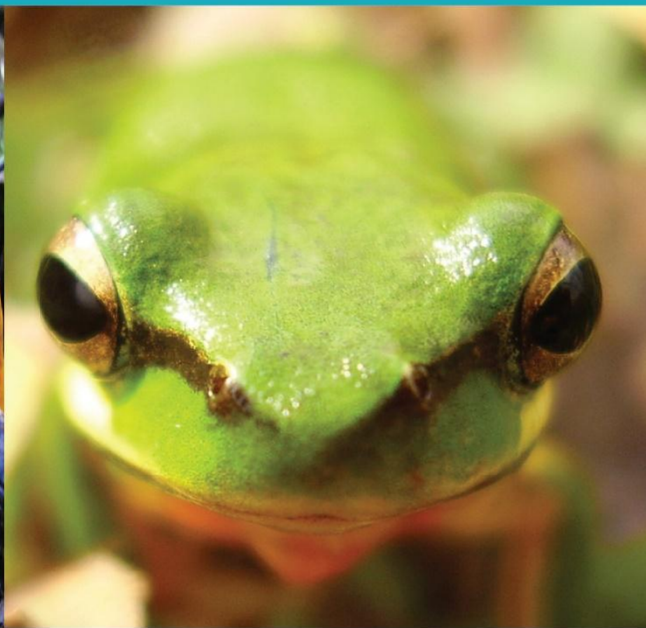




TRAVERS BUSHFIRE & ECOLOGY

A TBE ENVIRONMENTAL COMPANY



BIODIVERSITY ASSESSMENT REPORT

Rezoning Application

Lot 1, DP602888

717 Appin Road,

GILEAD

20 March 2026

(REF: 19OMA2.4)



BIODIVERSITY ASSESSMENT REPORT

Rezoning Application

Lot 1 DP602888, 717 Appin Road, Gilead

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The mapping is indicative of available space and location of features which may prove critical in assessing the viability of the proposed works. Mapping has been produced on a map base with an inherent level of inaccuracy, the location of all mapped features is to be confirmed by a registered surveyor.

LIST OF ABBREVIATIONS

APZ	Asset protection zone
BAM	Biodiversity Assessment Method (2020)
BAR	Biodiversity Assessment Report
<i>BC Act</i>	<i>Biodiversity Conservation Act (2016)</i>
<i>BC Reg</i>	<i>Biodiversity Conservation Regulation (2017)</i>
BCAR	Biodiversity Certification Assessment Report
BDAR	Biodiversity Development Assessment Report
BOS	Biodiversity Offset Scheme
BPA	Bushfire protection assessment
BSSAR	Biodiversity Stewardship Site Assessment Report
CEEC	Critically endangered ecological community
<i>CM Act</i>	<i>Coastal Management Act 2016</i>
DAWE	Department of Agriculture, Water, and the Environment (superseded by DCCEEW)
DCCEEW (Cmlth)	Cmlth Department of Climate Change, Energy, the Environment and Water
DCCEEW (NSW)	NSW Department of Climate Change, Energy, the Environment and Water
DCP	Development control plan
DEC	NSW Department of Environment and Conservation (superseded by DECC from April 2007)
DECC	NSW Department of Environment and Climate Change (superseded by DECCW from October 2009)
DECCW	NSW Department of Environment, Climate Change and Water (superseded by OEHS from April 2011)
DEWHA	Commonwealth Department of Environment, Water, Heritage & the Arts (superseded by SEWPAC)
DOEE	Commonwealth Department of Environment & Energy (superseded by DAWE)
DPE	NSW Department of Planning and Environment (superseded by DCCEEW (NSW) from January 2024)
DPIE	NSW Department of Planning, Industry and Environment (superseded by DPE)
EEC	Endangered ecological community
<i>EP&A Act</i>	<i>Environmental Planning and Assessment Act (1979)</i>
<i>EPBC Act</i>	<i>Environment Protection and Biodiversity Conservation Act (1999)</i>
<i>FM Act</i>	<i>Fisheries Management Act</i>
IBRA	Interim Biogeographic Regionalisation for Australia
LEP	Local Environmental Plan
LGA	Local Government Area
<i>LLS Act</i>	<i>Local Land Services Act (2013)</i>
NES	National environmental significance
<i>NPW Act</i>	<i>National Parks and Wildlife Act (1974)</i>
NRAR	Natural Resources Access Regulator (NSW)
NSW DPI	NSW Department of Industry and Investment
OEHS	Office of Environment and Heritage (superseded by DPIE from August 2019)
PCT	Plant community type
PFC	Projected foliage cover
RFS	NSW Rural Fire Service
SAIL	Serious And Irreversible Impacts
SEPP	State Environmental Planning Policy
SEWPAC	Commonwealth Dept. of Sustainability, Environment, Water, Population & Communities (superseded by DOEE)
SIS	Species impact statement
SULE	Safe useful life expectancy

TEC	Threatened ecological community
TPZ	Tree preservation zone
<i>TSC Act</i>	<i>Threatened Species Conservation Act (1995) – Superseded by the Biodiversity Conservation Act (2016)</i>
VMP	Vegetation Management Plan

EXECUTIVE SUMMARY

Travers bushfire & ecology has been engaged to undertake a biodiversity assessment of a proposed rezoning at 717 Appin Road, Gilead, within Campbelltown LGA. The extent of this entire lot is shown in Figure 1 below. This lot is currently zoned DM-Deferred Matter, under the Campbelltown Local Environmental Plan 2010 (LEP 2015). The surrounding land is zoned as RU2 Rural Landscape and RE1 Public Recreation (LEP 2015).

The area containing the proposed development, APZs and all associated impacts on habitat features are hereafter referred to as the 'development footprint.'

The site is also subject to a CPCP modification application and hence this report has been prepared to inform the sites biodiversity values, impacts caused by the proposed rezoning and suitability of the proposed zonings.

Modification application to amend the CPCP

The proponent has submitted a modification application to amend the CPCP for the site. This has been done following constraints survey and engagement with DCCEEW (NSW). In relation to this, if the current application for amendments to the CPCP mapping is not endorsed the following additional biodiversity assessment will be required to support the rezoning application:

- If the CPCP modification is endorsed by the regulator, and the master plan is consistent with the CPCP modification, a CPCP consistency report will be required and mitigation measures as per the CPCP will be required.
- If the CPCP modification is not or in part approved, a Biodiversity Development Assessment Report (BDAR) will likely be required for any impacts not contained within the certified urban capable lands.

Proposed zoning

The land is subject to a proposed rezoning application. The proposed zonings are likely to include the following:

- R2 Low Density Residential
- R3 Medium Density Residential
- RE1 Public Recreation
- SP2 Infrastructure
- C2 Environmental Conservation
- E3 Productivity Support

Recorded biodiversity

Ecological survey and assessment have been undertaken in accordance with the *Biodiversity Assessment Methodology 2020* (BAM) as well as relevant legislation including the *Environmental Planning and Assessment Act 1979* (EP&A Act), the *Biodiversity Conservation Act 2016* (BC Act), the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and the *Fisheries Management Act 1994* (FM Act).

In respect of matters required to be considered under the *EP&A Act* and relating to the species / provisions of the *BC Act*, the following listed entities were observed:

Threatened fauna species:

- Large Bent-winged Bat (*Miniopterus orianae oceanensis*),
- Eastern Coastal Free-tailed Bat (*Mormopterus norfolkensis*),
- Southern Myotis (*Myotis macropus*),
- Cumberland Plain Land Snail (*Meridolum corneovirens*),
- Little Lorikeet (*Glossopsitta pusilla*),
- Greater Broad-nosed Bat (*Scoteanax rueppellii*) and
- Eastern False Pipistrelle (*Falsistrellus tasmaniensis*)

Threatened flora species:

- None recorded

Threatened ecological communities:

- Cumberland Plain Woodland in the Sydney Basin Bioregion – critically endangered,
- Shale Sandstone Transition Forest in the Sydney Basin Bioregion – critically endangered, and
- River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin, and southeast Corner Bioregions – endangered

In respect of matters required to be considered under the *EPBC Act*, the following listed entities were observed:

Threatened fauna species:

- None recorded

Nationally protected migratory bird species:

- Latham's Snipe

Threatened flora species

- None recorded

Threatened ecological communities:

- Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest (critically endangered),
- Shale Sandstone Transition Forest in the Sydney Basin Bioregion (critically endangered) and
- River-Flat Eucalypt Forest on coastal floodplains of southern New South Wales and eastern Victoria (critically endangered) were recorded within the study area.

No listed entities under the *FM Act*, no threatened flora species, and no endangered flora populations were observed during the survey period.

The Cumberland Plain Conservation Plan (CPCP)

The Cumberland Plain Conservation Plan (CPCP) (DPE 2022) identifies several categories of land with different planning arrangements for each. The site is mapped as Certified Urban Capable Land, Avoided land and Strategic Conservation Area.

Consideration of the CPCP guidelines and in particular mitigation measures, is required for any application within the study area. The key planning controls require demonstration of avoidance or minimisation of impacts on biodiversity values, assessment of residual impacts to threatened ecological communities (TECs), threatened species, biophysical, ecological, and hydrological environments, and requirements for biodiversity offsets.

The development application will require a statement setting out whether the development is consistent with the *CPCP Guidelines, Part 2* for impacts on Avoided Lands, consistent with the *EP&A Act 1979 Amendment 2022*.

Development in Certified - Urban Capable Land (CUCL) areas will need to address the CPCP Mitigation Measures Guidelines (appendix E of the CPCP) to ensure consistency with the CPCP's biodiversity approvals, including the mitigation measures to Koalas (Part 1) and threatened ecological communities and threatened species (Part 2).

Biodiversity impact summary

Direct impacts associated with the proposed rezoning are as follows:

- Removal of 13.33 ha of native vegetation including:
 - i) 3.67 ha PCT3319 – Cumberland Shale Hills Woodland (CPW) (CEEC).
 - ii) 6.85 ha PCT3319 – Cumberland Shale Hills Woodland (CPW) (modified).
 - iii) 2.11 ha PCT3321 – Cumberland Shale-Sandstone Ironbark Forest (CEEC).
 - iv) 0.7 ha PCT4058 – Sydney Hinterland Red Gum Riverflat Forest (CEEC).
- Removal of 12.63 ha of Cumberland Plain Land Snail habitat,
- Removal of 13.33 ha of Koala habitat,
- Removal of five (5) farm dams considered as foraging habitat for Latham's Snipe and Southern Myotis, and
- 13.33 ha of threatened species foraging habitat.

Identified indirect impacts include:

- Potential increased incidence of roadkill,
- Potential weed invasion and degradation of habitat at the urban/bushland interface,
- Potential degradation in water quality and change in stream flows, and
- Potential loss of foraging habitat for recorded threatened fauna species including Large Bent-winged Bat, Eastern Coastal Free-tailed bat, Southern Myotis, Cumberland Plain Land Snail, Little Lorikeet, Latham's Snipe, Greater Broad-nosed Bat and Eastern False Pipistrelle.

Ecological constraints relevant to the proposed zoning and concept masterplan

Travers bushfire & ecology has identified the following relevant considerations:

- The land to the east and the far western boundary is mapped by NSW government, as Biodiversity Values Land. This land is sensitive to development and clearing.
- The proposal is predominantly within lands mapped as Certified Urban Capable Land (CUCL) under the CPCP except mapped riparian lands and native vegetation to 24.68 ha.

- There is 3.68 ha of mapped native vegetation, 2.6 ha of which will be impacted, within the CUCL. This CUCL land is not required to be assessed except to consider the mitigation measures of Appendix E of the CPCP.
- Vegetation loss due to stormwater infrastructure has not been determined less than the area clearing threshold of 0.5ha. Loss of riparian vegetation will trigger the biodiversity offset scheme.
- Riparian buffers of existing watercourses due to impacts on existing mapped water courses and waterfront land (40m from top of bank of existing watercourses), mapped by NSW Hydroline Spatial Data. Permissibility's subject to a Controlled Activity Approval as per the Controlled activities – Guidelines for riparian corridors on waterfront land (DPE).

Test of significance (BC Act)

For the purposes of this report, the Test of Significance has been undertaken for the proposed rezoning of 3.67 ha of native vegetation that is currently mapped under the CPCP as 'Avoided Lands.'

The state test of significance (Appendix 3) has concluded that the proposed development will not likely have a significant impact on any threatened species, populations or TECs except for a significant impact on PCT3319 Cumberland Shale Hills Woodland and PCT3321 - Cumberland Shale-Sandstone Ironbark Forest (CEEC).

A BDAR is required in support of the rezoning application. As an application to modify the CPCP has been made the preparation of a BDAR is subject to the outcomes of the CPCP modification request.

Mitigation measures

The following mitigation measures are proposed to minimise the likely biodiversity impacts because of the proposed rezoning. Key mitigation measures recommended for this site including those relevant to the CPCP include:

1. Avoidance of high conservation value lands.
2. Restore riparian vegetation in accordance with a Riparian Vegetation Management Plan.
3. Implement weed control through the preparation of an Integrated Weed Management Plan for the site and adjoining riparian zones to be applied both during and post construction.
4. Extend the width of riparian vegetation where possible to enhance the vegetative/connectivity width and habitat quality.
5. Plant Proteaceae shrubs in high density, particularly along riparian corridors and enhance habitat structures for mammal species.
6. Identify large trees with hollows in order to inspect and relocate good condition hollows to or immediately adjoining the riparian restoration area.
7. Planting with species endemic to the local vegetation communities but in particular to enhance its foraging resources and habitat value.
8. Make provision for roosting locations for bird of prey species.
9. Implement fauna searches and tree clearing protocol.
10. Minimise the impact on the riparian zones and mapped tributaries, by utilising existing drainage pathways.
11. Stabilising any stormwater outlets, drainage channels and revegetating with locally native species.

12. Where the removal of dams is required, undertake dam dewatering in stages to allow the retention of foraging habitat for the recorded Latham's Snipe and Southern Myotis.
13. Proposal is to demonstrate a not net change in water quality or quantity through MUSIC modelling.

Landscape design is to actively utilise high value foraging native species to support woodland birds and microbat populations.

Biodiversity considerations relevant to a proposed rezoning plan

Based on the current CPCP mapping, the proposal will likely trigger the BOS and offsetting required for:

- The significant impact on PCT3319 – Cumberland Shale Hills Woodland due to loss of an estimated 2.04 ha subject to future CPCP modification.
- The study area is mapped as Biodiversity Values Land.
- The proposed development will exceed the clearing threshold for native vegetation of 0.5 ha.

A Biodiversity Development Assessment Report (BDAR) may be required subject to the outcomes of the CPCP modification request. The BDAR will need to include a Biodiversity Credit Assessment to determine the offsetting requirements for the proposal. An assessment of Serious and Irreversible Impacts will also be needed for entities including Cumberland Shale Sandstone Ironbark Forest and Cumberland Shale Hills Woodland.

Under the CPCP, additional planning controls require demonstration of avoidance or minimisation of impacts to biodiversity values, assessment of residual impacts to TECs, threatened species, biophysical, ecological and hydrological environments, and requirements for biodiversity offsets.

PCT3319, PCT3321 and PCT4058 are commensurate with the following threatened ecological communities under the *EPBC Act*:

- Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest, and
- Cumberland Shale Sandstone Transition Forest in the Sydney Basin Bioregion, and
- River-Flat Eucalypt Forest on coastal floodplains of southern New South Wales and eastern Victoria.

A significance of impact assessment upon matters of national environmental significance is required, and an *EPBC Act* referral is recommended to be lodged with the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW Cmlth).

TABLE OF CONTENTS

1. BACKGROUND	1
1.1 Site description	1
1.2 Cumberland Plain Conservation Plan (CPCP)	2
1.3 Proposed rezoning & concept masterplan	4
1.3.1 Conservation zones	7
1.3.2 Recreation zones	7
1.3.3 Special Purpose Zones	10
1.3.4 Residential Zones	10
2. FLORA	12
2.1 Survey	12
2.2 Vegetation communities	12
2.2.1 PCT3319 – Cumberland Shale Hills Woodland	17
2.2.2 PCT3319 - Cumberland Shale Hills Woodland (Modified)	18
2.2.3 PCT3321 – Cumberland Shale-Sandstone Ironbark Forest	19
2.2.4 PCT4058 – Sydney Hinterland Red Gum Riverflat Forest	20
2.3 Threatened flora species	21
2.4 Endangered flora populations	21
2.5 Threatened ecological communities	22
3. FAUNA	27
3.1 Survey methods	27
3.2 Habitat features	29
3.2.1 Habitat tree data	29
3.3 Threatened fauna species	30
3.4 Protected migratory species (National)	32
3.5 Endangered fauna populations	32
3.6 State Environmental Planning Policy (Biodiversity and Conservation) 2021 – Chapter 4 Koala Habitat Protection	32
3.7 Vegetation connectivity	37
4. WATERCOURSES & WETLANDS	39
4.1 Endangered wetland communities	39
4.2 Groundwater Dependent Ecosystems (GDEs)	39
4.3 Watercourse assessment	41
4.4 Coastal wetlands	41
5. CUMBERLAND PLAIN CONSERVATION PLAN 2022	43
5.1 Planning controls to land covered under the CPCP 2022	44
5.1.1 Biodiversity values and proposed corridor	48

5.2	Mitigation measures in accordance with Appendix E of the Cumberland Plain Conservation Plan (CPCP) 2022.....	49
6.	BIODIVERSITY IMPACT ASSESSMENT	52
6.1	Biodiversity Offsets Scheme (BOS).....	52
6.2	Threshold assessment.....	52
6.2.1	<i>Biodiversity Values Land Map</i>	53
6.2.2	<i>Area clearing threshold</i>	53
6.2.3	<i>Test of Significance</i>	54
6.2.4	<i>Areas of Outstanding Biodiversity Value (AOBV)</i>	54
6.3	Streamlined assessment modules.....	54
6.3.1	<i>Streamlined assessment module - small area</i>	56
6.3.2	<i>Streamlined assessment module - planted native vegetation</i>	56
6.4	Mitigation measures	56
6.5	Avoidance and minimisation of impact actions	61
6.6	Ecological impacts	61
6.6.1	<i>Prescribed impacts</i>	61
6.6.2	<i>Direct impacts</i>	64
6.6.3	<i>Indirect impacts</i>	65
6.6.4	<i>Cumulative impacts</i>	66
7.	CONCLUSION	67
7.1	Recorded Biodiversity	67
7.2	Impact Summary.....	68
7.3	Significance Assessment Test	69
7.4	Suitability of proposed zoning from a biodiversity perspective	69
7.5	Biodiversity Offsets Scheme (BOS) – Threshold Assessment.....	70
8.	BIBLIOGRAPHY.....	71
	APPENDIX 1. FLORA & FAUNA SPECIES LISTS	74
	APPENDIX 2. THREATENED FLORA & FAUNA HABITAT ASSESSMENT	78
	APPENDIX 3. TEST OF SIGNIFICANCE	101
	APPENDIX 4. EPBC SIGNIFICANCE ASSESSMENT CRITERIA ...	113

Figures

Figure 1.1 – Subject lot (red outline)	1
Figure 1.2 - Impacts on CPCP avoided lands and koala habitat.....	3
Figure 1.3 – Cumberland Plain Conservation Plan mapping of the subject land and locality .	4
Figure 1.4 – Original proposed development.....	4
Figure 1.5 - Proposed Land Zoning associated with the final draft Master Plan.....	5

Figure 1.6 - Proposed rezoning of the subject land and locality.....	6
Figure 1.7 – Draft Concept Master Plan (version 2)	8
Figure 1.8 – Proposed final Master Plan (version 13).....	9
Figure 2.1 – Flowchart for identifying Cumberland Plain Shale Woodlands and Shale Gravel Transition Forest.....	23
Figure 2.2 – Condition thresholds for Shale-Sandstone Transition Forest.....	25
Figure 3.1 – Development assessment framework flowchart from the Campbelltown Comprehensive Plan of Management	33
Figure 3.2 – Flora & fauna survey effort & results	35
Figure 3.3 – Ecological constraints and connectivity	36
Figure 3.4 – Local connectivity.....	37
Figure 4.1 – Alluvial groundwater system discharging into a river	40
Figure 4.2 – Subject lot in relation to mapped groundwater dependent ecosystems (green shading) within locality	40
Figure 4.3 – Watercourses mapped onsite.....	41
Figure 4.4 – Coastal wetlands area map.....	42
Figure 5.1 – Current Cumberland Plain Conservation Plan mapping.....	43
Figure 5.2 – Strategic Conservation Area mapped by draft Cumberland Plain Conservation Plan	44
Figure 6.1 – Biodiversity values land (purple) within the study area	53

Tables

Table 1 – Site features	1
Table 2 – Observed vegetation communities	14
Table 3 – Threatened flora species with suitable habitat present	21
Table 4 – Habitat tree data.....	30
Table 5 – Threatened fauna species with suitable habitat present	31
Table 6 –Planning controls defined by the Cumberland Plain Conservation Plan.....	44
Table 7 – BOS entry threshold report.....	53
Table 8 – Streamlined assessment modules.....	55
Table 9 – Area clearing limits for application of the small area development module	56
Table 10 – Mitigation measures	57
Table 11 – Prescribed impacts.....	62
Table 12 – Direct impacts	64
Table 13 – Indirect impacts	65
Table 14 – Cumulative impacts	66

Appendices

Appendix 1.	Flora & Fauna Species Lists.....	74
Appendix 2.	Threatened Flora & Fauna Habitat Assessment	78
Appendix 3.	Test of Significance	101
Appendix 4.	EPBC Significance Assessment Criteria.....	113

1. BACKGROUND

Travers bushfire & ecology was engaged to undertake a biodiversity assessment at 717 Appin Road, Gilead, within Campbelltown Council local government area (LGA). The extent of this entire lot is shown in Figure 1.1 below. This lot is subject to a proposed rezoning application and will hereafter be referred to as the 'study area.' The subject lot is currently zoned DM - Deferred Matter - under the Campbelltown Local Environmental Plan 2010 (LEP 2015). The surrounding land is currently zoned as RU2 Rural Landscape, SP2 Infrastructure and RE1 Public Recreation (LEP 2015).

The area containing the proposed rezoning plan and all associated impact on habitat features is hereafter referred to as the 'development footprint' (Figure 1.8).

The proposal shall be assessed under the *Biodiversity Conservation Act (BC Act)*, 2016.



Figure 1.1 – Subject lot (red outline)

1.1 Site description

Table 1 provides a summary of the planning, cadastral, topographical, and disturbance details of the development footprint.

Table 1 – Site features

Location	717 Appin Road, Gilead
Area	Approximately 70.23 ha
Local government area	Campbelltown Council
Zoning	Deferred Matters (DM)
Grid reference	296159E; 6219552N (GDA94)

Elevation	Two peaks occur, one at 200 m AHD and one at 194 AHD, thereafter, the land descends to 134 m AHD at the rear of the property.
Topography	Two peaks occur, otherwise the landscape is undulating.
Geology and soils	Geology: The Woodhouse Creek catchment is mapped as Sandstone and the remainder of the property is formed with Shale. Soils: The study area is located on the Blacktown (9029bt) soil landscape. The topsoil is generally shallow to moderately deep with a friable greyish brown loam (bt1). Brown clay loams form the subsoils. These soils overlie Wianamatta Group Shales.
Catchment, drainage and stream order	Two primary tributaries of Nepean Creek run through the property. Woodhouse Creek runs from south to north along a vegetated riparian corridor which has been widened to form dams. The other tributary has been dammed and runs through the centre of the site, to the east of the historic home.
Existing land use	There is an existing rural residential house, currently inhabited, at the front of the property and a disused historic home and gardens to the rear of the property.
Connectivity features	There is rural land to the west, south and east, while a BioBanking site adjoins the northern boundary. There is good connectivity from this northern vegetation through the riparian corridor to the southern boundary.

1.2 Cumberland Plain Conservation Plan (CPCP)

Approximately two thirds of the study area is zoned as Certified – urban capable land (CUCL) under the Cumberland Plain Conservation Plan (CPCP), while the other third, at the western and eastern ends of the study area are zoned as Avoided Land (DPE 2022) (Figure 1.2).

