FLORA AND FAUNA ASSESSMENT

LOTS 10 & 11 DP 1012641

120-140 BRIDGE STREET, PICTON

PROPOSED REZONING

13th December 2021

HAYES ENVIRONMENTAL

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Project Team

Project Manager

Ms Rebecca Hogan

Bachelor of Science (environmental biology), UTS Sydney, 1996
Master of Engineering Management, UTS Sydney, 2000
Biodiversity Assessment Method Accredited Assessor (BAAS17090)
Scientific Licence, s132c of the NP&W Act 1974 (SL100778)
DPI Animal Care & Ethics Committee Approval (exp. September 2023)

Rebecca Hogan has been conducting environmental surveys in eastern NSW for 24 years, establishing Hayes Environmental in 1998 to specialise in flora and fauna planning and assessment for developments within the greater Sydney, Southern Highlands, and Southern Tablelands regions.

Rebecca has experience across a wide range of development projects, from small private constructions, to significant residential and urban renewal projects, infrastructure projects such as roads, pipelines and telecommunications towers, and mine development and rehabilitation.

Rebecca works within a network of professional associates, to set up project teams that are tailored to the specific needs of each project, engaging specialist field ecologists as required.

Rebecca's roles in this project included project management, site stratification, habitat evaluation, identification of plant community type/s, impact assessment, and report preparation.

Botanist

Mr Daniel Clarke

Bachelor of Science with First Class Honours (Botany), University of Sydney, 2010
Certificate IV in General Horticulture, 2005
Certificate II in Bushland Regeneration, 2000
Graduate Plant Science Internship, National Herbarium of NSW, Royal Botanic Gardens, 2009
Scientific Licence, s132c of the NP&W Act 1974 (SL101495)

Daniel Clarke has been carrying out contract botanical services for Hayes Environmental since 2016.

Daniel has 18 years of experience working as a field botanist, starting his career in the bushland regeneration industry, supervising work groups across the greater Sydney region, and working part-time for TAFE NSW providing training for the *Conservation and Land Management* and *General Horticulture* courses.

Daniel was part of the team contracted by OEH to conduct standardised plot surveys and ground-truthing for the recent Wingecarribee Plant Community Type mapping project. Daniel is contracted on a regular basis to undertake targeted threatened plant surveys and plant material collections for the DPIE Saving our Species program and for the Australian National Botanic Gardens.

Daniel's roles in this project included botanical field survey, assistance with identification of plant community type/s, and targeted searches for threatened plant species.

Conflict of Interest

To the best of my knowledge and belief, I, Rebecca Hogan, have no past, present or future relationship to stakeholders or decision-makers connected to this project that might be regarded as an actual, perceived or potential conflict of interest with my professional responsibilities and duties as a consultant.

Certification

This Flora and Fauna Assessment report has been prepared to address requirements of the *NSW Biodiversity Conservation Act 2016*, the *Commonwealth Environment Protection & Biodiversity Conservation Act 1999*, and *Wingecarribee Local Environmental Plan 2010*. To the best of my knowledge it presents true and relevant facts without omission, and draws conclusions from logical and reasonable interpretation of the facts. It is current at the date of issue, being 13th December 2021.

Ms Rebecca Hogan
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ECA ECOLOGICAL CONSULTANTS ASSOCIATION of NSW Inc
2021 PRACTISING MEMBER

Disclaimer

There are inherent uncertainties involved in surveying and documenting the natural environment. Some of this information will change over time. This report is also based in part on information provided by the client and by other external organisations. This report is to be used solely for determination of the specified development application. It shall not be replicated or altered without the express written permission of the author. Hayes Environmental does not accept any liability for consequences arising from its use.

CONTENTS

FLORA AND FAUNA ASSESSMENT

LOTS 10 & 11 DP 1012641

120-140 BRIDGE STREET, PICTON

PROPOSED REZONING

December 2021

EXECUTIVE SUMMARY

This Flora and Fauna Assessment report has been prepared to inform a planning proposal for rezoning of land at 120-140 Bridge Street, Picton, within the Wollondilly Local Government Area.

The Landholding (120-140 Bridge Street, Picton) is 1.43ha in size. The eastern part of the landholding is zoned IN2 Light Industrial under the *Wollondilly Local Environmental Plan 2011* (WLEP), with a minimum lot size of 1500m^2. The western part of the landholding is zoned RU2 Rural Landscape, with a minimum lot size of 16ha. The Landholding is located in the IBRA Cumberland sub-region (SYB08).

The proposal would rezone the RU2 Rural Landscape portion of the Landholding to IN2 Light Industrial, to enable development for industrial use.

The majority of the land has been previously cleared. A small area of native vegetation occurs within a steep-sided gully and riparian corridor associated with a 2nd order (Strahler) tributary of Redbank creek. Small fringing areas of native vegetation also occur along some fencelines. The total extent of native vegetation within the site is 0.24ha.

Vegetation within the site has been identified as PCT 850 Cumberland Shale Hills Woodland. PCT 850 comprises part of the *Cumberland Plain Woodland in the Sydney Basin Bioregion* ecological community listed as 'critically endangered' under both the NSW BC Act and the Commonwealth EPBC Act.

It has been assumed for this assessment that land associated with the riparian zone would be excluded from future development (as shown on Figure 2 within the report).

No threatened plant species are known to occur within the site. However, one species, *Thesium australe*, is assumed present in parts of the site due to the field survey not being conducted during a season consistent with relevant guidelines. The majority of potential habitat for this species would be retained within the riparian corridor. Remaining potential habitat is limited to the grassy fringes of the

site along fencelines. These areas could be retained and protected in future development of the site, if the species is detected during future surveys.

No threatened fauna species are known to occur on or utilise the site. Twenty-two (22) threatened fauna species are assumed to utilise vegetation present within the site on occasions. Potential impacts upon these species have been assessed as required under the NSW BC Act and Commonwealth EPBC Act.

Impact amelioration measures relied upon in the assessment include:

* Installation of temporary protective fencing for vegetation being retained during construction works on the site.
* Installation of sediment and erosion control features to meet standard requirements.
* Development exclusion area not to be used for vehicle parking or machinery or material storage.

Impact assessment conclusions:

* *National*

  The proposed development would not be likely to impose a significant impact upon any matter of *National Environmental Significance* listed under the Commonwealth EPBC Act. Referral of the proposal to the Commonwealth Minister for Environment is not required.

* *State*

  BC Act - The Biodiversity Offset Scheme does not apply. Further assessment of the project using the Biodiversity Assessment Method (BAM) is not required. A Biodiversity Development Assessment Report (BDAR) is not required. Offsetting of impacts under the Biodiversity Offsets Scheme (BOS) is not required.

  SEPP (Koala Habitat Protection) 2021 applies to the land. Part 2 Development control of koala habitats applies to the proposed development. The proposed development would have a low impact on koalas or koala habitat. A Koala Assessment Report is not required.

1 INTRODUCTION

1.1 Context

This Flora and Fauna Assessment report has been prepared to inform a planning proposal for rezoning of land at 120-140 Bridge Street, Picton, within the Wollondilly Local Government Area.

1.2 Development Site

The Landholding (Lots 10 & 11 DP 1012641, 120-140 Bridge Street, Picton) is 1.43ha in size. It consists of a narrow strip of land sandwiched between Bridge Street and the Main Southern Railway, at the southwestern end of the town of Picton.

The eastern part of the landholding is zoned IN2 Light Industrial under the *Wollondilly Local Environmental Plan 2011* (WLEP), with a minimum lot size of 1500m^2. The western part of the landholding is zoned RU2 Rural Landscape, with a minimum lot size of 16ha.

The Development Site is the portion of the landholding currently zoned RU2 (with an area of 1.24ha), as shown on Figure 1.

The Development Site drains to Redbank Creek within the Nepean River catchment. The site is relatively level, aside from a steep-sided gully carved by a 2nd order tributary to Redbank Creek, approximately along the boundary between Lots 10 and 11.

The majority of the land has been previously cleared. A small area of native vegetation has been retained within the gully and riparian corridor of the creek. This vegetation is part of a larger patch which extends to the south, although is separated from it by Bridge Street.

There are no geological features such as escarpments or rock outcrops within the site.

1.3 Proposed Development

The planning proposal would rezone the RU2 Rural Landscape portion of the landholding to IN2 Light Industrial, to enable development for industrial use. The creekline gully and associated native vegetation has existing protection under State and Federal biodiversity legislation.

It is assumed for this assessment that vegetation associated with the riparian corridor and on land mapped as high biodiversity value on the Biodiversity Values Map would be retained. All other areas would be cleared. Refer to Figure 2.

A discussion of potential impacts of the proposed development upon biodiversity is provided in Chapter 4.1.

Figure 1 *Development Site Map showing cadastre, existing development, landscape features, native vegetation, and high value biodiversity features (aerial photo obtained from Nearmap, dated 6th July 2021).*

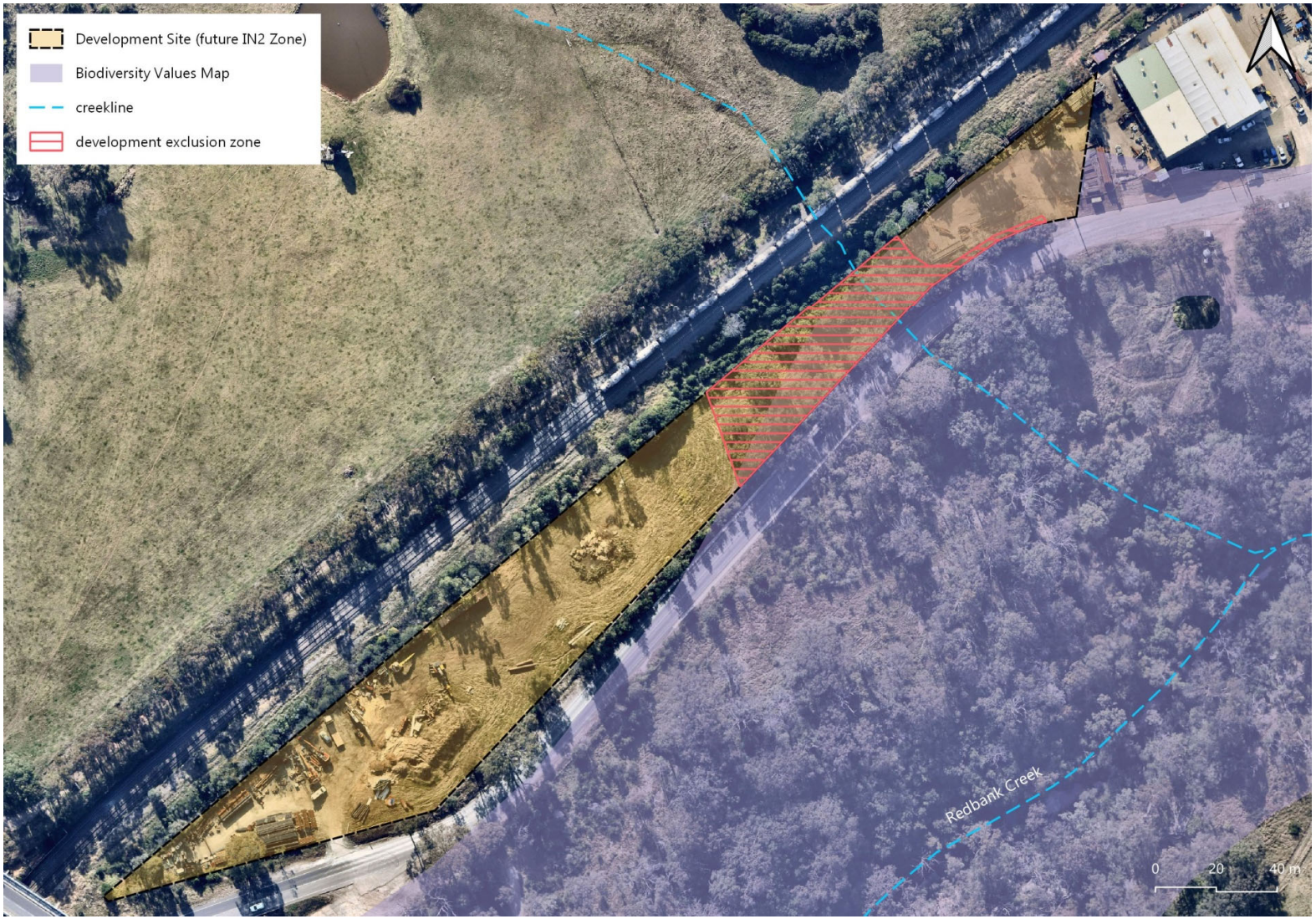

Figure 2 *Development Site showing biodiversity values protected under existing legislation and the area of land assumed to be excluded from future industrial development.*

1.4 Objectives of this Report

The objectives of this Flora and Fauna Assessment report are to:

- assess potential impacts of the proposed rezoning upon biodiversity values in accordance with requirements of the *NSW Biodiversity Conservation Act 2016* (BC Act);
- address *State Environmental Planning Policy (Koala Habitat Protection*) *2021*;
- address the requirement for referral of the project to the Commonwealth Minister for Environment & Heritage under the *Commonwealth Environment Protection & Biodiversity Conservation Act 1999* (EPBC Act).

1.5 Terms and Definitions

Region	The Cumberland subregion of the Sydney Basin BioRegion (SYB08), in the Interim BioRegionalisation of Australia v7 (IBRA).
Assessment Area	Land within 1500m of the *Development Site*, as shown on Figure 3. Also referred to as the 'Buffer Area'.
Landholding	Lots 10 & 11 DP 1012641, 120-140 Bridge Street, Picton
Development Site	Land zoned RU2 Rural Landscape within the Landholding, as shown on Figure 1.
Study Area	The Development Site and adjacent road verges and areas visible from the development site.
Vegetation Patch	An area of intact native vegetation (or habitat) that occurs wholly or partly on the Development Site. This may comprise a number of different *Plant Community Types* or *Vegetation Zones*. A Vegetation Patch is mapped without reference to site boundaries or other cadastre.
Plant Community Type	A vegetation unit identified using the NSW Plant Community Type (PCT) classification system.
Vegetation Zone	A subset of a *Plant Community Type* based on broad condition state.
Threatened	Species and ecological communities listed as either '*vulnerable*', '*endangered*' or '*critically endangered*' under the NSW BC Act and/or the Commonwealth EPBC Act.

