Flora and Fauna Assessment Report

26 Endeavour St, Oberon NSW 2787

Report prepared by Narla Environmental

Report:	Flora and Fauna Assessment Report – 26 Endeavour Street, Oberon, NSW 2787
Prepared for:	Borg Manufacturing
Prepared by:	Narla Environmental Pty Ltd
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Report Certification

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As Principal of Narla Environmental Pty Ltd, I Kurtis Lindsay, certify that:

- This assessment has been prepared in accordance with the brief provided by the client.
- All field workers involved in the preparation of this project were appropriately licensed under the Biodiversity Conservation Act 2016 and the Department of Primary Industries Animal Research Authority.
- The information presented in this report is a true and accurate record of the study findings in the opinion of the authors.

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Glossary

Acronym/ Term	Definition
(C)EEC	(Critically) Endangered Ecological Community
BC Act	New South Wales Biodiversity Conservation Act 2016
BDAR	Biodiversity Development Assessment Report
DA	Development Application
DCP	Development Control Plan
Development	The use of land, and the subdivision of land, and the carrying out of a work, and the demolition of a building or work, and the erection of a building, and any other act, matter or thing referred to in section 26 that is controlled by an environmental planning instrument but does not include any development of a class or description prescribed by the regulations for the purposes of this definition (Environmental Planning and Assessment Act 1979).
DPI	Department of Primary Industries
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
ha	Hectares
km	Kilometre
KTP	Key Threatening Process (as listed in the BC Act)
LEP	Local Environmental Plan
LGA	Local Government Area
Locality	The area within a 10km radius of the Survey Area. The same meaning when describing a local population of a species or local occurrence of an ecological community.
m	metres
mm	millimetres
NPWS	NSW National Parks and Wildlife Services
NSW	New South Wales
OEH	Office of Environment and Heritage
Proposal	The development, activity or action proposed.
ROTAP	Rare or Threatened Australian Plants
SIS	Species Impact Statement pursuant to s. 5A of the Environmental Planning and Assessment Act 1979
Subject Site	Development footprint
Subject Property	(34/-/DP1228591)
Development Footprint	Construction Footprint - The area containing all proposed artificial structures associated with the development
Threatened species, populations and ecological communities	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.

Executive Summary

Narla Environmental Pty Ltd (Narla) was engaged by the proponent to deliver a Flora and Fauna Assessment Report (FFA) for the proposed construction of a timber recycling plant ('the plant') at 26 Endeavour Street, Oberon, NSW, 2787 (34/-/DP1228591) ('the Subject Property').

Narla determined that the vegetation assemblage within the Subject Site was representative of non-native vegetation. This does not constitute a Threatened Ecological Community (TEC). The proposed works will result in the removal of approximately 6.81 ha of non-native vegetation.

Direct (wholesale) vegetation clearing will occur for the construction of the plant and will occur in consultation with the Project Ecologist and Oberon City Council's Environmental Officer.

No threatened fauna were identified on the Subject Site during field survey, however, flowering and fruit-bearing trees that are proposed for management within the proposed Asset Protection Zone (APZ) have the potential to offer intermittent sheltering and foraging habitat for threatened fauna. Due to the poor condition and lack of suitable habitat within the Subject Property (and surrounding locality) it was determined that the removal of potential habitat is unlikely to significantly impact upon a viable population of any of potentially occurring threatened species.

Owing to the lack of any perceived significant effects upon threatened biodiversity from the proposed development, it is expected that the proposed development can be achieved within minimal environmental impact. The proposed development may progress without further impact assessment.

1. Introduction

1.1 Project Proposal

This Flora and Fauna Assessment Report (FFA) has been prepared to accompany a Development Application (DA) for the construction of a timber recycling plant at 26 Endeavour Street, Oberon, NSW, 2787 (34/-/DP1228591) (hereafter referred to as 'the Subject Property'). The proposed activity is to be undertaken across the entire Subject Property (hereafter referred to as 'the Subject Site') (**Figure 1**).

The proposed development includes construction of a timber recycling plant within historically cleared areas, originally cleared for agricultural purposes. The construction of the proposed plant will be situated on historically cleared land and will require the clearing of all vegetation on the site.

The entire activity is contained within the 'Subject Site' which was the focus of this assessment.

1.2 Site Description and Location

The Subject Property is situated on the outskirts of Oberon, within the Oberon Local Government Area (LGA). The Subject Property encompasses approximately 8.15 ha of land zoned as '*IN1 – General Industry*' within an industrial landscape.

The Subject Property is wholly surrounded by historically cleared land (**Figure 1**). The Subject Site is accessed by an existing paved road.

1.3 Qualifying for the Biodiversity Offset Scheme

The requirements of the BC Act 2016 and Biodiversity Conservation Regulation 2017 are mandatory for all DA submitted after the 25th February 2018. This new legislation and regulation stipulates clearing 'area threshold' values that determine whether a development is required to be assessed in accordance with the 'Biodiversity Offset Scheme' (BOS). Minimum entry thresholds for vegetation clearing depend on the minimum lot size (shown in the Lot Size Maps made under the relevant Local Environmental Plan (LEP)), or actual lot size (where there is no minimum lot size provided for the relevant land under the LEP).

If native vegetation clearing exceeds the minimum threshold, the BOS applies to the proposed development including biodiversity impacts prescribed by clause 6.1 of the Biodiversity Regulation 2017 (**Table 1**).

Table 1. Biodiversity Offset Scheme Entry Thresholds

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
1 ha to less than 40 ha	**0.5 ha or more**
40 ha to less than 1000 ha	1 ha or more
1000 ha or more	2 ha or more

In this instance, the area of native vegetation to be removed or managed for the proposed DA is approximately 0.1ha, which falls under the required threshold, therefore:

- the BOS is not triggered,
- the BAM calculator does not apply,
- an Accredited Assessor is not required to prepare this BDAR; and
- no offset credit calculations are required.