To the north of 717 Appin Road sits the Beulah BioBanking Agreement site, at 767 Appin Road, which features an extensive stand of PCT3320 Cumberland Shale Plains as well as PCT3321 Cumberland Shale-Sandstone Ironbark Forest and a smaller remnant PCT4025 Cumberland Red Gum Riverflat Forest both *BC Act* and *EPBC Act* listed endangered ecological communities. This northern property also receives water along Woodhouse Creek, which travels north south downstream, through the study area.

The proponent has made an application seeking amendment to the CPCP (Figure 1.2), which is currently being investigated by the regulator. The concept masterplan layout has been developed with consideration of the submitted CPCP modification application to regulator (Figure 1.8).

To demonstrate biodiversity impact avoidance / mitigation and taking into the consideration the ground-truthed biodiversity, the proponent has modified their proposal to enhance biodiversity outcomes (Figure 1.8). This final Concept Masterplan enhances biodiversity outcomes by widening the conserved riparian koala corridor, minimising impacts to the western strip of vegetation, and increasing retained vegetation surrounding 715 Appin Road, Gilead.

The figure below includes calculations indicating the total areas and impacted areas for the current and proposed rezoning of CPCP mapping for urban capable and avoided lands.

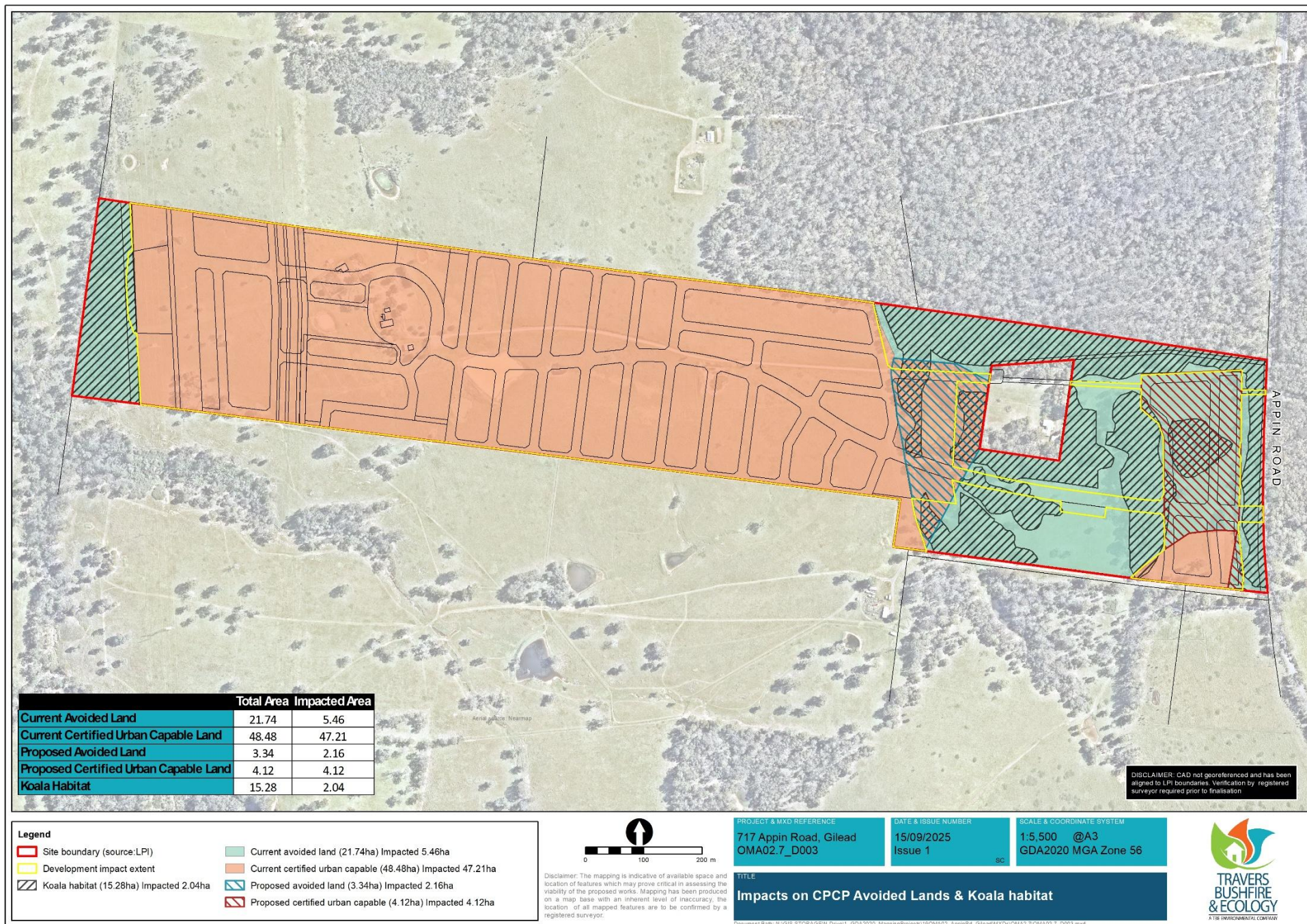


Figure 1.2 - Impacts on CPCP avoided lands and koala habitat

1.3 Proposed rezoning & concept masterplan

In addition to a proposed rezoning, the proponent is seeking a modification to the Cumberland Plain Conservation Plan (CPCP) mapping to enable additional development within the subject lot.

The original proposed concept plan is shown in Figure 1.4. This concept was for a higher density proposal with a narrow conserved riparian corridor connecting north to south. The proposal involved the redevelopment of the site to include medium residential housing, widening of the transport corridor along Appin Road, service easements, heritage open space and the conservation of the riparian zone. Access to the site would be provided via an expansion of the currently single-laned Appin Road with proposed redevelopment of internal roads within the site.

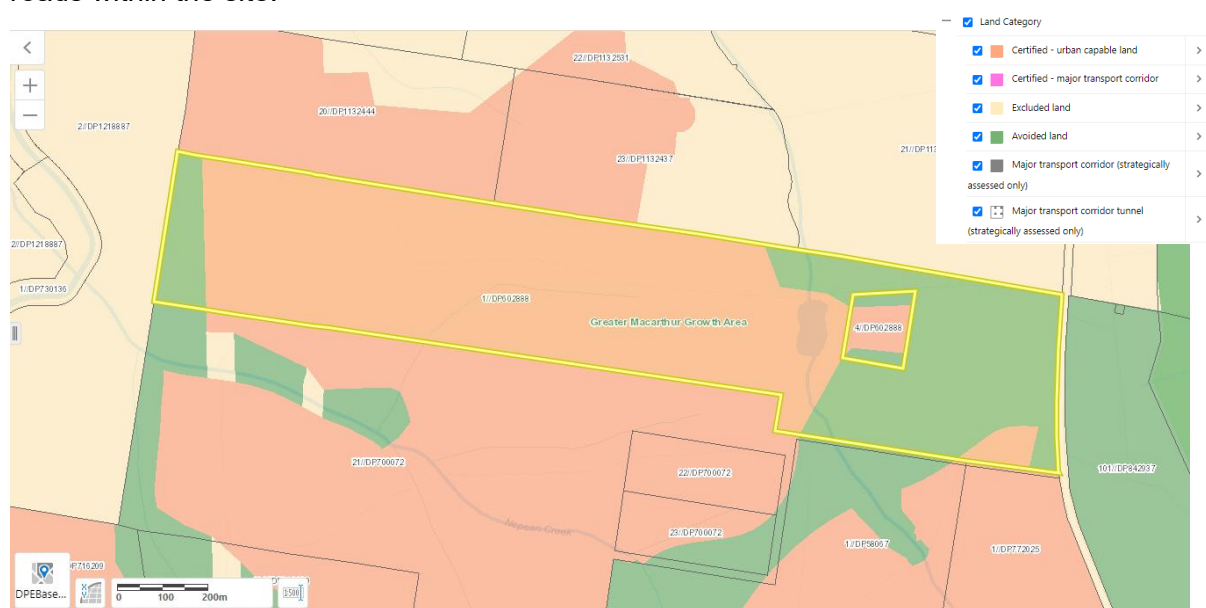


Figure 1.3 – Cumberland Plain Conservation Plan mapping of the subject land and locality

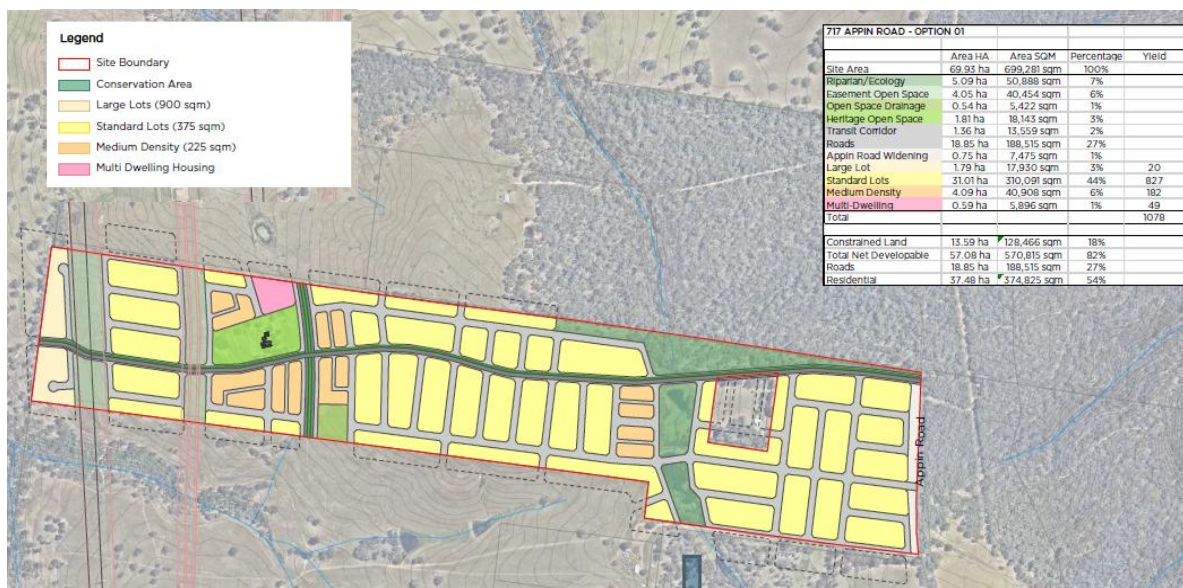


Figure 1.4 – Original proposed development

(Source: eUrban Pty Ltd 2023)

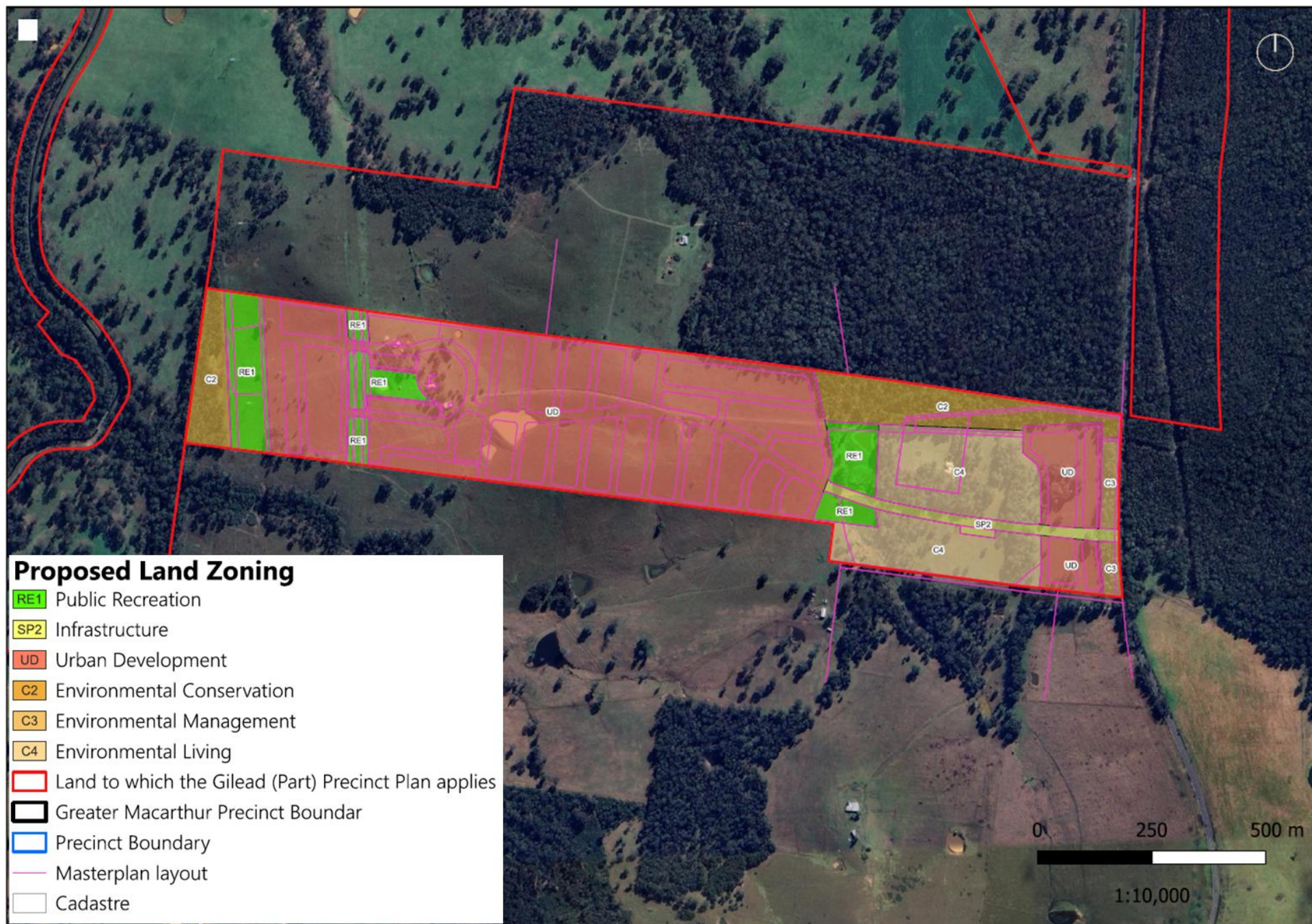


Figure 1.5 - Proposed Land Zoning associated with the final draft Master Plan

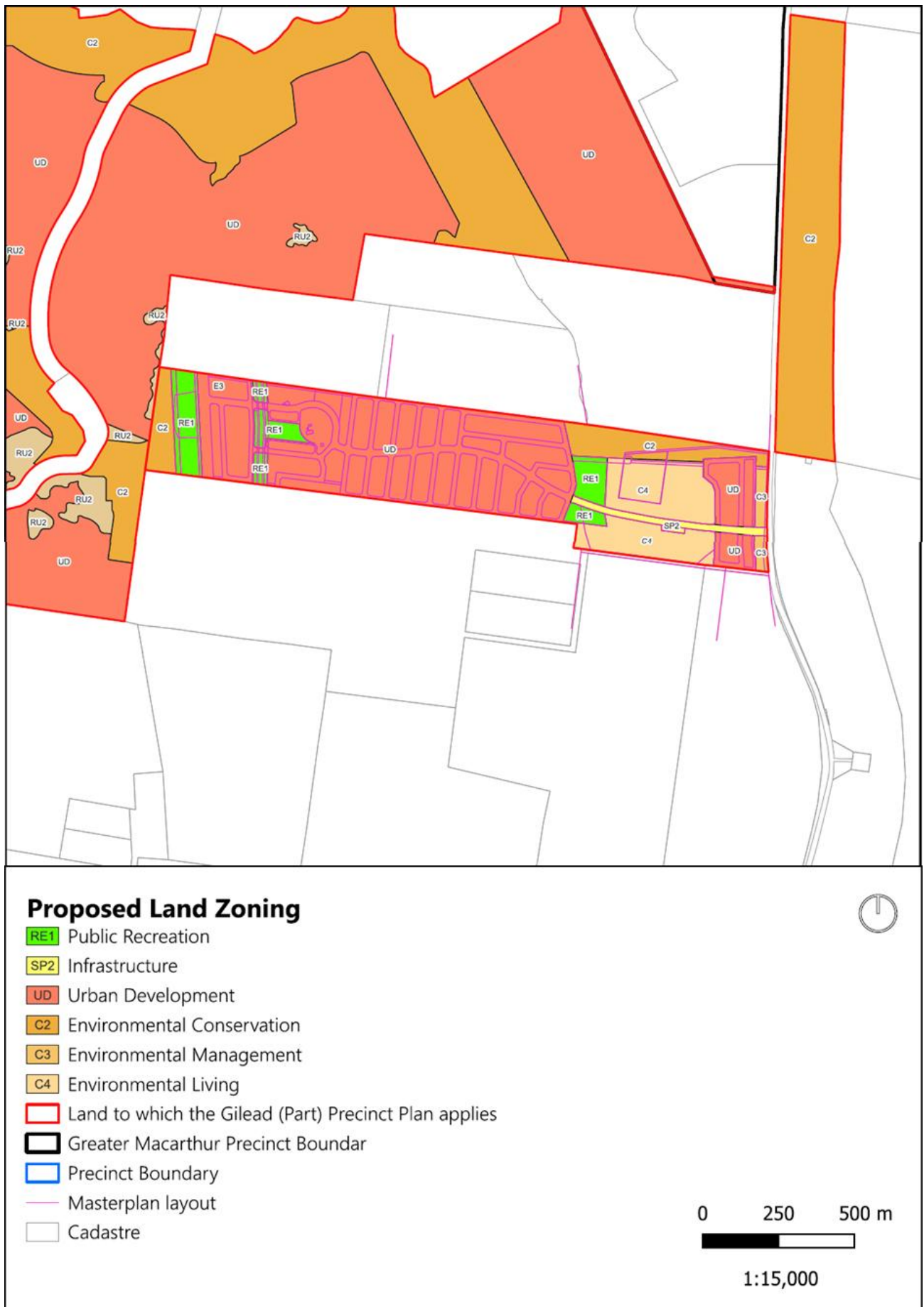


Figure 1.6 - Proposed rezoning of the subject land and locality

The following zones are proposed:

1.3.1 Conservation zones

This area of bushland, mapped as C2, C3 and C4 on Figure 1.5 is considered of high-quality biodiversity value, particularly with threatened ecological community status and is therefore, proposed for permanent protection. A limited range of activities are permissible on conservation zoned land and therefore, where native vegetation is to be protected, this is the most appropriate zone.

(a) C2 Environmental conservation

Following are the objectives of Zone C2 according to the Campbelltown Council LEP (2015) are C2 zoned lands:

- To protect, manage and restore areas of high ecological, scientific, cultural, or aesthetic values.
- To prevent development that could destroy, damage, or otherwise have an adverse effect on those values.
- To provide for land uses compatible with the high ecological, scientific, cultural, or aesthetic values of this zone.
- To foster the protection, enhancement, and creation of natural systems corridors. are to protect manage and restore areas of high ecological, scientific, cultural, or aesthetic value.

1.3.2 Recreation zones

This land identified as P1 – P5 on Figure 1.8 may contain remnants of native vegetation but with lesser biodiversity value than that zoned for conservation. It is considered appropriate for parks where residents may interact in active and passive recreation.

(a) Zone RE1 Public Recreation

Following are the objectives of Zone RE1, according to the Campbelltown Council LEP (2015).

- To enable land to be used for public open space or recreational purposes.
- To provide a range of recreational settings and activities and compatible land uses.
- To protect and enhance the natural environment for recreational purposes.
- To provide for land uses compatible with the ecological, scientific, cultural or aesthetic values of land in the zone.
- To facilitate the multiple use of certain open space areas.
- To facilitate development that is ancillary or incidental to the special land uses provided for in this zone.
- To provide for the sufficient and equitable distribution of public open space to meet the needs of the local community.
- To preserve and rehabilitate bushland, wildlife corridors and natural habitat, including waterways and riparian lands, and facilitate public enjoyment of these areas.
- To provide for the retention and creation of view corridors.
- To protect and enhance areas of scenic value and the visual amenity of prominent ridgelines.
- To preserve land that is required for public open space or recreational purposes.
- To maximise public transport patronage and encourage walking and cycling.



Figure 1.7 – Draft Concept Master Plan (version 2)

(Source: Inspire Planning 30 October 2023)

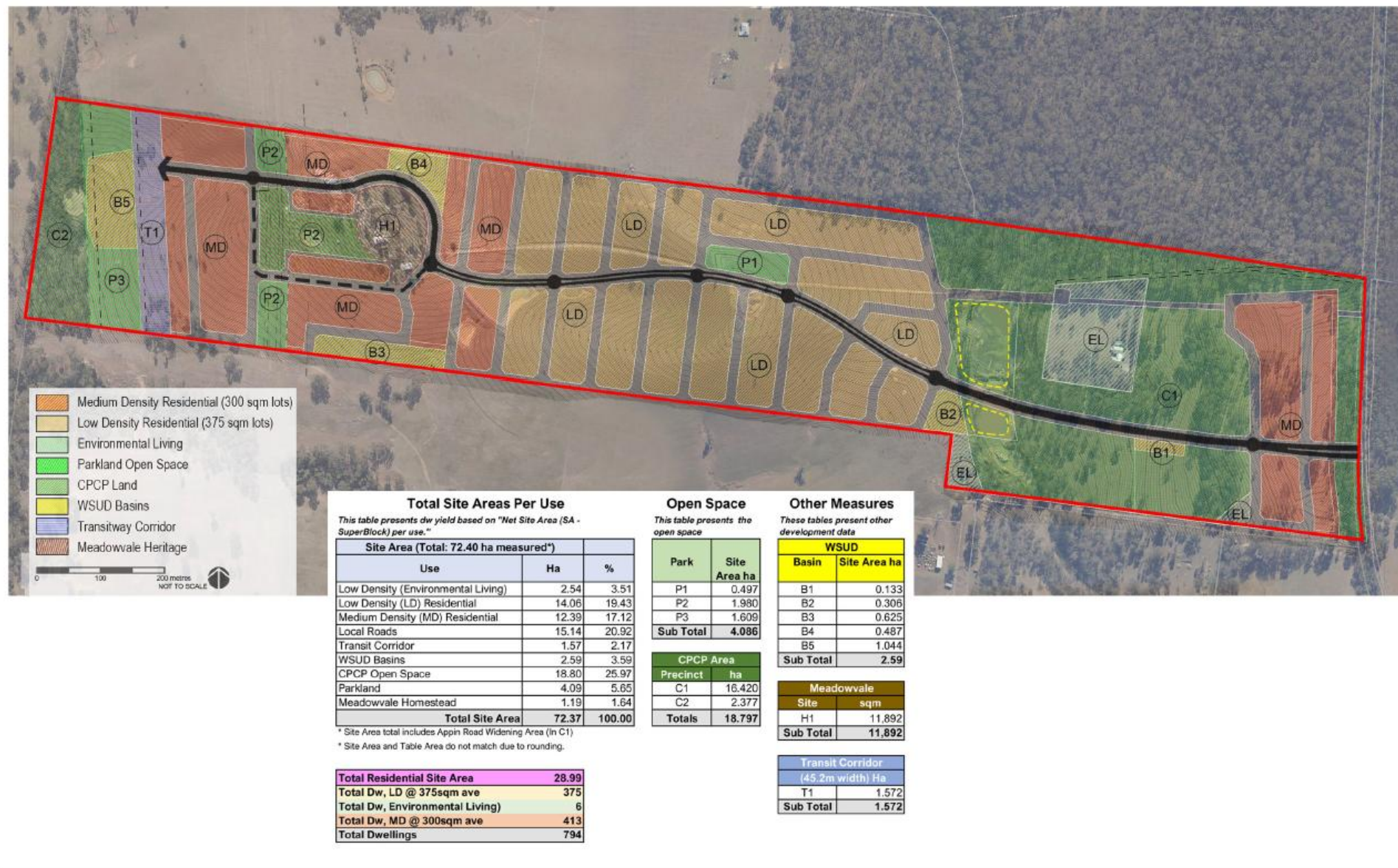


Figure 1.8 – Proposed final Master Plan (version 13)

(Source: Inspire Planning 01 September 2025)

The land proposed for open space and parkland is considered of lesser conservation value, however, would be of value for other purposes. For example, recreation areas, restaurants/cafes, Information and Education facilities.