2 RESEARCH & FIELD SURVEYS

2.1 Information Sources

Relevant legislation and policies include:

- *Commonwealth Environment Protection & Biodiversity Conservation Act 1999* (EPBC Act)
- *NSW Biodiversity Conservation Act 2016* (BC Act)
- *NSW Biodiversity Conservation Regulation 2017* (BC Reg)
- *NSW Biodiversity Assessment Method Order 2020* (BAM)
- *NSW State Environmental Planning Policy (Koala Habitat Protection) 2021* (Koala SEPP)
- *Wollondilly Local Environmental Plan 2011* (WLEP)

Relevant guidelines include:

- *Surveying threatened plants and their habitats. NSW survey guide for the Biodiversity Assessment Method (2020).* Department of Planning, Industry & Environment (2020).
- *Flora species with specific survey requirements.* NSW Office of Environment & Heritage.
- *NSW Survey Guide for Threatened Frogs.* Department of Planning, Industry & Environment (2020).
- *Guide for mapping threatened species for inclusion in the NSW regulatory framework.* Department of Planning, Industry & Environment (2020).
- *NSW survey guide – 'Species credit' threatened bats and their habitats (2018).*
- *Guidance to assist a decision-maker to determine a serious and irreversible impact* (2017).
- *Threatened biodiversity survey and assessment: Guidelines for developments and activities.* NSW Department of Environment and Conservation (2004, in draft).

Data sources and reports accessed include:

- NSW Bionet (www.bionet.nsw.gov.au): Vegetation Classification tool, Threatened Biodiversity Data Collection (TBDC), and Atlas Sightings.
- Threatened biodiversity profiles. NSW Office of Environment & Heritage.
- EPBC Act Protected Matters Search Tool (PMST).
- *A Directory of Important Wetlands in Australia*, Third Edition, Environment Australia (2001). http://www.environment.gov.au/water/wetlands/publications/directory-important-wetlands-australia-third-edition. (DIWA)
- SEED | Sharing and Enabling Environmental Data (www.seed.nsw.gov.au): NSW Interim Biogeographic Regions of Australia (IBRA) regions and subregions, NSW Mitchell Landscapes (version 3.1), Southeast NSW Native Vegetation (SouthCoast_SCIVI_v14_E_2230).

* Aerial photography of the site: Department of Lands SIX Viewer, Google Maps 2021 and Nearmap (6th July 2021).

2.2 Stratification

Using the results of desktop investigation, aerial photography and site survey, the Development Site was stratified into three units:

* Riparian woodland;
* Roadside woodland;
* Cleared land that is not native vegetation.

2.3 Botanical Survey

Botanical surveys were conducted within the study area by Mr Daniel Clarke on the 6th September 2021 and by Mr Graeme Bradburn on the 8th October 2021. Surveys were conducted on foot with reference to the *NSW survey guide: Surveying threatened plants and their habitats* (DPIE 2020), and to *DEC Threatened Biodiversity Survey and Assessment Guidelines* (in draft 2004).

September 2021

A general survey was conducted over approximately 2 hours across the site. Observations were recorded at 18 survey points placed to achieve a representative picture of the vegetation present. Survey points are shown on Figure 4 in Appendix 1.

Data recorded at each point includes:

* GPS location;
* photograph;
* dominant native canopy, shrub and groundlayer species;
* dominant weeds;
* general comments.

In addition, a series of parallel transect surveys were undertaken to target relevant threatened plant species (identified in Table 2 of this report) in accordance with the *Surveying threatened plants and their habitats* guidelines (DPIE 2020). Survey transects are shown on Figure 4 in Appendix 1.

October 2021

Orchid specialist, Mr Graeme Bradburn, was engaged to conduct targeted searches for two relevant threatened orchid species - *Caladenia tessellata* and *Pterostylis saxicola*. Both species were observed in flower at reference sites by Mr Bradburn within several days of his survey of the development site.

Mr Bradburn's report is included in Appendix 1 of this report.

The timing of surveys is discussed in Ch 2.5 Survey Limitations.

Survey data is provided in Appendix 1.

2.4 Fauna Survey

A fauna survey and habitat assessment was conducted across the Development Site by Ms Rebecca Hogan on the 26th October 2021.

The survey and habitat assessment was conducted with reference to the *DEC Threatened Biodiversity Survey and Assessment Guidelines* (in draft 2004), and with reference to Threatened Biodiversity Data Collection (TBDC) species profiles.

The primary purpose of the assessment was to identify habitats and features of potential relevance for threatened fauna species that would be affected by industrial development of the site. Searches were also conducted for indirect evidence of native fauna, such as scats, chew marks, scratches, diggings, dens, nests *etc*, which can persist on a site for some time.

Identification of tree-hollows included investigation to determine if hollows were in use at the time of survey, as evidenced by birds entering or guarding the hollow, recent chew marks around the entrance, fresh scats on the ground beneath the hollow, fresh scratchings on tree trunks *etc*.

A record was maintained of all native fauna observed or heard whilst walking through the study area over a 30 minute period.

Weather conditions on the 11th August 2021 were warm (21°C) and mostly sunny, with a light breeze. A recent severe storm (referred to as a mini-tornado by local residents) had passed through the site the week prior to the survey. Tree damage was substantial.

Targeted threatened species searches were not conducted due to the very small extent of proposed impact and degraded condition of the vegetation to be disturbed.

Relevant threatened species identified in Ch3.3 for which likely habitat occurs within the site, and which have not been adequately surveyed, are assumed to be present.

The timing of surveys is discussed in Ch 2.5 Survey Limitations. A description of fauna habitats is provided in Appendix 2.

2.5 Survey Limitations

Botanical

The botanical survey was conducted over a limited period (two separate days). Whilst the survey was thorough and accurately describes the vegetation type, it is noted that some threatened species are seasonal in appearance, some species are cryptic and require flowers for easier detectability, and some species require flowers or fruit for positive identification.

Upon review of Table 2, the botanical survey did not meet BAM survey specifications for two of the relevant threatened species:

- *Thesium australe*. This species is a straggling herb often hidden amongst grasses and herbs and easily overlooked. Flowers appear in spring and the fruit develops in summer. The botanical survey was conducted on 6 Sept 2021 outside of the November to February BAM survey period. However, the majority of the development site is cleared and highly degraded with grasses, where present, being short and very sparse. The survey was adequate for this species across these parts of the site. It is possible the species could have been missed along the northern and southern fencelines (adjoining the rail corridor and the Bridge Street verge) where grass growth is more established, and also on the southeaster edge of the riparian zone in the site where the understorey is not dominated by Privet. The areas of potential presence of *Thesium australe* are shown on Figure 1.
- *Pimelea spicata*. This species is an inconspicuous shrub to 50cm tall. The BAM survey period is all year, with a comment that the species should be surveyed when flowering. The survey was conducted during a reasonably wet period, but not specifically in accordance with recommended timing following a heavy rainfall event. However, due to the very small size of the site, the highly degraded condition of the vegetation, and the almost absent shrub layer, the survey is regarded as adequate for this species on this site. *Pimelea spicata* is not likely to be present.

Fauna

A full suite of targeted surveys for threatened fauna species has not been conducted on the site. This limitation has been addressed through:

- identification and filtering of relevant threatened species on the basis of criteria set out in Chapter 3.3.1;
- consideration of habitat resources present within the site and connectivity to other areas of habitat in the Assessment Area;
- consideration of the number and distribution of records in the Assessment Area and Region;
- searches for indirect evidence of native fauna, which can persist on a site for some years; and
- adoption of a precautionary approach – see Chapter 2.6 below.

2.6 Precautionary Approach

Where the Development Site contains likely habitat for threatened species known to occur in the PCT and in the Region, and where survey methods and effort employed have not been sufficient to demonstrate absence, it has been assumed on a precautionary basis that such species do utilise the site.

3 STAGE 1: BIODIVERSITY ASSESSMENT

3.1 Landscape Context

The Landholding consists of a narrow strip of land sandwiched between Bridge Street and the Main Southern Railway, at the southwestern end of the town of Picton. The vegetated Redbank Creek riparian corridor borders the land to the south. Surrounding lands have historically been cleared for agriculture. Local towns are experiencing a period of rapid residential growth.

The landscape context is illustrated on Figure 3 with details set out in Table 1.

Figure 3 *Location Map, showing landscape features within a 1500m buffer around the Landholding - referred to as the 'Assessment Area' (aerial photo for map obtained from Google Maps, 2021).*

Table 1 *Identified landscapes and landscape features within the Development Site and in the Assessment Area (*ie *land within 1500m of the Development Site*).

Interim Biogeographic Regionalisation for Australia (IBRA), v7	Development Site:
	- *Sydney Basin* bioregion (SYB)
	  • *Cumberland* sub-region (SYB08)
	Assessment Area:
	- *Sydney Basin* bioregion (SYB)
	  • *Cumberland* sub-region (SYB08)

Mitchell Landscape, v3.1	Development Site: - *Kurrajong Fault Escarpment* (Kbe). Landscape 41% cleared. Assessment Area: - *Kurrajong Fault Escarpment* (Kbe). Landscape 41% cleared - *Picton-Razorback Hills* (Pbh). Landscape 61% cleared. - *Upper Nepean Gorges* (Ung). Landscape 31% cleared.
Native vegetation cover class* * based on aerial photo interpretation	Development Site: - Extent of native vegetation within site = 0.24ha. - Patch size is approximately 122ha (although quite fragmented). The patch size class is <100ha. Assessment Area: - 72% native woody vegetation cover (cover class: >70%). - Landuses are predominantly residential and agriculture.
Hydrology	Development Site: - The site is relatively level, aside from a steep-sided gully carved by a 2nd order tributary to Redbank Creek, approximately along the boundary between Lots 10 and 11. Assessment Area: - The southern part of the Assessment Area drains east to the Nepean River. The northern part of the Assessment Area drains west to Lake Burragorang, and then to the Nepean River.
Habitat connectivity	Habitat within the Site forms the edge of a riparian corridor along Redbank Creek. The habitat is separated from the main corridor by Bridge Street and is not likely to be part of a wildlife corridor.
Areas of geological significance (such as caves, cliffs, rock, karst *etc*)	Development Site: - no areas of geological significance.

	Surrounding Area: - no areas of geological significance. - nearest rock escarpments are associated with the Nepean River, approximately 3-4km east of the Site.
Areas of Outstanding Biodiversity Value (AOBV)	There are no declared AOBVs within the Development Site or in the Surrounding Area.
Secretary's Environmental Assessment Requirements (SEARs) for a major project.	Not relevant.

3.2 Native Vegetation within the Development Site

3.2.1 Extent

Narrow strips of native vegetation occur along the verges of Bridge Street and the Main Southern Railway, and extend onto the site to a minor extent in several areas. A broad corridor of native vegetation has been retained within the riparian corridor which approximately divides Lot 10 from Lot 11. Refer to Figure 1.

Vegetation	Native Vegetation (0.24 ha)		Cleared Land (1.19 ha)
PCT	PCT 850 (0.24 ha)		n/a
Vegetation Zone	850a – riparian woodland (0.18 ha)	850b – roadside woodland (0.06 ha)	n/a

3.2.2 Plant Community Type (PCT)

Identification

Native vegetation within the Development Site has been identified as:

* Vegetation Class: Coastal Valley Grassy Woodlands

  PCT 850: Cumberland Shale Hills Woodland.

Rationale

The PCT was identified in the first instance using the *Bionet Vegetation Classification* tool, on the basis of IBRA region (SYB08), and number of matches with dominant tree, mid-storey and groundcover species recorded during the field survey.

The search found five PCTs relevant to the region containing the dominant tree species *Eucalyptus tereticornis*, and a high number of matches with other dominant plant species. The summary profiles of each of these five PCTs were viewed.

- PCT 850: excellent match for floristics, landscape position and other diagnostic features.
- PCT 835: good match for floristics. Landscape position and other diagnostic features are not as good a match – site is not on an alluvial flat.
- PCT 849: good match for floristics, although this PCT is reported as occurring mainly below 150m asl whereas the site is at 240m asl.
- PCT 1800: poor floristic match. No information in profile for landscape position or other diagnostic features. PCT name specifies 'riverflats' which is not a match for the site.
- PCT 830: good match for floristics and landscape position. Native mid-storey plants recorded are not mesic.

PCT 850 is the best match for the site. It is noted that *Eucalyptus eugenioides* is a common canopy tree within the site but is not listed in the canopy description for PCT 850. Review of the profile source for PCT 850 (Tozer *et al*, 2006, GW p28) finds that *E eugenioides* is listed as an 'other' tree that occurs less commonly in the community. The presence of *Acacia implexa* as a sub-canopy tree forming the canopy in some parts of the site is a diagnostic features of regrowth stands of this PCT.

Vegetation within the site is mapped as PCT 1395 on regional mapping. It is probable that this PCT is correctly mapped along the Redbank Creek corridor but transitions into PCT 850 upslope. The extent of remaining vegetation on the site is extremely limited such that it may not have been detected as a different PCT at the scale of the regional mapping. PCT 850 is mapped nearby (~200m) on lands upslope of the site.

3.2.3 PCT/Ecological Community Status

PCT 850 is estimated as 88% cleared in the landscape (Bionet VIS Community Profile).

PCT 850 comprises part of the *Cumberland Plain Woodland in the Sydney Basin Bioregion* ecological community listed as 'critically endangered' under both the NSW BC Act and the Commonwealth EPBC Act (Bionet VIS Community Profile).

3.2.4 Vegetation Integrity

PCT 850 within the Development Site has been classed as two Vegetation Zones:

* Riparian woodland – this vegetation consists of a canopy of eucalypts in generally poor condition, above a dense mid-storey of the exotic Privet *Ligustrum lucidum*. The groundcover is virtually absent beneath dense areas of Privet. On the more elevated southeastern part of the riparian patch, it contains a sparse cover of native grasses and herbs.
* Roadside woodland – this vegetation essentially consists of mature remnant trees in moderate to good condition with a highly degraded understorey. The shrub layer is discontinuous and absent in most areas. The groundcover contains a variable cover of native grasses and herbs.

Both vegetation zones have a low vegetation integrity, and would not be likely to regenerate to a functioning ecological community without ongoing weed control and management activities.

Photo 1 >

PCT 850a – Riparian Woodland at survey point 13, showing the dense mid-storey of Privet and the lack of groundcover vegetation

Photo 2 >

PCT 850a – Riparian Woodland at survey point 14, on the more elevated part of the riparian corridor in the southeast.

Photo 3 >

PCT 850b – Roadside Woodland at survey point 18.

Photo 4 >

Cleared land in the centre of Lot 10, at survey point 6.

3.3 Threatened Species

3.3.1 Identifying relevant threatened species

A list of all threatened flora and fauna species recorded or predicted to occur in the Burragorang (SYB09) IBRA sub-region and in PCT 1086 is provided in Appendix 3.