This BDAR has been produced in line with the following section of the Flora and Fauna Assessment Methodology (BAM) "Appendix 12: Requirements for a Biodiversity Development Assessment Report – streamlined assessment modules"

1.4 Biodiversity Value Map

The Subject Site or broader Subject Property has not been mapped as containing biodiversity value within the Biodiversity Value Map (NSW DoPE 2019).

Figure 4. Biodiversity Value Map of the Subject Property (34/-/DP1228591) accessed 25th February 2019

1.5 Sources of Information Used

A thorough literature review of local information relevant to the locality and the Oberon Local Government Area (LGA) was undertaken. Relevant literature that was reviewed in preparation of this report included:

- Relevant State and Commonwealth Databases
  - Protected Matters Search Tool (Commonwealth of Australia 2019)
  - NSW Bionet. The website of the Atlas of NSW Wildlife (OEH 2019)
  - Atlas of Living Australia Spatial Portal (ALA 2019)

- Vegetation Mapping
  - Google Earth Historical imagery 2003

- Council Documents
  - Oberon Local Environmental Plan 2013;
  - Oberon Development Control Plan 2001; and
  - Priority weeds for the Central Tablelands (DPI 2018).

- State and Federal Guidelines
  - Threatened Species Survey and Assessment: Guidelines for actions and activities. Working Draft. (DEC 2004)
  - Threatened species survey and assessment guidelines: field survey methods for fauna: Amphibians (DEC 2013)
  - NSW Guideline to Surveying Threatened Plants (OEH 2016b)
  - Survey guidelines for Australia's threatened birds. Guidelines for detecting birds listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth of Australia 2010a)
  - Survey guidelines for Australia's threatened bats. Guidelines for detecting bats listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999(Commonwealth of Australia 2010b)
  - Survey guidelines for Australia's threatened frogs. Guidelines for detecting frogs listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth of Australia 2010c)
  - Survey guidelines for Australia's threatened mammals. Guidelines for detecting mammals listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth of Australia 2011)
  - Survey guidelines for Australia's threatened orchids. Guidelines for detecting orchids listed as 'threatened' under the Environment Protection and Biodiversity Conservation Act 1999(Commonwealth of Australia 2013)

Online databases and literature review were utilised to gain an understanding of the natural environment and ecology of the Survey Area and its surrounds to an area of approximately 10 km². Searches utilising NSW Wildlife Atlas (Bionet) and the Commonwealth Protected Matters Search Tool were conducted to identify current threatened and migratory flora and fauna records within a 10km² search area centred on the Survey Area. This data was used to assist in establishing the presence or likelihood of any such ecological values as occurring on or adjacent the Survey Area and helped inform our Ecologist on what to look for during the site assessment.

Soil landscape and geological mapping was examined to gain an understanding of the environment on the Survey Area and assist in determining whether any threatened flora or ecological communities may occur there (Murphy and Lawrie 1998).

1.6 Oberon Local Environmental Plan 2013

The proposed development will be undertaken in a manner that meets the requirements of the Oberon Local Environmental Plan 2013 (LEP).

1.6.1 Zoning

The Subject Property has been zoned as 'IN1: General Industrial' under the Oberon Local Environmental Plan 2013 (LEP). The development must satisfy the zone objectives of the LEP which include the following:

- To provide a wide range of industrial and warehouse land uses.
- To encourage employment opportunities.
- To minimise any adverse effect of industry on other land uses.
- To support and protect industrial land for industrial uses.

1.6.2 Preservation of Trees or Vegetation

Part 5.9 and 5.9AA; 'Preservation of Trees or Vegetation' of the Oberon Local Environmental Plan (LEP 2013) applies to this proposal. The objective of this part of the LEP is to preserve the amenity of the area, including biodiversity values, through the preservation of trees and other vegetation.

1.7 Relevant Legislation and Policy

The following list of legislation and policy are addressed in this report.

Table 2. Relevant legislation and policy addressed

Legislation/ Policy	Relevant Ecological Feature on Site	Triggered	Action Required
Environmental Planning and Assessment Act 1979 (EP&A Act)	All features	Yes	This Flora and Fauna Assessment and all subsequent recommendations relevant to the DA (The planning process).
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)	A single individual of an unidentified species of eucalyptus, possibly *Eucalyptus macarthurii,* was found in the Survey Area	Yes	An assessment of significance of impact from the proposed DA on Matters of National Environmental Significance (MNES) EPBC Act Assessment of Significant Impact Criteria
Biodiversity Conservation Act 2016 (BC Act)	A single individual of an unidentified species of eucalyptus, possibly *Eucalyptus macarthurii,* was found in the Survey Area	Yes	A test of significance of impact from the proposed DA on BC Act listed threatened species, communities and populations pursuant to section 7.3 of the BC Act.
Biosecurity Act 2015 (Bio Act)	The following Priority weeds were identified in the Survey Area: ▪ *Rubus fruticosus*	Yes	*Prohibition on Dealings:* *Must not be imported into the State or sold.*
State Environmental Planning Policy No. 44 - Koala Habitat Protection (SEPP 44)	SEPP 44 applies to land within Oberon Council LGA and the Subject Property encompasses an area larger than 1 ha. No *Schedule 2 – Feed tree species* were identified within the Survey Area.	No	None
Water Management Act 2000	A watercourse is mapped as passing through the Subject Site, however it has been historically rerouted through manmade channels and pipes. (Peak Land Management 2016)	No	None

Figure 1. Site Map

2. Landscape Features

2.1 IBRA Bioregions and Subregions

The Subject Site occurs within the South Eastern Highlands IBRA Bioregion (version 7) and within that, the Oberon (SEH10) IBRA subregion. The activity site occurs entirely within the 'Oberon' NSW Mitchell Landscape (**Table 3**).