1.3.3 Special Purpose Zones

(a) Zone SP2 Infrastructure

Following are the objectives of Zone SP2, according to the Campbelltown Council LEP (2015).

- To provide for infrastructure and related uses.
- To prevent development that is not compatible with or that may detract from the provision of infrastructure.
- To encourage activities involving research and development.
- To optimise value-adding development opportunities, particularly those associated with research.
- To provide for the retention and creation of view corridors.
- To preserve bushland, wildlife corridors and natural habitat.
- To maintain the visual amenity of prominent ridgelines.

This zone allows for environmental protection works, without consent. Activities such as flood mitigation, however, would require consent to be granted.

1.3.4 Residential Zones

This land is identified as R1 – R9 on Figure 1.5. It is generally for land where biodiversity values are low and appropriate where the site contains exotic grass dominated paddocks and no native vegetation remnants. It is zoned to provide for residential development and facilities or services that meet the day to day needs of residents.

(a) R2 Low Density Residential

Following are the objectives of Zone R2, according to the Campbelltown Council LEP (2015).

- To provide for the housing needs of the community within a low-density residential environment.
- To enable other land uses that provide facilities or services to meet the day to day needs of residents.
- To enable development for purposes other than residential only if that development is compatible with the character of the living area and is of a domestic scale.
- To minimise overshadowing and ensure a desired level of solar access to all properties.
- To facilitate diverse and sustainable means of access and movement.

Permitted with consent includes the following:

Attached dwellings; Building identification signs; Business identification signs; Centre-based child care facilities; Community facilities; Dual occupancies; Dwelling houses; Emergency services facilities; Environmental facilities; Environmental protection works; Exhibition homes; Exhibition villages; Flood mitigation works; Group homes; Home-based child care; Home businesses; Home industries; Oyster aquaculture; Places of public worship; Pond-based aquaculture; Recreation areas; Recreation facilities (outdoor); Respite day care centres; Roads; Schools; Semi-detached dwellings; Tank-based aquaculture.

(b) R3 Medium Density Residential

Following are the objectives of Zone R3, according to the Campbelltown Council LEP (2015).

- To provide for the housing needs of the community within a medium density residential environment.
- To provide a variety of housing types within a medium density residential environment.
- To enable other land uses that provide facilities or services to meet the day to day needs of residents.
- To provide for a wide range of housing choices in close proximity to commercial centres, transport hubs and routes.
- To enable development for purposes other than residential only if that development is compatible with the character and scale of the living area.
- To minimise overshadowing and ensure a desired level of solar access to all properties.

Permitted with consent includes the following:

Attached dwellings; Boarding houses; Building identification signs; Business identification signs; Car parks; Centre-based child care facilities; Community facilities; Dual occupancies; Dwelling houses; Emergency services facilities; Environmental facilities; Environmental protection works; Exhibition homes; Exhibition villages; Flood mitigation works; Group homes; Home-based child care; Home businesses; Home occupations; Multi dwelling housing; Neighbourhood shops; Oyster aquaculture; Places of public worship; Recreation areas; Recreation facilities (outdoor); Respite day care centres; Roads; Semi-detached dwellings; Seniors housing; Shop top housing; Tank-based aquaculture.

2. FLORA

2.1 Survey

Several sessions of botanical surveys have been undertaken.

2019

Botanical survey was undertaken on 4 January 2019 over a time frame of approximately 4 hrs.

Botanical survey involved three (3) BAM plots and identification of dominant canopy species within areas of native vegetation to assist in determining the plant community types (PCTs). A review of the *Atlas of NSW Wildlife* (OEH 2019) was undertaken prior to the site visit to determine threatened species previously recorded within 10 km of the subject site, and opportunistic searches were undertaken as suited during stratified surveys.

2023

A botanical survey was undertaken on 22 May 2023 over a time frame of approximately six (6) hrs.

The focus of the botanical survey was to validate the vegetation communities across the site, assess their condition, and assessment of habitat for potential threatened species. This included a random meander in accordance with Cropper (1993) to gain an indicative species list of the plants across the site. Five (5) quadrats of 0.1 ha in size, were then undertaken, in accordance with the Biodiversity Assessment Method 2020 (BAM) to verify the Plant Community Types (PCTs), particularly in non-certified land. A review of the *BioNet Atlas of NSW Wildlife* (*BioNet*, DPE 2023) was undertaken prior to the site visit to identify threatened species previously recorded within 10 km of the development footprint over the last twenty years and these species were targeted in a search during the random meander across the study area.

All naturally occurring species were identified to species level where possible and are listed in Appendix 1.

2.2 Vegetation communities

The *Vegetation Mapping of the Cumberland Plain* (NSPW 2002) mapped the following vegetation communities across the study area:

- 10 - Shale Plains Woodland, and
- 09 - Shale Hills Woodland.

Remnant Vegetation of the Cumberland Plain (OEH 2013) mapped the following vegetation communities across the site:

- PCT849 - Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion.
- PCT850 - Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion, and

- PCT1395 - Narrow-Leaved Ironbark- Broadleaved Ironbark- Grey Gum open forest of the edges of the Cumberland Plain, Sydney Basin Bioregion.

Travers bushfire & ecology (2019) mapped the following PCTs within the study area:

- PCT835 - Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion, and
- PCT1395 - Narrow-leaved Ironbark - Broad-leaved Ironbark - Grey Gum open forest of the edges of the Cumberland Plain, Sydney Basin Bioregion.

Since this determination, NSW PCTs have been updated to reflect more recent regional scale mapping (State Vegetation Type Map (DPE 2022)). SVTM mapped the following vegetation communities on site.

- PCT4025 Cumberland Red Gum Riverflat Forest,
- PCT3320 Cumberland Shale Plains Woodland,
- PCT3321 Cumberland Shale-Sandstone Ironbark Forest,
- PCT3448 Castlereagh Ironbark Forest, and
- PCT3616 Sydney Hinterland Grey Gum Transition Forest.

Field verification of the study area found the following vegetation communities:

- PCT3319 Cumberland Shale Hills Woodland,
- PCT3321 Cumberland Shale-Sandstone Ironbark Forest,
- PCT4058 Sydney Hinterland Red Gum Riverflat Forest,
- Exotic-dominated grassland, and
- Planted exotic vegetation.

Details of these vegetation communities are provided in Table 2 below.

Table 2 – Observed vegetation communities

Plant Community Type (PCT)	Former Eastern NSW PCT mapped equivalent	Location within site and condition	Canopy	Mid-storey	Ground layer	Area (ha)	Conservation status	
							BC Act	EPBC
PCT 3319 Cumberland Shale Hills Woodland	PCT1395 Narrow-leaved Ironbark - Broad-leaved Ironbark - Grey Gum open forest of the edges of the Cumberland Plain	Occurs in poor to moderate condition. Located in patches in the SW and adjoining the riparian corridor in the northeast. Currently depauperate mid-storey and grazed by cattle.	<i>E. tereticornis</i> and <i>E. moluccana</i> .	<i>Acacia implexa</i> , <i>Bursaria spinosa</i> , <i>Gahnia aspera</i> .	Mix of native and exotic grasses. Native: <i>Eragrostis</i> sp., <i>Microlaena stipoides</i> , <i>Rytidosperma</i> sp. Exotic: <i>Axonopus fissifolius</i> , <i>Cenchrus clandestinus</i> , <i>Setaria parviflora</i> and <i>S. sphacelata</i> .	5.2	Cumberland Plain Woodland in the Sydney Basin Bioregion – <u>critically endangered</u>	Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest – <u>critically endangered</u>
PCT 3321 Cumberland Shale-Sandstone Ironbark Forest	PCT1395 Narrow-leaved Ironbark - Broad-leaved Ironbark - Grey Gum open forest of the edges of the Cumberland Plain	Moderate condition, located in the far west of the site in a narrow strip adjacent to the powerlines and in the east surrounding the northern dam, connecting to vegetation in the northern boundary.	<i>Eucalyptus crebra</i> , <i>E. globoidea</i> , and <i>E. tereticornis</i> .	<i>Bursaria spinosa</i> , <i>Kunzea ambigua</i> , <i>Pittosporum undulatum</i> . Exotics include: <i>Bidens pilosa</i> and <i>Lantana camara</i> .	<i>Aristida vagans</i> , <i>Calotis dentex</i> , <i>Echinopogon caespitosus</i> , <i>E. ovatus</i> , <i>Entolasia stricta</i> , <i>Gahnia aspera</i> , <i>Lobelia purpurascens</i> and <i>Microlaena stipoides</i> .	8.91	Shale Sandstone Transition Forest in the Sydney Basin Bioregion – <u>critically endangered</u>	Shale Sandstone Transition Forest in the Sydney Basin Bioregion – <u>critically endangered</u>

Plant Community Type (PCT)	Former Eastern NSW PCT mapped equivalent	Location within site and condition	Canopy	Mid-storey	Ground layer	Area (ha)	Conservation status	
							BC Act	EPBC
PCT4058 – Sydney Hinterland Red Gum Riverflat Forest	PCT835 Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain	Moderate condition. The area to the south of the riparian corridor has been heavily disturbed by excavation works, with piles of soil and dam widening.	<i>Angophora floribunda</i> , <i>E. tereticornis</i> and <i>E. punctata</i>	<i>Bursaria spinosa</i>	<i>Juncus usitatus</i>	1.75	<i>River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin, and southeast Corner Bioregions – endangered</i>	<i>River-Flat Eucalypt Forest on coastal floodplains of southern New South Wales and eastern Victoria – <u>critically endangered</u></i>
PCT3319 - Modified	PCT1395 Narrow-leaved Ironbark - Broad-leaved Ironbark - Grey Gum open forest of the edges of the Cumberland Plain	Eastern portion of site in former paddocks. Native grasses and native regeneration occurring with juvenile <i>E. tereticornis</i> trees 1-2 m high though canopy reduced to scattered/isolated trees (Photo 2).	Scattered trees including <i>Eucalyptus tereticornis</i>	<i>Bursaria spinosa</i>	<i>Aristida vagans</i> , <i>Cynodon dactylon</i> , <i>Eragrostis</i> sp., <i>Gahnia aspera</i> , <i>Juncus usitatus</i> , <i>Microlaena stipoides</i> .	8.82	Unlikely due to condition and less than 20% canopy cover.	Unlikely due to condition and less than 20% canopy cover.
Planted Exotic Vegetation	n/a	Planted exotic vegetation occurs	Non-native	Non-native	Non-native	0.64	No	No

Plant Community Type (PCT)	Former Eastern NSW PCT mapped equivalent	Location within site and condition	Canopy	Mid-storey	Ground layer	Area (ha)	Conservation status	
							BC Act	EPBC
		around the dwellings						
Exotic-dominated grassland	n/a	Occupies most of the site where pasture has been cultivated and seeded with exotic species	Generally, absent with exception of isolated <i>Acacia implexa</i> trees.	Occasional regrowth <i>Bursaria spinosa</i> .	Dominated by exotic species including <i>Cenchrus clandestinus</i> , <i>Paspalum</i> sp., <i>Setaria parviflora</i> . Some native species are present generally at less than 5% cover.	42.04	No	No

2.2.1 PCT3319 – Cumberland Shale Hills Woodland



Photo 1 – PCT3319 – Cumberland Shale Hills Woodland (Quadrat 4) (Photo: D. Warman)

PCT3319 – Cumberland Shale Hills Woodland is described as a tall to very tall sclerophyll woodland to open forest with a mid-storey layer of soft-leaved shrubs and small trees and a grassy groundcover (*BioNet Vegetation 2023*). The canopy is generally dominated by *Eucalyptus tereticornis* and *E. moluccana*. The mid-stratum generally is dominated by *Bursaria spinosa* and *Acacia implexa*. The ground layer is generally dominated by forbs such as *Brunoniella australis*, *Desmodium varians*, and *Dichondra repens*. Dominant native grasses include *Aristida ramosa* and *Microlaena stipoides*.

Validation of PCTs was based on canopy, mid-stratum and ground layer species, geology, BAM plot data and general observations across those sites not surveyed by plots. Within the plot surveyed (Q4), the canopy included *Eucalyptus tereticornis*, but also *Corymbia maculata* and rarely *E. moluccana*. The mid-storey included shale species such as *Bursaria spinosa*. For a full species list see Appendix 1.

This PCT may be associated with the NSW *BC Act* NSW Cumberland Plain Woodland TEC and the Commonwealth *EPBC Act* Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest TEC where a patch satisfies key diagnostic characteristics and condition thresholds.

Canopy: *Corymbia maculata*, *Eucalyptus crebra* and *E. tereticornis*.

Mid-storey: *Bursaria spinosa*.

Ground layer: *Dichondra repens*, *Echinopogon caespitosus*, *Microlaena stipoides*, *Oplismenus aemulus* and *Oxalis perennans*.

2.2.2 PCT3319 - Cumberland Shale Hills Woodland (Modified)



Photo 2 – PCT3319 Cumberland Shale Hills Woodland (Modified) (Quadrat 3) (Photo: S. Peters)

PCT3319 Cumberland Shale Hills Woodland (Modified) is described as a tall to very tall sclerophyll woodland to open forest with a mid-storey layer of soft-leaved shrubs and small trees and a grassy groundcover (*BioNet Vegetation 2023*). The canopy is generally dominated by *Eucalyptus tereticornis* and *E. moluccana*. The mid-stratum generally is dominated by *Bursaria spinosa* and *Acacia implexa*. The ground layer is generally dominated by forbs and grasses such as *Aristida ramosa*, *Brunoniella australis*, *Desmodium varians*, *Dichondra repens* and *Microlaena stipoides*.

Within the plot surveyed (Q3), the canopy was generally absent but for scattered trees across the site, hence the 'Modified' status. However, natural regeneration of this PCT was evident with *Eucalyptus* seedlings prevalent across the plot area and native shrubs and grasses. There was also evidence of some groundwater influence with *Juncus usitatus* across the site. This species is generally found in moist situations.

This PCT may be associated with the NSW *BC Act* Cumberland Plain Woodland TEC and the Commonwealth *EPBC Act* Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest TEC where it satisfies key diagnostic characteristics and condition thresholds.

Canopy: No canopy within Quadrat 3.

Mid-storey: Juvenile *Bursaria spinosa*.

Ground layer: *Aristida* sp. *Cynodon dactylon*, *Gahnia aspera*, *Juncus usitatus* and *Microlaena stipoides*.

2.2.3 PCT3321 – Cumberland Shale-Sandstone Ironbark Forest



Photo 3 – PCT3321 – Cumberland Shale-Sandstone Ironbark Forest (Quadrat 2) (Photo: D. Warman)

PCT3321 – Cumberland Shale-Sandstone Ironbark Forest is described as a tall sclerophyll open forest with a mid-storey of dry and soft-leaved shrubs or small trees and a grassy ground cover. It occurs across the fringes of the Cumberland Plain in western Sydney. The canopy very frequently includes *Eucalyptus crebra*, stringybarks such as *E. globoidea*, and the grey gum *E. punctata*. The mid-stratum generally includes both sandstone and shale dominant species such as *Bursaria spinosa*, *Leucopogon juniperinus* and *Persoonia linearis*. The ground layer typically includes *Aristida vagans*, *Cheilanthes sieberi* subsp. *sieberi*, *Entolasia stricta*, *Lepidosperma laterale*, *Lobelia purpurascens*, *Lomandra multiflora* subsp. *multiflora*, *Microlaena stipoides* and *Themeda triandra*.

Within the plots surveyed (Q2 and Q5) the canopy included *Corymbia maculata*, *Eucalyptus crebra*, *E. tereticornis*. For a full species list see Appendix 1.

Canopy: *Corymbia maculata*, *Eucalyptus tereticornis*, *E. crebra* and *E. globoidea*.

Mid-storey: *Bursaria spinosa*, *Hibbertia aspera* subsp. *aspera*, *Leucopogon juniperinus*, *Notelaea longifolia* subsp. *longifolia* and *Olearis viscidula*.

Ground layer: *Centella asiatica*, *Clematis aristate*, *Cynodon dactylon*, *Desmodium* sp., *Dichondra repens*, *Echinopogon caespitosus*, *Entolasia stricta*, *Gahnia aspera*, *Goodenia hederacea*, *Hardenbergia violaceae*, *Hibbertia aspera* subsp. *aspera*, *Lomandra* sp., *Juncus utitatus*, *Lobelia purpurascens*, *Microlaena stipoides* and *Oplismenus aemulus*.

2.2.4 PCT4058 – Sydney Hinterland Red Gum Riverflat Forest



Photo 4 – PCT4058 Sydney Hinterland Red Gum Riverflat Forest (Photo: S. Peters)

PCT4058 Sydney Hinterland Red Gum Riverflat Forest is described as a tall to very tall open forest with a mid-storey of soft-leaved shrubs and small trees with a mesic, grassy ground cover on alluvial flats alongside streams of the Sydney hinterland. The canopy very frequently *Eucalyptus tereticornis* or *E. amplifolia* and *Angophora floribunda*. The mid-storey includes scattered shrubs such as *Breynia oblongifolia*, *Bursaria spinosa* and *Rubus parvifolius*. The ground layer is characterised by a dense cover of grasses, soft-leaved forbs, vines and ferns. *Microlaena stipoides* and *Entolasia marginata* are almost always present and *Oplismenus aemulus*, *Dichondra repens* and *Sigesbeckia orientalis* subsp. *orientalis* are very frequent. Common ground covers include *Clematis glycinoides*, *Lobelia purpurascens*, *Adiantum aethiopicum*, *Pteridium esculentum* and *Stephania japonica* var. *discolor*.

Within the study area, the area to the east and south of the southern-most dam was most likely this community. The canopy included *Eucalyptus tereticornis* (or *Eucalyptus amplifolia*) and *Angophora floribunda*. A quadrat was not able to be achieved here, but observations made included large scale soil disturbance around the lower dam which may have altered the soil structure and therefore, associated species. The mid-storey included shale species such as *Bursaria spinosa*.

Validation of this PCT was based on canopy and mid layer species, as follows:

Canopy: *Angophora floribunda*, *Eucalyptus tereticornis*, *E. globoidea* and *E. punctata*.

Mid-storey: *Bursaria spinosa*.

Ground layer: Native grasses included *Microlaena stipoides*, *Entolasia marginata*, *Oplismenus aemulus*. Native forbs, vines and ferns included *Adiantum aethiopicum*, *Clematis glycinoides*, *Dichondra repens*, *Pteridium esculentum* *Sigesbeckia orientalis* subsp. *orientalis*, *Lobelia purpurascens*, and *Stephania japonica* var. *discolor*.

2.3 Threatened flora species

BC Act – A search of the *BioNet* Atlas of NSW Wildlife (DPE, 2023) indicated a list of species recorded within a 10 km radius of the development footprint, over the last twenty years. These species are listed in Table A2.1 (Appendix 2) and are considered for potential habitat within the development footprint.

EPBC Act – A review of the schedules of the *EPBC Act* indicated the potential for a list of threatened flora species to occur within a 10 km radius of the development footprint. These species have also been listed in Table A2.1 (Appendix 2) for consideration of potential to occur.

Based on the habitat assessment within Table (Appendix 2) it is considered that the development footprint provides potential habitat for the following threatened flora species. These species will be considered in the Test of Significance within Appendix 3:

Table 3 – Threatened flora species with suitable habitat present

Scientific name	BC Act	EPBC Act	Potential to occur
<i>Acacia pubescens</i>	V	V	Moderate
<i>Pomaderris brunnea</i>	E	V	Moderate
<i>Pultenaea pedunculata</i>	E	-	Moderate

Most threatened species in both the *BioNet* (NSW) and *EPBC Act* (Commonwealth) coordinate search were considered to have low potential suitable habitat within the study area because of previous clearing and landscaping works, past and ongoing land management practices, unsuitable soils / geology, unsuitable previous vegetation type or large distance to known specimens. However, the three species listed above have moderate potential to occur based on habitat and proximity to local records.

The state assessment of significance (Appendix 3) has concluded that the proposed development will not likely have a significant impact on any threatened flora species, and endangered populations or TECs with the exception of a significant impact on PCT3319 Cumberland Shale Hills Woodland (3.67 ha).

However, it is important to highlight that if the regulator denies the proponents' request to modify the existing CPCP mapping, additional evaluation for the rezoning application will be necessary. This includes the following:

- (a) A Species Impact Statement will be required for the proposal and
- (b) Biodiversity offsetting will be required and the appropriate Biodiversity Development Assessment Reporting will need to be submitted.

2.4 Endangered flora populations

One endangered flora population occurs within Campbelltown Council LGA.

- *Marsdenia viridiflora* R. Br. subsp. *viridiflora* population in the Bankstown, Blacktown, Camden, Campbelltown, Fairfield, Holroyd, Liverpool, and Penrith LGAs.

This population is not represented within the study area. No endangered populations are known to occur within 10km of the study area.

2.5 Threatened ecological communities

Travers bushfire & ecology notes that the assessment of impacts on TEC's is subject to the outcomes of the CPCP modification request.

On the basis of the proposed rezoning, three (3) threatened ecological communities were recorded within the study area under the *BC Act*, as follows:

1. Cumberland Plain Woodland in the Sydney Basin Bioregion (critically endangered),
2. Shale Sandstone Transition Forest in the Sydney Basin Bioregion (critically endangered), and
3. River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin, and southeast Corner Bioregions (endangered) were recorded within the study area.

PCT 3319 is commensurate with the NSW *BC Act* listed Cumberland Plain Woodland in the Sydney Basin Bioregion. This PCT is listed under the *BC Act* as critically endangered in NSW. The rezoning application will likely impact up to 10.52 ha of this PCT. The importance of the remnants to be impacted are moderate. The ground layer is a mixture of native and exotic herbs, forbs, and grasses with a regenerating layer of *Eucalypt* seedlings and the shrub *Bursaria spinosa*. There is also reasonably strong canopy connectivity between the northern and southern boundary to the east of the two dams.

With respect to the *EPBC Act*, this community forms part of the Cumberland Plain Shale Woodlands and Shale Gravel Transition Forest. It is listed under this *EPBC Act* as Critically endangered. For recognition under the *EPBC Act* definition, the vegetation remnant must meet key characteristics and selected criteria as identified in Figure 2.1.

PCT 3319 does meet the key diagnostic criteria as the vegetation present:

1. Occurs in the Sydney Basin IBRA bioregion, and Cumberland IBRA sub-region.
2. Occurs on clay soils derived from Wianamatta Group geology.
3. Upper tree layer of over 10% cover, and dominated by *Eucalyptus tereticornis* and *E. moluccana*, and
4. The understorey is comprised primarily of perennial native graminoids and forbs, most of which are diagnostic for the listed TEC.

Based on this assessment and the data collected, vegetation within PCT 3319 is commensurate with the EPBC-listed TEC.

However, if the CPCP submission to the regulator is endorsed, the impact on PCT 3319 will be solely contained within Urban-Capable Certified Lands.

PCT 3321 is commensurate with the NSW *BC Act* listed Shale Sandstone Transition Forest in the Sydney Basin Bioregion. This PCT is listed under the *BC Act* as critically endangered. This community was in varying condition due to grazing and some soil disturbance. At the location where Q1 was surveyed, the condition was moderate. At Q2, and Q5, greater intervention may be required including fencing off from grazing, by cattle. There was a mix of native and exotic shrubs in the mid-stratum and ground layer and all remnants have good ability to regenerate with minimal intervention. The rezoning application will likely impact up to 2.11 ha of this PCT.

PCT 3321 is aligned with, and potentially equivalent to *Shale Sandstone Transition Forest in the Sydney Basin Bioregion* which is listed under the *EPBC Act* as Critically Endangered. In order to be classified part of this TEC, the vegetation in question must meet key diagnostic and conditional criteria.

