.8 | 46   |    | NNW 26  | 1007.2          |      |      |
|               | 9   | Tu    | 11.4 | 22.7 | 0.2   | 0.2 |               | N 50    | 13:35 | 16.5 | 78    | 1    | E 11    | 1012.0          | 22.2 | 43   |    | NNW 30  | 1009.9          |      |      |
|               | 10  | We    | 9.5  | 22.0 | 2.8   | 5.2 |               | NW 35   | 13:01 | 15.8 | 99    | 8    | N 9     | 1009.5          | 20.3 | 73   |    | NW 13   | 1004.9          |      |      |
|               | 11  | Th    | 11.0 | 21.1 | 17.6  | 2.4 |               | E 39    | 14:37 | 17.0 | 52    | 2    | N 11    | 1005.2          | 17.8 | 74   |    | ENE 24  | 1002.6          |      |      |

|                                     |      |      |       |      |     |  |        |       |      |    |   |        |        |      |    |  |        |        |
|-------------------------------------|------|------|-------|------|-----|--|--------|-------|------|----|---|--------|--------|------|----|--|--------|--------|
| 12                                  | Fr   | 7.8  | 18.0  | 44.8 | 2.4 |  | N 52   | 19:22 | 10.4 | 96 | 7 | NE 15  | 997.0  | 16.0 | 86 |  | N 17   | 993.2  |
| 13                                  | Sa   | 8.1  | 13.3  | 9.6  | 1.6 |  | N 54   | 02:51 | 8.5  | 93 | 8 | N 31   | 997.1  | 12.5 | 80 |  | N 31   | 997.4  |
| 14                                  | Su   | 6.6  | 14.3  | 6.6  | 1.8 |  | NNW 72 | 16:29 | 10.5 | 72 | 2 | N 39   | 1005.3 | 8.5  | 92 |  | N 46   | 1003.1 |
| 15                                  | Mo   | 4.7  | 13.7  | 2.2  | 2.8 |  | NNW 83 | 03:52 | 6.6  | 75 | 7 | WNW 48 | 1004.9 | 12.8 | 68 |  |        | 1006.7 |
| 16                                  | Tu   | 3.8  | 16.3  | 1.0  | 2.0 |  |        |       | 10.2 | 63 | 1 |        | 1014.5 | 15.3 | 46 |  | NW 15  | 1015.6 |
| 17                                  | We   | 1.1  | 20.4  | 0    | 3.6 |  | ESE 28 | 12:58 | 12.8 | 69 | 1 | NNE 13 | 1022.5 | 18.5 | 45 |  | NE 6   | 1019.7 |
| 18                                  | Th   | 3.8  | 23.5  | 0    | 3.4 |  | W 46   | 09:34 | 15.7 | 74 | 0 | NNW 6  | 1019.4 | 22.7 | 34 |  | WNW 24 | 1014.9 |
| 19                                  | Fr   | 12.9 | 24.3  | 0    | 5.4 |  | W 61   | 09:06 | 18.8 | 61 | 7 | WNW 26 | 1012.5 | 21.3 | 56 |  | WNW 20 | 1011.8 |
| 20                                  | Sa   | 13.4 | 18.1  | 0.6  | 2.8 |  | NW 35  | 11:11 | 16.7 | 94 | 8 | NW 13  | 1010.1 | 16.5 | 95 |  | WNW 19 | 1010.5 |
| 21                                  | Su   | 9.9  | 13.6  | 19.0 | 1.8 |  | ESE 43 | 10:11 | 11.1 | 99 | 8 | SE 17  | 1015.8 | 11.9 | 91 |  | ESE 22 | 1016.2 |
| 22                                  | Mo   | 7.2  | 18.4  | 1.2  | 1.6 |  | ESE 39 | 10:14 | 12.0 | 79 | 7 | ESE 20 | 1022.6 | 17.2 | 53 |  | E 26   | 1020.3 |