Table 3. IBRA Bioregions, Subregions and NSW Mitchell Landscapes

IBRA Bioregion	IBRA Subregion	NSW Mitchell Landscape	Subject Property Area (ha)
South Eastern Highlands	SEH10 Oberon	SEH: Oberon	8.15

2.1.1 NSW Mitchell Landscape Ecosystem – Rockley Plains (Rop)

Low rolling hills on plateau surface with Silurian and Ordovician slate, phyllites, felspathic sandstones and interbedded volcanics. General elevation over 1000m, relief to 150m. Red and yellow texture-contrast soils with often with prominent bleached A2 horizons. Mixed eucalyptus forest and woodlands including Peppermints (*Eucalyptus sp.*), Stringybark *(Eucalyptus sp.*), Candlebark (*Eucalyptus rubida*), Brittle Gum (*Eucalyptus mannifera*) and Snow Gum (*Eucalyptus pauciflora*). Cold air drainage hollows with grasslands and swamps.

2.2 Landscape Features

2.2.1 Topography, Geology and Soils

The Survey Area is situated on a northeast facing slope on the outskirts of Oberon town with an elevation range between 1097m and 1085m above mean sea level (amsl) on the Australian Height Datum (AHD).

Soil mapping designates the site within the 'Oberon' Soil Landscape (Murphy and Lawrie, 1998).

2.2.2 Hydrology

Owing to the topography of the Survey Area, overland stormwater flows across the site in a north-easterly direction.

A watercourse has been historically mapped within the Survey Area **(Figure 2)**. However, Peak Land Management (2016) states:

"*The stream shown over the development site … no longer exists, with underground pipes being located from the end of Endeavour Street (which picks up stormwater from both Borg, and the public road system). This water flows through two pipes, one via easement being directed to Kings Stockyard creek from the road runoff, and the other to a small dam located over the development site for the Borg runoff water. The Borg water from this small dam then overflows through a manmade open grassed stormwater channel into Kings Stockyard Creek, via another manmade channel over the northern part of the development site which will not be affected by any proposed works*"

The Subject Site is not proposed to impact the mapped watercourse and is heavily modified, as such it has not been assessed further in this report.

3. Methodology

3.1 Ecological Site Assessment

The following sections of this report detail the site assessments undertaken by Narla Environmental including the survey methods and the weather conditions experienced in the lead-up and during each assessment.

3.1.1 General Survey

A site assessment was undertaken by Narla Environmental Ecologist, David Hancock on Thursday 13th September 2018. A total of 8 hours was spent surveying the entirety of the Survey Area. An additional survey was undertaken buy Stefan Giessler on Tuesday 5th February 2019. The purpose of this assessment was to assess an additional area.

During the site assessment, the following activities were undertaken:

- Identifying and recording the vegetation communities present on the Survey Area, with focus on identifying any Threatened Ecological Communities (TEC);
- Recording a detailed list of flora species encountered on the Survey Area, with a focus on threatened species, species diagnostic of threatened ecological communities and priority weeds;
- Recording opportunistic sightings of any fauna species seen or heard on or within the immediate surrounds of the Survey Area;
- Identifying and recording the locations of notable fauna habitat such as important nesting, roosting or foraging microhabitats;
- Targeting the habitat of any threatened and regionally significant fauna including:
    - Tree hollows (habitat for threatened large forest owls, parrots, cockatoos and arboreal mammals);
    - Caves and crevices (habitat for threatened reptiles, small mammals and microbats);
    - Termite mounds (habitat for threatened reptiles and the echidna);
    - Soaks (habitat for threatened frogs and dragonflies);
    - Wetlands (habitat for threatened fish, frogs and water birds);
    - Drainage lines (habitat for threatened fish and frogs);
    - Fruiting trees (food for threatened frugivorous birds and mammals);
    - Flowering trees (food for threatened nectivorous mammals and birds);
    - Trees and shrubs supporting nest structures (habitat for threatened birds and arboreal mammals), and
    - Logs, bark and artificial debris (habitat for threatened frogs, reptiles and snails)
    - Any other habitat features that may support fauna (particularly threatened) species.
- Assessing the connectivity and quality of the vegetation within the Survey Area and surrounding area.

Figure 2. Development Footprint

3.1.2 Weather conditions prior and during the general flora and fauna survey

A summary of the prevailing weather conditions during the Survey Area survey and the lead-up to the surveys is presented (**Table 4**). This data was collected from the nearest weather station 'Oberon'.

Table 4. Weather conditions taken from the nearest weather station (Oberon) in the lead up to and during the field survey (BOM 2018) (Survey dates in bold).

Survey date	Minimum Temp. °C	Maximum Temp. °C	Rainfall (mm)
07/09/2018	n/a	13.0	0
08/09/2018	6.5	11.1	7.4
09/09/2018	3.9	12.1	2.8
10/09/2018	4.6	17.9	0.2
11/09/2018	1.5	18.0	0
12/09/2018	9.9	20.1	0
13/09/2018	**2.5**	**19.5**	**0**
30/01/2011	18.1	26.1	0
31/01/2019	18.3	30.3	0
01/02/2019	12.2	10.6	0.8
02/02/2019	14.2	23.7	0.2
03/02/2019	14.7	29.6	0
04/02/2019	15.6	29.4	0
05/02/2019	**2.5**	**19.5**	**3.1**

3.1.3 Vegetation Community Assessment

An initial desktop assessment using aerial imagery, geological mapping, soil landscape mapping and topographic mapping was used to identify the Survey Area as currently and historically cleared.

3.1.4 Targeted Threatened Flora Surveys

Targeted surveys were undertaken to identify locations of the threatened flora species known or predicted to occur within the locality (within 10km of the Survey Area). Narla Environmental undertook targeted survey for all threatened flora with potential to occur, with effort focused on finding the following species:

- *Eucalyptus aggregata* - four (4) historical records within 10km of the Survey Area.