The list in Appendix 3 was refined to identify relevant species for assessment on the basis of the following (as set out in Step 1 of Ch 5.2 of the BAM):

a. known or predicted to occur within the IBRA sub-region within which the site is mostly located [Cumberland]; and

b. site is within any geographic limitations of the species distribution within the IBRA sub-region, as listed on the species profile (if relevant); and

c. reported association with any of the PCTs occurring within the site [850]; and

d. native vegetation cover (%) within the Assessment Area is equal to or greater than the minimum class required for the species [cover class for Assessment Area is 11-30%]; and

e. patch size associated with the relevant vegetation zone is equal to or greater than the minimum specified for the species [patch size is <100ha]; and

f. the species is identified as being assessed for ecosystem credits or species credits in the TBDC.

3.3.2 Filtering threatened species likely to use habitats

Relevant species are listed in Table 2 (below). Details of habitat constraints, vagrancy, microhabitats, site condition and field surveys (as set out in Steps 2, 3, & 4 of the BAM) were used to filter this list of species to identify those species likely to use habitats within the site and be affected by the proposed development.

These species are assessment further by application of the Test of Significance (set out under s7.3 of the BC Act).

The Test of Significance is provided in Chapter 4.2.3 of this report.

Table 2 *Relevant species for assessment, with consideration of habitat constraints, vagrancy, microhabitats, site condition and field surveys (as set out in Steps 2, 3 & 4, Ch 5.2 of the BAM) to identify those species likely to use habitats within the site and be affected by the proposed development. These species require further assessment through application of the Test of Significance (set out under s7.3 of the BC Act).*

Relevant Species	BC/ EPBC Status	Habitat constraints and other considerations (such as vagrancy)	Sp/Eco credit	Habitat suitability and field surveys	Location/distribution within Development Site	s7.3 Test of Sig. requ.	Pot. SAII
Flora							
Cynanchum elegans	E/E	n/a	Sp	Associated PCT/s: 850 Climber or twiner with variable form to 10m long. Usually occurs on the edge of dry rainforest. Flowers between August and May. BAM survey period: all year Not recorded during targeted survey on 6 Sept 2021.	Absent – field survey	No	N
Isotoma fluviatilis ssp fluviatilis	-/X	n/a	Sp	Associated PCT/s: 850 Prostrate herb. Known to grow in damp places. BAM survey period: Sept to Nov Not recorded during targeted survey on 6 Sept 2021.	Absent – field survey	No	Y
Pultenaea pedunculata	E/-	n/a	Sp	Associated PCT/s: 850 A shrub that forms carpets 1m or more wide. Occurs in a range of habitats. BAM survey period: Sept to Nov Use peduncles to identify. Not recorded during targeted survey on 6 Sept 2021.	Absent – field survey	No	N

Relevant Species	BC/ EPBC Status	Habitat constraints and other considerations (such as vagrancy)	Sp/Eco credit	Habitat suitability and field surveys	Location/distribution within Development Site	s7.3 Test of Sig. requ.	Pot. SAII
Acacia pubescens	V/V	n/a	Sp	Associated PCT/s: 850 Spreading shrub to 1-5m high. Occurs on alluviums, shales and at the intergrade between shales and sandstones. The soils are characteristically gravely soils, often with ironstone. Occurs in open woodland and forest, in a variety of plant communities. Flowers from August to October. BAM survey period: all year Not recorded during targeted survey on 6 Sept 2021.	Absent – field survey	No	N
Caladenia tessellata	E/V	n/a	Sp	Associated PCT/s: 850 Terrestrial orchid. Generally found in grassy sclerophyll woodland on clay loam or sandy soils, though the population near Braidwood is in low woodland with stony soil. BAM survey period: Sep to Oct Coastal populations are best surveyed in September and populations on the ranges surveyed in October. Not recorded during botanical survey on 6 Sept 2021. Not recorded during targeted survey by orchid specialist on 8th October 2021.	Absent – field survey	No	Y
Grevillea juniperina ssp juniperina	V/-	n/a	Sp	Associated PCT/s: 850 Broadly spreading to erect shrub to 2.5m high. Recorded from a variety of plant community types on soils derived from Wianamatta Shale and Tertiary Alluvium. BAM survey period: all year Not recorded during botanical survey on 6 Sept 2021.	Absent – field survey	No	N

Relevant Species	BC/ EPBC Status	Habitat constraints and other considerations (such as vagrancy)	Sp/Eco credit	Habitat suitability and field surveys	Location/distribution within Development Site	s7.3 Test of Sig. requ.	Pot. SAII
Thesium australe	V/V	n/a	Sp	Associated PCT/s: 850 Straggling herb to 40cm tall. Occurs in grassland on coastal headlands or grassland and grassy woodland away from the coast. A root parasite often associated with *Themeda australis*. BAM survey period: Nov to Feb Species can be easily overlooked when understorey height exceeds 30cm. When this is the case close inspection surveys (searching between grass tussocks) may be necessary to conclusively determine absence of this species. Not recorded during botanical survey on 6 Sept 2021.	Largely absent – field survey. Assumed present in some areas – refer to discussion in Ch 2.5, and Figure 1.	Yes	N
Pimelea spicata	E/E	n/a	Sp	Associated PCT/s: 850 Erect or spreading shrub to 50cm tall. Found on well-structured clay soils. On the Cumberland Plain sites it is associated with Grey Box communities (particularly Cumberland Plain Woodland variants and Moist Shale Woodland) and in areas of ironbark. BAM survey period: all year Use flowers to locate and identify as species is inconspicuous. Flowering is unpredictable and rain dependent. Survey 4 weeks after at least a 30 mm rainfall event. In drier times plants are often not visible above ground unless soils remain moist. Multiple surveys may be required. Survey at least 3 times, each at least a month apart unless found. Not recorded during botanical survey on 6 Sept 2021.	Absent – survey was not conducted specifically in accordance with recommended timing following a heavy rainfall event. However, the site is small, highly degraded and lacks a native shrub layer. The survey is regarded as adequate for this species on this site. *Pimelea spicata* is not likely to be present – refer to discussion in Ch 2.5.	No	N

Relevant Species	BC/ EPBC Status	Habitat constraints and other considerations (such as vagrancy)	Sp/Eco credit	Habitat suitability and field surveys	Location/distribution within Development Site	s7.3 Test of Sig. requ.	Pot. SAII
Fauna							
Green & Golden Bell Frog		Within 1km of semi-permanent/ephemeral wet areas; within 1km of swamps; within 1km of waterbodies	Sp	Associated PCT/s: 850 Inhabits marshes, dams and stream-sides, particularly those containing bullrushes (*Typha* spp.) or spikerushes (*Eleocharis* spp.). Optimum habitat includes water-bodies that are unshaded, free of predatory fish, have a grassy area nearby and diurnal sheltering sites available. Can occur in highly disturbed areas. BAM survey period: Nov to Mar Refer to the 'NSW Survey Guide for Threatened Frogs' published in Sep 2020, for specific survey requirements. Site does not contain suitable habitat – no permanent water. Temporary pools are completely shaded by Privet infestation. No rushes present.	Absent – not suitable habitat	No	N
White-throated Needletail	-/V	n/a	Eco	Associated PCT/s: 850 Strongly migratory, widespread and predominately aerial. Migratory and usually seen in eastern Australia from October to April. Breeds in forests in the northern hemisphere. Roosts in trees amongst dense foliage in the canopy or in hollows. BAM survey period: predicted – survey not required. Not recorded during fauna habitat survey on 26 Oct 2021.	Assumed present	Yes	N

Relevant Species	BC/ EPBC Status	Habitat constraints and other considerations (such as vagrancy)	Sp/Eco credit	Habitat suitability and field surveys	Location/distribution within Development Site	s7.3 Test of Sig. requ.	Pot. SAII
Spotted Harrier	V/-	n/a	Eco	Associated PCT/s: 850 Occurs in grassy open woodland. Builds a stick nest in a tree and lays eggs in spring (or sometimes autumn), with young remaining in the nest for several months. Species is flexible enough to use other nests sites once breeding completed. BAM survey period: predicted – survey not required. Not recorded and no stick nests recorded during fauna habitat survey on 26 Oct 2021.	Assumed present	Yes	N
White-bellied Sea-Eagle	V/C	Breeding: mature trees within suitable vegetation within 1km of rivers, lakes, large dams or creeks, wetlands and coastlines. Foraging: Within 1km of rivers, lakes, large dams or creeks, wetlands and coastlines.	Both	Associated PCT/s: 850 Habitats are characterised by the presence of large areas of open water including larger rivers, swamps, lakes and the sea. Nests are large structures built from sticks and lined with leaves or grass BAM breeding survey period: Jul to Dec Not recorded and no stick nests recorded during fauna habitat survey on 26 Oct 2021. Site does not contain open water. Site is not within 1km of large waterbodies.	Absent – not suitable habitat	No	N
Little Eagle	V/-	Breeding: nest trees – live (occasionally dead) large old trees within vegetation. Foraging: n/a	Both	Associated PCT/s: 850 Breeding habitat is large old trees within suitable vegetation & the presence of a male and female; or female with nesting material; or an individual on a large stick nest in the top half of the tree canopy. BAM breeding survey period: Aug to Oct Not recorded and no stick nests observed during fauna habitat survey on 26 Oct 2021.	No confirmed breeding habitat. Assumed to forage across site.	Yes	N

Relevant Species	BC/ EPBC Status	Habitat constraints and other considerations (such as vagrancy)	Sp/Eco credit	Habitat suitability and field surveys	Location/distribution within Development Site	s7.3 Test of Sig. requ.	Pot. SAII
Square-tailed Kite	V/-	Breeding: nest trees. Foraging: n/a	Both	Associated PCT/s: 850 Breeding habitat is live large old trees within suitable vegetation AND the presence of a male and female; or female with nesting material; or an individual on a large stick nest in the top half of the tree canopy. BAM breeding survey period: Sept to Jan Not recorded and no stick nests recorded during fauna habitat survey on 26 Oct 2021.	No confirmed breeding habitat. Assumed to forage across site.	Yes	N
Bush Stone-curlew	E/-	Fallen/standing dead timber including logs	Sp	Associated PCT/s: 850 Mainly found in western slopes and plains and the Riverina. Inhabits open forests and woodlands with a sparse grassy groundlayer and fallen timber. BAM survey period: all year Not recorded during fauna habitat survey on 26 Oct 2021. Site does not contain suitable habitat – woodland understorey is dense thickets of privet. Scattered trees are virtually cleared beneath.	Absent – not suitable habitat	No	N
Little Lorikeet	V/-	n/a	Eco	Associated PCT/s: 850 Feeds primarily in the canopy of eucalypt forest and woodland. Nests in hollows with small entrances (3cm). BAM survey period: predicted – survey not required. Not recorded during fauna habitat survey on 26 Oct 2021.	Assumed present	Yes	N

Relevant Species	BC/ EPBC Status	Habitat constraints and other considerations (such as vagrancy)	Sp/Eco credit	Habitat suitability and field surveys	Location/distribution within Development Site	s7.3 Test of Sig. requ.	Pot. SAII
Gang-gang Cockatoo	V/-	Breeding: eucalypt tree species with hollows greater than 9 cm diameter. Foraging: n/a	Both	Associated PCT/s: 850 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. Also occurs in sub-alpine Snow Gum woodland and temperate rainforests. Favours old growth forest and woodland for nesting and roosting. BAM breeding survey period: Oct to Jan The identification of breeding habitat will require survey or an expert report - Assessors should look for SIGNS OF BREEDING on site as follows; (a) lone adult males identified during the breeding season (October to January); or (b) an occupied nest. Not recorded during fauna habitat survey on 26 Oct 2021.	Breeding habitat constraint (no breeding hollows). Assumed to forage across site.	Yes	N
Swift Parrot	E/CE	Breeding: as per mapped areas Foraging: n/a	Both	Associated PCT/s: 850 Only present in NSW during non-breeding season (Feb to Oct). Found in areas where eucalypts are flowering profusely or where there are abundant lerp infestations. Study Area is not within a mapped area for this species. BAM survey period: predicted – survey not required. Not recorded during fauna habitat survey on 26 Oct 2021.	Breeding habitat constraint (not part of a mapped area) Assumed to forage across site.	Yes	Y

Relevant Species	BC/ EPBC Status	Habitat constraints and other considerations (such as vagrancy)	Sp/Eco credit	Habitat suitability and field surveys	Location/distribution within Development Site	s7.3 Test of Sig. requ.	Pot. SAII
Turquoise Parrot	V/-	n/a	Eco	Associated PCT/s: 850 Lives on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland. BAM survey period: predicted – survey not required. Not recorded during fauna habitat survey on 26 Oct 2021.	Assumed present	Yes	N
Barking Owl	V/-	Breeding: Living or dead trees with hollows greater than 20 cm diameter and greater than 4m above the ground. Foraging: n/a	Both	Associated PCT/s: 850 Inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. It is flexible in its habitat use, and hunting can extend in to closed forest and more open areas. BAM breeding survey period: May to Dec SIGNS OF BREEDING: suitable habitat AND (a) presence of male and female OR (b) calling to each other (duetting) OR (c) find nest Not surveyed.	Breeding habitat constraint (no breeding hollows). Assumed to forage across site.	Yes	
Powerful Owl	V/-	Breeding: Living or dead trees with hollow greater than 20cm diameter. Foraging: n/a	Both	Associated PCT/s: 850 Powerful Owls nest in large tree hollows (at least 0.5 m deep), in large eucalypts (diameter at breast height of 80-240 cm) that are at least 150 years old. While the female and young are in the nest hollow the male Powerful Owl roosts nearby (10-200 m) guarding them, often choosing a dense "grove" of trees that provide concealment from other birds that harass him. BAM breeding survey period: May to Aug SIGNS OF BREEDING: suitable habitat AND (a) presence of male and female OR (b) calling to each other (duetting) OR (c) find nest. Not surveyed.	Breeding habitat constraint (no breeding hollows). Assumed to forage across site.	Yes	N

Relevant Species	BC/ EPBC Status	Habitat constraints and other considerations (such as vagrancy)	Sp/Eco credit	Habitat suitability and field surveys	Location/distribution within Development Site	s7.3 Test of Sig. requ.	Pot. SAII
Masked Owl	V/-	Breeding: Living or dead trees with hollows greater than 20cm diameter. Foraging: n/a	Both	Associated PCT/s: 850 Lives in dry eucalypt forests and woodlands. Often hunts along the edges of forests. Roosts and breeds in moist eucalypt forested gullies. BAM breeding survey period: May to Aug DPIE is currently developing survey guidance for threatened bird species. In the interim, assessors must undertake a species survey using best practice methods that can be replicated for repeat surveys (as per the BAM threatened species survey requirements). Not surveyed.	Breeding habitat constraint (no breeding hollows). Assumed to forage across site.	Yes	N
Brown Treecreeper	V/-	n/a	Eco	Associated PCT/s: 850 The eastern subspecies lives in eastern NSW in eucalypt woodlands through central NSW and in coastal areas with drier open woodlands such as the Snowy River Valley, Cumberland Plains, Hunter Valley and parts of the Richmond and Clarence Valleys. fallen timber is an important habitat component for foraging. Declines have occurred in remnant vegetation fragments smaller than 300 hectares, that have been isolated or fragmented for more than 50 years BAM survey period: predicted – survey not required. Not recorded during fauna habitat survey on 26 Oct 2021.	Absent – not suitable habitat (lack of fallen timber and understorey dominated by thickets of privet)	No	N