| 23                                  | Tu   | 10.1 | 21.9  | 0.2  | 2.8 |  | ENE 35 | 10:49 | 13.9 | 83 | 7 | ENE 19 | 1020.4 | 19.8 | 63 |  | ENE 20 | 1017.9 |
| 24                                  | We   | 13.1 | 23.1  | 0    | 2.6 |  | NNE 31 | 16:13 | 17.5 | 83 | 7 | Calm   | 1016.6 | 21.2 | 80 |  | WSW 11 | 1013.8 |
| 25                                  | Th   | 16.1 | 23.1  | 18.6 | 2.0 |  | SE 31  | 20:53 | 19.9 | 90 | 6 | NE 11  | 1011.3 | 23.0 | 72 |  | NW 13  | 1007.0 |
| 26                                  | Fr   | 12.5 | 14.4  | 6.8  | 2.6 |  | SE 57  | 13:47 | 12.7 | 99 | 8 | SE 17  | 1010.5 | 13.5 | 88 |  | SE 35  | 1010.8 |
| 27                                  | Sa   | 9.1  | 12.1  | 12.2 | 2.4 |  | SSE 48 | 09:04 | 10.0 | 99 | 8 | SSE 28 | 1019.0 | 11.2 | 91 |  | SSE 24 | 1019.3 |
| 28                                  | Su   | 8.3  | 15.0  | 0.2  | 0.6 |  | SSE 33 | 08:55 | 11.5 | 83 | 7 | SE 20  | 1022.8 | 13.2 | 77 |  | ESE 22 | 1020.4 |
| 29                                  | Mo   | 8.3  | 23.6  | 0.2  | 1.4 |  | ENE 28 | 16:52 | 13.0 | 72 | 2 | E 9    | 1020.2 | 22.4 | 47 |  | W 7    | 1016.2 |
| 30                                  | Tu   | 11.3 | 25.7  | 0    | 3.2 |  | E 33   | 15:05 | 14.0 | 94 | 8 | NNW 6  | 1018.0 | 24.5 | 41 |  | E 11   | 1014.5 |
| <b>Statistics for November 2021</b> |      |      |       |      |     |  |        |       |      |    |   |        |        |      |    |  |        |        |
| Mean                                | 9.4  | 19.7 |       | 2.6  |     |  |        |       | 13.8 | 82 | 5 | 16     | 1014.6 | 18.2 | 65 |  | 18     | 1012.5 |
| Lowest                              | 1.1  | 12.1 | 0     | 0.2  |     |  |        |       | 6.6  | 52 | 0 | Calm   | 997.0  | 8.5  | 34 |  | WNW 2  | 993.2  |
| Highest                             | 16.1 | 25.7 | 44.8  | 5.4  |     |  | NNW 83 |       | 19.9 | 99 | 8 | WNW 48 | 1026.7 | 24.5 | 98 |  | N 46   | 1024.5 |
| Total                               |      |      | 192.2 | 78.6 |     |  |        |       |      |    |   |        |        |      |    |  |        |        |

Table 16. Weather Conditions During Survey Period October 2021.

| Date         | Day | Temps |     | Rain | Eva p | Sun | Max wind gust |       |       | 9 am |       |      |     |                 | 3 pm   |      |    |      |                 |        |      |
|--------------|-----|-------|-----|------|-------|-----|---------------|-------|-------|------|-------|------|-----|-----------------|--------|------|----|------|-----------------|--------|------|