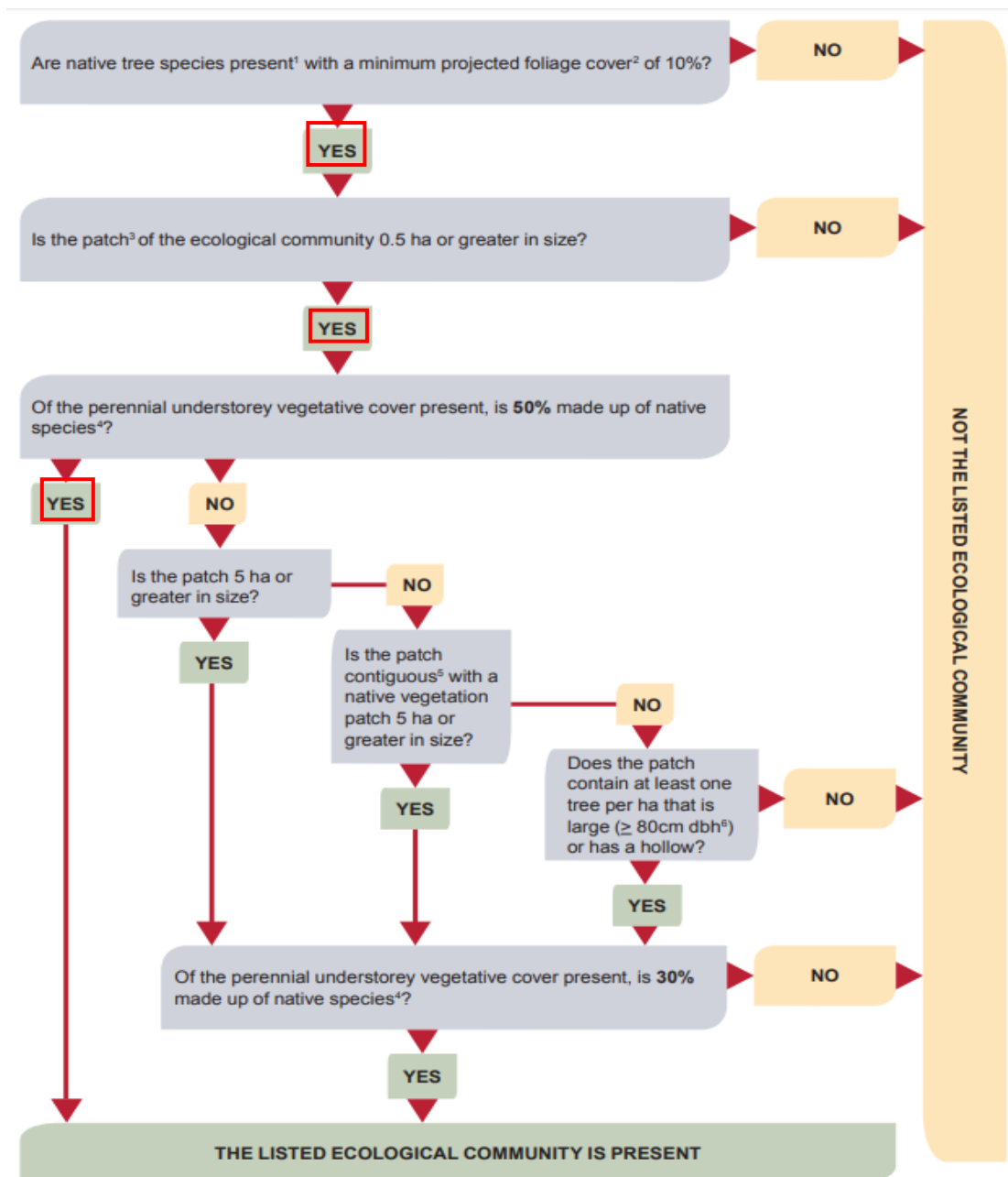


Figure 2.1 – Flowchart for identifying Cumberland Plain Shale Woodlands and Shale Gravel Transition Forest

PCT 3321 does meet the key diagnostic criteria as the vegetation present:

- Occurs to the Sydney Basin Bioregion
- Occurs at the transition between shales and sandstones of the Wianamatta and Hawkesbury Groups, including the transitional Mittagong Formation
- Occurs as forest or woodland and may have a primary shrubby or primarily grassy understorey or a combination of grass and shrubs.

- Canopy is a mix of species typically including two or more of the following: *Eucalyptus punctata* (Grey Gum), *E. crebra* (narrow-leaved ironbark), *E. fibrosa* subsp. *fibrosa* (Broad-leaved ironbark), *E. tereticornis* subsp. *tereticornis* (forest red gum), *E. resinifera* subsp. *resinifera* (red mahogany), *E. eugenioides* (or *E. globoidea* depending on local species present and degree of sandstone influence) and *Angophora bakeri* (narrow-leaved apple).
- Where present the mid layer of the understorey varies in structure and floristics.
- Where present, the small tree layer is likely to be dominated by Eucalypt species and *Allocasuarina littoralis* (black she-oak).
- Where shrubs are present, the mid layer is likely to be dominated by *Bursaria spinosa* (blackthorn) in areas with low sandstone influence, with other common species including *Leucopogon juniperinus*, *Kunzea ambigua* (tick bush), *Persoonia linearis* (narrow-leaved geebung), *Ozothamnus diosmifolius* (rice flower, sago bush, white dogwood) and *Hibbertia aspera* (rough guinea flower).
- Where present, the ground layer of the understorey is typically diverse and dominated by grasses and herbs including: *Aristida vagans* (three-awned spear grass), *Austrostipa pubescens* (spear grass), *Cheilanthes sieberi* subsp. *sieberi* (poison rock fern), *Dichondra repens* (kidney weed), *Echinopogon ovatus* (forest hedgehog grass), *Entolasia marginata* (bordered panic), *Entolasia stricta* (wiry panic), *Lepidosperma laterale* (saw sedge), *Lomandra multiflora*, *Microlaena stipoides* var. *stipoides* (weeping grass), *Oxalis perennans* (wood-sorrel), *Pimelea linifolia* subsp. *linifolia*, *Pomax umbellata*, *Phyllanthus hirtellus*, *Lobelia purpurascens* (white root), *Solanum prinophyllum* (forest nightshade) and *Themeda triandra* (kangaroo grass). The ground layer may also contain small shrubs, including *Hibbertia aspera* (rough guinea flower).

PCT 3321 meets Criteria B (Figure 2.2), Moderate Condition Class and based on this assessment and the data collected, vegetation within PCT 3321 is commensurate with the EPBC-listed TEC.

Category and Rationale	Thresholds		
A. Moderate condition class Represented by medium to large-size patch as part of a larger native vegetation remnant and/or with mature trees	Patch size ≥ 0.5 ha And $\geq 30\%$ of the perennial understorey vegetation cover is made up of native species. And		
	The patch is contiguous with a native vegetation remnant (any native vegetation where cover in each layer present is dominated by native species) ≥ 1 ha in area.	Or	The patch has at least one tree with hollows or at least one large locally indigenous tree (>80 cm dbh).
B. Moderate condition class Represented by medium to large size patch with high quality native understorey	Patch size ≥ 0.5 ha And $\geq 50\%$ of the perennial understorey vegetation cover is made up of native species.		
C. High condition class Represented by medium to large size patch with very high quality native understorey	Patch size ≥ 0.5 ha And $\geq 70\%$ of the perennial understorey vegetation cover is made up of native species.		
D. High condition class Represented by larger size patch with high quality native understorey	Patch size ≥ 2 ha And $\geq 50\%$ of the perennial understorey vegetation cover is made up of native species.		
<i>Perennial understorey vegetation cover</i> includes vascular plant species of both the ground layer and mid/shrub layer (where present) with a lifecycle of more than two growing seasons. Measurements of perennial understorey vegetation cover exclude annuals, cryptogams, leaf litter or exposed soil. <i>Contiguous</i> means the patch of the ecological community is continuous with, or in close proximity (within 100 m) to another area of vegetation that is dominated by native species in each vegetation layer present.			

Figure 2.2 – Condition thresholds for Shale-Sandstone Transition Forest

PCT4058 is commensurate with the NSW *BC Act* listed River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin, and southeast corner Bioregions. This PCT is listed under the *BC Act* as Endangered. This community was in poor condition due to excavation works around the southern extent. Large piles of soil extend across the area. The mid-storey and understorey were depauperate with limited ability to regenerate, without intervention. The rezoning application will likely impact up to 1.75 ha of this PCT. Despite its EEC status, the importance of the remnant to be impacted is lower because of its condition.

PCT 4058 is aligned with, and likely equivalent to, River-Flat Eucalypt Forest on Coastal Floodplains of southern New South Wales which is listed under the *EPBC Act* as Critically Endangered. In order to be classified as a part of this TEC, the vegetation in question must meet key diagnostic and conditional criteria.

To be considered under the *EPBC Act*, PCT 4058 must meet these key characteristics as well as a condition assessment, as follows:

- Occurs in the Southeast Corner and Sydney Basin IBRA7 Bioregions, in eastern Victoria and southeastern New South Wales.
- Occurs within catchments of the eastern and southern watershed of the Great Dividing Range.

- Occurs at elevations up to 250 metres above sea-level (ASL), but most typically below 50 metres ASL.
- Occurs on alluvial landforms related to coastal river floodplains and associated sites where transient water accumulates, including floodplains, riverbanks, riparian zones, lake foreshores, creek lines (including the floors of tributary gullies), floodplain pockets, depressions, alluvial flats, fans, terraces, and localised colluvial fans.
- Occurs on alluvial soils of various textures including silts, clay loams, sandy loams, gravel, and cobbles. Does not occur on soils that are primarily marine sands, or aeolian sands.
- Occurs as a tall closed-forest, tall open-forest, closed forest, open forest, tall woodland, or woodland. The canopy has a crown cover of at least 20 percent.
- Has a canopy dominated by one or a combination of the following species: *Angophora floribunda*, *A. subvelutina*, *Eucalyptus amplifolia*, *E. baueriana*, *E. benthamii*, *E. bosistoana*, *E. botryoides*, *E. botryoides* x *E. saligna*, *E. elata*, *E. grandis*, *E. longifolia*, *E. moluccana*, *E. ovata*, *E. saligna*, *E. tereticornis* and *E. viminalis*.

PCT 4058 is likely to be commensurate with the *EPBC Act* threatened community, as it meets the key characteristics, with a canopy of approximately 20% crown cover and dominated by *Angophora floribunda* and *Eucalyptus amplifolia*, *E. moluccana* and *E. tereticornis*, although the condition of this remnant is poor due to soil disturbance.

3. FAUNA

3.1 Survey methods

Several fauna survey efforts have been undertaken.

2019

A preliminary fauna survey and habitat assessment within the study area was undertaken on 10 and 11 January 2019. Weather conditions were fine and appropriate.

Diurnal survey included:

- Searches for significant habitat trees. This includes trees containing large hollows suitable for nesting/roosting use by threatened owls/cockatoos, or two or medium hollows (10-30cm entry) or more than 7 small hollows (<10cm entry). A tree may also be deemed significant if providing specific value for a threatened or notable species.
- Diurnal bird census points at four locations within the study area. Census is undertaken for a minimum of 30mins in an area accounting approximately for 100m². These were undertaken in strips of vegetation and therefore more so covered 50 x 200m areas. Opportunistic bird survey was undertaken between census points and while undertaking other survey methods.
- Three Koala Spot Assessment Technique survey points were undertaken in accordance with *Phillips & Callaghan (2008)*. The first point was undertaken in the far south-western corner of the site and accounted for all of the 10 Grey Gum trees present in this entire patch. A scientific paper prepared by Koala experts *Stephen Phillips and John Callaghan (2000)* established that Grey Gum (*Eucalyptus punctata*) and Blue-leaved Stringybark (*E. agglomerata*) when growing on shale-based substrates were most preferred by koalas in the Campbelltown area. The third point was undertaken in a high proportion of Koala feed trees Forest Red Gum occurring with Spotted Gum. Given all trees in this area were smooth-barked the 30 trees selected for scat searches were only those showing fauna scratch marks on the trunk. Therefore, this SAT point was biased towards activity potential and nearly all trees in this patch were searched for scratch marks.
- A spotting scope outlook point was undertaken close to large dams to target presence of any wading birds and waterfowl particularly small species foraging along the edges.
- Random habitat searches for Cumberland Plain Land Snail were undertaken in patches of forest/woodland containing log and leaf debris in the understorey. Large logs were targeted and turned over to search for living and dead snail shells below.

Nocturnal survey included:

- Stag-watching significant habitat trees SHT3 & SHT4 together during the dusk to early evening period, both of which were considered potentially suitable for Masked Owl and located close to each other.

- Nocturnal call-playback for Powerful Owl, Masked Owl, Barking Owl, Yellow-bellied Glider, Squirrel Glider, and Koala. Koala call-playback was undertaken at a second location adjacent to the BioBanking site to the north where the species has been numerous recorded.
- Ultrasonic bat recording overnight for four consecutive nights from the 11/1/19 at two locations within the study area. Both locations were facing over open water targeting presence of Large-footed Myotis.
- Spotlighting through the eastern portions of the site.

2023

Fauna survey including afternoon and morning diurnal survey, nocturnal survey and threatened species habitat assessment was undertaken within the subject site and nearby surrounds on 22-24 May 2023.

Diurnal fauna survey included:

- Opportunistic frog and reptile habitat searches,
- Opportunistic aural-visual bird recordings,
- Mammal activity searches (scats, scratches, diggings, burrows, etc.),
- Acoustic recording with Song Meter 4's,
- Koala SATs x4,
- Owl activity searches for white-wash and pellets, and
- Habitat tree survey.

Nocturnal fauna survey included:

- Spotlighting transects (3x 20-min 200m transects),
- Frog call identification,
- Ultrasonic microbat recording (x2 passive recording stations), and
- Hollow watching.

Specific survey effort locations and results are shown on Figure 3.2. All fauna species recorded during survey within the development footprint and nearby surrounds are listed in Appendix 1.

A review of the *BioNet Atlas of NSW Wildlife* (DPE 2023) was undertaken prior to the site visit to determine threatened species previously recorded within 5 km of the development footprint within the past 20 years (Appendix 2).

2025

A Koala use and feed tree assessment survey was undertaken on 12 June 2025 in order to determine potential Koala habitat on the subject land according to the Koala SEPP 2021. As per the SEPP 2021 (Chapter 3 – Koala habitat protection), potential koala habitat means areas of native vegetation where trees of the types listed in Schedule 1 constitute at least 15% of the total number of trees in the upper or lower strata of the tree component. Survey was undertaken to identify feed tree species for potential Koala habitat listed in Schedule 1 that may be impacted by the proposed development. Koala feed trees identified on or in proximity to the proposed development footprint have been identified as T1-T12 on Figure 3.2.

3.2 Habitat features

The following notable habitat features were observed present:

- Seven (7) significant habitat trees,
- Four (4) habitat trees containing a range of hollow sizes,
- Leaf litter and logs,
- Drainage line/creek and permanent dams,
- Year-round nectar producing tree species, principally *Eucalyptus* sp.,
- Dense mid and upper-storey foliage areas, and
- Surface soils suitable for foraging by bandicoots.

Weather conditions at the start and end of nocturnal survey on 22/05/2023 were 5-0% cloud, light-no wind, no rain, 14.7-9.5°C between 09:30 – 17:00.

Weather conditions at the start and end of nocturnal survey on 23/05/2023 were 10-5% cloud, no wind, no rain, 15.5-9.2°C between 17:00 – 18:55.

Hollow-bearing tree data for the development footprint is provided in Table 4.

The recorded hollows may be suitable for hollow-dependent threatened species with potential to occur including microbats, gliders, and owls. The Southern Myotis and East-coast Freetail Bat was recorded during survey and such hollows may be utilised for roosting and breeding. Therefore, the assessment for these species has recommended retention of hollows within the development landscape.

The proposed development layout enables retention of all habitat trees (Figure 3.2). However, it is possible that some small hollow-bearing trees are present but were not recorded during survey. In this case, a recommendation has been made to ensure a fauna ecologist is present during removal of hollow or nest-bearing trees to effectively recover any residing fauna species.

3.2.1 Habitat tree data

Significant habitat trees for the study area are trees containing large hollows suitable for nesting/roosting use by threatened owls/cockatoos, two or more medium hollows (10-30cm entry) or more than 7 small hollows (<10cm entry). A tree may also be deemed significant if providing specific value for a threatened or notable species however none of these were identified. Seven (7) significant habitat trees containing hollows were identified within the study area.

Three significant habitat trees (SHT3, SHT4 & SHT7) each contained a large broken trunk hollow considered potentially suitable for Masked Owl. Two of these SHT3 & SHT4 were stag-watched together during survey with no emergence of fauna recorded. SHT7 is however considered most suitable for use by Masked Owl. No signs of activity were found on the ground surrounding these three trees.

Table 4 – Habitat tree data

Tree No	Scientific Name	Common Name	DBH (cm)	Height (m)	Spread (m)	Vigour (%)	Hollows Recorded
HT1	N/A	Stag	45	18	5	0	1x 10cm trunk hollow 3m high
HT2	<i>Eucalyptus moluccana</i>	Grey Box	100	22	16	70	1x 15cm branch spout 15m high 1x 5cm branch spout 12m high
HT3	N/A	Stag	40	19	5	0	1x 10cm branch hollow 14m high
HT4 (Previously logged as SHT01)	<i>Eucalyptus crebra</i>	Narrow-leaved Ironbark	100	22	15	85	1x 35cm branch spout 8m high
HT5	N/A	Stag	85	22	12	0	1x 5cm trunk hollow 2.5m high 1x 10cm branch hollow 12m high
HT6	N/A	Stag	50	12	0.5	0	1x 35cm trunk spout 12m high
HT7	<i>Eucalyptus capitellata</i>	Brown Stringybark	70	21	16	90	1x 15cm branch spout 6m high 1x 10cm branch spout 13m high
HT8 (Previously logged as SHT05)	<i>Eucalyptus tereticornis</i>	Forest Red Gum	95	24	12	80	1x 20cm branch spout 18m high 1x 5cm trunk hollow 17m high
T009 (Previously logged as SHT06)	N/A	Stag	65	15	?	?	1x 25cm trunk spout 15m high
HT10 (Previously logged as SHT07)	N/A	Stag	120	19	8	0	1x 30cm branch spout 17m high
HT11 (Previously logged as SHT04)	N/A	Stag	95	17	5	0	1x 50cm trunk hollow 17m high

3.3 Threatened fauna species.

BC Act – A search of the *BioNet Atlas of NSW Wildlife* (DPE, 2023) provided a list of threatened fauna species previously recorded within a 5 km radius of the development footprint since June 2003. The species that are considered for potential habitat within the study area are listed in Table A2.1 and A2.2 (Appendix 2).

EPBC Act – A review of the schedules of the *EPBC Act* identified a list of threatened fauna species or species habitat likely to occur within a 5 km radius of the development footprint. These species have also been listed in Table A2.1 and A2.2 (Appendix 2).

In accordance with the tables in Appendix 2, the following state and nationally listed threatened fauna species were recorded or are considered to have suitable habitat with ‘moderate’ or ‘high’ potential to occur within the study area. The state listed species will be considered in the test of significance (Appendix 3):

Table 5 lists threatened fauna species with suitable habitat present.

Table 5 – Threatened fauna species with suitable habitat present

Common name	BC Act	EPBC Act	Potential to occur
Eastern Coastal Free-tailed Bat	V	-	Recorded (2019,2023)
Southern Myotis	V	-	Recorded (2023)
Large Bent-winged Bat	V	-	Recorded (2023)
Little Lorikeet	V	-	Recorded (2019)
Cumberland Plain Land Snail	E	-	Recorded (2019)
Greater Broad-nosed Bat	V	-	Recorded (2019)
Eastern False Pipistrelle	V	-	Recorded (2019)
Little Eagle	V	-	High
Square-tailed Kite	V	-	High
Masked Owl	V	-	High
Dusky Woodswallow	V	-	High
Koala	V	V	High
Greater Broad-nosed Bat	V	-	Moderate
Large-eared Pied Bat	V	V	Moderate
Grey-headed Flying-fox	V	V	Moderate
Scarlet Robin	V	-	Moderate
Varied Sittella	V	-	Moderate
Powerful Owl	V	-	Moderate
Gang-gang Cockatoo	V	-	Moderate
Glossy Black-Cockatoo	V	-	Moderate
Swift Parrot	E	E	Moderate
White-bellied Sea Eagle	V	-	Moderate

The state test of significance assessment (Appendix 3) and a review of *EPBC* impact criteria (Appendix 4) has concluded that the proposed development will not likely have a significant impact on threatened fauna species. Therefore, entry into the Biodiversity Offset Scheme (BOS) is not required based on threatened fauna.

Fisheries Management Act (FM Act) – No habitats suitable for threatened aquatic species were observed within the study area and as such the provisions of this act do not require any further consideration.

3.4 Protected migratory species (National)

The *EPBC Act* Protected Matters Report provides additionally listed terrestrial, wetland and marine migratory species of national significance likely to occur, or with habitat for these species likely to occur, within a 5 km radius of the development footprint. The habitat potential of migratory species is considered in Table A2.3 (Appendix 2). The habitat potential of threatened migratory species are instead considered with other threatened species in Table A2.2 (Appendix 2).

One (1) nationally protected migratory bird species Latham's Snipe was recorded present to a 'probable' level of certainty foraging along the edge of one of the large central dams. The individual took flight before identification could be confirmed. It landed next to the adjacent vegetated dam but could not be found. The study area does not contain any breeding habitat for this species however the recorded foraging habitat should ideally be retained.

However, the total size of the subject land is 70.2 ha so none of the area clearing thresholds could be exceeded and it is considered highly unlikely that the mortality threshold would be exceeded (i.e., only an insignificant portion of each species' population could be impacted). Therefore, no EPBC referral is required.

Following a review of the impact criteria for protected migratory bird species under the *EPBC Act* (Appendix 4), it is concluded that the proposal will not likely significantly impact any nationally listed protected migratory species with considered potential to occur.

3.5 Endangered fauna populations

There are no endangered fauna populations within Campbelltown LGA.

3.6 State Environmental Planning Policy (Biodiversity and Conservation) 2021 – Chapter 4 Koala Habitat Protection

Campbelltown has its own Comprehensive Koala Plan of Management (CKPoM), therefore, assessment of Koalas is deferred to the Campbelltown Comprehensive Koala Plan of Management (CCKPoM) in accordance with *State Environmental Planning Policy (Biodiversity and Conservation) 2021 – Chapter 4 Koala Habitat Protection*.

There are numerous recent and historical records of Koalas within the study area. A well known koala population is currently located along the Georges River to the east of the Gilead township and extends north through St Helens Park to Kentlyn. As of June 2023, there are 931 Koala records within 10kms of the subject land in the last 18 years. These records primarily occur within the vegetation along the northeastern lot boundary and along the road adjacent to the eastern lot boundary.

Under Schedule 2 of *SEPP 2021*, City of Campbelltown LGA falls within the Central Coast Koala Management Area (KMA). Four (4) tree species were recorded in the study area which are considered Koala use species within this KMA under Schedule 3 of *SEPP 2021*. These include:

- *Eucalyptus tereticornis*,
- *Corymbia maculata*,

- *Eucalyptus crebra*, and
- *Eucalyptus globoides*.

Assessment of Koalas in accordance with the CCKPoM is outlined in Figure 3.1.