Relevant Species	BC/ EPBC Status	Habitat constraints and other considerations (such as vagrancy)	Sp/Eco credit	Habitat suitability and field surveys	Location/distribution within Development Site	s7.3 Test of Sig. requ.	Pot. SAII
Speckled Warbler	V/-	n/a	Eco	Associated PCT/s: 850 Lives in a wide range of *Eucalyptus* dominated communities that have a grassy understorey, often on rocky ridges or in gullies. Large, relatively undisturbed remnants are required for the species to persist in an area. BAM survey period: predicted – survey not required. Not recorded during fauna habitat survey on 26 Oct 2021.	Absent – not suitable habitat (understorey dominated by thickets of privet)	No	N
Regent Honeyeater	CE/CE	Breeding: as per mapped areas Foraging: n/a	Both	Associated PCT/s: 850 Mainly inhabits temperate woodlands and open forests of the inland slopes of south-east Australia. In NSW, the distribution is very patchy and mainly confined to the two main breeding areas (Capertee Valley and Bundarra-Burraba) and surrounding fragmented woodlands. In some years flocks converge on flowering coastal woodlands and forests. Study Area is not within a mapped area for this species. BAM survey period: predicted – survey not required. Not recorded during fauna habitat survey on 26 Oct 2021.	Breeding habitat constraint (not part of a mapped area) Assumed to forage across site.	Yes	Y
Painted Honeyeater	V/V	Mistletoes present at a density of greater than five mistletoes per hectare	Eco	Associated PCT/s: 850 Inhabits Boree/Weeping Myall, Brigalow and Box-Gum Woodlands and Box-Ironbark Forests. A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus Amyema. BAM survey period: predicted – survey not required. Not recorded during fauna habitat survey on 26 Oct 2021.	Absent – habitat constraint (no mistletoes present on site)	No	N

Relevant Species	BC/ EPBC Status	Habitat constraints and other considerations (such as vagrancy)	Sp/Eco credit	Habitat suitability and field surveys	Location/distribution within Development Site	s7.3 Test of Sig. requ.	Pot. SAII
Black-chinned Honeyeater	V/-	n/a	Eco	Associated PCT/s: 850 In NSW it is widespread, with records from the tablelands and western slopes of the Great Dividing Range to the north-west and central-west plains and the Riverina. It is rarely recorded east of the Great Dividing Range, although regularly observed from the Richmond and Clarence River areas. It has also been recorded at a few scattered sites in the Hunter, Central Coast and Illawarra regions, though it is very rare in the latter. BAM survey period: predicted – survey not required. Not recorded during fauna habitat survey on 26 Oct 2021.	Assumed present	Yes	N
Varied Sittella	V/-	n/a	Eco	Associated PCT/s: 850 A sedentary species that inhabits eucalypt forests and woodlands. BAM survey period: predicted – survey not required. Not recorded during fauna habitat survey on 26 Oct 2021.	Assumed present	Yes	N
Dusky Woodswallow	V/-	n/a	Eco	Associated PCT/s: 850 Inhabits dry, open eucalypt forests and woodlands. Partly migratory. BAM survey period: predicted – survey not required. Not recorded during fauna habitat survey on 26 Oct 2021.	Assumed present	Yes	N

Relevant Species	BC/ EPBC Status	Habitat constraints and other considerations (such as vagrancy)	Sp/Eco credit	Habitat suitability and field surveys	Location/distribution within Development Site	s7.3 Test of Sig. requ.	Pot. SAII
Hooded Robin	V/-	n/a	Eco	Associated PCT/s: 850 Prefers lightly wooded country, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas. Requires structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses. Paddock trees can be important for this species as they can link remnant foraging habitat. BAM survey period: predicted – survey not required. Not recorded during fauna habitat survey on 26 Oct 2021.	Absent – not suitable habitat (not structurally diverse, understorey dominated by thickets of privet)	No	N
Scarlet Robin	V/-	n/a	Eco	Associated PCT/s: 850 Lives in dry eucalypt forests and woodlands. Understorey is usually open and grassy with few scattered shrubs. BAM survey period: predicted – survey not required. Not recorded during fauna habitat survey on 26 Oct 2021.	Absent – not suitable habitat (not structurally diverse, understorey dominated by thickets of privet)	No	N
Flame Robin	V/-	n/a	Eco	Associated PCT/s: 850 Breeds in upland tall moist eucalypt forests and woodlands, often on ridges and slopes. In winter, birds migrate to drier more open habitats in the lowlands. Breeding and non-breeding habitat is very different, key should be protecting breeding habitat. BAM survey period: predicted – survey not required. Not recorded during fauna habitat survey on 26 Oct 2021. Site does not contain breeding habitat.	Assumed present in non-breeding season	Yes	N

Relevant Species	BC/ EPBC Status	Habitat constraints and other considerations (such as vagrancy)	Sp/Eco credit	Habitat suitability and field surveys	Location/distribution within Development Site	s7.3 Test of Sig. requ.	Pot. SAII
Diamond Firetail	V/-	n/a	Eco	Associated PCT/s: 850 Found in grassy eucalypt woodlands, including Box-Gum Woodlands and Snow Gum *Eucalyptus pauciflora* Woodlands. Also occurs in open forest, mallee, natural temperate grassland, and in secondary grassland derived from other communities. BAM survey period: predicted – survey not required. Not recorded during fauna habitat survey on 26 Oct 2021.	Absent – not suitable habitat (lacks grassy understorey – dominated by thickets of privet)	No	N
Spotted-tailed Quoll	V/E	n/a	Eco	Associated PCT/s: 850 Recorded across a range of habitat types. Uses hollow trees and logs, also caves and other animal burrows for den sites. Mostly nocturnal. BAM survey period: predicted – survey not required. Not surveyed. No indirect evidence found during habitat survey on 26 Oct 2021.	Absent – not suitable habitat (lack of breeding features, degraded habitat with low likelihood of prey species, habitat separated from primary riparian corridor by Bridge Street so not likely to be used for movement).	No	N
Koala	V/V	Breeding: Areas identified via survey as important habitat. Foraging: n/a	Both	Associated PCT/s: 850 Inhabits eucalypt woodlands and forests. Inactive for most of the day, feeding and moving mostly at night. BAM breeding survey period: all year Important' habitat is defined by the density of koalas and quality of habitat determined by on-site survey. Not recorded during fauna habitat survey on 26 Oct 2021.	Site is not important habitat for breeding. Assumed present.	Yes	N

Relevant Species	BC/ EPBC Status	Habitat constraints and other considerations (such as vagrancy)	Sp/Eco credit	Habitat suitability and field surveys	Location/distribution within Development Site	s7.3 Test of Sig. requ.	Pot. SAII
Eastern Pygmy-possum	V/-	n/a	Sp	Associated PCT/s: 850 Feeds largely on nectar and pollen collected from banksias, eucalypts and bottlebrushes; an important pollinator of heathland plants such as banksias; soft fruits are eaten when flowers are unavailable. BAM survey period: Oct to Mar Not surveyed.	Absent – not suitable habitat (lack of native understorey, lack of tree-hollows, fragmentation and degradation of site)	No	N
Squirrel Glider	V/-	n/a	Sp	Associated PCT/s: 850 Inhabits mature old growth Box, Box-Ironbark woodlands and River Red Gum forest west of the Great Dividing Range and Blackbutt-Bloodwood forest with heath understorey in coastal areas. Requires abundant tree hollows for refuge and nest sites. BAM survey period: all year Survey year round but sites with bipinnate acacia, autumn winter flowering trees and shrubs such as Eucalyptus robusta and Banksia sp (integrifolia etc) should be subject to a more retracted survey period of between March-August. Relies on large old trees with hollows for breeding and nesting. These trees are also critical for movement and typically need to be closely-connected (i.e. no more than 50 m apart). Not surveyed.	Absent – not suitable habitat (lack of tree hollows, lack of heath understorey, lack of large old trees).	No	N

Relevant Species	BC/ EPBC Status	Habitat constraints and other considerations (such as vagrancy)	Sp/Eco credit	Habitat suitability and field surveys	Location/distribution within Development Site	s7.3 Test of Sig. requ.	Pot. SAII
Grey-headed Flying-fox	V/V	Breeding: breeding camps Foraging: n/a	Both	Associated PCT/s: 850 Roosting camps are generally located within 20km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy. Can travel up to 50km from the camp to forage; but more often <20km. BAM breeding survey period: Oct to Dec Not recorded during fauna habitat survey on 26 Oct 2021.	Breeding camp not present. Assumed to forage across site.	Yes	N
Yellow-bellied Sheath-tail Bat	V/-	n/a	Eco	Associated PCT/s: 850 Forages in most habitats across its very wide range, with and without trees; appears to defend an aerial territory. Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows. BAM survey period: predicted – survey not required. Not surveyed.	Assumed present.	Yes	N
Eastern Freetail Bat	V/-	n/a	Eco	Associated PCT/s: 850 Occur in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range. BAM survey period: predicted – survey not required. Not surveyed.	Assumed present.	Yes	N

Relevant Species	BC/ EPBC Status	Habitat constraints and other considerations (such as vagrancy)	Sp/Eco credit	Habitat suitability and field surveys	Location/distribution within Development Site	s7.3 Test of Sig. requ.	Pot. SAII
Large-eared Pied Bat	V/V	Within two kilometres of rocky areas containing caves, overhangs, escarpments, outcrops, or crevices, or within two kilometres of old mines or tunnels.	Sp	Associated PCT/s: 850 Found mainly in areas with extensive cliffs and caves. Found in well-timbered areas containing gullies. Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin (*Petrochelidon ariel*). BAM survey period: Nov to Jan SAII threshold is potential breeding habitat and presence of breeding individuals. Potential breeding habitat is PCTs associated with the species within 100m of rocky areas containing caves, or overhangs or crevices, cliffs or escarpments, or old mines, tunnels, culverts, derelict concrete buildings. Surveys must be undertaken as per the Threatened Bat Survey Guide to confirm breeding habitat. Not surveyed.	Absent – habitat constraint (nearest rocky areas are 3-4km east of the site)	No	Y
Southern Myotis	V/-	Hollow-bearing trees within 200m of riparian zone; Bridges, caves or artificial structures within 200 m of riparian zone; Waterbodies - This include rivers, creeks, billabongs, lagoons, dams and other waterbodies on or within 200m of the site.	Sp	Associated PCT/s: 850 Dependent on waterways with pools of 3m wide or greater for foraging. BAM survey period: Oct to Mar The species can be detected via survey using appropriate techniques (see Threatened Bat Survey Guide). Not surveyed.	Absent – habitat constraint (lack of hollow-bearing trees and lack of waterbodies >3m wide)	No	N

Relevant Species	BC/ EPBC Status	Habitat constraints and other considerations (such as vagrancy)	Sp/Eco credit	Habitat suitability and field surveys	Location/distribution within Development Site	s7.3 Test of Sig. requ.	Pot. SAII
Little Bent-winged Bat	V/-	Breeding: Cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding including species records with microhabitat code 'IC – in cave'; observation type code 'E nest-roost'; with numbers of individuals >500 Foraging: n/a	Both	Associated PCT/s: 850 Moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests and banksia scrub. Generally found in well-timbered areas. Maternity colonies form in spring and birthing occurs in early summer. Males and juveniles disperse in summer. Only five nursery sites/maternity colonies are known in Australia. SAII threshold – breeding habitat. BAM breeding survey period: Dec to Feb Not surveyed.	Breeding habitat constraint (no caves or similar) Assumed to forage across site.	Yes	Y
Eastern Bent-winged Bat	V/-	Breeding: cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding including species records with microhabitat code "IC - in cave;" observation type code "E nest-roost;" with numbers of individuals >500 Foraging: n/a	Both	Associated PCT/s: 850 Maternity caves have very specific temperature and humidity regimes. At other times of the year, populations disperse within about 300 km range of maternity caves. Breeding or roosting colonies can number from 100 to 150,000 individuals. SAII threshold – breeding habitat. BAM breeding survey period: Dec to Feb Not surveyed.	Breeding habitat constraint (no caves or similar) Assumed to forage across site.	Yes	Y

Relevant Species	BC/ EPBC Status	Habitat constraints and other considerations (such as vagrancy)	Sp/Eco credit	Habitat suitability and field surveys	Location/distribution within Development Site	s7.3 Test of Sig. requ.	Pot. SAII
Cumberland Plain Land Snail	E/-	n/a	Sp	Associated PCT/s: 850 Lives in small areas on the Cumberland Plain west of Sydney, from Richmond and Windsor south to Picton and from Liverpool west to the Hawkesbury and Nepean Rivers. Lives under litter of bark, leaves and logs, or shelters in loose soil around grass clumps. Occasionally shelters under rubbish. BAM survey period: all year Identification of live specimens is required early morning or in the evening during or after rain, while the ground and vegetation surfaces are still wet. Presence of snail shells and can be detected all year round. For the purpose of survey, the presence of CPLS shells = the presence of this species. The species is reliant on a good cover of coarse woody debris, and uses soil cracks for shelter. Not recorded during fauna habitat survey on 26 Oct 2021.	Absent – field survey and unsuitable habitat (lack of coarse woody debris)	No	N
Dural Land Snail	E/E	n/a	Sp	Associated PCT/s: 850 The species is a shale-influenced-habitat specialist, which occurs in low densities along the western and NW fringes of the Cumberland IBRA SR on shale-sandstone transitional landscapes. *Pommerhelix duralensis* in the strict sense is found in an area of NW Sydney between Rouse Hill - Cattai and Wiseman's Ferry, west from Berowra Creek. Occurrence in Wollondilly Shire is unlikely. BAM survey period: all year The species is likely to persist in a small clump (3 trees) of paddock trees as long as bark and/or leaf litter is present. Not recorded during fauna habitat survey on 26 Oct 2021.	Absent – field survey and unsuitable habitat (lack of bark and leaf-litter). Also considered unlikely to occur in Wollondilly Shire	No	N

3.4 SEPP (Koala Habitat Protection) 2021

The *State Environmental Planning Policy (Koala Habitat Protection) 2021* was made and commenced on 17 March 2021.