The Random Meander technique documented by Cropper (1993) was employed with maximum effort directed toward sampling areas with suitable habitat.

Any tentative threatened species found were photographed and specimens taken for identification utilising formal keys. Where necessary this involved the use of a microscope. Any confirmed or plausible specimens identified were GPS tagged, for future reference. Where identification of plausible specimens could not be made with absolute confidence by Narla Ecologists, specimens were collected and sent to the National Herbarium for expert identification.

3.1.5 Opportunistic sightings and analysis of scats, tracks and traces

During all site visits throughout the project, opportunistic fauna observations including sightings, scats, tracks, characteristic scrapes on trees, burrows and bones were collected. These were identified within the site, and/or used as focus areas to position additional targeted survey techniques to determine species presence.

3.2 Study Limitations

The ecological dataset provided for the site was restricted to what was observed by Narla Environmental during the site assessment on the 13th September 2018.

The timing of the survey may not have coincided with emergence times of some species of flora and fauna, such as seasonally flowering herbs, seasonal migratory fauna or nocturnal fauna. No spotlighting was undertaken for nocturnal fauna and no passive acoustic recordings or harp trapping were undertaken for bats as these items were outside the scope of works.

Table 5. Optimal survey periods for the threatened flora species targeted

Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Eucalyptus aggregata												
KEY		Timing of Survey Undertaken by Narla (2019)			Flowering Period			Sporadic flowering/ identifiable from other features			Unsuitable Survey Times	

4. Native Vegetation

4.1 Historically Mapped Vegetation Communities

Historical vegetation mapping shows the Subject Site and surrounding areas as being industrial or cleared land, since at least 2003, and containing no native vegetation communities (**Figure 3**).

This vegetation mapping was sourced from historical imagery (Google Earth 2019).

4.2 Field Validated Plant Community Type within the Survey Area

Within the Survey Area, vegetation was in poor condition, with a high proportion of exotic species. No native plant community types (PCT) were recorded within the survey area.

4.2.1 Threatened Ecological Communities

No Threatened Ecological Communities (TEC) were identified within or adjoining the Subject Site.

Figure 3. Subject site within industrial and cleared landscape

5. Threatened Species

5.1 Threatened Flora

Desktop analysis revealed a single species of threatened flora as occurring or having the potential to occur on or within 10 km radius of the Subject Property.

Extensive targeted surveys were undertaken throughout the Survey Area for potentially occurring threatened flora (see **section 3.1.4**). Targeted survey identified no threatened flora within the Survey Area.

However, three individual trees that showed features resemblant of the vulnerable *Eucalyptus macarthurii*, (Paddy's River Box) were found in the survey area. It is possible these trees were historically planted as they were growing in a row. However, since the Subject Property is located within the known distribution of this species, the potential for these three plants to represent a wild remnant cannot be ruled out. Samples have been sent to the herbarium for identification. Observing the precautionary principle, a 5-part test has been conducted for this species should it prove to be positively identified (**Appendix C**).

It is anticipated that there will be no significant impacts to any potential locally-occurring threatened flora should the project proceed.

5.2 Threatened Fauna

The desktop analysis and site habitat assessment revealed three species of threatened fauna had potential to utilise habitat on the Subject Property during part of their lifecycles.

The proposed facility is to be located within historically cleared land, the proposal will require the removal of all suitable nesting trees. None of the habitat features within the Survey Area are considered to be important to the long-term survival of threatened fauna species within the locality. The impact of removal of marginal foraging habitat for these species is therefore considered to be negligible.

The total list of threatened species deemed as having potential to occur in the Subject Property is presented in **Table 6. Assessment of threatened flora and likelihood of occurrence within** the Subject Site

Species	BC Act	EPBC Act	Habitat requirements (OEH)	Habitat Present on Site	Anticipated Impact	5-Part Test required?
Eucalyptus aggregata	V	V	Occurs in lowest parts if the landscape on alluvial soils, on cold, poorly-drained flats and hollows adjacent to creeks and small rivers. Often grows with other cold-adapted eucalypts such as *Eucalyptus pauciflora*, *E. viminalis* and *E. ovata*. Usually occurs in open woodland formation with a grassy groundlayer dominated by River Tussock or Kangaroo Grass.	Suboptimal habitat present, due to topography, disturbed site, and areas of severe weed infestation.	None. No proximal records. Not detected in Subject Site despite extensive survey. The area is highly disturbed and it is unlikely this species is present in the seed bank.	No
Eucalyptus macarthurii	E	E	Occurs on flats and near swamps and streams, growing at moderately high altitudes between 700 and 1200m and favouring cold, wet locations with annual rainfall of 1000-1400mm.	Suboptimal habitat present, due to topography, disturbed site, and areas of severe weed infestation.	Three individuals on site are within the clearing area completely removing this population. The loss of this individual has been assessed under a 5-part test. No significant impact is expected.	Yes

5.2.1 Table 7Threatened Fauna Habitat

No hollow-bearing trees were identified within the Survey Area, and were not found within the broader Subject Property.

Only three (3) fruit and flower-bearing trees were identified during surveys which may provide foraging habitat for local and nomadic fauna, however no threatened species likely to use this habitat were identified as occurring locally.

The Subject Site has the potential to be used by a number of threatened insectivorous microchiropteran bats. The Subject Property may provide intermittent foraging habitat to a suite of threatened microchiropteran bats but none were identified as occurring locally.

Small-medium sized mammals and birds within the Subject Property may attract large predatory birds including:

- *Hieraaetus morphnoides* (Little Eagle).