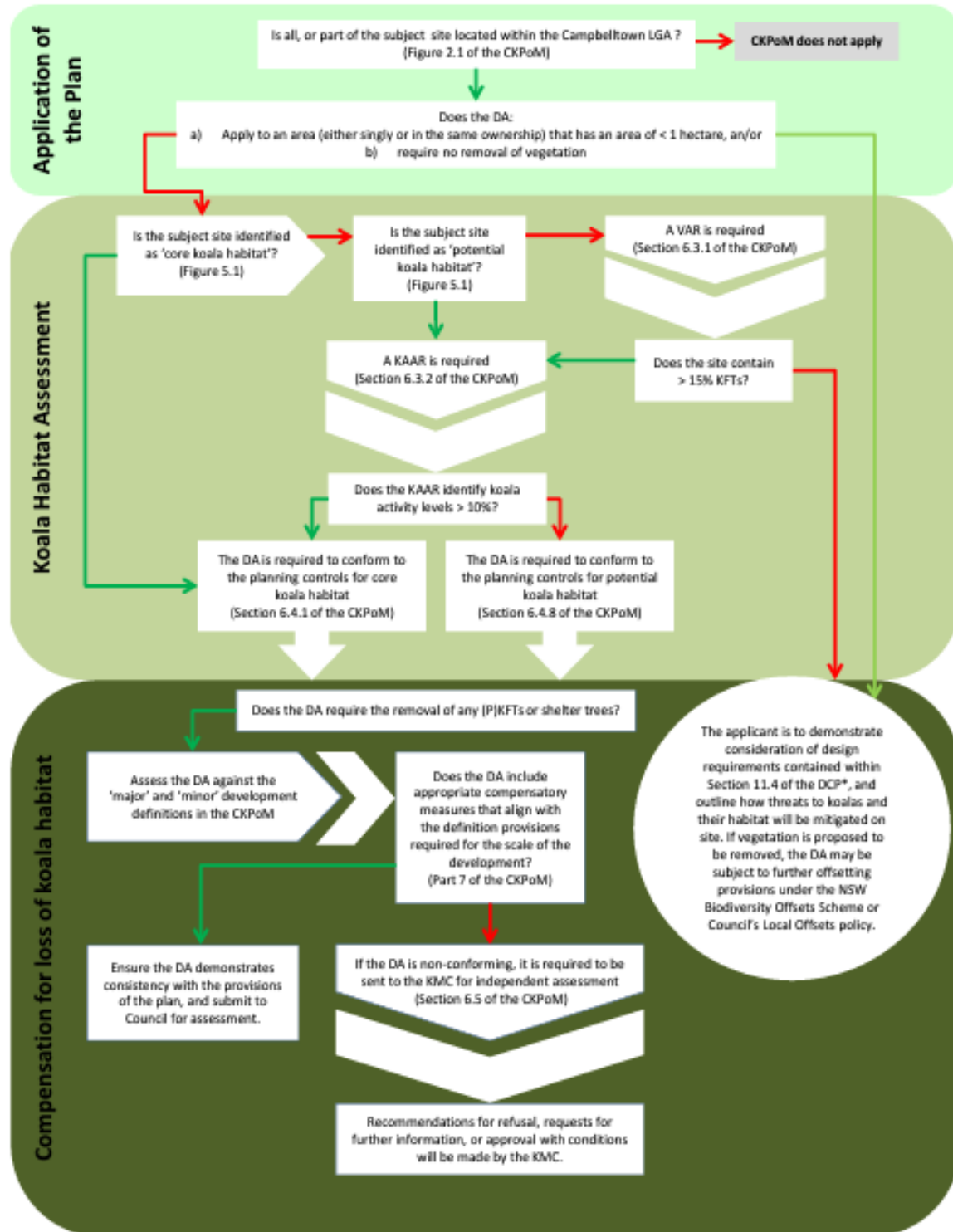


Figure 3.1 – Development assessment framework flowchart from the Campbelltown Comprehensive Plan of Management

- Is all, or part of the subject site located within the Campbelltown LGA?

Response - Yes, the subject site is located within the Campbelltown LGA.

- *Does the DA*
 - a. Apply to an area (either singly or in the same ownership) that has an area of <1 hectare, and/or*
 - b. Require no removal of vegetation.*

Response - The Subject site has an area of >1 hectare and requires the removal of vegetation.

- *Is the subject site identified as 'core koala habitat'?*

Response - Yes, Figure 5.3 within the CCKPoM shows the subject site located within the mapped core koala habitat area. There are also many near and recent records of Koalas within the locality.

- *The DA is required to confirm to the planning controls for core Koala habitat.*

Response - 6.4.1 Planning controls in 'core' koala habitat (i) This section applies to all planning proposals, rezonings, and DA's that relate to areas of core koala habitat.

- *Does the DA require the removal of any Koala feed trees (KFTs) or shelter trees?*

Response - Yes. Future bulk earthworks and construction will likely result in the removal of *Eucalyptus tereticornis*, *Corymbia maculata*, *Eucalyptus crebra*, and *Eucalyptus globoides*. The rezoning application does not require the removal of any KFT's but should be considered in the context of the proposed zones that will likely cause impacts.

- *Assess the DA against the 'major' and 'minor' development definitions in the CCKPoM*
Major development applies to any DA that relates to the subdivision of land into $\geq$ three lots, and/ or requires the removal of three or more KFTs for each hectare of assessable land.
Minor applies to any DA that relates to the construction of a single residential dwelling, and/ or subdivision of land into $\leq$ two lots, and/ or requires the removal of no more than two (P)KFTs for each hectare of assessable land.

Response - The proposal involves the subdivision of land into $\geq$ three lots. Therefore, it is classified as a Major Development.

- *Does the DA include appropriate compensatory measures that align with the definition provisions required for the scale of the development.*
To ensure that the provision of compensation is:
 - *equivalent to the importance of habitat to be removed*
 - *geographically appropriate so as to contribute to the long- term conservation and viability of Campbelltown's koalas the proponent shall be required to compensate for the loss of any (P)KFTs or shelter trees at the following ratio of replacement trees (or the monetary equivalent¹) for every individual tree that is removed: (a) Small (DBH<100 mm) 1:10 (b) Medium (DBH>100<300 mm) 1:15 (c) Large (DBH>300 mm) 1:20 (iv) the location of the compensatory plantings shall be at the discretion of Council in the context of Part 8 of the Plan.*

Response - The proponent has proposed to retain and enhance the on-site riparian corridor and conserved portions of the remaining remnant vegetation. Revegetation works are likely required and may compensate for the loss of trees. Removal of Koala foraging trees will need to be commensurate with the Appendix E of the CPCP Mitigation Measures.

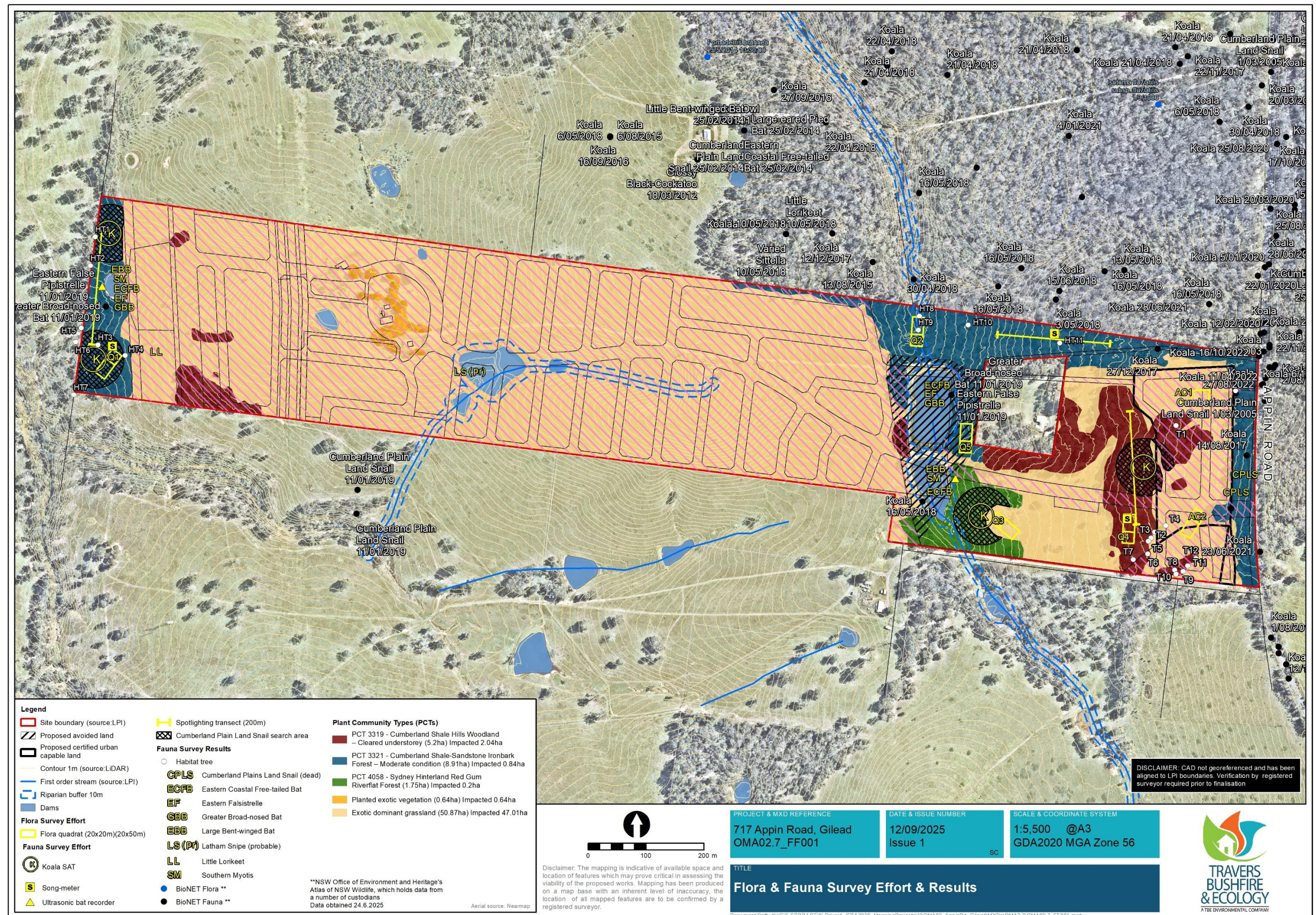
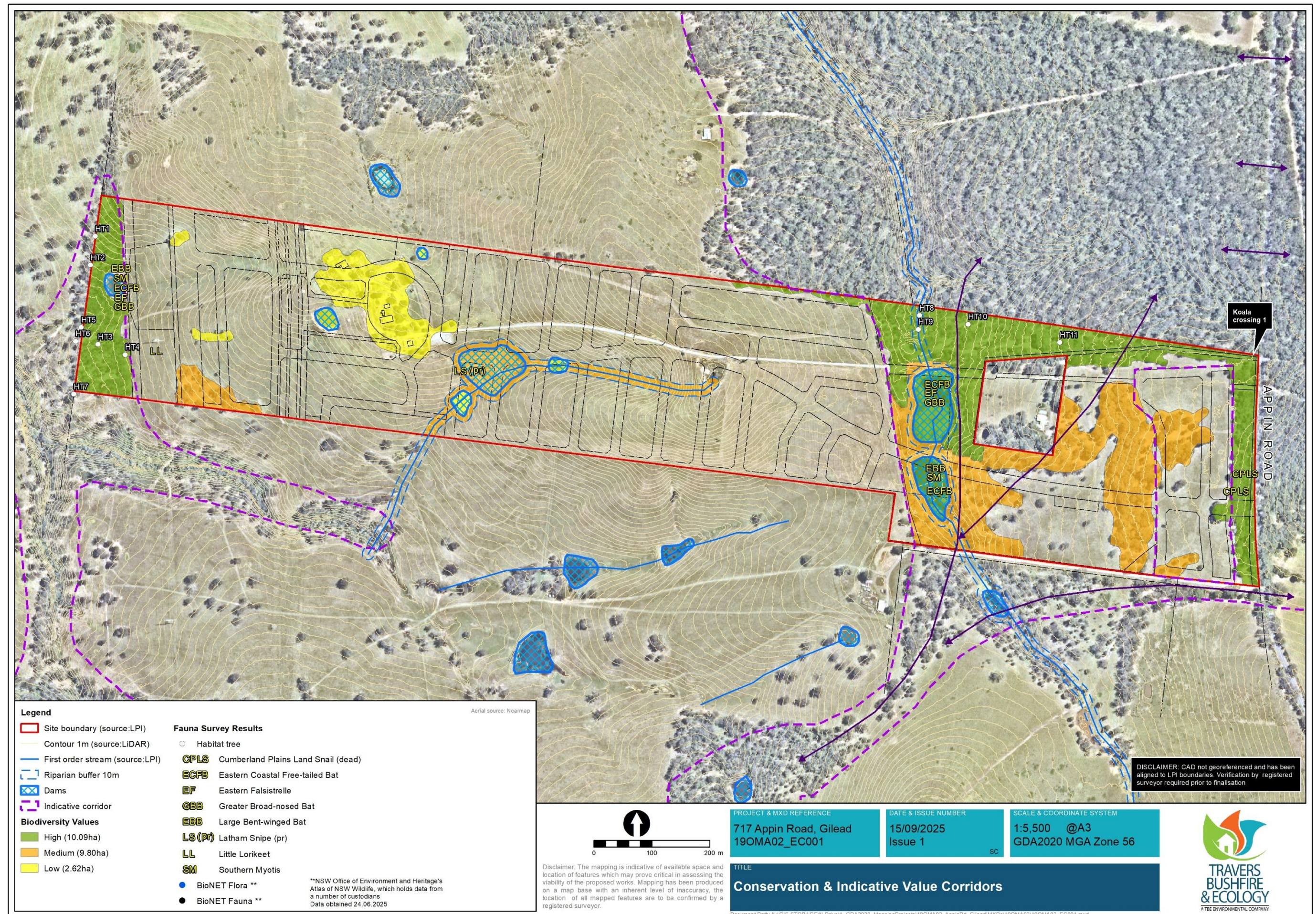


Figure 3.2 – Flora & fauna survey effort & results



3.7 Vegetation connectivity

The vegetation within the eastern portions of the study area is fragmented, grazed and remains as patches and strips of mostly mature trees. These patches contribute to local connectivity between the naturally vegetated Biobanking site to the immediate north and linear riparian vegetation lining Nepean Creek which nearly bisects the south-western corner of the site. This vegetation narrows in parts and has gaps across local powerline easements which also continue across the western end of the study area.

Local connectivity surrounding the study area is depicted in Figure 3.4. The connectivity through the study area is depicted as the mostly Forest Red Gum strip lining the edges of Woodhouse Creek and associated dams along this depression. Natural vegetation is however also present directly east of Appin Road and the other patches of remnant vegetation in the eastern portions of the study area may also contribute to movements directly east.

The connectivity through the study area mentioned above and leaving the site to the south eventually improves further west where large areas of natural gully forest and plateau woodland vegetation lines both sides of the Nepean River. Figure 3.4 shows there are other avenues of connectivity which links the Georges River habitats to the east to the Nepean River to the west and these also have fragmented sections.

These other options however do not devalue the connectivity through the study area, particularly given that this connectivity supports Koala dispersal movements and the closest Koala records to the Nepean River are directly west of the study area. There are numerous records in proximity to the study area, these are depicted on Figure 3.3.



Figure 3.4 – Local connectivity

The study areas' contribution to local connectivity is considered of high importance in particular for Koalas, as discussed further in Section 5.1.1. Connective landscape for Koalas should be provided as part of any future development.

Most other threatened fauna species recorded in the immediate locality are birds and bats which may forage and move along linear connective opportunities but are not restricted to these. The Greater Glider and Squirrel Glider have been recorded nearby to the north-east and Yellow-bellied Glider has been also recorded in this direction approximately 4 km away. None of these species have been recorded to the west. Non-threatened gliders and other arboreal mammals are likely to make use of the existing connectivity through the study area.

4. WATERCOURSES & WETLANDS

4.1 Endangered wetland communities

A number of wetland communities have been listed as an 'endangered ecological community' under the NSW *BC Act*.

Impacts on wetland communities must be assessed under the *BC Act* and if present the management of wetland communities must be given due consideration in accordance with the objectives and principles of management as contained within the NSW Wetlands Policy (2010), and appropriate management as determined by NSW DPIE - Office of Water in their general terms of approval. This may include but not limited to the provision of buffers, management of stormwater runoff and maintenance of natural inflows or runoff into those wetland communities.

- Artesian springs ecological community.
- Castlereagh Swamp Woodland Community.
- Coastal Saltmarsh in the NSW North Coast, Sydney Basin, and Southeast Corner bioregions.
- Coastal Upland Swamp in the Sydney Basin bioregion.
- Coolibah–Black Box woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain and Mulga Lands bioregions.
- Freshwater Wetlands on Coastal Floodplains of the NSW North Coast, Sydney Basin and Southeast Corner bioregions.
- Kurri sand swamp woodland in the Sydney Basin Bioregion.
- Lagunaria swamp forest on Lord Howe Island.
- Maroota Sands swamp forest.
- Newnes Plateau Shrub Swamp in the Sydney Basin Bioregion.
- Swamp oak floodplain forest of the NSW North Coast, Sydney Basin, and Southeast Corner bioregions.
- Swamp sclerophyll forest on coastal floodplains of the NSW North Coast, Sydney Basin, and Southeast Corner bioregions.
- The shorebird community occurring on the relict tidal delta sands at Taren Point.
- Upland wetlands of the drainage divide of the New England Tableland Bioregion, and
- Wingecarribee Swamp.

No endangered wetland communities were present within the study area.

4.2 Groundwater Dependent Ecosystems (GDEs)

Groundwater dependent ecosystems are communities of plants, animals, and other organisms whose extent and life processes are dependent on groundwater. Some examples of ecosystems which depend on groundwater are:

- wetlands.
- red gum forests, vegetation on coastal sand dunes and other terrestrial vegetation.
- ecosystems in streams fed by groundwater.
- limestone cave systems.
- springs, and

- hanging valleys and swamps.

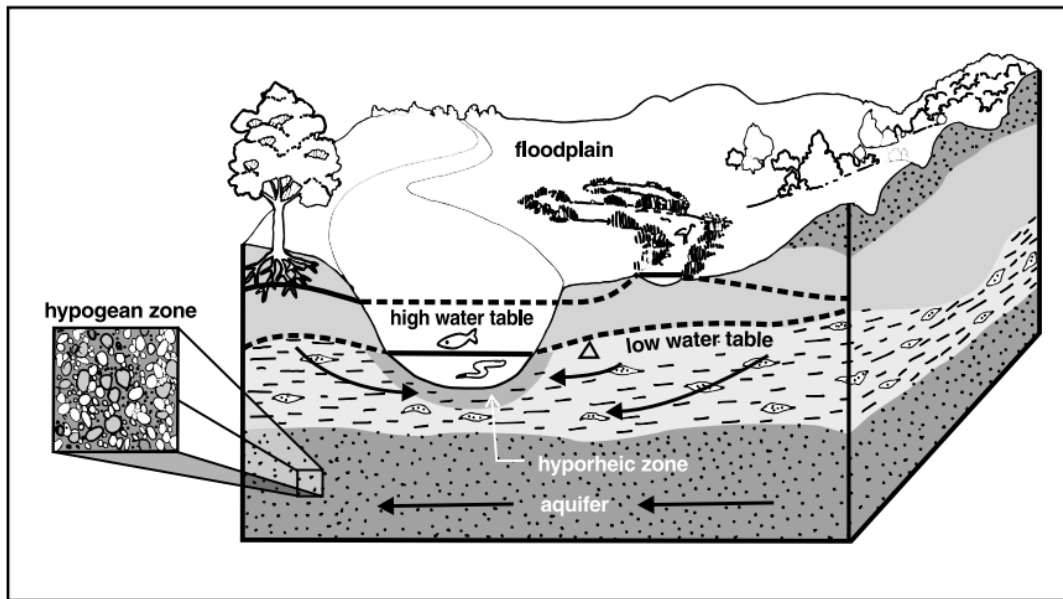


Figure 4.1 – Alluvial groundwater system discharging into a river

Groundwater dependent ecosystems are therefore ecosystems that have their species composition and their natural ecological processes determined by groundwater (NSW State Groundwater Dependent Ecosystems Policy April 2002).



Figure 4.2 – Subject lot in relation to mapped groundwater dependent ecosystems (green shading) within locality

(Source: seed.nsw.gov.au)

Groundwater Dependent Ecosystems (GDEs) were not mapped within the study area (Figure 4.2) and therefore the policy does not require any further consideration.

4.3 Watercourse assessment

Two watercourses were mapped as first-order streams by NSW Hydro line spatial data (Figure 4.3) within the study area. The western watercourse is a first-order stream of Nepean Creek. It is an unnamed ephemeral drainage line that flows through a series of farm dams before descending into Nepean Creek to the south. The north-south watercourse is the Woodhouse Creek channel.

The riparian buffer of 10 m from top of bank of each of these watercourses has been overlaid on Figure 3.3. A riparian buffer is the required setback in accordance with the *NSW Controlled Activity Guidelines for Riparian corridors 2018*. A referral is required if impacts are within 40 m of a watercourse termed as “waterfront land”. The rezoning application is set beyond 10 m from top of bank of Woodhouse Creek inclusive of the required APZ and will not directly impact on the stream or riparian vegetation. However, the first-order stream of Nepean Creek has not been accounted for in the Draft Master Plan.

It is understood that this report pertains to a planning proposal to facilitate a future land use change however any future DA, that incurs impacts on mapped waterfront land (within 40 m of a watercourse) and a referral to the Department of Planning and Environment is required for impacts within Waterfront lands..



Figure 4.3 – Watercourses mapped onsite

(Source: Water Management (general) Regulation 2018 hydro line spatial data 1.0)

4.4 Coastal wetlands

The NSW DPE *Coastal Wetlands and Littoral Rainforests Area Map*

(<https://geo.seed.nsw.gov.au/PublicViewer/index.html?viewer=PublicViewer&locale=en-AU>) identifies that the site is not mapped as “coastal wetlands” or “proximity area for coastal wetlands” (Figure 4.4). Further consideration of this SEPP is therefore not required.



Figure 4.4 – Coastal wetlands area map (Solid blue - coastal wetlands; hatched blue - proximity area for coastal wetlands)

5. CUMBERLAND PLAIN CONSERVATION PLAN 2022

The Cumberland Plain Conservation Plan 2022 (CPCP) identifies strategically important biodiversity areas within the Cumberland subregion to offset the biodiversity impacts of future urban development. The CPCP has been developed to meet requirements for strategic biodiversity certification under the *BC Act* and strategic assessment under the *EPBC Act*.

The CPCP identifies areas suitable for development (Certified – urban capable land) within the nominated areas without the need for further biodiversity approvals. The CPCP mapping is shown in Figure 5.1, along with the location of the subject lots in red. This indicates that the subject lot falls within the Greater Macarthur Growth Area and is part mapped as Strategic Conservation Area overlapped with the Avoided lands.

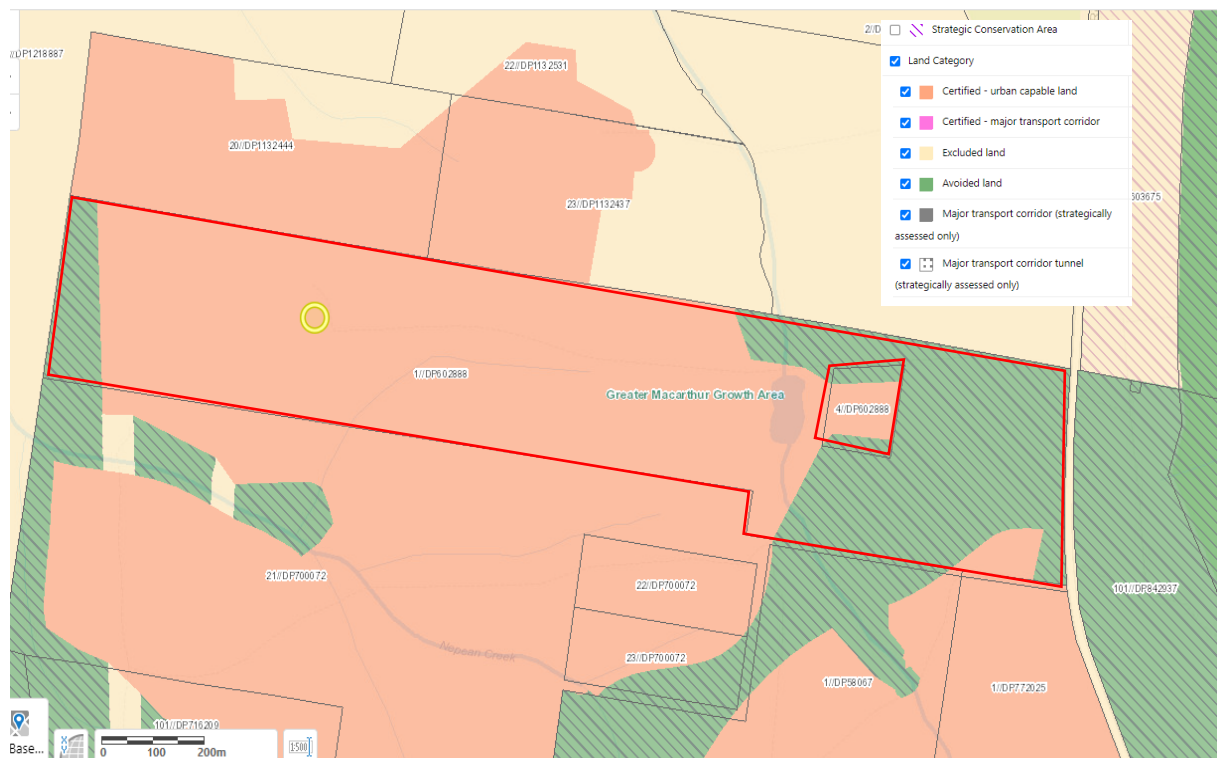


Figure 5.1 – Current Cumberland Plain Conservation Plan mapping
 (Source: Cumberland Plain Conservation Plan Viewer (NSW DPE 29/10/2023))

The proponent has made a formal submission seeking amendment to the CPCP mapping which is currently being investigated by the regulator. The masterplan layout and development footprint has been developed with consideration that the submitted application to regulator will successfully adopt amendments to the current CPCP mapping.