The Koala SEPP 2021 reinstates the policy framework of SEPP Koala Habitat Protection 2019 to 83 Local Government Areas (LGA) in NSW. At this stage:

- In nine of these LGAs – Metropolitan Sydney (Blue Mountains, Campbelltown, Hawkesbury, Ku-Ring-Gai, Liverpool, Northern Beaches, Hornsby, Wollondilly) and the Central Coast LGA – Koala SEPP 2021 applies to all zones.
- In all other identified LGAs, Koala SEPP 2021 does not apply to land zoned RU1 Primary Production, RU2 Rural Landscape or RU3 Forestry.

For all RU1, RU2 and RU3 zoned land outside of the Sydney Metropolitan Area and the Central Coast, Koala SEPP 2020 continues to apply. This is an interim measure while new land management and private native forestry codes are developed in line with the NSW Government's announcement on 8 March 2021.

The Landholding is within the Wollondilly LGA. SEPP (Koala Habitat Protection) 2021 is the relevant SEPP for this site.

Does the SEPP apply?

Landholding is within an LGA listed in Schedule 1 of the SEPP	Yes
Exemption under Section 8.	No
Development Site is on land to which an approved Koala Plan of Management applies.	No
Development Site is on land which has an area of at least 1 hectare (including adjoining land within the same ownership).	Yes

Part 2: Development control of koala habitats

11(2) Before a council may grant consent to a development application for consent to carry out development on the land, the council must assess whether the development is likely to have any impact on koalas or koala habitat.

11(3) If the council is satisfied that the development is likely to have low or no impact on koalas or koala habitat, the council may grant consent to the development application.

The development site contains approximately 0.24ha of native vegetation, of which only a small proportion contains native trees.

It is assumed that some trees on site boundaries outside of the riparian corridor may be impacted by future development and could be lost or removed.

The site does not contain breeding habitat for Koalas, is not likely to be part of a movement route and is not known to have been used for foraging by Koalas. The potential impacts of the rezoning would be minor, and would be negligible in relation to the extent of potential koala habitat present within the Assessment Area. The impact on koalas or koala habitat would be low.

Conclusion

SEPP (Koala Habitat Protection) 2021 applies to the land. Part 2 Development control of koala habitats applies to the proposed development. The proposed development would have a low impact on koalas or koala habitat. A Koala Assessment Report is not required.

3.5 Identifying Prescribed Biodiversity Impacts

These are potential impacts on threatened entities and their habitat in addition to, or instead of, impacts from clearing of vegetation, as set out in Clause 6 of the BC Reg.

Table 3 *Prescribed biodiversity impacts and their relevance to the Development Site.*

Prescribed Biodiversity Impact	Details
Impacts on threatened entities associated with karst, caves, crevices cliffs, rocks and other geological features of significance	There is no karst, or caves, rock or other features of geological significance within the study area.
Impacts on the habitat of threatened entities associated with human made structures or non-native vegetation.	No human made structures or areas of non-native vegetation of value for threatened species would be affected by the proposal.
Impacts of on connectivity of habitat of threatened entities	Habitat within the Site forms the edge of a riparian corridor along Redbank Creek. The habitat is separated from the main corridor by Bridge Street and is not likely to be part of a wildlife corridor. There would not be an impact on connectivity of habitat for threatened entities.
Impacts on water quality, water bodies and hydrological processes that sustain threatened entities	A 2nd order creekline runs across the site to Redbank Creek. These creeklines support a threatened ecological community. It is noted that several other creeklines drain from existing industrial developments to the east of the site into Redbank Creek. With implementation of standard water quality design and sediment and erosion controls, it is not likely that impacts arising from the proposed rezoning would notably alter the existing extent of impact on these waterbodies.

Prescribed Biodiversity Impact	Details
Impacts of wind turbine strikes on protected animals.	Not applicable.
Impacts of vehicle strikes on threatened fauna or fauna that are part of a TEC	The increase in vehicular traffic on Bridge Street from industrial development of this site would be negligible, given existing industrial development on adjacent lands along Bridge Street, and the size of Picton and Thirlmere.

4 STAGE 2: IMPACT ASSESSMENT

4.1 Identification, Avoidance and Minimisation of Impacts

4.1.1 Project Design to Avoid and Minimise Impacts

The planning proposal would rezone the RU2 Rural Landscape portion of the landholding to IN2 Light Industrial, to enable development for industrial use. Refer to Figure 2.

The creekline gully and associated native vegetation has existing protection under State and Federal biodiversity legislation and is partly mapped as high biodiversity value on the DPIE Biodiversity Values Map. This land is not suitable for industrial development.

It is intended that vegetation associated with the riparian corridor (as mapped on Figure 2) would be excluded from future industrial development.

Other parts of the site consist of cleared land, with some areas of native vegetation along fencelines bordering the Bridge Street road verge and the railway corridor.

4.1.2 Direct Impacts

Table 4 *Direct impacts (including potential impacts) of the proposed development upon native vegetation and threatened entities, with details of the vegetation zones affected, the extent of impact, and a summary of measures to avoid and/or minimise the impact.*

Type of Impact	Veg. Zone	Extent within site	Extent & details of impact	Summary of avoidance and minimisation
Clearing of native vegetation and habitats	850a: Riparian	0.18ha	Unlikely loss of extent.	Riparian corridor to be excluded from industrial development.
	850b: Roadside	0.06ha	Up to 0.06ha could potentially be removed.	Future development proposals should justify impacts and any proposed removal of trees along site boundaries.

4.1.3 Indirect Impacts

Table 5 *Indirect impacts (including potential impacts) of the proposed development upon native vegetation and threatened entities, with details of the nature, extent, duration and timing of the impact, and a summary of measures to avoid and/or minimise the impact.*

Type of Impact	Details	Summary of avoidance and minimisation
Inadvertent physical damage to vegetation retained within the Landholding.	Accidental damage to existing trees could be caused by careless operation of large machinery. Damage to native vegetation could also be caused by the parking of vehicles or storing of materials beneath trees.	Trees and vegetation to be retained should be protected by temporary fencing during construction works on the site. The development exclusion area should not be used for vehicle parking or machinery or material storage.
Reduced viability of habitat due to edge effects.	The local patch of habitat is already substantially impacted by edge effects. The minor potential loss of vegetation from the boundaries of the development site would not further reduce the viability of retained vegetation.	No actions proposed.
Reduced viability of habitat due to noise, dust or light spill.	The local patch of habitat is already substantially impacted by noise and light spill. Industrial development of the site would not further reduce the quality or viability of habitat within the local patch.	No actions proposed.
Spread of diseases and weeds.	The site is already affected by weeds, and is already at risk of soil borne diseases through adjacent landuse and development. There is a low increased risk of introduction of diseases to the site with construction machinery, and future landscaping activities.	The measures below are recommended, but are not relied upon in this assessment report: Biosecurity risk should be addressed as part of future sediment and erosion control plans. Typically, requirements would include that: i) all machinery, equipment and work boots are cleaned of soil and plant propagules prior to entering the Development Site, and upon leaving the Development Site; and ii) any fill, soil, or mulch imported to the site be screened and certified clean of diseases and weeds.

Type of Impact	Details	Summary of avoidance and minimisation
Loss of food and shelter for fauna.	The extent of loss of habitat for fauna would be negligible in relation to the extent present within the Assessment Area.	No actions proposed.
Loss of breeding habitat.	The site does not provide breeding habitat for any threatened species. The extent of loss of habitat would be negligible in relation to the extent present within the Assessment Area.	No actions proposed.
Trampling of threatened flora species.	Not applicable.	No actions proposed.
Inhibition of nitrogen fixation and increased soil salinity.	Not applicable.	No actions proposed.
Fertiliser drift.	Not applicable.	No actions proposed.
Rubbish dumping.	Not applicable.	No actions proposed.
Wood collection.	Not applicable.	No actions proposed.
Removal of rocks.	Not applicable.	No actions proposed.
Increase in predators.	Not applicable.	No actions proposed.
Increase in pest animal populations.	Not applicable.	No actions proposed.
Changed fire regime.	Unlikely to change.	No actions proposed.
Disturbance to specialist breeding and foraging habitat.	No specialist breeding and foraging habitat is present on the site.	No actions proposed.

4.1.4 Prescribed Biodiversity Impacts

Prescribed impacts are potential impacts on threatened entities and their habitat in addition to, or instead of, impacts from clearing of vegetation, as set out in Clause 6 of the BC Reg. Relevant prescribed biodiversity impacts were identified in Ch 3.5 of this report.

Of potential relevance to the proposed rezoning, creeklines within and adjacent to the site support a threatened ecological community. However, with implementation of standard water quality design and sediment and erosion controls, it is not likely that impacts arising from the proposed rezoning would notably alter the existing extent of impact on these waterbodies.

4.1.5 Summary of avoidance, minimisation and mitigation measures

Table 6 *Summary of measures to be implemented to avoid, minimise and mitigate impacts. Essential measures are those relied upon for the purpose of the impact assessment in this report.*

Action	Outcome	Timing	Responsibility	Essent'l
Prior to construction				
Installation of temporary protective fencing for vegetation being retained during construction works on the site.	To avoid accidental damage to trees and vegetation being retained	Prior to commencement of site works.	Site Manager	✓
If relevant, engagement of an Arborist to recommend and install tree protection measures.	Minimise impacts on trees to be retained	Prior to commencement of site works.	Land owner & Arborist	
Installation of sediment and erosion control features to meet standard requirements	Minimise impacts on creeklines and water quality.	Prior to commencement of works	Site Manager	✓
During construction				
Development exclusion area not to be used for vehicle parking or machinery or material storage	Avoid impacts on vegetation to be retained.	Throughout site works	Site Manager & all site workers	✓
Cleaning of machinery, equipment and boots	Avoid spread of disease and weeds.	Throughout site works, whenever equipment, machinery or workboots enters or leaves site.	Site Manager & all site workers	
Fill, soil, or mulch imported to the site to be screened and certified clean of diseases and weeds	Minimise potential for spread of diseases and weeds.	As relevant.	Site Manager	
Ongoing use of site				
Development exclusion area not to be used for vehicle parking or machinery or material storage	Avoid impacts on vegetation to be retained.	Ongoing	Landowners	✓

Action	Outcome	Timing	Responsibility	Essent'l
Attention to site biosecurity. Do not allow imported soil or plant material to be washed into creeklines.	Minimise potential for spread of diseases and weeds.	Ongoing	Landowner	

4.2 Does the Biodiversity Offset Scheme apply?

4.2.1 Areas of Outstanding Biodiversity Value (AOBV)

The proposed development would not affect any land declared to be an Area of Outstanding Biodiversity Value.

4.2.2 BOSET - Area Criteria

If a development project will clear an area of native vegetation equivalent to the area specified in column 2 of the area of clearing table (see below) established under clause 7.2 of the BC Reg, then the project exceeds the Biodiversity Offset Scheme Entry Threshold (BOSET).

Column 1	Column 2
Minimum lot size of land	Area of clearing
Less than 1 hectare	0.25 hectare or more
Less than 40 hectares but not less than 1 hectare	0.5 hectare or more
Less than 1,000 hectares but not less than 40 hectares	1 hectare or more
1,000 hectares or more	2 hectares or more

The minimum lot size for the development site is 16ha, so the area of clearing criteria is 0.5ha.

The total extent of native vegetation within the development site is 0.24ha. The proposed rezoning may result in removal of up to 0.06ha of native vegetation. The proposal would not exceed the BOSET area criteria.

4.2.3 BOSET - Biodiversity Values Map

An area of vegetation associated with the riparian corridor is mapped as high biodiversity value (refer to Figure 1 and 2). The mapping corresponds to the boundary of regional vegetation mapping for Shale Sandstone Transition Forest.

Rezoning of the land for industrial development would not require removal of vegetation on land mapped on the Biodiversity Values Maps. The proposal would not exceed the BOSET map criteria.

4.2.4 Test of Significance

For development projects that do not exceed the BOSET area or map criteria, a Test of Significance is required to determine whether the project "*is likely to significantly affect threatened species or ecological communities, or their habitats*", in accordance with s7.3 of the BC Act.

The test of significance set out below has been prepared in accordance with the *Threatened Species Test of Significance Guidelines* (NSW Office of Environment and Heritage, July 2018), gazetted on 3rd August 2018.

Relevant threatened species

The OEH (2018) guidelines state:

> *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.*

Relevant threatened species are listed in Chapter 3.3 of this report. Field surveys were conducted to search for threatened flora, and for some threatened fauna. Surveys were also conducted to search for indirect evidence of threatened fauna and for important or critical habitat components.

Consideration as to whether relevant species are known or potentially present within the Development Site on the basis of survey and habitat assessment data is summarised in Table 2, with a conclusion as to whether an assessment of impacts is required.

Test of Significance

The following is to be taken into account for the purpose of determining whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats:

(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.

- *Thesium australe*: Assumed to occur amongst grasses along site fencelines, and on the southeastern edge of the riparian zone. Habitat within the riparian zone would be retained. Habitat along site fencelines may be disturbed such that plants could be lost from this area. It would be possible to retain areas of habitat for this species if it was found to be present during a subsequent survey. The proposed rezoning would not be likely to affect the life cycle of the species.

* *White-throated Needletail*: Would not breed within the site. May use the site for roosting or foraging on occasions. The proposed rezoning would not affect the life cycle of the species.

* *Spotted Harrier*: Does not appear to breed within the site but is assumed to hunt across the site on occasions. The extent of vegetation removal that may occur relative to that present within the Assessment Area and within the foraging range of this species is negligible. No unique or rare resources would be removed. No likely impact on life cycle.

* *Little Eagle*: Occurs as a single breeding population in NSW. Does not breed within the site but is assumed to hunt across the site on occasions. The extent of vegetation removal that may occur relative to that present within the Assessment Area and within the foraging range of this species is negligible. No unique or rare resources would be removed. No likely impact on life cycle.

* *Square-tailed Kite*: Does not appear to breed within the site but is assumed to hunt across the site on occasions. The extent of vegetation removal that may occur relative to that present within the Assessment Area and within the foraging range of this species is negligible. No unique or rare resources would be removed. No likely impact on life cycle.

* *Little Lorikeet*: Unlikely to breed within the site – no hollows observed and no individuals sighted during the spring breeding season. Assumed to forage within the site on occasions. The extent of vegetation removal that may occur relative to that present within the Assessment Area and within the foraging range of this species is negligible. No unique or rare resources would be removed. No likely impact on life cycle.