The total list of threatened species deemed as having potential to occur in the Subject Property is presented in **Table 7.**

5.2.2 Migratory Fauna Species

A list of three (3) EPBC Act listed migratory fauna species were considered likely to occasionally use habitat within the Subject Site for foraging or passage, these were:

- *Myiagra cyanoleuca* (Satin Flycatcher);
- *Hirundapus caudacutus* (White-throated Needletail); and
- *Apus pacificus* (Fork-tailed Swift).

It was deemed that the proposed works will have no significant impact on these species. Therefore, an EPBC Act Referral to Commonwealth is not required.

Table 6. Assessment of threatened flora and likelihood of occurrence within the Subject Site

Species	BC Act	EPBC Act	Habitat requirements (OEH)	Habitat Present on Site	Anticipated Impact	5-Part Test required?
Eucalyptus aggregata	V	V	Occurs in lowest parts if the landscape on alluvial soils, on cold, poorly-drained flats and hollows adjacent to creeks and small rivers. Often grows with other cold-adapted eucalypts such as *Eucalyptus pauciflora*, *E. viminalis* and *E. ovata*. Usually occurs in open woodland formation with a grassy groundlayer dominated by River Tussock or Kangaroo Grass.	Suboptimal habitat present, due to topography, disturbed site, and areas of severe weed infestation.	None. No proximal records. Not detected in Subject Site despite extensive survey. The area is highly disturbed and it is unlikely this species is present in the seed bank.	No
Eucalyptus macarthurii	E	E	Occurs on flats and near swamps and streams, growing at moderately high altitudes between 700 and 1200m and favouring cold, wet locations with annual rainfall of 1000-1400mm.	Suboptimal habitat present, due to topography, disturbed site, and areas of severe weed infestation.	Three individuals on site are within the clearing area completely removing this population. The loss of this individual has been assessed under a 5-part test. No significant impact is expected.	Yes

Table 7. Assessment of threatened fauna habitat and likelihood of occurrence within the Subject Site

Species	BC Act	EPBC Act	Foraging Habitat Present on Site	Breeding Habitat Present on Subject Site	Anticipated Impact	5-Part Test required?
Phascolarctos cinereus (Koala)	V	V	None. No suitable Eucalyptus spp. recorded in Subject Site	None. No suitable Eucalyptus sp. recorded in Subject Site	None. No anticipated loss of foraging or breeding habitat.	No
Hieraaetus morphnoides (Little Eagle)	V	-	Small-medium sized mammals and birds. Negligible (if any) impacts from proposal.	Tall trees (sub-optimal habitat due to disturbance)	None. Breeding habitat is already sub-optimal due to increased human traffic within site.	No
Litoria aurea (Green and Golden Bell Frog)	E	V	None. No suitable habitat	None. No soaks or ponds identified.	None. No suitable habitat on site.	No

6. Avoid and Minimise Impacts

6.1 Impact Mitigation and Minimisation Measures

This section of the report details recommended efforts to avoid and minimise impact on biodiversity values associated with the proposed development. Measures to be implemented before, during and post construction to avoid and minimise the impacts of the project are detailed in **Table 8**.

Table 8. Table of measures to be implemented before, during and after construction to avoid and minimise the impacts of the project

	Before Construction			
Action	**Outcome/Measure**	**Risk and Consequence of Residual Impacts**	**Timing**	**Responsibility**
Project Location	The location of the proposed development has been positioned within historically cleared land in order to avoid and minimise the potential resulting impacts on biodiversity values within the Subject Site.	Risk = low Consequence = Harm to native vegetation and native fauna	Pre-construction phase	▪ Proponent
Project Design	The proposed activity has been designed to avoid and minimise impacts on native vegetation and habitat where possible within the Survey Area. Where this is not possible, mitigation measures have been designed and recommended to reduce impact. A large portion of the proposed activity is situated within historically cleared and/or built areas,	Risk = low Consequence = Harm to native vegetation and native fauna	Pre-construction phase	▪ Proponent

Action	Before Construction Outcome/Measure	Risk and Consequence of Residual Impacts	Timing	Responsibility
Assigning a Project Ecologist	Prior to construction, the proponent should commission the services of a qualified and experienced Ecologist Consultant (minimum 3 years' experience) with a minimum tertiary degree in Science, Conservation, Biology, Ecology, Natural Resource Management, Environmental Science or Environmental Management. The Ecologist must be licensed with a current Department of Primary Industries Animal Research Authority permit and New South Wales Scientific License issued under the BC Act. The Ecologist will be commissioned to: ▪ Assist the proponent in identifying and assigning an appropriate skilled Bushland Restoration Professional to implement vegetation restoration; ▪ Help the proponent undertake any threatened species habitat augmentation or translocation; ▪ Undertake any required targeted searches for threatened flora prior to vegetation clearing; ▪ Undertake an extensive pre-clearing survey; delineating habitat-bearing trees and shrubs to be retained/removed; and ▪ Supervise the clearance of trees and shrubs (native and exotic) in order to capture, treat and/or relocate any displaced fauna.	Risk = low Consequence = No continuity, professional advice, guidance or monitoring of management actions.	Prior to vegetation clearance works	▪ Proponent
Clearing of vegetation/ fauna habitat	The following conditions must be adhered to: ▪ Before any vegetation is damaged or removed, a qualified Ecologist with flora identification experience should be assigned to undertake a pre-clearing survey to delineate areas permitted to be cleared, from areas that must be retained. Bunting or strong flagging tape should be used. ▪ Prior to vegetation being damaged or removed, a qualified Ecologist with fauna identification experience should determine the presence of any suitable habitat for roosting microbats, nesting birds or other fauna in the area of the Survey Area due to be cleared. ▪ A qualified Project Ecologist with experience in handling wildlife should be present on the Project Site during all vegetation clearing in order to supervise clearing and capture and relocate any displaced, healthy animals, or care for / rehabilitate any injured or orphaned animals.	Risk = moderate Consequence = Harm to native vegetation and native fauna.	Construction phase	▪ Bush regeneration contractor ▪ Project Ecologist ▪ Proponent
Relocation of woody debris	Where possible; all woody debris (fallen trees and logs), within the Survey Area is to be retained. Woody debris within the activity footprint should be relocated, as directed by the Project Ecologist.	Risk = low Consequence = Loss of fauna habitat.	Construction phase	▪ Bush regeneration contractor ▪ Project Ecologist ▪ Proponent