5.1 Planning controls to land covered under the CPCP 2022

Planning controls in the strategic conservation area (Figure 5.2) will still allow landholders to submit new rezoning applications. However, as part of the assessment process the consent authority will consider the region's biodiversity values and the impact of the proposal on those values when assessing rezoning applications.

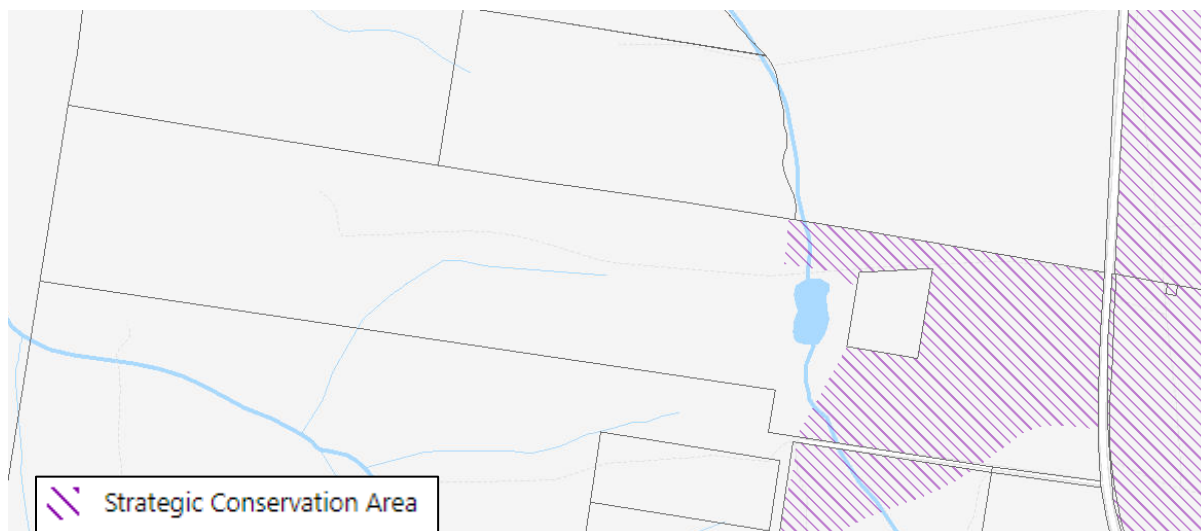


Figure 5.2 – Strategic Conservation Area mapped by draft Cumberland Plain Conservation Plan

The CPCP is supported by planning controls to minimise impacts on land identified as strategic conservation area, including by:

- requiring consent to clear native vegetation
- requiring consent authorities to consider the impact of proposed development on regionally significant biodiversity
- identifying the importance of the site for landscape connectivity or ecological restoration
- considering the impact of subdivision on the continued protection of threatened ecological communities, threatened species and their habitats

There are five main planning controls that must be considered for land mapped within the Strategic Conservation Area under the CPCP (Table 6):

Table 6 –Planning controls defined by the Cumberland Plain Conservation Plan

Planning Controls	Relevance to the study area
Chapter 13 Strategic Conservation Planning within the <i>State Environmental Planning Policy (Biodiversity and Conservation) 2021</i>	The amendment to the SEPP (Chapter 13) applies to the study area as it is shown on the Land Application Map. Part 13.4 Development controls—strategic conservation area, including Sections 13.11–13.14, is relevant to the study area and is reproduced below: 13.11 Preservation of native vegetation in strategic conservation area (1) <i>The objectives of this section are—:</i>

- (a) *to protect and enhance native vegetation on land in a strategic conservation area, and*
 - (b) *to promote the conservation of, and minimise the impact of development on, native vegetation.*
 - (2) *A person must not clear native vegetation on land in a strategic conservation area without development consent.*
 - (3) *Development consent must not be granted for the clearing of native vegetation unless the consent authority is satisfied—*
 - (a) *sufficient measures have been, or will be, taken—*
 - (i) *to avoid or minimise the impact of the development on biodiversity values, and*
 - (ii) *to protect or enhance the biodiversity values and ecological integrity of the land, and*
 - (b) *there is no reasonable alternative available to the disturbance of the native vegetation caused by the clearing, and*
 - (c) *the loss of native vegetation caused by the disturbance will be compensated by—*
 - (i) *revegetation on the land on which the development is carried out of an amount equivalent to a ratio of at least 1:1, or*
 - (ii) *a condition imposed on the development consent, under the Biodiversity Conservation Act 2016, section 7.13(3), requiring the applicant to retire biodiversity credits, and*
 - (d) *the clearing of the vegetation is unlikely to cause or increase soil erosion, salination, land slip, flooding, pollution or other adverse land or water impacts.*
 - (4) *This section does not apply to the following—*
 - (a) *clearing of native vegetation carried out by or on behalf of a public authority,*
 - (b) *clearing to remove vegetation that the council is satisfied is a risk to human life or property,*
 - (c) *bush fire hazard reduction work carried out in accordance with State Environmental Planning Policy (Transport and Infrastructure) 2021, section 2.52(8).*
- Note— Development consent is not required for clearing for the construction and maintenance of certain fences and farm tracks— see section 13.18.*

13.12 Development on land in strategic conservation area generally

- (1) *The objectives of this section are as follows—*
 - (a) *to minimise the impacts of development on areas with regionally significant biodiversity, including threatened ecological communities, threatened species and their habitats,*
 - (b) *to maintain and enhance ecological function,*
 - (c) *to protect and enhance koala habitat and corridors.*

Planning Controls	Relevance to the study area
	(2) Development consent must not be granted to development on land in a strategic conservation area unless the consent authority has considered whether the development is likely to cause an adverse impact on the following— (a) the biodiversity values of the land, (b) threatened ecological communities, threatened species and their habitats, both on the site of the development and on adjoining land in a strategic conservation area, (c) habitat connectivity and fauna movement, including koala and wildlife corridors and links to ecological restoration areas, both on the site of the development and on adjoining land in a strategic conservation area, (d) the integrity and resilience of the biophysical, ecological and hydrological environments, including surface and groundwater, and the quality of the natural flow of water in a riparian corridor, (e) matters of national environmental significance set out in the Environment Protection and Biodiversity Conservation Act 1999 of the Commonwealth, Chapter 2, Part 3, Division 1. (3) Development consent must not be granted to development on land in a strategic conservation area unless the consent authority has considered whether the cumulative impact of the development and other development for which consent, or an approval has been granted in relation to the land is likely to cause an adverse impact on the following— (a) the matters referred to in subsection (2)(a)–(e), (b) the potential for the ecological restoration of the land, (c) adjoining land identified as a strategic conservation area. (4) Development consent must not be granted to development on land in a strategic conservation area unless the consent authority is satisfied that— (a) the development is designed, sited and will be managed to avoid or minimise an adverse impact referred to in subsection (2) or (3) (an adverse impact), and (b) the height, bulk, scale, size, and proposed use of the development avoids or minimises an adverse impact, and (c) supporting infrastructure required for the development avoids or minimises an adverse impact. (5) Subsection (4) does not apply to land identified by this Chapter as avoided land and land in a strategic conservation area. 13.13 Subdivision of land in strategic conservation area Development consent must not be granted for the subdivision of land in a strategic conservation area unless the consent authority is satisfied the subdivision— (a) will allow for the continued protection of threatened ecological communities, threatened species and their habitats, and

Planning Controls	Relevance to the study area
	<i>(b) will facilitate the long-term biodiversity conservation management of the land, and</i> <i>(c) will not increase the risk of disturbance to threatened ecological communities, threatened species and their habitats, and</i> <i>(d) will not increase the potential for land use conflict or intensify land uses.</i> 13.14 Ecological restoration works. <i>(1) Development for the purposes of environmental protection works may be carried out by or on behalf of a public authority without development consent if the environmental protection works will give effect to the Cumberland Plain Conservation Plan.</i> <i>(2) In this section— environmental protection works has the same meaning as in the standard instrument set out in the Standard Instrument (Local Environmental Plans) Order 2006.</i>
Ministerial Direction 3.6 (Strategic Conservation Planning) under Section 9.1(2) of the <i>Environmental Planning and Assessment Act 1979</i> .	Requires a planning proposal to demonstrate that it protects or enhances biodiversity. This includes native vegetation, threatened ecological communities, koala habitat and corridors and matters of national environmental significance within the avoided lands or strategic conservation areas.
Regulatory Amendment (Avoided Land) 2022 to <i>Environmental Planning and Assessment Regulation 2021</i>	Applies to “avoided land” under the CPCP, and therefore is relevant to the study area.
Cumberland Plain Conservation Plan Guidelines for Infrastructure Development	Applies to infrastructure, as the site is within the Western Sydney Parklands. The future subdivision will also be a Part 4 DA, and therefore is relevant to the study area.
Cumberland Plain Conservation Plan Mitigation Measures Guideline	This applies to Part 4 development carried out on certified-urban capable land within the Greater Macarthur Growth Area; and also, to development on certified-major transport corridors under the CPCP. As such, it is relevant to the study area.

Consideration of the CPCP will be required for any rezoning application within the study area. As identified in Table 6, the key planning controls require demonstration of Avoidance or Minimisation of impacts to biodiversity values, assessment of residual impacts to TECs, threatened species, biophysical, ecological, and hydrological environments, and requirements for biodiversity offsets.

In summary, the BDAR would require more intense survey and assessment of the biodiversity values of vegetation remnants, farm dams and corridor proposal as discussed briefly in Section 5.1.1.

5.1.1 Biodiversity values and proposed corridor

Figure 3.3 maps a indicative corridor based on perceived value of the eight farm dams, the biodiversity value of vegetation remnants across the site, existing connective habitat and a Koala crossing across Appin Road, with potential for an indicative secondary corridor, beyond the lot boundary.

(a) Aquatic value of dams

Where dams are large and incorporate remnant riparian vegetation they are perceived as of higher value than small dams with limited native vegetation and restricted connectivity. The results of fauna surveys highlight the added value of farm dams, to threatened fauna such as the Southern Myotis and Latham's Snipe at this site. The removal of these dams will result in the generation of biodiversity credits. Mitigation measures will be required for dam dewatering.

(b) Biodiversity value of vegetation remnants

Vegetation remnants are considered of high biodiversity value where the canopy cover is connected and forms a corridor to other vegetation. Also, where the complexity of the vegetation includes a native canopy, mid-stratum and ground layer, and where soil has experienced minimal disturbance. There is also higher value where regeneration of native plants is occurring with minimal intervention.

(c) Proposed corridor and koala crossing

The BioBanking site to the north has high biodiversity/conservation value and extending this corridor along bushland remnants on site, from the north to the south would enhance the value of not only the BioBanking site but be in keeping with the objectives of the CPCP.

Travers bushfire & ecology notes that vegetation connectivity to the south west is highly constrained and of limited connective width reducing its function as a corridor in a future urban landscape.

Koala records as recent as 2021 and 2022 were noted along Appin Road (Figure 3.3) in the vicinity of the site. A proposed Koala Crossing would be incorporated into the design of the conservation corridor (Figure 3.3).

5.2 Mitigation measures in accordance with Appendix E of the Cumberland Plain Conservation Plan (CPCP) 2022

Appendix E of the CPCP Species and TEC Specific mitigation measures are provided as an attachment. The mitigation measures are specified for the Greater Macarthur Growth Area and are required to be implemented.

For urban and industrial development, the mitigation measures are required to be implemented.

Subdivision design

- Design subdivision layout including perimeter roads and asset protection zones should reduce impacts on and protect areas of koala habitat.
- Retain large trees (including dead trees but excluding noxious weeds) ($\geq 50\text{cm}$ DBH) during precinct planning where possible and avoid impacts to soil within the dripline of these trees during construction.
- Establish a 100 m minimum setback for development around flying fox camps. The setback area should be maintained free of flying fox roosting habitat.
- Raptor nests require a 500 m circular setback from nest locations in undisturbed bushland or 250 m for nests adjacent to existing development. Owl nests require a 100 m circular setback from nest locations.
- Where planned linear infrastructure such as gas and electricity transmission crosses existing koala- exclusion fencing, consider appropriate access treatments such as gates to ensure integrity of koala-exclusion fencing.
- Where public road infrastructure crosses koala corridors, ensure:
(a) exclusion fencing is in place to prevent koalas from entering the road
(b) suitable koala connectivity structures are installed to protect corridor integrity.
- Consult with relevant land managers to implement critical actions for Cumberland Plain Land Snail under the Saving our Species program (EES, 2020) on public land adjacent to urban development during construction and operation of the development, taking into account relevant guidance in the weed control implementation strategy and the fire management strategy.
- Implement 'open structure design' when designing structures such as roads adjacent to known populations of Cumberland Plain Land Snail where possible, consistent with the critical actions for this species under the Saving our Species program (EES 2020).
- Implement the following traffic-calming measures for all development not subject to wildlife- and koala exclusion fencing. Apply speed limit restrictions on local roads for areas adjacent to open space and land identified as avoided under CPCP. Signpost perimeter roads and roads adjacent to wildlife habitat areas in accordance with Austroads, RMS technical guidelines, council guidelines and relevant Australian standards. Install traffic-calming devices such as speed humps and audible surfacing along perimeter roads adjacent to wildlife habitat.
- Where permitted and appropriate, contain domestic cats and dogs in new residential areas during operation of the development at the urban/bushland interface consistent with relevant Council guidelines.

Landscaping

- Revegetate with Proteaceae shrubs in high density, where possible, particularly along riparian corridors.
- Do not plant koala feed trees, as listed in Koala SEPP Schedule 2 Koala use tree species in open space and recreation areas.

- Dog-proof fenced areas are to be designated within open space and public recreation areas.
- Dog-proof fencing is a design requirement for each residential lot in accordance with Council requirements.
- Signpost areas adjoining koala habitat with signage indicating koalas are in the area, the permitted/prohibited activities, and associated penalties that apply for noncompliance.
- Install koala-friendly road design structures such as underpasses, fauna bridges and overpasses consistent with any approval conditions. Consider and apply RMS Biodiversity Guidelines.

Preconstruction

- Undertake pre-construction surveys prior to removal or disturbance (seasonally dependent, before torpor) to human made structures to ensure any roosting habitat for microbat species including mine shafts, storm water tunnels, old or derelict buildings, bridges, and culverts, are retained where possible.
- Undertake site assessment and pre-clearance survey prior to removal of vegetation and undertake Koala and Cumberland Plain Land Snail survey and implement translocation plan if required.
- Erect temporary protective fencing around areas identified for conservation on or adjoining the site at pre-construction phase to ensure adequate protection is in place during construction.

During and post construction

- Undertake site assessment and pre-clearance survey prior to removal of vegetation and undertake Koala survey and implement translocation plan if required.
- Modify pest control techniques implemented during construction and operation of the development and under the pest control strategy to reduce the risk of secondary poisoning (e.g., from Pindone or second-generation rodenticides).
- Erect temporary protective fencing around areas identified for conservation on or adjoining the site at pre-construction phase to ensure adequate protection is in place during construction.
- Implement a tree-felling protocol to avoid impacts to koalas in trees that are to be cleared.
- Manage roadside vegetation adjacent to koala habitat areas to minimise height of ground cover and increase visibility of any roadside fauna. Mow turfed areas, mechanically trim low ground covers.
- Have an onsite ecologist present throughout the duration of pre-clearance surveys and clearing works.
- Incorporate best-practice site hygiene protocols to manage the potential spread of pathogens, such as *Phytophthora* sp. and Myrtle Rust (*Austropuccinia psidii*) within or adjacent to potential habitat for relevant species.
- Strictly enforce vehicle wash down points for machinery, equipment, and tyres prior to entering and leaving the construction site. Use hygiene procedures in instances where vegetation pathogens known to affect koala trees may be spread.
- Make sure all vehicles, machinery, maintenance equipment, tyres and work boots are free of mud, soil, and vegetation prior to entering and leaving a development construction site.
- Consult with managers of land containing known populations or habitat for relevant species to mitigate indirect impacts from fire during construction and operation of the development, considering guidance in the fire management strategy. Further mitigation measures apply to Infrastructure (including essential infrastructure) and Intensive plant agriculture as per Appendix E of the CPCP.

- Consult with land managers of land containing known populations or habitat for relevant species to mitigate indirect impacts from human disturbance during construction and operation of the development, including controlling public access, managing maintenance activities such as mowing and slashing, and managing rubbish dumping. Additionally, for *Pimelea spicata* ensure weed management activities involving the use of herbicides will minimise risks and maintain the species.
- Undertake fire hazard management within the asset protection zone at this location to protect existing *Pimelea spicata* individuals and is sympathetic ongoing recruitment of new individuals of this species.
- Incorporate best-practice site hygiene protocols to manage the potential spread of pathogens, such as *Phytophthora* sp. and Myrtle Rust (*Austropuccinia psidii*) adjacent to potential habitat for relevant species.
- Incorporate best-practice site hygiene protocols to manage the potential spread of pathogens, such as *Phytophthora* sp. and Myrtle Rust (*Austropuccinia psidii*) adjacent to potential habitat for relevant TECs.

Mitigation measures

Key mitigation measures recommended for this site including those relevant to the CPCP include:

1. Restore the riparian vegetation in accordance with a Riparian Vegetation Management Plan.
2. Implement weed control through the preparation of an Integrated Weed Management Plan for the site and adjoining riparian zones during and post construction.
3. Extend the width of riparian vegetation where possible to enhance the vegetative width and habitat quality.
4. Plant Proteaceae shrubs at high density, particularly along riparian corridors and enhance habitat structures for mammal species.
5. Identify large trees with hollows and inspect and relocate good condition hollows to or immediately adjoining the riparian restoration area.
6. Planting with species endemic to the local vegetation communities but in particular to enhance its foraging resources and habitat value.
7. Make provision for roosting locations for bird of prey species.
8. Implement fauna searches and tree clearing protocol.
9. Minimise the impact on the riparian zones by utilising existing drainage pathways.
10. Minimise impacts on recorded aquatic dependant threatened species including Southern Myotis and Latham's Snipe by avoiding impacts to dams located in avoided lands
11. Stabilising any stormwater outlets, drainage channels and revegetating with locally native species.
12. Proposal is to demonstrate a net change in water quality or quantity through MUSIC modelling.

Landscape design is to actively utilise high value foraging native species to support woodland birds, Koala, Cumberland Plain Land Snail and microbat populations.

6. BIODIVERSITY IMPACT ASSESSMENT

6.1 Biodiversity Offsets Scheme (BOS)

The *BC Act* repeals the *Threatened Species Conservation Act 1995*, the *Nature Conservation Trust Act 2001* and the animal and plant provisions of the *National Parks and Wildlife Act 1974*. Together with the [Biodiversity Conservation Regulation 2017](#), the *BC Act* establishes a new regulatory framework for assessing and offsetting biodiversity impacts on proposed developments and clearing. It establishes a framework to avoid, minimise and offset impacts on biodiversity from development through the Biodiversity Offsets Scheme (BOS). Where development consent is granted, the authority may impose as a condition of consent an obligation to retire a number and type of biodiversity credits determined under the Biodiversity Assessment Method (BAM).

Where development consent is granted, the authority may impose as a condition of consent an obligation to retire a number and type of biodiversity credits determined under the BAM.

Travers bushfire & ecology notes that in the case of the CPCP, the Biodiversity offset scheme only applies to impacts on avoided lands.

The Biodiversity Offsets Scheme applies to:

- local development (assessed under Part 4 of the *Environmental Planning and Assessment Act 1979*) that triggers the Biodiversity Offsets Scheme Threshold or is likely to significantly affect threatened species based on the test of significance in section 7.3 of the *Biodiversity Conservation Act 2016*.
- state significant development and state significant infrastructure projects, unless the Secretary of the Department of Planning, Industry and Environment and the environment agency head determine that the project is not likely to have a significant impact.
- [biodiversity certification](#) proposals.
- clearing of native vegetation in urban areas and areas zoned for environmental conservation that exceeds the Biodiversity Offsets Scheme threshold and does not require development consent.
- clearing of native vegetation that requires approval by the Native Vegetation Panel under the [Local Land Services Act 2013](#), and
- activities assessed and determined under Part 5 of the *Environmental Planning and Assessment Act 1979* (generally, proposals by government entities) if proponents choose to 'opt in' to the Scheme.

Proponents will need to supply evidence relating to the triggers for the Biodiversity Offsets Scheme Threshold and the test of significance (where relevant) when submitting their application to the consent authority.

6.2 Threshold assessment

The BOS includes three (3) elements to the threshold test – an area trigger, a Biodiversity Values Land Map trigger, and the Test of Significance. If impacts exceed at least one of these triggers, the Biodiversity Offset Scheme applies to the proposed clearing.

6.2.1 Biodiversity Values Land Map

Biodiversity Values Land has been mapped within the study area. Figure 6.1 below shows the site (blue) in relation to those areas (coloured mauve) as having biodiversity values.

The proposed application for rezoning will impact land identified as having Biodiversity Values in the eastern portion of the site. Since this land in part is mapped as avoided lands as defined by the CPCP, impacts within mapped avoided lands will trigger the biodiversity offset scheme.

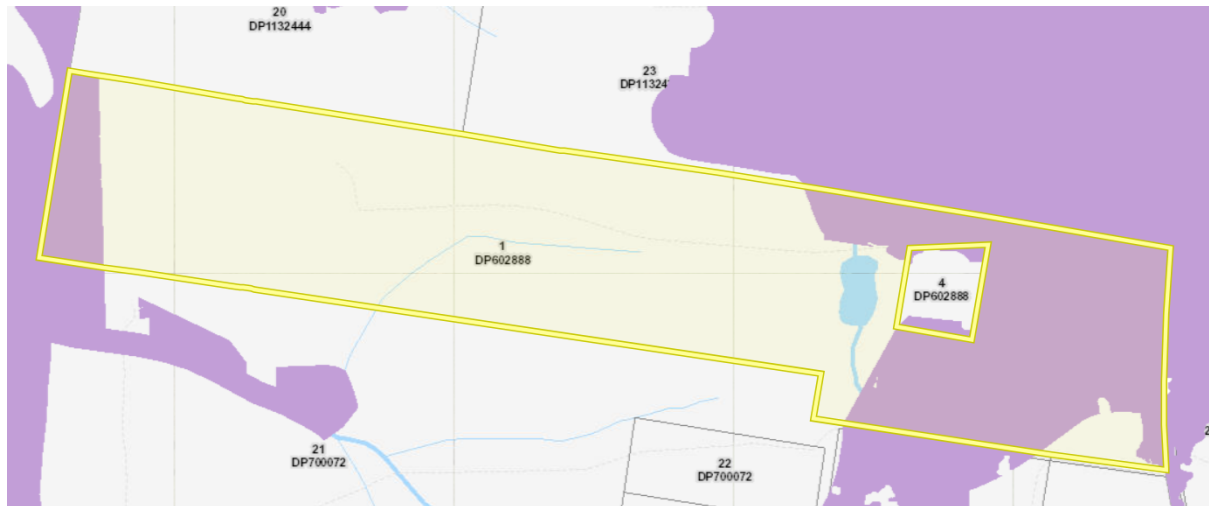


Figure 6.1 – Biodiversity values land (purple) within the study area

(Source: DPIE – Biodiversity Values March – August 2025)

6.2.2 Area clearing threshold

The area threshold varies depending on the minimum lot size (shown in the Lot Size Maps made under the relevant Local Environmental Plan (LEP), or actual lot size (where there is no minimum lot size provided for the relevant land under the LEP).