|              |     | Min   | Max |      |       |     | Dir           | Sp d  | Time  | Temp | RH    | Cl d | Dir | Sp d            | MSLP   | Temp | RH | Cl d | Dir             | Sp d   | MSLP |
|              |     | °C    | °C  |      |       |     | mm            | mm    | hours | km/h | local | °C   | %   | 8 <sup>th</sup> | km/h   | hPa  | °C | %    | 8 <sup>th</sup> | km/h   | hPa  |
| October 2021 | 1   | Fr    | 5.9 | 20.3 | 3.8   | 1.8 |               | NW 46 | 00:02 |      | 16.0  | 69   | 6   | NE 15           | 1007.9 | 14.9 | 64 |      | W 31            | 1004.4 |      |
|              | 2   | Sa    | 7.0 | 16.8 | 0.8   | 1.8 |               | W 43  | 12:36 |      | 13.0  | 86   | 7   | W 20            | 1005.1 | 13.8 | 80 |      | WNW 20          | 1002.2 |      |

|    |    |      |      |      |     |  |         |       |      |    |   |         |        |      |    |         |        |
|----|----|------|------|------|-----|--|---------|-------|------|----|---|---------|--------|------|----|---------|--------|
| 3  | Su | 7.2  | 18.2 | 2.8  | 1.6 |  | W 52    | 13:06 | 13.1 | 81 | 3 | W 30    | 1005.1 | 16.5 | 62 | WN W 33 | 1002.6 |
| 4  | Mo | 5.1  | 18.1 | 0    | 2.4 |  | WN W 72 | 18:51 | 14.5 | 81 | 1 | NNW 6   | 1000.8 | 16.2 | 44 | W 37    | 1001.3 |
| 5  | Tu | 3.6  | 13.7 | 0    | 4.2 |  | W 81    | 11:39 | 9.1  | 78 | 3 | W 33    | 1007.7 | 11.7 | 52 | W 44    | 1009.2 |
| 6  | We | 4.3  | 17.9 | 0    | 3.4 |  | W 48    | 09:48 | 10.5 | 70 | 0 | W 31    | 1016.0 | 17.0 | 37 | W 37    | 1012.9 |
| 7  | Th | 2.0  | 21.4 | 0    | 4.0 |  | NW 70   | 08:49 | 17.9 | 36 | 0 | NW 37   | 1007.2 | 20.3 | 38 | WN W 35 | 1008.7 |
| 8  | Fr | 0.3  | 20.3 | 0    | 4.4 |  | NNW 33  | 13:49 | 8.5  | 99 | 4 | Calm    | 1018.6 | 19.3 | 33 | NNW 11  | 1015.5 |
| 9  | Sa | 1.5  | 23.1 | 0    | 3.4 |  | W 43    | 13:17 | 13.3 | 69 | 2 | NW 13   | 1017.2 | 22.4 | 32 | WN W 22 | 1014.1 |
| 10 | Su | 7.2  | 23.0 | 0.2  | 2.6 |  | NW 43   | 11:30 | 14.0 | 94 | 7 | SW 9    | 1010.3 | 19.3 | 66 | NW 22   | 1008.0 |
| 11 | Mo | 3.9  | 13.9 | 12.6 | 2.6 |  | E 39    | 22:31 | 7.3  | 80 | 7 | SE 13   | 1015.8 | 12.4 | 54 | E 22    | 1014.8 |
| 12 | Tu | 6.3  | 11.9 | 0.4  | 2.2 |  | E 39    | 11:01 | 8.1  | 90 | 8 | E 17    | 1018.3 | 10.9 | 76 | E 24    | 1016.1 |
| 13 | We | 8.0  |      | 0.2  | 1.2 |  | NE 43   | 22:32 | 10.2 | 80 | 8 | ENE 20  | 1016.2 | 13.2 | 79 | ENE 19  | 1012.5 |
| 14 | Th | 10.1 | 18.2 | 0.4  | 1.6 |  | NNE 39  | 00:51 | 11.7 | 86 | 7 | Calm    | 1009.3 | 13.1 | 98 | SE 17   | 1003.6 |
| 15 | Fr | 5.1  | 15.3 | 35.8 | 2.0 |  | WN W 63 | 11:47 | 7.9  | 84 | 6 | NNW 11  | 1002.5 | 12.8 | 64 | WN W 26 | 999.1  |
| 16 | Sa | 6.7  | 14.9 | 0.8  | 2.2 |  | WN W 67 | 05:53 | 7.8  | 91 | 7 | NW 24   | 1003.7 | 14.1 | 66 | W 43    | 1004.1 |