Action	Before Construction Outcome/Measure	Risk and Consequence of Residual Impacts	Timing	Responsibility
Avoidance of hollow-bearing Trees	Any hollow-bearing trees (including dead trees) should be retained where possible. If such habitat features are to be removed, an Ecologist should be present to supervise felling.	Risk = low Consequence = Loss of fauna habitat.	Construction phase	▪ Bush regeneration contractor ▪ Project Ecologist ▪ Proponent
Replacement of hollows	Wherever possible the proponent should install nestboxes on trees to enhance fauna habitat, particularly habitat for microbats. No hollow-bearing trees will be removed, as a result of the proposal. In the event that any hollow-bearing trees require removal; hollows are to be replaced nest boxes (with similar sized entry holes to the hollows lost) to the compensatory ratio of 1:2 (two replacements for each one lost), or as agreed by the Project Ecologist.	Risk = low Consequence = Loss of fauna habitat.	Construction phase	▪ Bush regeneration contractor ▪ Project Ecologist ▪ Proponent
Erosion and Sedimentation	Appropriate erosion and sediment control must be erected and maintained at all times during construction. As minimum such measures should comply with the relevant industry guidelines such as 'the Blue Book' (Landcom 2004).	Risk = low Consequence = Degradation of vegetation	Construction phase	▪ Construction Contractor
Storage and Stockpiling (Soil and Materials)	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.	Risk = low Consequence = Harm to native vegetation and native fauna	Construction phase	▪ Construction Contractors
Tree Replacement and Revegetation	The proponent continues to actively manage the broader Subject Property including the removal of weeds and plantings of locally-indigenous trees.	Risk = moderate Consequence = Harm to native vegetation.	Post-construction phase	▪ Proponent ▪ Landscape Architect ▪ Bush Regeneration Contractor

Action	Before Construction Outcome/Measure	Risk and Consequence of Residual Impacts	Timing	Responsibility
Weed suppression and eradication	The proponent will continue to actively manage weed infestations throughout the Subject Site and broader Subject Property. Since herbaceous weeds and woody weeds exist within the Subject Area, priority must be given to manage and eliminate all weeds in order to prevent weeds from spreading into neighbouring areas. This will be undertaken using a combination of hand removal, cut/scrape and painting, brush cutting and spot spraying as required.	Risk = moderate Consequence = Harm to native vegetation and native fauna habitat.	Construction phase and Post-construction phase	▪ Proponent ▪ Bush Regeneration Contractor
Sewerage	All stormwater accumulation and sewerage produced on site will be managed in an appropriate system as advised by a stormwater/wastewater engineer. Sewerage produced on site to a certified sewerage system will eliminate any adverse effects to the local ecology.	Risk = low Consequence = Harm to native vegetation and native fauna habitat.	Post-construction phase	▪ Proponent

6.2 Other Impacts

6.2.1 Serious and Irreversible Impacts

The proposed development will not impact upon any 'Serious and Irreversible Impacts' (SAII).

6.2.2 State Environmental Planning Policy (SEPP) No. 44 – Koala Habitat Protection

SEPP 44 - Koala Habitat Protection 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 activity application applies to the whole, or only part, of the land.

The *State Environmental Planning Policy No. 44 – Koala Habitat Protection* (SEPP 44) applies to all local government areas (LGAs) listed on Schedule 2 of the policy, except land dedicated under the *National Parks and Wildlife Act 1974* or the *Forestry Act 1916*. The identification of an area of land as SEPP 44 Potential Koala Habitat is determined by the presence Koala feed tree species listed within Schedule 2 of the policy.

Site assessment revealed that there were no Schedule 2 Feed Trees within the Survey Area. Therefore no 'core Koala habitat' as defined in Clause 4 of SEPP 44 (1995) will be impacted by the proposal and as a result did not require further assessment under this SEPP.

7. Impact Summary

The following section of the report details the ecological impacts associated with the proposed DA.

7.1 Vegetation Loss

The proposed development will require the removal/modification of approximately 6.81 ha of non-native vegetation.

7.2 Fauna habitat to be removed or modified

All foraging habitat will be lost from the Subject Property by the proposed development.

No hollow-bearing trees or other significant breeding habitat will be lost or modified as a result of the proposal.

7.1 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 Site. 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.

Table 9. Indirect Impacts of the Proposed Action

Indirect Impact	Extent and duration	Threatened species, threatened ecological communities and their habitats likely to be affected.	Consequences of the impacts for the bioregional persistence of the threatened species, threatened ecological communities and their habitats.
(a) inadvertent impacts on adjacent habitat or vegetation	The proposed development will not have inadvertent impacts on adjacent habitat or vegetation provided the actions outlined within this report are adhered to. Condition of vegetation surrounding the proposed development will improve through weed management.	No Endangered Ecological Communities will be impacted by this development. Impacts to threatened fauna habitat within surrounding vegetation will be minimised through the implementation of environmental safeguards including signage and erosion and sediment controls.	Disruption to suboptimal threatened fauna habitat adjacent to the development causing it to become unsuitable for fauna. This impact is considered insignificant when compared to the extensive amount of habitat within the locality.
(b) reduced viability of adjacent habitat due to edge effects	It is unlikely that the proposed development will result in an adverse impact to the viability of adjacent habitat due to edge effects. ▪ Hygiene controls should be adhered to prevent the transportation of pathogens and weed seed on to the Subject Site. Following installation weed management will be conducted throughout the Subject Site. ▪ Condition of vegetation in the area will improve through the revegetation and continued weed management from the proponent or contracted qualified Bush Regenerators.	No Endangered Ecological Communities will be impacted by this development. Impacts to threatened fauna habitat within surrounding vegetation will be minimised through the implementation of environmental safeguards including temporary fencing, signage and erosion and sediment controls.	Disruption to suboptimal threatened fauna habitat adjacent to the development causing it to become unsuitable for fauna. This impact is considered insignificant when compared to the extensive amount of habitat within the locality.
(c) reduced viability of adjacent habitat due to noise, dust or light spill	The proposed works are unlikely to significantly exacerbate any of these issues which are all currently in effect within the industrial precinct already.	NA	NA