* *Gang-gang Cockatoo*: Does not breed within the site but is assumed to forage in vegetation present on occasions. The extent of vegetation removal that may occur relative to that present within the Assessment Area and within the foraging range of this species is negligible. No unique or rare resources would be removed. No likely impact on life cycle.

* *Swift Parrot*: A migratory species. It does not breed within the site but could theoretically forage in vegetation present in some years. The extent of vegetation removal that may occur relative to that present within the Assessment Area and within the foraging range of this species is negligible. No unique or rare resources would be removed (the site is not dominated by winter flowering trees). No likely impact on life cycle.

* *Turquoise Parrot*: Unlikely to breed within the site – no hollows observed and no individuals sighted during the spring breeding season. Assumed to forage within the site on occasions. The extent of vegetation removal that may occur relative to that present within the Assessment Area and within the foraging range of this species is negligible. No unique or rare resources would be removed. No likely impact on life cycle.

* *Barking Owl*: Does not breed within the site but is assumed to hunt across the site on occasions. The extent of vegetation removal that may occur relative to that present within the Assessment Area and within the foraging range of this species is negligible. No unique or rare resources would be removed. No likely impact on life cycle

* *Powerful Owl*: Does not breed within the site but is assumed to hunt across the site on occasions. The extent of vegetation removal that may occur relative to that present within

the Assessment Area and within the foraging range of this species is negligible. No unique or rare resources would be removed. No likely impact on life cycle.

* *Masked Owl*: Does not breed within the site but is assumed to hunt across the site on occasions. The extent of vegetation removal that may occur relative to that present within the Assessment Area and within the foraging range of this species is negligible. No unique or rare resources would be removed. No likely impact on life cycle.

* *Regent Honeyeater*: A migratory species. It does not breed within the site but is assumed to forage in vegetation present in some years. The extent of vegetation removal that may occur relative to that present within the Assessment Area and within the foraging range of this species is negligible. No unique or rare resources would be removed. No likely impact on life cycle.

* *Black-chinned Honeyeater*: A rare visitor to the region. This species is not likely to breed within the site. It is assumed to forage in vegetation present in some years. The extent of vegetation removal that may occur relative to that present within the Assessment Area and within the foraging range of this species is negligible. No unique or rare resources would be removed. No likely impact on life cycle.

* *Varied Sittella*: Assumed to forage within the site on occasions. It is a sedentary species that was not observed on site at the time of the surveys. No nests were observed. It does not appear to breed on the site. The extent of vegetation removal that may occur relative to that present within the Assessment Area and within the foraging range of this species is negligible. No unique or rare resources would be removed. No likely impact on life cycle.

* *Dusky Woodswallow*: Assumed to forage within the site on occasions. It was not observed on site at the time of the surveys. No nests were observed. It does not appear to breed on the site. The extent of vegetation removal that may occur relative to that present within the Assessment Area and within the foraging range of this species is negligible. No unique or rare resources would be removed. No likely impact on life cycle.

* *Flame Robin*: Would not breed within the site. Assumed to forage within the site during the non-breeding season. The extent of vegetation removal that may occur relative to that present within the Assessment Area and within the foraging range of this species is negligible. No unique or rare resources would be removed. No likely impact on life cycle.

* *Koala*: Does not reside or breed within the site. Individuals are known to occasionally travel through developed areas and could theoretically use the site for short periods when dispersing through the landscape. Development of the site would not prevent Koalas from continuing to disperse along treed boundaries of the site. The vegetation present represents a very small proportion of the potential habitat available for this species in the Assessment Area. No unique or rare resources would be removed. No likely impact on life cycle.

* *Grey-headed Flying-fox*: Does not camp or breed within the site but is assumed to forage in vegetation present on occasions. The extent of vegetation removal that may occur relative to that present within the Assessment Area and within the foraging range of this species is negligible. No unique or rare resources would be removed. No likely impact on life cycle.

- *Yellow-bellied Sheath-tail Bat*: Assumed to forage and/or roost in vegetation within the site. The extent of vegetation removal that may occur relative to that present within the Assessment Area and within the flight range of this species is negligible. No significantly large old hollow-bearing trees, or other unique or rare resources would be removed. Microchiropteran bats generally change roost sites regularly, and are not dependent upon particular hollows. No likely impact on life cycle.
- *Eastern Freetail-Bat*: Assumed to forage and/or roost in vegetation within the site. The extent of vegetation removal that may occur relative to that present within the Assessment Area and within the flight range of this species is negligible. No significantly large old hollow-bearing trees, or other unique or rare resources would be removed. Microchiropteran bats generally change roost sites regularly, and are not dependent upon particular hollows. No likely impact on life cycle.
- *Little Bentwing-bat*: Does not breed within or near to the site. It is assumed to forage in vegetation present on occasions. The extent of vegetation removal that may occur relative to that present within the Assessment Area and within the flight range of this species is negligible. No significantly large old hollow-bearing trees, or other unique or rare resources would be removed. No likely impact on life cycle.
- *Eastern Bentwing-bat*: Does not breed within or near to the site. It is assumed to forage in vegetation present on occasions. The extent of vegetation removal that may occur relative to that present within the Assessment Area and within the flight range of this species is negligible. No significantly large old hollow-bearing trees, or other unique or rare resources would be removed. No likely impact on life cycle.

(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

(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.

- *Cumberland Plain Woodland*: Rezoning of the site could result in loss of up to 0.06ha of degraded roadside woodland. This loss would not significantly alter the already low viability of remaining vegetation along the road verge and railway corridor and within the riparian zone. Future development would not be likely to further modify the composition of the community such that the local occurrence would be placed at further risk of extinction.

(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

(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

(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.

* *Cumberland Plain Woodland*: Rezoning of the site could result in loss of up to 0.06ha of degraded roadside woodland. Development would not further fragment habitat for this community. The habitat is highly degraded, limited in extent, subject to substantial edge effects and is not likely to be of importance for the long term survival of this community in the locality.

* *Thesium australe*: Rezoning of the site could impact upon up to 0.03ha of potential grassy habitat for this species. It would be possible for boundary areas of the site to be retained if this species was confirmed present during future surveys, such that impacts could be completely avoided. The habitat is already highly fragmented. If the species is present, the habitat would be considered of some importance for the long term survival of the species.

* *White-throated Needletail*: Rezoning of the site could result in loss of up to 0.06ha of degraded roadside woodland. This is a negligible loss in relation to the 186ha of potential habitat available in the Assessment Area - refer to Figure 3. Development would not further fragment habitat for this species. The habitat is not likely to be of importance for this species.

* *Spotted Harrier:* Rezoning of the site could result in loss of up to 0.06ha of degraded roadside woodland. This is a negligible loss in relation to the 186ha of potential habitat available in the Assessment Area - refer to Figure 3. Development would not further fragment habitat for this species. The habitat is not likely to be of importance for this species.

* *Little Eagle*: Rezoning of the site could result in loss of up to 0.06ha of degraded roadside woodland. This is a negligible loss in relation to the 186ha of potential habitat available in the Assessment Area - refer to Figure 3. Development would not further fragment habitat for this species. The habitat is not likely to be of importance for this species.

* *Square-tailed Kite*: Rezoning of the site could result in loss of up to 0.06ha of degraded roadside woodland. This is a negligible loss in relation to the 186ha of potential habitat available in the Assessment Area - refer to Figure 3. Development would not further fragment habitat for this species. The habitat is not likely to be of importance for this species.

* *Little Lorikeet:* Rezoning of the site could result in loss of up to 0.06ha of degraded roadside woodland. This is a negligible loss in relation to the 186ha of potential habitat available in the Assessment Area - refer to Figure 3. Development would not further fragment habitat for this species. The habitat is not likely to be of importance for this species.

* *Gang-Gang Cockatoo*: Rezoning of the site could result in loss of up to 0.06ha of degraded roadside woodland. This is a negligible loss in relation to the 186ha of potential habitat available in the Assessment Area - refer to Figure 3. Development would not further fragment habitat for this species. The habitat is not likely to be of importance for this species.

* *Swift Parrot*: Rezoning of the site could result in loss of up to 0.06ha of degraded roadside woodland. This is a negligible loss in relation to the 186ha of potential habitat available in the Assessment Area - refer to Figure 3. Development would not further fragment habitat for this species. The habitat is not likely to be of importance for this species.

* *Powerful Owl*: 0.23ha of potential hunting habitat would be removed. This is a negligible loss in relation to the 524ha of substantially higher quality potential habitat available in the Assessment Area - refer to Figure 3). The habitat to be removed is already isolated from other areas of intact vegetation. The proposed development would not fragment or isolate an area of habitat for this species. The habitat that would be affected would not be of importance for the long term survival of this species in the locality.

* *Turquoise Parrot*: Rezoning of the site could result in loss of up to 0.06ha of degraded roadside woodland. This is a negligible loss in relation to the 186ha of potential habitat available in the Assessment Area - refer to Figure 3. Development would not further fragment habitat for this species. The habitat is not likely to be of importance for this species.

* *Barking Owl:* Rezoning of the site could result in loss of up to 0.06ha of degraded roadside woodland. This is a negligible loss in relation to the 186ha of potential habitat available in the Assessment Area - refer to Figure 3. Development would not further fragment habitat for this species. The habitat is not likely to be of importance for this species.

* *Powerful Owl* Rezoning of the site could result in loss of up to 0.06ha of degraded roadside woodland. This is a negligible loss in relation to the 186ha of potential habitat available in the Assessment Area - refer to Figure 3. Development would not further fragment habitat for this species. The habitat is not likely to be of importance for this species.

* *Masked Owl*: Rezoning of the site could result in loss of up to 0.06ha of degraded roadside woodland. This is a negligible loss in relation to the 186ha of potential habitat available in the Assessment Area - refer to Figure 3. Development would not further fragment habitat for this species. The habitat is not likely to be of importance for this species.

* *Regent Honeyeater:* Rezoning of the site could result in loss of up to 0.06ha of degraded roadside woodland. This is a negligible loss in relation to the 186ha of potential habitat available in the Assessment Area - refer to Figure 3. Development would not further fragment habitat for this species. The habitat is not likely to be of importance for this species.

* *Black-chinned Honeyeater*: Rezoning of the site could result in loss of up to 0.06ha of degraded roadside woodland. This is a negligible loss in relation to the 186ha of potential habitat available in the Assessment Area - refer to Figure 3. Development would not further fragment habitat for this species. The habitat is not likely to be of importance for this species.

* *Varied Sittella:* Rezoning of the site could result in loss of up to 0.06ha of degraded roadside woodland. This is a negligible loss in relation to the 186ha of potential habitat available in the Assessment Area - refer to Figure 3. Development would not further fragment habitat for this species. The habitat is not likely to be of importance for this species.

- *Dusky Woodswallow:* Rezoning of the site could result in loss of up to 0.06ha of degraded roadside woodland. This is a negligible loss in relation to the 186ha of potential habitat available in the Assessment Area - refer to Figure 3. Development would not further fragment habitat for this species. The habitat is not likely to be of importance for this species.
- *Flame Robin:* Rezoning of the site could result in loss of up to 0.06ha of degraded roadside woodland. This is a negligible loss in relation to the 186ha of potential habitat available in the Assessment Area - refer to Figure 3. Development would not further fragment habitat for this species. The habitat is not likely to be of importance for this species.
- *Koala*: Rezoning of the site could result in loss of up to 0.06ha of degraded roadside woodland. This is a negligible loss in relation to the 186ha of potential habitat available in the Assessment Area - refer to Figure 3. Development would not further fragment habitat for this species. The habitat is not likely to be of importance for this species.
- *Grey-headed Flying-fox*: Rezoning of the site could result in loss of up to 0.06ha of degraded roadside woodland. This is a negligible loss in relation to the 186ha of potential habitat available in the Assessment Area - refer to Figure 3. Development would not further fragment habitat for this species. The habitat is not likely to be of importance for this species.
- *Yellow-bellied Sheathtail-bat*: Rezoning of the site could result in loss of up to 0.06ha of degraded roadside woodland. This is a negligible loss in relation to the 186ha of potential habitat available in the Assessment Area - refer to Figure 3. Development would not further fragment habitat for this species. The habitat is not likely to be of importance for this species.
- *Eastern Freetail-bat*: Rezoning of the site could result in loss of up to 0.06ha of degraded roadside woodland. This is a negligible loss in relation to the 186ha of potential habitat available in the Assessment Area - refer to Figure 3. Development would not further fragment habitat for this species. The habitat is not likely to be of importance for this species.
- *Little Bent-wing Bat*: Rezoning of the site could result in loss of up to 0.06ha of degraded roadside woodland. This is a negligible loss in relation to the 186ha of potential habitat available in the Assessment Area - refer to Figure 3. Development would not further fragment habitat for this species. The habitat is not likely to be of importance for this species.
- *Eastern Bentwing-bat*: Rezoning of the site could result in loss of up to 0.06ha of degraded roadside woodland. This is a negligible loss in relation to the 186ha of potential habitat available in the Assessment Area - refer to Figure 3. Development would not further fragment habitat for this species. The habitat is not likely to be of importance for this species.

(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).

- There are no declared areas of outstanding biodiversity value on the Development Site or within the Assessment Area.

(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.

Table 8 *Key Threatening Processes listed under the BC Act, relevant to the IBRA Burragorang sub-region (Bionet).*

Key Threatening Process	Effect of proposal
Aggressive exclusion of birds from potential woodland and forest habitat by over-abundant noisy miners (*Manorina melanocephala*)	nil
Alteration of habitat following subsidence due to longwall mining	nil
Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands	not significant
Anthropogenic climate change	negligible
Bushrock removal	nil
Clearing of native vegetation	not significant
Competition and grazing by the feral European Rabbit *Oryctolagus cuniculus*	nil
Competition and habitat degradation by Feral Goats *Capra hircus*	nil
Competition from feral honey bees *Apis mellifera*	nil
Forest eucalypt dieback associated with over-abundant psyllids and Bell Miners	nil
Herbivory and environmental degradation caused by feral deer	nil
High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition	nil
Importation of red imported fire ants *Solenopsis invicta*	nil
Infection by Psittacine Circoviral (beak and feather) Disease affecting endangered psittacine species and populations	nil
Infection of frogs by amphibian chytrid causing the disease chytridiomycosis	unlikely
Infection of native plants by *Phytophthora cinnamomi*	unlikely
Introduction and establishment of Exotic Rust Fungus of the order Pucciniales pathogenic on plants of the family Myrtaceae	unlikely
Introduction of the large earth bumblebee *Bombus terrestris*	nil
Invasion and establishment of exotic vines and scramblers	nil
Invasion and establishment of Scotch Broom (*Cytisus scoparius*)	nil
Invasion and establishment of the cane toad (*Bufo marinus*)	nil

Key Threatening Process	Effect of proposal
Invasion of native plant communities by African Olive *Olea europaea* ssp *cuspidata*	nil
Invasion of native plant communities by *Chrysanthemoides monilifera*	nil
Invasion of native plant communities by exotic perennial grasses	nil
Invasion of the yellow crazy ant (*Anoplolepis gracilipes*) into NSW	nil
Invasion, establishment and spread of Lantana (*Lantana camara*)	nil
Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants.	nil
Loss of hollow-bearing trees	nil
Loss or degradation (or both) of sites used for hill-topping by butterflies	nil
Predation and hybridisation of feral dogs (*Canis lupus familiaris*)	nil
Predation by *Gambusia holbrooki* Girard, 1859 (plague minnow or mosquito fish)	nil
Predation by European red fox (*Vulpes vulpes*)	nil
Predation by the feral cat (*Felis catus*)	nil
Predation, Habitat degradation, Competition and Disease Transmission by Feral Pigs (*Sus scrofa*)	nil
Removal of dead wood and dead trees	unlikely

The proposed development would result in a minor loss of native vegetation with associated impact on dead wood and dead trees. The impact is not regarded as significant for any of the relevant threatened species.