| 17 | Su | 3.9  | 17.5 | 0    | 1.6 |  | W 41    | 08:37 | 11.2 | 65 | 1 | W 20    | 1014.1 | 17.0 | 49 | WN W 22 | 1012.8 |
| 18 | Mo | 0.4  | 20.6 | 0    | 3.6 |  | WSW 41  | 14:23 | 12.9 | 75 | 0 | NW 6    | 1016.3 | 19.1 | 43 | W 26    | 1014.6 |
| 19 | Tu | 7.3  | 18.6 | 0.2  | 3.8 |  | WSW 54  | 12:20 | 15.7 | 73 | 2 | WN W 13 | 1016.2 | 15.1 | 57 | SSE 24  | 1016.5 |
| 20 | We | 1.6  | 17.2 | 0    | 4.0 |  | SSE 44  | 09:43 | 12.8 | 91 | 7 | SSE 24  | 1018.8 | 15.5 | 82 | SE 24   | 1018.0 |
| 21 | Th | 10.1 | 19.9 | 1.2  | 2.0 |  | E 31    | 14:58 | 12.6 | 95 | 7 | ESE 9   | 1018.0 | 17.7 | 64 | NNE 7   | 1015.6 |
| 22 | Fr | 6.4  | 22.6 | 0.2  | 2.0 |  | ESE 15  | 08:14 | 13.5 | 99 | 7 | ENE 7   | 1018.0 | 20.8 | 52 | Calm    | 1015.1 |
| 23 | Sa | 6.4  | 25.4 | 0    | 3.6 |  | W 39    | 10:48 | 13.1 | 99 | 2 | Calm    | 1014.3 | 23.7 | 51 | W 20    | 1012.1 |
| 24 | Su | 4.4  | 18.5 | 0.2  | 4.4 |  | W 52    | 12:55 | 13.2 | 67 | 1 | W 17    | 1015.3 | 16.5 | 44 | WN W 30 | 1014.6 |
| 25 | Mo | -0.1 | 16.9 | 0    | 4.6 |  | NW 43   | 13:49 | 10.5 | 69 | 1 | WN W 20 | 1016.0 | 16.0 | 49 | W 20    | 1015.2 |
| 26 | Tu | 0.7  | 19.5 | 0    | 4.2 |  | WN W 26 | 10:08 | 11.6 | 81 | 1 | SE 4    | 1020.1 | 18.4 | 37 | NNW 6   | 1016.9 |
| 27 | We | 4.2  | 23.1 | 0    | 3.6 |  | W 33    | 12:38 | 12.0 | 85 | 1 | N 9     | 1018.8 | 22.1 | 38 | W 17    | 1015.4 |
| 28 | Th | 2.0  | 26.3 | 0    | 0.6 |  | W 44    | 12:39 | 15.0 | 72 | 2 | NNW 7   | 1014.2 | 24.6 | 29 | W 24    | 1010.9 |
| 29 | Fr | 7.8  | 19.8 | 0    | 4.4 |  | WN W 70 | 16:17 | 19.1 | 49 | 3 | WN W 37 | 1005.3 | 19.4 | 49 | WN W 48 | 1005.4 |
| 30 | Sa | 0.3  | 16.8 | 0    | 4.8 |  | WSW 39  | 12:21 | 10.6 | 61 | 1 | SW 13   | 1017.2 | 15.8 | 36 | WN W 19 | 1016.3 |
| 31 | Su | -1.8 | 20.5 | 0    | 4.4 |  | E 26    | 19:58 | 9.5  | 77 | 1 | N 4     | 1025.2 | 18.4 | 35 | SE 6    | 1022.8 |

**Statistics for October 2021**

|         |      |      |      |      |  |  |      |  |      |    |   |      |        |      |    |         |    |        |
|---------|------|------|------|------|--|--|------|--|------|----|---|------|--------|------|----|---------|----|--------|
| Mean    | 4.4  | 19.0 |      | 3.0  |  |  |      |  | 12.1 | 78 | 3 | 15   | 1013.2 | 17.0 | 53 |         | 23 | 1011.3 |
| Lowest  | -1.8 | 11.9 | 0    | 0.6  |  |  |      |  | 7.3  | 36 | 0 | Calm | 1000.8 | 10.9 | 29 | Calm    |    | 999.1  |
| Highest | 10.1 | 26.3 | 35.8 | 4.8  |  |  | W 81 |  | 19.1 | 99 | 8 | # 37 | 1025.2 | 24.6 | 98 | WN W 48 |    | 1022.8 |
| Total   |      |      | 59.6 | 93.0 |  |  |      |  |      |    |   |      |        |      |    |         |    |        |

Table 17. Weather Conditions During Survey Period September 2021.