Indirect Impact	Extent and duration	Threatened species, threatened ecological communities and their habitats likely to be affected.	Consequences of the impacts for the bioregional persistence of the threatened species, threatened ecological communities and their habitats.
(d) transport of weeds and pathogens from the site to adjacent vegetation	It is unlikely that the proposed development will result in transport of weeds and pathogens from the site to adjacent vegetation. Construction activities will be restricted to the development footprint. Activities should not pass through adjoining areas of bushland which may result in the transport of weed and pathogens to adjacent vegetation.	NA	NA
(e) increased risk of starvation, exposure and loss of shade or shelter	This issue is unlikely to occur on the Subject Site. It is unlikely that any threatened fauna relies on habitat within the Subject Site, such that the proposed impacts will lead to increased risks from starvation, exposure, shade and shelter. All habitat resources removed will be replaced within the Subject Property so the biodiversity value of the site is not lost.	NA	NA
(f) loss of breeding habitats	This issue is unlikely to occur on the Subject Site. It is unlikely that any threatened fauna relies on habitat within the Subject Site for breeding purposes.	NA	NA
(g) trampling of threatened flora species	A tentative specimen of *Eucalyptus macarthurii* was identified on the Subject Site. Therefore, it is possible the proposed development will result in the trampling of threatened flora species.	*Eucalyptus macarthurii*	Reduced survival of seedlings in this isolated population
(h) inhibition of nitrogen fixation and increased soil salinity	The proposed works is unlikely to result in an indirect impact on nitrogen fixation and increased soil salinity on the Subject Site.	NA	NA
(i) fertiliser drift	The proposed works is unlikely to result in an indirect impact on fertiliser drift on the Subject Site.	NA	NA
(j) rubbish dumping	The proposed development will not result in increased level of dumping within the Subject Site.	NA	NA

Indirect Impact	Extent and duration	Threatened species, threatened ecological communities and their habitats likely to be affected.	Consequences of the impacts for the bioregional persistence of the threatened species, threatened ecological communities and their habitats.
(k) wood collection	Where possible; all woody debris (fallen trees and logs), within the Survey Area is to be retained. Woody debris within the activity footprint should be relocated, as directed by the Project Ecologist.	NA	NA
(l) bush rock removal and disturbance	No bushrock will be removed or disturbed to facilitate the proposed development.	NA	NA
(m) increase in predatory species populations	It is unlikely that the proposed works will influence or alter predatory species populations.	NA	NA
(n) increase in pest animal populations	It is unlikely that the proposed works will influence or alter pest species populations. Pest fauna already inhabit the Subject Property.	NA	NA
(o) increased risk of fire	The installation of this facility is likely to increase the fire risk within the Subject Site. A tentative specimen of *Eucalyptus macarthurii* was identified on the Subject Site. Therefore, it is possible that the increased fire risk will pose a risk to this species.	*Eucalyptus macarthurii*	Reduced survival of individuals and seedlings in this isolated population.
(p) disturbance to specialist breeding and foraging habitat, e.g. beach nesting for shorebirds.	There is no specialist breeding habitat on the Subject Site. Flowering and fruit bearing trees may provide intermittent foraging habitat. It was determined that none of these species are likely to be affected by the proposed development	NA	NA

7.2 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*.

Table 10. Potential Prescribed or Uncertain Impacts of the Proposed Action

Will there be impacts on any of the following	Yes/No	If Yes, Address all of the assessment questions in a 5-part test
Species or ecological communities associated with karst, caves, crevices, cliffs and other features of geological significance	No	NA
Habitat of threatened species or ecological communities associated with rocks	No	NA
Habitat of threatened species or ecological communities associated with human made structures	No	NA
Habitat of threatened species or ecological communities associated with non-native vegetation	Yes	Addressed in 5-part Test **(Appendix C)**
Connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range	No	NA
Movement of threatened species that maintains their life cycle	No	NA
Water quality, water bodies and hydrological processes that sustain threatened species and threatened ecological communities (including subsidence or subsidence resulting from underground mining or other development)	No	NA
Wind turbine strikes on protected animals	No	NA
Vehicle strikes on threatened species of animals or on animals that are part of a TEC	No	NA

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9. Appendices

Appendix A. Flora species recorded within the Survey Area

Appendix B. Fauna species identified within the Survey Area

Appendix C. 5-Part Test for *Eucalyptus macarthurii*

Appendix A. Flora species recorded within the Survey Area

Scientific Name	Exotic	Status	Canopy	Mid-storey	Groundcover
Acetosella vulgaris	x				x
Achillea millefolium	x				x
Arctotheca calendula	x				x
Bellis perennis	x				x
Biforia testiculata	x				x
Carduus tenuiflorus	x				x
Centaurium erythraea	x				x
Cenchrus clandestinus	x				x
Centaurium sp					
Cirsium vulgare	x				x
Cupressus spp.	x		x		
Cypress eragrostic	x				x
Cyperus spp.	x				x
Dactylis glomerata	x				x
Daviesia latifolia				x	
Ehrharta erecta	x				x
Eucalyptus macarthurii			x		
Euchiton sphaericus	x				x
Euchium vulgare	x				x
Geranium molle	x				x
Geranium homeanum					
Hypochaeris radicosa	x				x
Juncus planifolius					x
Lamium amplexicaule	x				x
Lamium purpureum	x				x
Lepidium draba	x				x
Medicago sativa	x				x
Onopordum acanthium	x				x
Oxalis spp.	x				x