Table 7 – BOS entry threshold report

Date of Calculation	03/04/2023 1:30 PM	BDAR Required*
Total Digitised Area	73,831.5 sqm	
Minimum Lot Size Method	Lot size	
Minimum Lot Size 10,000sqm = 1ha	702,104 sqm	
Area Clearing Threshold 10,000sqm = 1ha	10,000 sqm	
Area clearing trigger Area of native vegetation cleared	Unknown #	Unknown #
Biodiversity values map trigger Impact on biodiversity values map(not including values added within the last 90 days)?	no	no
Date of the 90 day Expiry	N/A	

Table 7 identifies that the BOS entry threshold report determined the area threshold based on the minimum lot size of 70.21ha, and the area clearing threshold for which the BOS applies is 1 ha. Clearing of 'native vegetation' that exceeds 1 ha will require a biodiversity offset to be obtained. Note that 'native vegetation' includes planted native species. The proposed rezoning will require the clearing of more than 1 ha of native vegetation within lands mapped as avoided lands under the current CPCP mapping. Subject to the CPCP modification entry into the Biodiversity Offset Scheme may be required.

6.2.3 Test of Significance

A detailed test of significance has been applied to the following recorded species or species with a 'moderate' or 'high' potential to occur, within Appendix 3, in accordance with Section 7.2 of the *BC Act*, as follows:

- Eastern Coastal Free-tailed Bat, Southern Myotis, Large Bent-winged Bat, Little Eagle, Square-tailed Kite, Little Lorikeet, Masked Owl, Dusky Woodswallow, Koala, Cumberland Plain Land Snail, Greater Broad-nosed Bat, Large-eared Pied Bat, Eastern False Pipistrelle, Grey-headed Flying-fox, Scarlet Robin, Varied Sittella, Powerful Owl, Gang-gang Cockatoo, Glossy Black-Cockatoo, Swift Parrot, and White-bellied Sea Eagle - It is concluded that there will be no significant impact any state or nationally listed threatened fauna species with considered potential to occur.
- The test of significance applied to flora species *Acacia pubescens*, *Pomaderris brunnea* and *Pultenaea pedunculata* has concluded that the proposal will not have a significant impact upon these entities.
- The test of significance applied to River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin, and southeast Corner Bioregions concludes a non-significant impact on these entities, however,
- The test of significance for Cumberland Plain Woodland in the Sydney Basin Bioregion, and Shale Sandstone Transition Forest in the Sydney Basin Bioregion concludes a significant impact on these entities.

The outcomes of the significance assessment test will likely be negated in the CPCP modification application is approved and consistent with the proposed rezoning.

6.2.4 Areas of Outstanding Biodiversity Value (AOBV)

Areas of Outstanding Biodiversity Value are special areas with irreplaceable biodiversity values that are important to the whole of New South Wales, Australia or globally.

The relevant legislative provisions for AOBV are Part 3, *BC Act* 2016 and Part 3, *BC reg.* 2017.

AOBV declarations in New South Wales include the following:

- *Gould's Petrel – critical habitat declaration.*
- *Little Penguin population in Sydney's North Harbour – critical habitat declaration.*
- *Mitchell's Rainforest Snail in Stotts Island Nature Reserve – critical habitat declaration, and*
- *Wollemi Pine – critical habitat declaration.*

None of the above occur within the development footprint or will be indirectly impacted.

6.3 Streamlined assessment modules

The BAM contains three streamlined assessment modules that are set out in Appendices B, C and D of the BAM. The streamlined assessment modules include specific requirements to assess the impacts on biodiversity values for the purpose of preparing a BDAR. These streamlined assessment modules may be used where the proposal impacts on:

- a) scattered trees (Appendix B).
- b) a small area (Appendix C), and

- c) planted native vegetation, where the planted native vegetation was planted for purposes such as street trees and other roadside plantings, windbreaks, landscaping in parks and gardens, and revegetation for environmental rehabilitation (Appendix D).

Appendices B, C and D of the BAM set out the circumstances where each of the streamlined assessment modules can be used to assess a proposal and the specific assessment requirements.

The streamlined assessment modules for scattered trees and planted native vegetation may be used in conjunction with the full BAM to assess parts of the subject land under a single BDAR.

Table 8 – Streamlined assessment modules

Streamlined assessment module	Criteria for application	Does the impacted vegetation meet this criterion?	Can this module be applied?
Scattered trees	Scattered trees are defined as species listed in the tree growth form group that: a. has a percent foliage cover that is less than 25% of the benchmark for tree cover for the most likely plant community type and are on category 2-regulated land and surrounded by category 1-exempt land on the Native Vegetation Regulatory Map under the LLS Act, or	No	No
	b. has a DBH of greater than or equal to 5 cm and are located more than 50 m away from any living tree that is greater than or equal to 5 cm DBH, and the land between the scattered trees is comprised of vegetation that are all ground cover species on the widely cultivated native species list, or exotic species or human-made surfaces or bare ground, or	No	
	c. are three or fewer trees that have a DBH of greater than or equal to 5 cm and are within a distance of 50 m of each other, that in turn, are greater than 50 m away from the nearest living tree that is greater than or equal to 5 cm DBH, and the land between the scattered trees is comprised of vegetation that are all ground cover species on the widely cultivated native species list, or exotic species or human-made surfaces or bare ground.	No	
Small area	Is the area of native vegetation clearing less than or equal to the thresholds as shown in Table 9 (BAM Table 12)? This depends on minimum or actual lot size: - For lot size <1 ha, threshold is ≤1 ha. - For lot size 1–40 ha, threshold is ha ≤2 ha. For lot size 40–1000 ha, threshold is ≤3 ha. - For lots size 1000 ha, threshold is ≤5 ha	No: minimum lot size is <70.2ha, so clearing threshold of ≤3 ha applies. It is expected that >3 ha of native vegetation will be cleared so the threshold would be exceeded, and the criterion is not met.	No

Streamlined assessment module	Criteria for application	Does the impacted vegetation meet this criterion?	Can this module be applied?
Planted native vegetation	Is any planted native vegetation impacted?	Yes	No

Table 9 – Area clearing limits for application of the small area development module

Minimum lot size associated with the property *	Maximum area clearing limit for application of the small area development module
Less than 1 ha	≤1 ha
Less than 40 ha but not less than 1 ha	≤2 ha
Less than 1000 ha but not less than 40 ha	≤3 ha
1000 ha or more	≤5 ha

*shown in the lot size maps made under the relevant local environmental plan (LEP), or actual lot size (where there is no minimum lot size provided for the relevant land under the LEP)

6.3.1 Streamlined assessment module - small area

Table 8 identifies that the small area streamlined assessment module cannot be used when preparing a BDAR for any future impacts on native vegetation within the site.

6.3.2 Streamlined assessment module - planted native vegetation

A small amount of native vegetation was observed planted within the heritage allotment of the study area.

6.4 Mitigation measures

The following mitigation measures are recommended to avoid, minimise, or ameliorate the potential ecological impacts, address threatening processes and to guide a more positive ecological outcome for threatened species and their associated habitats.

Table 10 – Mitigation measures

Action / Technique	Outcome	Timing / Frequency	Responsibility
(a) 40km/h speed limit within the conservation zone	Reduce Koala roadkill	In perpetuity and during any clearing/construction works	Proponent
(b) Enhancement of riparian corridor	Improves on-site habitat to compensate for removed vegetation	In perpetuity following construction works	Project Ecologist / Contractors
(c) Dam dewatering is to be undertaken in accordance with appropriate protocols to ensure consideration is given to all potentially impacted aquatic dependant fauna within the dam (e.g. eels / turtles) and breeding water birds as well as species potentially indirectly impacted elsewhere. Protocols are to include frog hygiene, relocating aquatic fauna to recipient sites and appropriate euthanasia of Gambusia.	Reduce potential for direct impact on aquatic dependant species present, specifically the recorded Southern Myotis and Latham's Snipe and minimise indirect impacts on aquatic species elsewhere	Prior to land clearance	Project Ecologist
(d) Sediment and erosion control measures in accordance with Managing Urban Stormwater: Soils and Construction (Landcom 2004) to minimise impact of possible sedimentation to local drainage lines.	Maintain integrity of nearby bushland habitat and natural topsoil soil by preventing deposition	Prior to any clearing works. Ongoing during all exposed soil stages until landscaping is completed	Project Ecologist / Contractors

Action / Technique	Outcome	Timing / Frequency	Responsibility
(e) Temporary fencing - Where they adjoin the development areas, the boundaries of the conserved vegetation areas shall be clearly marked out on-site to ensure their protection. All areas of natural vegetation retention shall be protected by fencing, prior to construction, to ensure that these areas are not damaged during the construction phase.	Maintain integrity of remaining natural habitat	Prior to construction / habitat clearance	Project Ecologist / Contractors
(f) Prior to any habitat removal, a comprehensive search for Cumberland Plain Land Snails is to be undertaken on site to relocate any individuals into the nearby creek line vegetation to the immediate south of site.	Avoid the destruction of an adjacent known threatened Cumberland Plain Land Snail population	Immediately prior to land clearance	Prior to any habitat removal, a comprehensive search for Cumberland Plain Land Snails is to be undertaken on site to relocate any individuals into the nearby creek line vegetation to the immediate south of site.
(g) Prior to any habitat removal, a comprehensive search for fauna and habitat is to be undertaken to relocate any terrestrial individuals and identify any important nesting to be protected until fledging.	Reduce potential for impact on native species	Immediately prior to land clearance	Project Ecologist

Action / Technique	Outcome	Timing / Frequency	Responsibility
(h) Management of hollows and hollow-dependent fauna: The felling of hollow-bearing trees is to be conducted under the supervision of a fauna ecologist to ensure appropriate animal welfare procedures are taken, particularly for threatened species. Hollows of high quality or with fauna recorded residing within should be dismantled for relocation and all hollows should be inspected for occupation, signs of previous activity and potential for reuse.	Protection of hollow-dependent wildlife	At time of removal. Note, that no hollow-bearing trees were observed in the development footprint at the time of survey, however they may appear after storm activity breaks through a trunk or branch	Project Ecologist
(i) Constructed nest boxes should as priority target recorded hollow-dependent threatened species (and their prey species). Boxes should be constructed all of weatherproof timber (marine ply), fasteners and external paint and appropriately affixed to a recipient tree under the guidance of a fauna ecologist.	Protection of hollow-dependent wildlife	Prior to hollow removal	Project Ecologist
(j) If a threatened species is found to be occupying the hollow at the time of removal, then this hollow section is to be reattached to a recipient tree within the nearby conservation areas as selected and directed by the fauna ecologist. The welfare and temporary holding of the residing animal(s) is at the discretion of the fauna ecologist.	Priority protection of hollow-dependent threatened species	At time of removal	Project Ecologist

Action / Technique	Outcome	Timing / Frequency	Responsibility
(k) The relocated hollow section and nest boxes should be well secured in the recipient tree in a manner that will not compromise the current or future health of that tree.	Ensure hollow integrity is maintained	Time of installation	Project Ecologist
(l) Monitoring of nest boxes and relocated hollows	Ensure hollow integrity is maintained	Each year for 5 years	Project Ecologist
(m) Management of any other displaced fauna	Prevent direct impacts on nesting and terrestrial native fauna species	Prior to and during habitat removal / Adaptive management required	Project Ecologist
(n) If any fauna species, a nest, or roost is located during development works, then works should cease until safe relocation can be advised by a contact fauna ecologist	Prevent direct impacts on nesting and terrestrial native fauna species	At time of removal / Adaptive management required	Project Ecologist / Contractors

6.5 Avoidance and minimisation of impact actions

The following actions have been undertaken to either avoid or minimise impacts on biodiversity values (Figure 3.2):

- Protection of high value connective native vegetation remnants subject to the CPCP modification,
- Avoided a total of 3.16 ha of the 5.2 ha of PCT3319 Cumberland Shale Hills Woodland (CPW; cleared understorey),
- Avoided 8.07 ha of the 8.91 ha of PCT3321 Cumberland Shale-Sandstone Ironbark Forest (SSTF, moderate condition),
- Avoided 1.55 ha of the 1.75 ha PCT4058 – Sydney Hinterland Red Gum Riverflat Forest (RFEF),
- Any cleared vegetation will be compensated for by the enhancement of the riparian corridor running north south in the eastern half of the property,
- Partial protection of the existing riparian zones, to the east, with reconstruction of waterbodies and rehabilitation of riparian vegetation proposed, and
- Development has been located to maximise usage of already cleared areas, and to minimise impacts on native vegetation.

6.6 Ecological impacts

The direct, indirect, and cumulative ecological impacts have been considered in respect of recorded biodiversity, threatening processes, and extent of impact as a result of the proposed works in Tables 11 - 14.

6.6.1 Prescribed impacts

'Prescribed impacts' is a term used within the NSW BOS (2020) to describe impacts on biodiversity values which are not related to, or are in addition to, native vegetation clearing and habitat loss, including:

- a) the habitat of threatened entities including:
 - i) karst, caves, crevices, cliffs, rocks, and other geological features of significance, or
 - ii) human-made structures, or
 - iii) non-native vegetation.
- b) on areas connecting threatened species habitat, such as movement corridors.
- c) that affect water quality, water bodies and hydrological processes that sustain threatened entities (including from subsidence or upsidence from underground mining).
- d) on threatened and protected animals from turbine strikes from a wind farm, and
- e) on threatened species or fauna that are part of a TEC from vehicle strikes.

The prescribed impacts are discussed further in Table 11 below.

Table 11 – Prescribed impacts

Feature	Present (yes / no)	Description of feature characteristics and location	Threatened species or community using or dependent on feature	Potential impact	Predicted consequences and justification
Karst, caves, crevices, cliffs, rocks, or other geological features of significance	no	n/a	n/a	n/a	n/a
Human-made structures or non-native vegetation	yes	Non-native vegetation	A whole suite of threatened birds, bats, mammals, and frogs have the potential to use non-native vegetation for foraging or nesting/breeding.	Minimal due to the large amount of conserved native vegetation.	The majority of good-quality native vegetation is being retained and enhanced within the study area. Therefore, the removal of some non-native vegetation is not expected to have significant consequences for any threatened species.
Habitat connectivity	yes	Riparian corridor that connects the vegetation adjacent to the northern and southern property boundaries.	Koalas in particular but also a whole suite of other fauna species.	Partial disconnection of vegetation corridor as a result of the proposed road crossing	The north-south riparian corridor will be retained and enhanced as a result of the proposal, so no negative biodiversity outcome is expected in regard to connectivity.
Waterbodies, water quality and hydrological processes	yes	Two large dams/waterbodies in the eastern half of the property and six farm dams in the western half of the property.	These waterbodies provide foraging habitat for Southern Myotis, Latham's Snipe and have the potential to provide foraging and breeding opportunities for many other species such as White-bellied Sea Eagle.	Loss of open water and aquatic habitat for Southern Myotis, Latham's Snipe and potentially other species.	The proposed rezoning will cause loss of existing aquatic habitat and carries the risk of degrading the watercourses on the site, primarily due to potential obstruction and alteration of connectivity between dams situated within the avoided lands. This poses the risk of heightened inputs of sediment, pollution, and nutrients into the water bodies. Despite these concerns, it is recognised that the incorporation of effective sedimentation and erosion control measures during the construction phase (as outlined in Section 6.4) and the implementation of a well-designed stormwater management system have the potential to alleviate these potential impacts.

Feature	Present (yes / no)	Description of feature characteristics and location	Threatened species or community using or dependent on feature	Potential impact	Predicted consequences and justification
					While the emphasis on sediment control measures can contribute to ameliorating certain water quality concerns, it is essential to give further consideration to the potential impact on watercourse connectivity, particularly concerning the access road. This aspect warrants careful attention to ensure that the construction and use of the access road do not compromise the connectivity of watercourses within avoided lands.
Wind farm development	no	n/a	n/a	n/a	n/a
Vehicle strikes	yes	Internal road going through the conservation area/corridor	Koalas in particular but also a whole suite of other fauna species.	Koala roadkill	A 40km/h speed limit will be enforced in perpetuity on roads within the conservation and the nearby surrounding land. Clear Koala warning signs will also be installed. The combination of these methods is expected to significantly reduce potential koala fatalities due to vehicle strikes. As such, the internal road is expected to have minimal impact on Koalas.

We note that connectivity and movement potential is expected to be enhanced by the proposal as the north-south riparian corridor will be retained and restored with potential expansion beyond the lot boundary.

6.6.2 Direct impacts

Table 12 provides a summary of the directly impacted entities as a result of the proposed rezoning and concept masterplan.

Direct impacts associated with the proposed rezoning are as follows:

Table 12 – Direct impacts

Direct impacts	Impacted	BC Act status	SAIL entity	Project phase/timing of impact
Removal of PCT3319 Cumberland Shale Hills Woodland (CPW) (both remnant and modified)	2.04 ha	CEEC	Yes	Proposed rezoning and future bulk earthworks
Removal of PCT3321 - Cumberland Shale-Sandstone Ironbark Forest (CPW)	0.84 ha	EEC	Yes	Proposed rezoning and future bulk earthworks
Removal of PCT4058 – Sydney Hinterland Red Gum Riverflat Forest	0.2 ha	-	No	Proposed rezoning and future bulk earthworks
Removal of five farm dams and associated potential riparian buffer zone	Five farm dams	No	No	Proposed rezoning and future bulk earthworks
Removal of Cumberland Plain Land Snails and removal of their habitat	(2.04 + 0.84 + 0.2) = 3.08 ha	Vulnerable	No	Proposed rezoning and future bulk earthworks
Removal of foraging habitat and associated resources for threatened species including Little Lorikeet, Cumberland Plain Land Snail, Greater Broad-nosed Bat, Easter Coastal Freetail Bat, Eastern Falsie Pipistrelle, Little Eagle, Square-tailed Kite, Gang-gang Cockatoo, Glossy Black-Cockatoo, Swift Parrot, Powerful Owl, Masked Owl, Varied Sittella, Dusky Woodswallow, Koala, Grey-headed Flying-fox, Yellow-bellied Sheathtail Bat, Large-eared Pied Bat, Little Bent-winged Bat, Eastern Bent-winged Bat, Southern Myotis, White-bellied Sea Eagle, Yellow-bellied Glider, Squirrel Glider, Greater Glider, Turquoise Parrot, Brown Treecreeper and Scarlet Robin	Removal of 3.08 ha	Various	Yes	Proposed rezoning and future bulk earthworks

6.6.3 Indirect impacts

Table 13 provides a summary of the likely direct impacts of the proposed rezoning and concept masterplan.

Table 13 – Indirect impacts

Indirect impact description	Impacted entities (PCT, species, TEC)	Frequency	Duration	Project phase/ timing of impact	Likelihood and consequences
Edge effects	All retained vegetation within 20m of development interface	Constant	Lifetime of development	Clearing, construction and ongoing	• Increased soil nutrients from changes to runoff that may provide further opportunities for weeds. • Spill-over from noise, activity, scent and lighting effects • Inappropriate use of remaining native vegetation areas such as additional clearing, dumping of materials and waste
Concentrated stormwater runoff from solid surfaces and subsequent increased flows	All retained vegetation, watercourses and habitat downslope of the development	During rainfall events	Lifetime of development	Clearing, construction and ongoing	• Potential increased flow, nutrient and sediment loads that may provide further opportunities for weeds within retained vegetation. • Potential increased flow, nutrient and sediment loads within watercourses on site.
Reduced inter-site connectivity	Small bird species, arboreal mammals	Once	Lifetime of development	Clearing, construction	• Reduced cross-site movements by local and transient fauna

Indirect impact description	Impacted entities (PCT, species, TEC)	Frequency	Duration	Project phase/ timing of impact	Likelihood and consequences
Increased human activity (e.g., more noise and light)	Most species fauna	Constant	Lifetime of development	Constant	• Potential disturbance to existing species and potential to reduce suitability of habitat for new species to occupy.
Potential roadkill on interlinking roads	Not quantifiable	N/A	N/A	Post subdivision and occupation	• Potential roadkill on interlinking roads

6.6.4 Cumulative impacts

Table 14 provides a summary of the likely cumulative impacts of the proposed rezoning and concept masterplan.

Table 14 – Cumulative impacts

Indirect impact description	Impacted entities (PCT, species, TEC)	Frequency	Duration	Project phase/ timing of impact	Likelihood and consequences
Cumulative loss of native vegetation within the local area	All retained vegetation within c. 10 m of development	Constant	Lifetime of development	Clearing, construction and ongoing	• Increased soil nutrients from changes to runoff that may provide further opportunities for weeds. • Spill-over from noise, activity, scent, and lighting effects • Inappropriate use of remaining native vegetation areas such as additional clearing, dumping of materials and waste

7. CONCLUSION

Ecological survey and constraints assessment has been undertaken in accordance with relevant legislation including the *Environmental Planning and Assessment Act 1979*, the *Biodiversity Conservation Act 2016*, the commonwealth *Environment Protection and Biodiversity Conservation Act 1999* and the *Fisheries Management Act 1994*.

We note that the following conclusions are subject to the CPCP modification application to determine the extent of avoided and certified lands. In the event the CPCP modification is commensurate with the proposed rezoning then compliance with the CPCP will be required in particular Appendix E – Mitigation Measures. The relevant mitigation measures have been incorporated into this assessment.

A CPCP Consistency report has been prepared (TBE 2025) and supplied with this BAR.

7.1 Recorded Biodiversity

Ecological survey and assessment has been undertaken in accordance with the *Biodiversity Assessment Methodology 2020* (BAM) as well as relevant legislation including the *Environmental Planning and Assessment Act 1979* (EP&A Act), the *Biodiversity Conservation Act 2016* (BC Act), the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and the *Fisheries Management Act 1994* (FM Act).

In respect of matters required to be considered under the EP&A Act and relating to the species / provisions of the BC Act, the following listed entities were observed:

Threatened fauna species:

- Large Bent-winged Bat (*Miniopterus orianae oceanensis*),
- Eastern Coastal Free-tailed Bat (*Mormopterus norfolkensis*),
- Southern Myotis (*Myotis macropus*),
- Cumberland Plain Land Snail (*Meridolum corneovirens*),
- Little Lorikeet (*Glossopsitta pusilla*),
- Greater Broad-nosed Bat (*Scoteanax rueppellii*) and
- Eastern False Pipistrelle

Threatened flora species:

- None recorded

Threatened ecological communities:

- Cumberland Plain Woodland in the Sydney Basin Bioregion (critically endangered),
- Shale Sandstone Transition Forest in the Sydney Basin Bioregion – critically endangered), and
- River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin, and southeast Corner Bioregions (endangered) were recorded within the study area.

In respect of matters required to be considered under the EPBC Act, the following listed entities were observed:

Threatened fauna species:

- None recorded

Nationally protected migratory bird species:

- Latham's Snipe

Threatened flora species

- None recorded

Threatened ecological communities:

- Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest (critically endangered),
- Shale Sandstone Transition Forest in the Sydney Basin Bioregion (critically endangered) and
- River-Flat Eucalypt Forest on coastal floodplains of southern New South Wales and eastern Victoria (critically endangered) were recorded within the study area.

No listed entities under the *FM Act*, no threatened flora species, and no endangered flora populations were observed during the survey period.

7.2 Impact Summary

Direct impacts associated with the proposed rezoning are as follows:

- Removal of 3.08 ha of native vegetation including:
 - i. 2.04 ha PCT3319 - Cumberland Shale Hills Woodland (CPW) (CEEC).
 - ii. 0.84 ha PCT3321 - Cumberland Shale-Sandstone Ironbark Forest (CEEC).
 - iii. 0.2 ha PCT4058 – Sydney Hinterland Red Gum Riverflat Forest (EEC).
- Removal of 3.08 ha of Cumberland Plain Land Snail and associated habitat.
- Removal of 2.04 ha of CPCP mapped Koala habitat, and
- Removal of five (5) farm dams and 3.08 ha of threatened species foraging habitat.