| Date        | Day | Temps |      | Rain | Eva p | Sun | Max wind gust |      |       | 9 am |    |      |      |      | 3 pm   |      |    |      |     |      |        |
|-------------|-----|-------|------|------|-------|-----|---------------|------|-------|------|----|------|------|------|--------|------|----|------|-----|------|--------|
|             |     | Min   | Max  |      |       |     | Dir           | Sp d | Time  | Temp | RH | Cl d | Dir  | Sp d | MSLP   | Temp | RH | Cl d | Dir | Sp d | MSLP   |
|             |     | °C    | °C   |      |       |     |               |      |       |      |    |      |      |      |        |      |    |      |     |      |        |
| September 1 | We  | -0.2  | 22.7 | 0    | 1.8   |     | ENE           | 22   | 15:59 | 12.3 | 68 | 1    | N    | 9    | 1029.8 | 22.1 | 27 |      | ENE | 9    | 1027.6 |
| 2           | Th  | -2.3  | 20.2 | 0    | 2.2   |     | NE            | 39   | 12:01 | 12.9 | 83 | 0    | N    | 2    | 1030.0 | 19.5 | 54 |      | NE  | 28   | 1025.1 |
| 3           | Fr  | 3.2   | 22.7 | 0    | 2.4   |     | N             | 37   | 10:56 | 17.0 | 74 | 1    | N    | 13   | 1025.2 | 21.7 | 49 |      | NNW | 22   | 1019.9 |
| 4           | Sa  | 5.4   | 14.1 | 0.4  | 2.6   |     | N             | 48   | 11:42 | 12.8 | 86 | 8    | N    | 15   | 1019.7 | 13.3 | 92 |      | N   | 13   | 1015.6 |
| 5           | Su  | 5.8   | 9.2  | 15.8 | 1.6   |     | N             | 63   | 09:27 | 7.2  | 82 | 6    | N    | 28   | 1014.5 | 7.3  | 83 |      | N   | 35   | 1015.6 |
| 6           | Mo  | 3.3   | 15.2 | 0.2  | 1.0   |     | NW            | 54   | 10:20 | 8.0  | 76 | 1    | N    | 33   | 1024.6 | 14.7 | 26 |      | SW  | 31   | 1025.4 |
| 7           | Tu  | 0.5   | 15.0 | 0    | 2.6   |     |               |      |       | 8.9  | 70 | 1    | NNW  | 31   | 1027.8 | 14.4 | 53 |      | WNW | 37   | 1025.6 |
| 8           | We  | -1.5  | 16.6 | 0    | 2.8   |     | WNW           | 37   | 18:37 | 5.9  | 99 | 7    | NNW  | 13   | 1032.1 | 16.4 | 51 |      | W   | 26   | 1028.3 |
| 9           | Th  | 3.4   | 17.9 | 0    | 2.4   |     | W             | 59   | 10:20 | 10.9 | 80 | 2    | WNW  | 28   | 1028.5 | 16.8 | 48 |      | WNW | 39   | 1024.1 |
| 10          | Fr  | 6.9   | 20.9 | 0.2  | 2.4   |     | WNW           | 54   | 02:23 | 14.3 | 50 | 1    | WNW  | 24   | 1022.9 | 19.4 | 35 |      | WNW | 30   | 1021.2 |
| 11          | Sa  | -0.2  | 22.0 | 0    | 2.8   |     | NW            | 61   | 10:38 | 18.1 | 36 | 1    | NW   | 22   | 1017.1 | 21.0 | 32 |      | NW  | 31   | 1012.8 |
| 12          | Su  | 4.3   | 18.6 | 0    | 4.0   |     | W             | 56   | 13:08 | 15.4 | 44 | 1    | WNW  | 31   | 1006.9 | 15.2 | 58 |      | W   | 31   | 1006.0 |
| 13          | Mo  | -0.5  | 12.8 | 0.8  | 3.4   |     | SSE           | 35   | 17:53 | 5.6  | 99 | 8    | WNW  | 4    | 1015.0 | 7.1  | 90 |      | ENE | 13   | 1015.8 |
| 14          | Tu  | -2.9  | 13.2 | 0.8  | 1.4   |     | SSE           | 43   | 09:06 | 7.5  | 75 | 7    | S    | 24   | 1024.2 | 11.6 | 53 |      | SSE | 17   | 1022.7 |
| 15          | We  | -2.9  | 13.9 | 0.2  | 1.2   |     | ESE           | 24   | 11:06 | 4.3  | 99 | 0    | SSE  | 4    | 1025.8 | 12.2 | 47 |      | SE  | 9    | 1022.8 |
| 16          | Th  | 1.5   | 15.3 | 0    | 1.6   |     | ESE           | 26   | 09:46 | 10.2 | 70 | 3    | E    | 13   | 1024.8 | 13.0 | 45 |      | NE  | 6    | 1020.8 |
| 17          | Fr  | 0.3   | 19.3 | 0    | 2.2   |     | NW            | 43   | 23:22 | 7.7  | 99 | 0    | Calm |      | 1021.6 | 18.5 | 39 |      | W   | 28   | 1017.8 |