Ozothamnus diosmifolius	x				x
Paspalum urvillei	x				x
Phalaris spp.	x				x
Phalaris spp.	x				x
Pinus radiata	x		x		
Plantago lanceolata	x				x
Poa spp.					x
Rhytidosporum sp					x
Rubus fruticosus agg. spp	x	Priority Weed			x
Rumex acetosella	x				x
Rumex brownii					x
Rumex crispus	x				x
Silybum marianum	x				x
Stellaria media	x				x
Taraxacum officinale	x				x
Trifolium repens	x				x
Ulmus sp	x				x

Appendix B. Fauna species identified within the Survey Area

Class	Scientific Name	Common Name	BC Act Status
Aves	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill	protected
Aves	*Acanthiza pusilla*	Brown Thornbill	protected
Aves	*Anthus novaeseelandiae*	Australian Pipit	protected
Aves	*Aquila audax*	Wedge-tailed Eagle	protected
Aves	*Carduelis carduelis*	European Goldfinch	Not protected
Aves	*Corvus coronoides*	Australian Raven	Not protected
Aves	*Eolophus roseicapilla*	Galah	protected
Aves	*Gymnorhina tibicen*	Australian Magpie	protected
Aves	*Hirundo neoxena*	Welcome Swallow	protected
Aves	*Malarus cyaneus*	Superb Fairy-Wren	protected
Aves	*Platycercus elegans*	Crimson Rosella	protected
Aves	*Sericornis frontalis*	White-browed Scrubwren	protected
Aves	*Sturnus vulgaris*	European Starling	Not protected
Aves	*Coturnix pectoralis*	Stubble Quail	Protected
Mammalia	*Lepus europaeus*	European Hare	Not protected
Amphibia	*Crinia signifera*	Brown Froglet	protected

Appendix C. 5-Part Test for *Eucalyptus macarthurii*

Biodiversity Conservation Act 2016– Assessment of Significance (5-part Test) for *Eucalyptus macarthurii*		
BC Act Status: Endangered		
Species Ecology	White flowers are produced in January-February, and the sticky pollen is collected by birds and insects. Seeds are dispersed locally by wind or gravity, and there is no mechanism for dormancy. It does not spread vegetatively, and longevity is likely to be greater than 100 years. It is fire tolerant to some degree as it is known to resprout after fire. It predominately occurs in the Sydney Basin and South Eastern Highlands Bioregions and has a naturally disjunct distribution across the Southern-Central Tablelands from the Blue Mountains to near Goulburn. In both locations this species is found on flats and near swamps and streams, growing at moderately high altitudes between 700 and 1200m and favouring cold, wet locations with annual rainfall of 1000-1400mm.	
(a) in the case of a threatened species, whether the proposed development 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,	The action proposed 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. The presence of one, small, isolated individual of this species does not constitute a viable local population. This individual is located in historically cleared, pasture improved and developed landscape. A long history of disturbance within the site, including historical clearing, improper planting, routine mowing, and the invasion of the site by exotic plants has contributed to the degradation of suitable habitat within the site. The loss of this isolated individual would not cause a viable local population to go extinct.	
(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:	**(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**	Not applicable – *Eucalyptus macarthurii* is not an ecological community.

Biodiversity Conservation Act 2016– Assessment of Significance (5-part Test) for *Eucalyptus macarthurii* **BC Act Status: Endangered**		
	(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,	Not applicable – *Eucalyptus macarthurii* is not an ecological community.
(c) in relation to the habitat of a threatened species or ecological community:	**(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and**	i) The extent to which habitat is being removed, is limited to the dripzone surrounding the three (3) individual trees recorded on the Subject Site. It is possible that these trees were historically planted given their position in the landscape – growing in a row. The proposed development will be occurring on largely historically cleared land. Routine mowing and historical clearing has encouraged the invasion of common exotic perennials that now dominate the groundcover. Consequently, no further suitable habitat will be lost as a result of the development. The surrounding landscape contains similar habitat that may have been historically suitable for the species.
	(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and	ii) No area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development. The site is isolated by rural and industrial areas. The proposed development will be occurring in historically cleared land. Routine mowing within the site, as well as historical clearing has encouraged the invasion of common exotic perennials that now dominate the groundcover. No further habitat fragmentation or isolation will occur.

Biodiversity Conservation Act 2016– Assessment of Significance (5-part Test) for *Eucalyptus macarthurii*		
BC Act Status: Endangered		
	(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,	iii) Targeted searches within the subject site and surrounding area, including database searches for local records, found three individuals growing in the Subject Site. The Subject Site is considered to be the only locally recorded site for this species. All remaining areas proposed to be cleared within the Subject Site are considered of low importance to the survival of *Eucalyptus macarthurii.*
(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),	The development proposed is not likely to have an adverse effect on any declared area of outstanding biodiversity value, directly or indirectly.	
(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.	Key Threatening Processes (KTPs) relevant to the continued survival of *Eucalyptus macarthurii* within the locality of the subject site are: ▪ Clearing of native vegetation ▪ Invasion of native plant communities by *Rubus* spp; These KTPS have been carefully considered during the development of this report, and addressed in the provided recommendations.	

Conclusion:
The proposed development will not incur a significant impact on *Eucalyptus macarthurii pursuant to section 7.3 of the BC Act*.

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