Spread of diseases is unlikely, with the risk to be further minimised through implementation of management measures outlined in Ch4.1 above.

Development of the site would alter surface flows across the site which could affect the natural flow regime of Redbank Creek. The impact is not likely to be significant given the small size of the site and existing impacts on the creekline.

Threatened species potentially utilising the Development Site, and species known to occur in the Assessment Area, would not be likely to be significantly affected by the contribution of the proposed development to these *Key Threatening Processes*.

Test of Significance Conclusion

The likely and potential impacts of the proposed development upon threatened species have been considered pursuant to s7.3 of the BC Act. In conclusion, the proposed development is not "*likely to significantly affect threatened species or ecological communities, or their habitats*".

4.2.5 Biodiversity Offset Scheme Conclusion

In conclusion:

1. The development would not affect any Areas of Outstanding Biodiversity Value (AOBV)
2. The development would not exceed the Biodiversity Offset Scheme Entry Threshold (BOSET)
3. The development would not be likely to significantly affect threatened species or ecological communities, or their habitats.

Further assessment of the project using the Biodiversity Assessment Method (BAM) is not required. A Biodiversity Development Assessment Report (BDAR) is not required. Offsetting of impacts under the Biodiversity Offsets Scheme (BOS) is not required.

4.3 Commonwealth EPBC Act

The *Commonwealth Environment Protection & Biodiversity Conservation Act 1999* requires that an action which has, will have or is likely to have a significant impact upon one or more matters of National Environmental Significance (NES) must be referred to the Commonwealth Minister for Environment & Heritage for approval. These actions are referred to as 'controlled actions'.

Matters of NES include World Heritage properties, listed Ramsar Wetlands of international importance, listed threatened species and communities, listed migratory species, nuclear actions and Commonwealth marine areas.

4.3.1 Matters of National Environmental Significance

Table 9 *Identification of mattters of National Environmental Significance for assessment.*

NES	Relevance to project
World Heritage Properties	n/a
Ramsar Wetlands	n/a
Threatened plant species	*Thesium australe* (V) – assumed to occur in grassy areas along fencelines.
Threatened fauna species	White-throated Needletail (V) – would not breed within the site. Assumed to forage and roost within the site on occasions. Swift Parrot *Lathamus discolor* (CE) – assumed to forage in vegetation within the site in some years. Regent Honeyeater *Anthochaera phrygia* (CE) – assumed to forage in vegetation within the site in some years. Koala *Phascolarctos cinereus* (V) – individuals could theoretically occur on the site

NES	Relevance to project
	on occasions. Grey-headed Flying-fox *Pteropus poliocephalus* (V) – assumed to forage in vegetation within the site on occasions.
Threatened communities	Cumberland Plain Woodland in the Sydney Basin Bioregion
Migratory species	A large number of listed migratory bird species are known to occur in the Region. Many would be likely to range over the site on occasions, and could theoretically stop within the site opportunistically. The site does not contain any unique features that would be of value for migratory birds. It is not likely that any migratory species would utilise the Development Site or include it as part of a regular foraging range. The proposed development would not be likely to affect any migratory species listed under the EPBC Act.
Nuclear actions	n/a
Commonwealth marine areas	n/a

4.3.2 Assessment of Significance

Critically Endangered Ecological Community – Cumberland Plain Woodland

An action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will:

* reduce the extent of an ecological community;

  Rezoning of the site could result in loss of up to 0.06ha of degraded roadside woodland. This is a negligible extent of impact.

* fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines;

  Development would not further fragment habitat for this community.

* adversely affect habitat critical to the survival of an ecological community;

  The proposed development would not affect habitat declared critical to the community.

* modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns;

  Future development of the site would be required to manage stormwater flows to avoid erosion and water quality impacts. Surface flows are likely to be altered which could affect

the natural flow regime of Redbank Creek. The impact is not likely to be significant given the small size of the site and existing impacts on the creekline.

* cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting;

  Future development would not be likely to further modify the composition of the community.

* cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to:

  - assisting invasive species, that are harmful to the listed ecological community, to become established; or
  - causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community; or

  Development of the site would not assist invasive species to become established, or cause additional fertilisers or herbicides to be introduced to natural systems. Future development would provide opportunity to install a formal stormwater management system for the land.

* interfere with the recovery of an ecological community.

  The proposed development would be located on a small private landholding. The proposal would not interfere with recovery of the ecological community in the locality.

Critically Endangered species – Swift Parrot, Regent Honeyeater

An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:

* lead to a long-term decrease in the size of a population;

  Swift Parrot and Regent Honeyeater – these wide-ranging migratory birds may forage in vegetation within the site in some years. They are not resident or regular visitors to Picton and would not breed in the Assessment Area. The extent of foraging habitat that may be removed relative to that present in the Assessment Area is negligible. Its loss would not affect the size of a population of either species.

* reduce the area of occupancy of the species;

  Neither of these species 'occupy' the site. Habitats present may be used on an occasional basis in some years. The extent of foraging habitat that may be removed relative to that present in the Assessment Area is negligible. No important or rare resources would be removed. Development of the site would not reduce the area of occupancy for either of these species.

* fragment an existing population into two or more populations;

  The Swift Parrot and Regent Honeyeater are both wide-ranging migratory species. Development of the site would not fragment a population of either species.

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

The site is not part of an important mapped area for either species. Development of the site would not affect any habitat declared critical to these species.

* disrupt the breeding cycle of a population;

  Swift Parrot and Regent Honeyeater – these wide-ranging migratory birds do not breed on the site or in the Assessment Area. Development of the site would not disrupt the breeding cycle for either species.

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

  The habitat that may be removed is already degraded, of limited extent, and subject to substantial indirect impacts. Neither species reside or breed within the region. Development of the site would not affect the availability or quality of habitat for either of these species such that the species would decline.

* result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat;

  Development of the site would not alter the current situation in regard to harmful species.

* introduce disease that may cause the species to decline, or;

  Development of the site would not alter the current situation in regard to disease.

* interfere with the recovery of the species.

  Recovery Plans have been prepared for both the Swift Parrot and Regent Honeyeater. The plans do not require actions that involve the site. Development of the site would not interfere with the recovery of either species.

Vulnerable species – Thesium australe, Koala, and Grey-headed Flying-fox

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:

* lead to a long-term decrease in the size of an important population of a species:

  Thesium australe - Assumed to occur amongst grasses along site fencelines, and on the southeastern edge of the riparian zone. Habitat within the riparian zone would be retained. Habitat along site fencelines may be disturbed such that plants could be lost from this area. It would be possible to retain areas of habitat for this species if it was found to be present during a subsequent survey. The proposed rezoning would not need to result in long-term decrease of the size of a population.

  Koala – Koalas do not reside or breed within the site. Koalas are recorded occasionally near Picton, likely to be dispersing individuals. Rezoning of the site could result in loss of up to 0.06ha of degraded roadside woodland. This is a negligible loss in relation to the 186ha of potential habitat available in the Assessment Area. Development of the site would not lead to a long-term decrease in the size of the local population of this species.

  Grey-headed Flying-fox – this species do not reside or breed within the site but may forage within vegetation present on occasions. Rezoning of the site could result in loss of up to

0.06ha of degraded roadside woodland. This is a negligible loss in relation to the 186ha of potential habitat available in the Assessment Area. Development of the site would not lead to a long-term decrease in the size of the local population of this species.

* reduce the area of occupancy of an important population:

  Thesium australe: Assumed to occur amongst grasses along site fencelines, and on the southeastern edge of the riparian zone. Habitat within the riparian zone would be retained. Habitat along site fencelines may be disturbed such that plants could be lost from this area. It would be possible to retain areas of habitat for this species if it was found to be present during a subsequent survey. The proposed rezoning would not need to reduce the area of occupancy of a population of this species.

  Koala and Grey-headed Flying-fox: Neither of these species 'occupy' the site. Habitats may be used on an occasional basis. The extent of loss of foraging habitat is negligible in relation to that present within the foraging ranges of these species. No important or rare resources would be removed. The proposed development would not be likely to reduce the area of occupancy for either of these species.

* fragment an existing important population into two or more populations:

  Development of the site would not further fragment habitat for any of these species

* adversely affect habitat critical to the survival of a species:

  The proposed development would not affect any habitat declared critical to these species.

* disrupt the breeding cycle of an important population:

  Thesium australe: Development of the site would not disrupt the breeding cycle of this species.

  Koala and Grey-headed Flying-fox: Neither of these species breed within or adjacent to the site. Development of the site would not disrupt the breeding cycle of either of these species.

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

  The habitat to be removed is already degraded, of limited extent, and subject to substantial indirect impacts. Development of the site would not further affect the availability or quality of habitat for any of the species such that the species would decline.

* result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat:

  Development of the site would not alter the current situation in regard to harmful species.

* introduce disease that may cause the species to decline:

  Development of the site would not alter the current situation in regard to disease.

* interfere substantially with the recovery of the species:

  Development of the site would not interfere with or prevent the recovery of any of these species.

4.3.3 Conclusion

The proposed development would not be likely to impose a significant impact upon any matter of *National Environmental Significance* listed under the Commonwealth EPBC Act.

Referral of the proposal to the Commonwealth Minister for Environment is not required.

5 SUMMARY & CONCLUSIONS

National

The proposed development would not be likely to impose a significant impact upon any matter of *National Environmental Significance* listed under the Commonwealth EPBC Act. Referral of the proposal to the Commonwealth Minister for Environment is not required.

State

BC Act - The Biodiversity Offset Scheme does not apply. Further assessment of the project using the Biodiversity Assessment Method (BAM) is not required. A Biodiversity Development Assessment Report (BDAR) is not required. Offsetting of impacts under the Biodiversity Offsets Scheme (BOS) is not required.

SEPP (Koala Habitat Protection) 2021 applies to the land. Part 2 Development control of koala habitats applies to the proposed development. The proposed development would have a low impact on koalas or koala habitat. A Koala Assessment Report is not required.

APPENDIX 1

Vegetation data recorded in the study area by Dan Clarke (6th September 2021), and Graeme Bradburn (8th October 2021).

Description:

* The vegetation.
* Canopy species.
* Mid-storey species
* Groundlayer species
* The main weeds recorded were
* No threatened flora species were observed and it is considered unlikely that any potentially occurring species would be found onsite.

Figure 4 *Botanical survey observation points and threatened species transects.*

Observation Points:

Observation point 1 GPS:	Native canopy, midstorey and groundlayer species: Exotic vegetation: General comments:
Observation point 2 GPS:	Native canopy, midstorey and groundlayer species: Exotic vegetation: General comments:
Observation point 3 GPS:	Native canopy, midstorey and groundlayer species: Exotic vegetation: General comments:
Observation point 4	Native canopy, midstorey and groundlayer species:

GPS:	Exotic vegetation: General comments:
Observation point 5 GPS:	Native canopy, midstorey and groundlayer species:. Exotic vegetation: General comments:
Observation point 6 GPS:	Native canopy, midstorey and groundlayer species: Exotic vegetation: General comments:
Observation point 7 GPS:	Native canopy, midstorey and groundlayer species: Exotic vegetation: General comments:
Observation Point 8 GPS:	Native canopy, midstorey and groundlayer species: Exotic vegetation: General comments:.

APPENDIX 2

Fauna species and habitat data recorded in the study area by Rebecca Hogan (26th October 2021).

General habitat description

The study area contains a disturbed patch of native woodland within a steep-sided gully associated with an ephemeral 2nd order (Strahler) creekline. There are also narrow strips of native vegetation extending onto the site along the southern and northern boundaries from adjacent transport corridors.

There are no geological features within the site such as rocky areas or caves.

The vegetation consists of a discontinuous canopy of eucalypts of varying ages. There are no particularly large old trees within the site. Vegetation in the gully is heavily infested in the mid-storey with Privet and Lantana. The groundcover beneath areas of weed thicket consists of a layer of fallen exotic leaves. There is very limited native understorey vegetation within the site.

Specific resources:

Habitat Features:	
Hollow-bearing trees	There may be small crevices or hollows less than 5cm diameter in the upper canopy of some trees, although none were sighted. No medium or large hollows are present.
Large trees	No
Large stags	No
Logs, fallen debris	Substantial due to recent storm, but all recent – not a feature of the site.
Mistletoe	No
Casuarina or Allocasuarina spp	No
Termite mounds	No
Water	Ephemeral creekline with small pools at the time of the survey
Caves, culverts etc	No
Surface rock	Some exposed sandstone within the gully
Other	No

Signs of fauna:	
Diggings	No
Scratches/chews on trees	No, but tree trunks damaged by mini tornado so could have been missed
Scats	No, but likely disintegrated in mini tornado
Burrows/dens	No
Nests	No
Chewed cones	No
Other	No

Weather conditions at the time of survey:

Warm (21°C), with a light breeze, mostly sunny, no rain. Recent severe storm (referred to as a mini-tornado by witnesses).

Species recorded

Key	
Status	
*	Introduced species
V	Species listed as Vulnerable under the BC Act

Status	Common Name	Scientific Name	Detection method
	BIRDS		
	Noisy Miner	*Manorina melanocephala*	Observed on site
	Magpie-lark	*Grallina cyanoleuca*	Observed on site
	Australian Magpie	*Cracticus tibicen*	Observed on site
	Australian Raven	*Corvus coronoides*	Heard nearby

APPENDIX 3

List of threatened species known or predicted to occur in the IBRA Cumberland (SYB08) sub-region (Bionet 12/12/2021), and threatened species known to be associated with PCT 850 (TBDC 12/12/2021), to identify relevant species for assessment. Previous records in study area from Bionet Atlas (14/09/2021). Patch size is 122ha (patch size class <100ha). Cover in 1500m Assessment Area is 22% (cover class is 11-30%).