| 18          | Sa  | 7.5   | 16.9 | 0.2  | 3.0   |     | W             | 54   | 16:57 | 15.4 | 66 | 6    | W    | 31   | 1015.0 | 13.2 | 75 |      | WNW | 20   | 1015.0 |
| 19          | Su  | 2.3   | 15.6 | 1.6  | 2.0   |     | WNW           | 67   | 15:30 | 10.8 | 62 | 1    | WNW  | 26   | 1023.2 | 14.4 | 44 |      | WNW | 43   | 1018.6 |
| 20          | Mo  | 5.9   | 18.1 | 0    | 3.0   |     | WNW           | 78   | 10:33 | 14.9 | 43 | 0    | WNW  | 33   | 1013.1 | 10.4 | 72 |      | WSW | 39   | 1011.2 |
| 21          | Tu  | 0.0   | 13.7 | 1.6  | 4.0   |     | SSW           | 54   | 13:11 | 6.3  | 68 | 1    | SW   | 20   | 1017.6 | 11.6 | 44 |      | SSW | 24   | 1018.9 |
| 22          | We  | -2.4  | 15.8 | 0    | 2.4   |     | NW            | 33   | 14:12 | 10.1 | 63 | 0    | W    | 11   | 1024.5 | 14.8 | 50 |      | W   | 20   | 1022.3 |
| 23          | Th  | 2.5   | 18.4 | 0    | 2.6   |     | WNW           | 48   | 14:06 | 11.0 | 79 | 1    | WNW  | 24   | 1022.0 | 17.3 | 54 |      | WNW | 33   | 1017.9 |
| 24          | Fr  | 2.5   | 19.6 | 0    | 3.0   |     | W             | 63   | 11:01 | 16.0 | 59 | 0    | WNW  | 37   | 1014.6 | 18.9 | 40 |      | WNW | 41   | 1010.4 |
| 25          | Sa  | 3.7   | 14.9 | 0    | 4.4   |     | W             | 44   | 10:16 | 10.9 | 55 | 0    | WNW  | 28   | 1016.0 | 14.1 | 42 |      | W   | 22   | 1016.7 |
| 26          | Su  | 3.8   | 14.3 | 0    | 3.4   |     | ESE           | 37   | 15:14 | 8.9  | 56 | 1    | ESE  | 19   | 1026.5 | 13.1 | 44 |      | ESE | 17   | 1024.8 |
| 27          | Mo  | 1.4   | 16.7 | 0    | 2.8   |     | NNE           | 46   | 08:58 | 11.1 | 62 | 1    | NNE  | 26   | 1025.2 | 15.8 | 48 |      | ENE | 7    | 1020.0 |
| 28          | Tu  | 1.9   | 19.7 | 0    | 2.6   |     | WNW           | 33   | 12:24 | 13.8 | 69 | 1    | NE   | 7    | 1021.2 | 18.2 | 54 |      | NW  | 11   | 1017.1 |

|                                      |    |     |      |      |      |  |            |       |      |    |   |            |        |      |    |            |        |
|--------------------------------------|----|-----|------|------|------|--|------------|-------|------|----|---|------------|--------|------|----|------------|--------|
| 29                                   | We | 5.1 | 14.7 | 0.4  | 1.8  |  | N 41       | 16:15 | 11.0 | 99 | 7 | Calm       | 1017.7 | 13.6 | 95 | ENE 17     | 1013.8 |
| 30                                   | Th | 8.4 | 18.9 | 23.0 | 0.8  |  | N 48       | 10:11 | 14.3 | 74 | 7 | NNW 22     | 1012.4 | 17.9 | 62 | NNW 24     | 1009.1 |
| <b>Statistics for September 2021</b> |    |     |      |      |      |  |            |       |      |    |   |            |        |      |    |            |        |
| Mean                                 |    | 2.2 | 16.9 |      | 2.5  |  |            |       | 11.1 | 71 | 2 | 19         | 1021.3 | 15.2 | 53 | 24         | 1018.8 |
| Lowest                               |    | 2.9 | 9.2  | 0    | 0.8  |  |            |       | 4.3  | 36 | 0 | Calm       | 1006.9 | 7.1  | 26 | NE 6       | 1006.0 |
| Highest                              |    | 8.4 | 22.7 | 23.0 | 4.4  |  | WN<br>W 78 |       | 18.1 | 99 | 8 | WN<br>W 37 | 1032.1 | 22.1 | 95 | WN<br>W 43 | 1028.3 |
| Total                                |    |     |      | 45.2 | 74.2 |  |            |       |      |    |   |            |        |      |    |            |        |





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