Scientific Name	Common Name	BC Act	EPBC Act	No. in SYB08	PCT 850	short-list	Geographic limitations	min. patch size	min % cover 1500m	previous record in study area	relevant species
Flora											
Cynanchum elegans	White-flower Wax Plant	E	E	23	✓	✓	none	n/a	n/a	X	✓
Isotoma fluviatilis ssp fluviatilis			X	15	✓	✓	incomplete profile	n/a	n/a	X	✓
Allocasuarina glareicola		E	E	103							
Wilsonia backhousei	Narrow-leaved Wilsonia	V		115							
Hibbertia fumana		CE		1072							
Hibbertia puberula		E		1246							
Hibbertia sp Bankstown		CE	CE	217							
Hibbertia spanantha	Julian's Hibbertia	CE	CE	1							
Hibbertia superans		E		66							
Tetratheca glandulosa		V		81							
Tetratheca juncea	Black-eyed Susan	V	V	15							
Epacris purpurascens var purpurascens		V		478							
Leucopogon exolasius	Woronora Beard-heath	V	V	9							

Scientific Name	Common Name	BC Act	EPBC Act	No. in SYB08	PCT 850	short-list	Geographic limitations	min. patch size	min % cover 1500m	previous record in study area	relevant species
Leucopogon fletcheri ssp fletcheri		E		17							
Chamaesyce psammogeton	Sand Spurge	E		P							
Dillwynia tenuifolia		V		4587							
Pultenaea parviflora		E	V	1426							
Pultenaea pedunculata	Matted Bush-pea	E		41	✓	✓	none	n/a	n/a	X	✓
Acacia bynoeana	Bynoe's Wattle	E	V	257							
Acacia clunies-rossiae	Kanangra Wattle	V		1							
Acacia flocktoniae	Flockton Wattle	V	V	P							
Acacia gordonii		E	E	P							
Acacia pubescens	Downy Wattle	V	V	5725	✓	✓	none	n/a	n/a	X	✓
Acacia terminalis ssp Eastern Sydney	Sunshine Wattle	E	E	1							
Grammitis stenophylla	Narrow-leaf Finger Fern	E		4							
Gyrostemon thesioides		E		32							
Haloragis exalata ssp exalata	Square Raspwort	V	V	P							
Haloragodendron lucasii		E	E	8							
Camarophyllopsis kearneyi		E		1							
Hygrocybe anomala var ianthinomarginata		V		2							
Hygrocybe aurantipes		V		2							
Hygrocybe austropratensis		E		2							
Hygrocybe collucera		E		1							

Scientific Name	Common Name	BC Act	EPBC Act	No. in SYB08	PCT 850	short-list	Geographic limitations	min. patch size	min % cover 1500m	previous record in study area	relevant species
Hygrocybe griseoramosa		E		1							
Hygrocybe lanecovensis		E		2							
Hygrocybe reesiae		V		5							
Hygrocybe rubronivea		V		1							
Maundia triglochinoides		V		2							
Prostanthera marifolia	Seaforth Mintbush	CE	CE	1							
Commersonia prostrata	Dwarf Kerrawang	E	E	18							
Lasiopetalum joyceae		V	V	6							
Pilularia novae-hollandiae		E		1							
Callistemon linearifolius	Netted Bottle Brush	V		51							
Darwinia biflora		V	V	28							
Darwinia peduncularis		V		7							
Eucalyptus benthamii	Camden White Gum	V	V	590							
Eucalyptus camfieldii	Camfield's Stringybark	V	V	18							
Eucalyptus glaucina	Slaty Red Gum	V	V	P							
Eucalyptus macarthurii	Paddy's River Box	E	E	1							
Eucalyptus nicholii	Narrow-leaved Black Peppermint	V	V	11							
Eucalyptus scoparia	Wallangarra White Gum	E	V	6							
Leptospermum deanei		V	V	2							
Melaleuca biconvexa	Biconvex Paperbark	V	V	2							
Melaleuca deanei	Deane's Paperbark	V	V	66							

Scientific Name	Common Name	BC Act	EPBC Act	No. in SYB08	PCT 850	short-list	Geographic limitations	min. patch size	min % cover 1500m	previous record in study area	relevant species
Micromyrtus minutiflora		E	V	685							
Rhodamnia rubescens	Scrub Turpentine	CE		32							
Syzygium paniculatum	Magenta Lilly Pilly	E	V	77							
Triplarina imbricata	Creek Triplarina	E	E	4							
Caladenia tessellata	Thick-lipped Spider-orchid	E	V	4	✓	✓	none	n/a	n/a	X	✓
Cryptostylis hunteriana	Leafless Tongue Orchid	V	V	1							
Diuris aequalis	Buttercup Doubletail	E	V	1							
Genoplesium baueri	Bauer's Midge Orchid	E	E	21							
Genoplesium plumosum	Tallong Midge Orchid	CE	E	1							
Pterostylis nigricans	Dark Greenhood	V		2							
Pterostylis saxicola	Sydney Plains Greenhood	E	E	48							
Rhizanthella slateri	Underground Orchid	V	E	P							
Deyeuxia appressa		E	E	3							
Persicaria elatior	Tall Knotweed	V	V	1							
Grevillea beadleana	Beadle's Grevillea	E	E	1							
Grevillea caleyi	Caley's Grevillea	CE	CE	1							
Grevillea juniperina ssp juniperina	Juniper-leaved Grevillea	V		4812	✓	✓	none	n/a	n/a	X	✓
Grevillea parviflora subsp. parviflora	Small-flower Grevillea	V	V	1312							
Grevillea parviflora ssp supplicans		E		5							

Scientific Name	Common Name	BC Act	EPBC Act	No. in SYB08	PCT 850	short-list	Geographic limitations	min. patch size	min % cover 1500m	previous record in study area	relevant species
Macadamia integrifolia	Macadamia Nut		V	38							
Persoonia bargoensis	Bargo Geebung	E	V	593							
Persoonia glaucescens	Mittagong Geebung	E	V	56							
Persoonia hirsuta	Hairy Geebung	E	E	50							
Persoonia mollis ssp *maxima*		E	E	11							
Persoonia nutans	Nodding Geebung	E	E	2226							
Pomaderris brunnea	Brown Pomaderris	E	V	83							
Galium australe	Tangled Bedstraw	E		3							
Zieria involucrata		E	V	1							
Thesium australe	Austral Toadflax	V	V	1	✓	✓	none	n/a	n/a	X	✓
Pimelea curviflora var curviflora		V	V	66							
Pimelea spicata	Spiked Rice Flower	E	E	1856	✓	✓	none	n/a	n/a	X	✓
Zannichellia palustris		E		3							
Fauna											
Pseudophryne australis	Red-crowned Toadlet	V		28							
Litoria aurea	Green & Golden Bell Frog	E	V	15,485	✓	✓	none	<5ha	0-10%	X	✓
Heleioporus australiacus	Giant Burrowing Frog	V	V	6							
Varanus rosenbergi	Rosenberg's Goanna	V		5							
Hoplocephalus bungaroides	Broad-headed Snake	E	V	1							
Oxyura australis	Blue-billed Duck	V		3							

Scientific Name	Common Name	BC Act	EPBC Act	No. in SYB08	PCT 850	short-list	Geographic limitations	min. patch size	min % cover 1500m	previous record in study area	relevant species
Stictonetta naevosa	Freckled Duck	V		20							
Ptilinopus superbus	Superb Fruit-dove	V		16							
Hirundapus caudacutus	White-throated Needletail		V, M	95	✓	✓	none	<5ha	0-10%	X	✓
Ephippiorhynchyus asiaticus	Black-necked Stork	E		15							
Botaurus poiciloptilus	Australasian Bittern	E	E	20							
Ixobrychus flavicollis	Black Bittern	V		26							
Circus assimilis	Spotted Harrier	V		26	✓	✓	none	<5ha	11-30%	X	✓
Haliaeetus leucogaster	White-bellied Sea-Eagle	V	C	350	✓	✓	incomplete profile	<5ha	0-10%	X	✓
Hieraaetus morphnoides	Little Eagle	V		128	✓	✓	none	<5ha	11-30%	X	✓
Lophoictinia isura	Square-tailed Kite	V		58	✓	✓	none	<5ha	11-30%	X	✓
Pandion cristatus	Eastern Osprey	V		6							
Falco hypoleucos	Grey Falcon	E	V	1							
Falco subniger	Black Falcon	V		21							
Burhinus grallarius	Bush Stone-curlew	E		8	✓	✓	none	<5ha	11-30%	X	✓
Haematopus fuliginosus	Sooty Oystercatcher	V		3							
Charadrius leschenaultia	Greater Sand-plover	V	V	1							
Irediparra gallinacean	Comb-crested Jacana	V		10							
Rostratula australis	Australian Painted Snipe	E	E	14							
Calidris canutus	Red Knot		E	8							
Calidris ferruginea	Curlew Sandpiper	E	CE	41							
Limicola falcinellus	Broad-billed Sandpiper	V		1							

Scientific Name	Common Name	BC Act	EPBC Act	No. in SYB08	PCT 850	short-list	Geographic limitations	min. patch size	min % cover 1500m	previous record in study area	relevant species
Limosa limosa	Black-tailed Godwit	V		11							
Numenius madagascariensis	Eastern Curlew		CE	1							
Onychoprion fuscata	Sooty Tern	V		2							
Sternula albifrons	Little Tern	E		3							
Callocephalon fimbriatum	Gang-gang Cockatoo	V		59	✓	✓	none	<5ha	11-30%	X	✓
Calyptorhynchus lathami	Glossy Black-Cockatoo	V		89							
Lophochroa leadbeateri	Major Mitchell's Cockatoo	V		1							
Glossopsitta pusilla	Little Lorikeet	V		208	✓	✓	none	<5ha	0-10%	X	✓
Lathamus discolor	Swift Parrot	E	CE	337	✓	✓	none	<5ha	0-10%	X	✓
Neophema pulchella	Turquoise Parrot	V		16	✓	✓	none	<5ha	11-30%	X	✓
Polytelis swainsonii	Superb Parrot	V	V	5							
Ninox connivens	Barking Owl	V		27	✓	✓	none	<5ha	11-30%	X	✓
Ninox strenua	Powerful Owl	V		975	✓	✓	none	<5ha	11-30%	X	✓
Tyto novaehollandiae	Masked Owl	V		34	✓	✓	none	<5ha	11-30%	X	✓
Tyto tenebricosa	Sooty Owl	V		5							
Climacteris picumnus victoriae	Brown Treecreeper	V		30	✓	✓	none	<5ha	0-10%	X	✓
Chthonicola sagittata	Speckled Warbler	V		386	✓	✓	none	<5ha	0-10%	X	✓
Anthochaera phrygia	Regent Honeyeater	CE	CE	93	✓	✓	none	<5ha	0-10%	X	✓
Epthianura albifrons	White-fronted Chat	V		71							
Grantiella picta	Painted Honeyeater	V	V	3	✓	✓	none	<5ha	11-30%	X	✓
Melithreptus gularis gularis	Black-chinned Honeyeater	V		30	✓	✓	none	5-24ha	11-30%	X	✓

Scientific Name	Common Name	BC Act	EPBC Act	No. in SYB08	PCT 850	short-list	Geographic limitations	min. patch size	min % cover 1500m	previous record in study area	relevant species
Daphoenositta chrysoptera	Varied Sittella	V		318	✓	✓	none	<5ha	11-30%	X	✓
Pachycephala olivacea	Olive Whistler	V		3							
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V		419	✓	✓	none	<5ha	0-10%	X	✓
Melanodryas cucullata cucullata	Hooded Robin	V		8	✓	✓	none	<5ha	0-10%	X	✓
Petroica boodang	Scarlet Robin	V		71	✓	✓	none	<5ha	0-10%	close to site - Bionet	✓
Petroica phoenicea	Flame Robin	V		49	✓	✓	none	<5ha	0-10%	X	✓
Petroica rodinogaster	Pink Robin	V		2							
Neochmia ruficauda	Star Finch	CE	E	1							
Stagonopleura guttata	Diamond Firetail	V		20	✓	✓	none	<5ha	0-10%	X	✓
Dasyurus maculatus	Spotted-tailed Quoll	V	E	44	✓	✓	none	<5ha	0-10%	X	✓
Phascogale tapoatafa	Brush-tailed Phascogale	V			✓						
Phascolarctos cinereus	Koala	V	V	1948	✓	✓	none	<5ha	0-10%	X	✓
Cercartetus nanus	Eastern Pygmy-possum	V		9	✓	✓	none	<5ha	11-30%	X	✓
Petaurus australis	Yellow-bellied Glider	V		14	✓	✓	none	25-100ha	31-70%	X	X
Petaurus norfolcensis	Squirrel Glider	V		33	✓	✓	none	<5ha	0-10%	X	✓
Petauroides volans	Greater Glider	E2	V	31	✓	✓	incomplete profile	5-24ha	31-70%	X	X
Petrogale penicillata	Brush-tailed Rock-wallaby	E	V	1							
Pteropus poliocephalus	Grey-headed Flying-fox	V	V	5159	✓	✓	none	<5ha	0-10%	X	✓

Scientific Name	Common Name	BC Act	EPBC Act	No. in SYB08	PCT 850	short-list	Geographic limitations	min. patch size	min % cover 1500m	previous record in study area	relevant species
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V		88	✓	✓	none	<5ha	11-30%	X	✓
Micronomus norfolkensis	Eastern Freetail-bat	V		392	✓	✓	none	<5ha	0-10%	X	✓
Chalinolobus dwyeri	Large-eared Pied Bat	V	V	75	✓	✓	none	<5ha	11-30%	X	✓
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V		148	✓	✓	none	5-24ha	31-70%	X	X
Myotis macropus	Southern Myotis	V		492	✓	✓	none	<5ha	0-10%	X	✓
Scoteanax rueppellii	Greater Broad-nosed Bat	V		244	✓	✓	none	5-24ha	31-70%	X	X
Miniopterus australis	Little Bent-winged Bat	V		109	✓	✓	none	<5ha	0-10%	X	✓
Miniopterus orianae oceanensis	Eastern Bent-winged Bat	V		643	✓	✓	none	<5ha	0-10%	X	✓
Pseudomys novaehollandiae	New Holland Mouse		V	6							
Meridolum corneovirens	Cumberland Plain Land Snail	E		1354	✓	✓	none	<5ha	0-10%	X	✓
Pommerhelix duralensis	Dural Land Snail	E	E	58	✓	✓	none	<5ha	0-10%	X	✓