Identified indirect impacts include:

- Potential increased incidence of roadkill.
- Potential weed invasion and degradation of habitat at the urban/bushland interface.
- Potential degradation in water quality and change in stream flows, and
- Potential loss of foraging habitat for including Little Lorikeet, Cumberland Plain Land Snail, Greater Broad-nosed Bat, Easter Coastal Freetail Bat, Eastern Falsie Pipistrelle, Little Eagle, Square-tailed Kite, Gang-gang Cockatoo, Glossy Black-Cockatoo, Swift Parrot, Powerful Owl, Masked Owl, Varied Sittella, Dusky Woodswallow, Koala, Grey-headed Flying-fox, Yellow-bellied Sheathtail Bat, Large-eared Pied Bat, Little Bent-winged Bat, Eastern Bent-winged Bat, Southern Myotis, White-bellied Sea Eagle, Yellow-bellied Glider, Squirrel Glider, Greater Glider, Turquoise Parrot, Brown Treecreeper and Scarlet Robin

7.3 Significance Assessment Test

For the purposes of this report, the Test of Significance has been undertaken for the proposed rezoning of 3.34 ha of native vegetation that is currently mapped under the CPCP as ‘avoided lands.’

The state assessment of significance (Appendix 3) has concluded that the proposed development will not likely have a significant impact on any threatened species, populations or TECs with the exception to a potential a significant impact on PCT3319 Cumberland Shale Hills Woodland (CEEC) and PCT3321 - Cumberland Shale-Sandstone Ironbark Forest (CEEC).

The preparation of a BDAR may be required subject to the outcomes of the CPCP modification application.

7.4 Suitability of proposed zoning from a biodiversity perspective

The proposal is likely to include the following zones:

1) C2 Environmental Conservation

The C2 Environmental Conservation zone is used to protect areas that have high environmental value and significance. The C2 zone therefore has very limited permissible uses and development potential.

Bushland that is considered of high conservation value, is recommended for protection under this zoning. A limited range of activities are permissible on C2 zoned land and therefore, where high conservation value native vegetation and habitat is to be protected, this is the most appropriate zone.

2) RE1 Public Recreation

This zone is generally intended for a wide range of public recreational areas and activities including local and regional parks and open space. The uses include recreation facilities, community facilities, environmental facilities, ‘environmental protection works and other uses compatible with the primary use of the land.

This land may contain remnants of native vegetation but with lesser biodiversity value than that zoned for conservation. This zoning is appropriate for parks or similar where residents may interact with treed landscapes of lower biodiversity value in active and passive recreation areas.

3) SP2 Infrastructure

This land is zoned to provide for infrastructure and related uses and to prevent development not compatible with the provision of infrastructure. This zone encourages land for research and development and to optimise value-adding development opportunities, particularly those associated with research.

4) R2 Low Density Residential

This zone is generally for land where biodiversity values are low, have been certified as urban capable, and appropriate where the site contains exotic grass dominated paddocks and no native vegetation remnants. It is zoned to provide for low-density residential environment and facilities that meet the day to day needs of residents.

5) R3 Medium Density Residential

This zone is generally for land where biodiversity values are low, have been certified as urban capable, and appropriate where the site contains exotic grass dominated paddocks and no native vegetation remnants. It is zoned to provide for medium density residential environment and facilities or services that meet the day to day needs of residents.

7.5 Biodiversity Offsets Scheme (BOS) – Threshold Assessment

Subject to the outcomes of the CPCP modification application, offsetting under the Biodiversity Offsets Scheme (BOS) is required for the proposal as:

- The proposed rezoning is currently within avoided lands as mapped under the Cumberland Plain Conservation Plan (CPCP) and located on areas mapped as Biodiversity Values Land.
- The proposed clearing of 2.04 ha of PCT3319 Cumberland Plain Woodland (CPW) is more than the area clearing threshold of 1 ha and is likely to cause a significant impact on this threatened ecological community.
- Entry into the biodiversity offset scheme is likely to be required.

In respect of matters required to be considered under the *Environment Protection and Biodiversity Conservation Act 1999*, no threatened fauna species, no protected migratory bird species, no threatened flora species, and three (3) TECs were recorded within the study area.

The proposed rezoning was considered to have a significant impact on and be constrained by matters of national environmental significance. As such a referral to DCCEW is recommended.

In respect of matters relative to the *Fisheries Management Act 1994*, no suitable habitat for threatened marine or aquatic species was observed within the development footprint and there are no matters requiring further consideration under this Act.

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Appendix 1. Flora & Fauna Species Lists

Table A1.1 – Flora species recorded

Family	Scientific name	Common name
TREES		
Lamiaceae	<i>Clerodendrum tomentosum</i>	Hairy Clerodendrum
Myrtaceae	<i>Corymbia maculata</i>	Spotted Gum
Myrtaceae	<i>Eucalyptus crebra</i>	Narrow-leaved Ironbark
Myrtaceae	<i>Eucalyptus globoidea</i>	White Stringybark
Myrtaceae	<i>Eucalyptus tereticornis</i> *K	Forest Red Gum
Oleaceae	<i>Notelaea longifolia</i>	Large Mock-olive
SHRUBS		
Phyllanthaceae	<i>Breynia oblongifolia</i>	Coffee Bush
Pittosporaceae	<i>Bursaria spinosa</i> var. <i>spinosa</i>	Native Blackthorn
Asteraceae	<i>Calotis dentex</i>	White Burr Daisy
Dilleniaceae	<i>Hibbertia aspera</i> subsp. <i>aspera</i>	Rough Guinea Flower
Myrtaceae	<i>Kunzea ambigua</i>	Tick Bush
Verbenaceae	<i>Lantana camara</i> *	Lantana
Ericaceae	<i>Leucopogon juniperinus</i>	Prickly Beard-heath
Pittosporaceae	<i>Pittosporum undulatum</i>	Sweet Pittosporum
Oleaceae	<i>Olea europaea</i> *	African Olive
Asteraceae	<i>Olearia viscidula</i>	Wallaby Weed
Roseaceae	<i>Rubus fruticosus</i> agg. *	Blackberry
GROUNDCOVERS		
Poaceae	<i>Aristida vagans</i>	Threeawn Speargrass
Poaceae	<i>Axonopus fissifolius</i> *	Narrow-Leafed Carpet Grass
Asteraceae	<i>Bidens pilosa</i> *	Cobbler's Pegs
Apiaceae	<i>Centella asiatica</i>	Indian Pennywort
Poaceae	<i>Cynodon dactylon</i>	Couch
Convolvulaceae	<i>Dichondra repens</i>	Kidney Weed
Poaceae	<i>Echinopogon caespitosus</i>	Bushy Hedgehog Grass
Poaceae	<i>Echinopogon ovatus</i>	Forest Hedgehog Grass
Poaceae	<i>Entolasia stricta</i>	Wiry Panic
Poaceae	<i>Ehrharta erecta</i> *	Panic Veldtgrass
Cyperaceae	<i>Gahnia aspera</i>	Rough Saw-sedge
Goodeniaceae	<i>Goodenia hederacea</i>	Forest Goodenia
Juncaceae	<i>Juncus usitatus</i>	-
Lobeliaceae	<i>Lobelia purpurascens</i>	Whiteroot
Lomandraceae	<i>Lomandra longifolia</i>	Spiny-headed Mat-rush
Lomandraceae	<i>Lomandra micrantha</i> subsp. <i>tuberculata</i>	Small-flowered Mat-rush
Lomandraceae	<i>Lomandra</i> spp.	Mat-rush
Poaceae	<i>Microlaena stipoides</i> var. <i>stipoides</i>	Weeping Grass
Poaceae	<i>Oplismenus aemulus</i>	Wavy Beard Grass
Oxalidaceae	<i>Oxalis perennans</i>	-
Poaceae	<i>Panicum</i> spp.	-
Poaceae	<i>Paspalum dilatatum</i> *	Paspalum

Family	Scientific name	Common name
Fabaceae (Faboideae)	<i>Pullenia gunnii</i>	Slender Tick Trefoil
Asteraceae	<i>Senecio madagascarensis</i> *	Fireweed
Asteraceae	<i>Siegsbeckia orientalis</i> subsp. <i>orientalis</i>	Indian Weed
Poaceae	<i>Sporobolus</i> sp.*	-
Scrophulariaceae	<i>Veronica plebeia</i>	Trailing Speedwell
VINES		
Vitaceae	<i>Cayratia clematidea</i>	Native Grape
Fabaceae (Faboideae)	<i>Clematis aristata</i>	Twining Glycine
Fabaceae (Faboideae)	<i>Glycine microphylla</i>	Small-leaf glycine
Fabaceae	<i>Hardenbergia violacea</i>	False Sarsparilla
Fabaceae	<i>Passiflora</i> sp.	Passionfruit species
* denotes exotic species		
*K denotes Koala Feed Tree Species		
TS denotes threatened species		

Note - Not all garden, cultivar or landscape species have been identified as part of this assessment.

Table A1.2 – Fauna species recorded

Common name	Scientific name	Method observed	
Birds		Jan 2019	May 2023
Australian Grebe	<i>Tachybaptus novaehollandiae</i>	O	
Australian King Parrot	<i>Alisterus scapularis</i>		O
Australian Magpie	<i>Cracticus tibicen</i>	OW	O
Australian Raven	<i>Corvus coronoides</i>	OW	W
Australian Wood Duck	<i>Chenonetta jubata</i>	O	O
Bell Miner	<i>Manorina melanophrys</i>	OW	W
Black-face Cuckoo Shrike	<i>Coracina novaehollandiae</i>	OW	
Black-fronted Dotterel	<i>Elseyornis melanops</i>	O	
Black Swan	<i>Cygnus atratus</i>		O
Cattle Egret	<i>Ardea ibis</i>		O
Channel-billed Cuckoo	<i>Scythrops novaehollandiae</i>	W	
Common Myna *	<i>Sturnus tristis</i>	OW	
Common Starling *	<i>Sturnus vulgaris</i>	O	O
Crested Pigeon	<i>Ocyphaps lophotes</i>	OW	O
Eastern Rosella	<i>Platycercus eximius</i>	OW	O W
Eurasian Coot	<i>Fulica atra</i>		O
Fairy Martin	<i>Hirundo ariel</i>	O	
Hardhead Duck	<i>Aythya australis</i>		
Golden Whistler	<i>Pachycephala pectoralis</i>	W	
Grey Butcherbird	<i>Cracticus torquatus</i>	OW	
Latham’s Snipe ^{MS}	<i>Gallinago hardwickii</i>		
Laughing Kookaburra	<i>Dacelo novaeguineae</i>		
Little Lorikeet ^{TS}	<i>Glossopsitta pusilla</i>	W	
Long-billed Corella	<i>Cacatua tenuirostris</i>	OW	
Magpie Lark	<i>Grallina cyanoleuca</i>	OW	
Masked Lapwing	<i>Vanellus miles</i>	OW	
Musk Lorikeet	<i>Glossopsitta concinna</i>	W	

Common name	Scientific name	Method observed	
Noisy Friarbird	<i>Philemon corniculatus</i>	OW	
Noisy Miner	<i>Manorina melanocephala</i>	OW	O
Pacific Black Duck	<i>Anas superciliosa</i>	OW	
Pallid Cuckoo	<i>Cacomantis pallidus</i>	O	
Peacock	<i>Pavo cristatus</i>		O
Pied Currawong	<i>Strepera graculina</i>		W
Pink-eared Duck	<i>Malacorhynchus membranaceus</i>	O	
Purple Swampphen	<i>Porphyrio</i>	OW	O
Rainbow Lorikeet	<i>Trichoglossus haematodus</i>	OW	W
Red Wattlebird	<i>Anthochaera carunculata</i>		O
Royal Spoonbill	<i>Platalea regia</i>	O	
Southern Boobook	<i>Ninox novaeseelandiae</i>	O	
Straw-necked Ibis	<i>Threskiornis spinicollis</i>		O
Sulphur Crested Cockatoo	<i>Cacatua galerita</i>	OW	O W
Superb Fairy-wren	<i>Malurus cyaneus</i>		O
Wedge-tailed Eagle	<i>Aquila audax</i>		O
Welcome Swallow	<i>Hirundo neoxena</i>	OW	O W
White-faced Heron	<i>Egretta novaehollandiae</i>	O	O
White-throated Gerygone	<i>Gerygone olivacea</i>	OW	
White-throated Treecreeper	<i>Cormobates leucophaea</i>		W
White-winged Chough	<i>Corcorax melanorhamphos</i>	OW	
Willie Wagtail	<i>Rhipidura leucophrys</i>	OW	W
Yellow-faced Honeyeater	<i>Caligavis chrysops</i>	W	W
Mammals			
Chocolate Wattled Bat	<i>Chalinolobus morio</i>	U	U ^{PO}
Common Brushtail Possum	<i>Trichosurus vulpecula</i>		O
Common Wombat	<i>Vombatus ursinus</i>	O	
Domesticated Cattle *	<i>Bos taurus</i>		O
Eastern Coastal Free-tailed Bat ^{TS}	<i>Micronomus norfolkensis</i>	U	U
Eastern False Pipistrelle ^{TS}	<i>Falsistrellus tasmaniensis</i>		
Large Bent-winged Bat ^{TS}	<i>Miniopterus orianae oceanensis</i>		U
Little Bent-winged Bat ^{TS}	<i>Miniopterus australis</i>		
Eastern Grey Kangaroo	<i>Macropus giganteus</i>	O	O
Eastern Horseshoe-bat	<i>Rhinolophus megaphyllus</i>		U
Gould's Wattled Bat	<i>Chalinolobus gouldii</i>		U
Greater Broad-nosed Bat ^{TS}	<i>Scoteanax rueppellii</i>	U	
Large Forest Bat	<i>Vespadelus darlingtoni</i>		U ^{PO}
Forest Bat	<i>Vespadelus vulturnus</i>	U	
Rabbit *	<i>Oryctolagus cuniculus</i>		O
Southern Myotis ^{TS}	<i>Myotis macropus</i>	U	U
White-striped Mastiff Bat	<i>Austronomus australis</i>	U	
Reptiles			
Delicate Skink	<i>Lampropholis delicata</i>	O	O
Amphibians			
Broad-palmed Frog	<i>Litoria latopalmata</i>	W	
Laughing Tree Frog	<i>Litoria tyleri</i>	W	
Peron's Tree Frog	<i>Litoria peronii</i>	W	

Common name		Scientific name		Method observed	
Whistling Tree Frog		Litoria verreauxii		W	W
Molluscs					
Cumberland Plain Land Snail ^{TS}		Meridolum corneovirens		O	
	Note: * indicates introduced species ^{TS} indicates threatened species ^{MS} indicates Migratory species All species listed are identified to a high level of certainty unless otherwise noted as: ^{PR} indicates species identified to a 'probable' level of certainty – more likely than not ^{PO} indicates species identified to a 'possible' level of certainty – low-moderate level of confidence				
E - Nest/roost	H - Hair/feathers/skin	P - Scat		W - Heard call	
F-Tracks/scratchings	K- Dead	Q- Camera		X- In scat	
FB - Burrow	O - Observed	T - Trapped/netted		Y - Bone/teeth/shell	
G - Crushed cones	OW- Obs & heard call	U- Anabat/ultrasound		Z- In raptor/owl pellet	

Appendix 2. Threatened Flora & Fauna Habitat Assessment

Table A2.1 – Threatened flora species habitat assessment

Scientific name DATABASE SOURCE	BC Act	EPBC Act	Growth form and habitat requirements Distribution limit	Recorded on site (y/n)	If not recorded on site				Considered in test of significance test (✓) Refer to Appendix 3
					Suitable habitat present (y/n)	Nearby and / or high number of record(s) (y/n) Notes 1,2 & 3	Record(s) from recent years (y/n) Notes 1,2 & 3	Potential to occur	
<i>Acacia bynoeana</i> DPE EPBC	E1	V	Erect or spreading shrub to 0.3 m high growing in heath and dry sclerophyll open forest on sandy soils. Often associated with disturbed areas such as roadsides. <i>Distribution limits N-Newcastle S-Berrima.</i>	No	Sub-optimal	17 records within 10 km	2013	Unlikely	No
<i>Acacia pubescens</i> DPE EPBC	V	V	Spreading shrub 1-4 m high open sclerophyll growing in open forest and woodlands on clay soils. <i>Distribution limits N-Bilpin S-Georges River.</i>	No	Yes	4 records within 10 km	2019	Moderate	Yes
<i>Amperea xiphoclada</i> var. <i>pedicellata</i> DPE EPBC	Ext.	Ext.	An erect shrub growing up to 60 cm high, was previously widespread in heath, woodland and forest on low fertility and sandy soils and is now presumed extinct.	No	No	No	No	No	No
<i>Ancistrachne maidenii</i> DPE	V	-	Decumbent grass. Grows in sandstone-derived soils. Distribution limits Berowra Waters, Brooklyn and Wisemans Ferry.	No	No	No	No	Unlikely	No
<i>Callistemon linearifolius</i> DPE	V	-	Shrub to 4 m high. Dry sclerophyll forest on coast and adjacent ranges. <i>Distribution limits N-Nelson Bay S-Georges River.</i>	No	No	3 records within 10 km	No	Unlikely	No
<i>Cynanchum elegans</i> DPE EPBC	E1	E	Climber or twiner to 1 m. Grows in rainforest gullies, scrub & scree slopes. <i>Distribution limits N-Gloucester S-Wollongong.</i>	No	No	No	No	Unlikely	No

Scientific name DATABASE SOURCE	BC Act	EPBC Act	Growth form and habitat requirements Distribution limit	Recorded on site (y/n)	If not recorded on site				Considered in test of significance test (✓) Refer to Appendix 3
					Suitable habitat present (y/n)	Nearby and / or high number of record(s) (y/n) Notes 1,2 & 3	Record(s) from recent years (y/n) Notes 1,2 & 3	Potential to occur	
<i>Darwinia biflora</i> DPE EPBC	V	V	Erect or spreading shrub to 0.8 m high. Grows in heath or understorey of woodland on or near shale-capped ridges underlain by Hawkesbury sandstone. <i>Distribution limits N-Gosford S-Cheltenham.</i>	No	No	No	No	Unlikely	No
<i>Deyeuxia appressa</i> DPE EPBC	E1	E	Erect grass to 0.9 m high. Grows on wet ground. <i>Distribution limits N-Hornsby S-Bankstown.</i>	No	No	No	No	Unlikely	No
<i>Dillwynia tenuifolia</i> DPE	V	-	Erect shrub 0.6-1 m high. Grows in woodlands and open forest on sandstone shale or laterite. <i>Distribution limits N-Howes Valley S-Cumberland Plain.</i>	No	No	No	No	Unlikely	No
<i>Epacris purpurascens</i> var. <i>purpurascens</i> DPE	V	-	Erect shrub to 1.5 m high growing in sclerophyll forest and scrub and near creeks and swamps on sandstone. <i>Distribution limits N-Gosford S-Blue Mountains.</i>	No	No	No	No	Unlikely	No
<i>Eucalyptus benthamii</i> DPE EPBC	V	V	Blue gum to 40 m high. Wet forest on sandy alluvial soils. <i>Distribution limits N-Yarramundi S-Bents Basin.</i>	No	No	No	No	Unlikely	No
<i>Eucalyptus</i> sp. <i>Cattai</i> DPE	E1	-	Tree to 4.5 m high. Rare emergent in scrub heath and low woodland on sandy soils usually flat areas or ridge tops. <i>Distribution limits N-Colo Heights S-Castle Hill.</i>	No	No	30 planted specimen within 10 km	2020	Unlikely	No

Scientific name DATABASE SOURCE	BC Act	EPBC Act	Growth form and habitat requirements Distribution limit	Recorded on site (y/n)	If not recorded on site				Considered in test of significance test (✓) Refer to Appendix 3
					Suitable habitat present (y/n)	Nearby and / or high number of record(s) (y/n) Notes 1,2 & 3	Record(s) from recent years (y/n) Notes 1,2 & 3	Potential to occur	
<i>Genoplesium baueri</i> DPE EPBC	E1	E	A terrestrial orchid that grows in sparse sclerophyll forest and moss gardens over sandstone. Flowers Feb–Mar. <i>Distribution limits N – Hunter Valley S – Nowra.</i>	No	No	No	No	Unlikely	No
<i>Grammitis stenophylla</i> DPE	E1	-	A small lithophytic fern with fronds generally <5 cm. Occurs in rainforest and wet sclerophyll forest in the coastal divisions of NSW. Usually grown on rocks.	No	No	1 record within 10 km	2018	Unlikely	No
<i>Grevillea juniperina subsp. juniperina</i> DPE	V	-	Erect to spreading shrub 0.5-1.5 m tall. Grows on soils derived from Wianamatta Shale, laterite and Tertiary alluvium. <i>Distribution limits St Marys-Londonderry-Prospect.</i>	No	No	No	No	Unlikely	No
<i>Grevillea parviflora subsp. parviflora</i> DPE EPBC	V	V	Open to erect shrub to 1 m. Grows in woodland on light clayey soils. <i>Distribution limits N-Cessnock S-Appin.</i>	No	No	1040 records within 10 km	2018	Unlikely	No
<i>Grevillea parviflora subsp. supplicans</i> DPE	E1	-	Low spreading shrub. Grows in skeletal sandy soil over sandstone. <i>Distribution limits Maroota – Marramarra Creek area.</i>	No	No	No	No	Unlikely	No
<i>Gyrostemon thesioides</i> DPE	E1	-	Multi-stemmed shrub to 70 cm. Grows on hillsides and riverbanks. <i>Confined to Georges and Nepean Rivers and believed extinct.</i>	No	No	No	No	No	No

Scientific name DATABASE SOURCE	BC Act	EPBC Act	Growth form and habitat requirements Distribution limit	Recorded on site (y/n)	If not recorded on site				Considered in test of significance test (✓) Refer to Appendix 3
					Suitable habitat present (y/n)	Nearby and / or high number of record(s) (y/n) Notes 1,2 & 3	Record(s) from recent years (y/n) Notes 1,2 & 3	Potential to occur	
<i>Hibbertia puberula</i> DPE	E1	-	Shrublets with branches up to 30 cm long. It favours dry sclerophyll woodland or low heath on sandy soils or rarely in clay, with or without rocks underneath. <i>It extends from Wollemi National Park south to Morton National Park and the south coast near Nowra. Early records are from Hawkesbury River area in Sydney and the Blue Mountains.</i>	No	No	No	No	No	No
<i>Hibbertia superans</i> DPE	E1	-	Small spreading shrub to 0.3 m high. Grows on sandstone, usually in or near SSTF. <i>Distribution limits N-Glenorie S-Kellyville disjunct Mt Boss.</i>	No	No	No	No	No	No
<i>Kunzea rupestris</i> DPE EPBC	V	V	Shrub to 1.5 m high. Grows in cracks and fissures on Hawkesbury Sandstone rock platforms. <i>Distribution limits N-Maroota S-Glenorie.</i>	No	No	No	No	No	No
<i>Lasiopetalum joyceae</i> DPE EPBC	V	V	Erect shrub to 2 m high. Grows in heath and open forest on Hawkesbury sandstone. <i>Distribution limits Hornsby Plateau.</i>	No	No	No	No	No	No
<i>Leucopogon exolasius</i> DPE EPBC	V	V	Erect shrub to 2 m high. Rocky hillsides and creek banks in Sydney Sandstone Gully Forest. Confined to Woronora and Georges Rivers and Stokes Creek.	No	No	5 records within 10 km	2013	Unlikely	No

Scientific name DATABASE SOURCE	BC Act	EPBC Act	Growth form and habitat requirements Distribution limit	Recorded on site (y/n)	If not recorded on site				Considered in test of significance test (✓) Refer to Appendix 3
					Suitable habitat present (y/n)	Nearby and / or high number of record(s) (y/n) Notes 1,2 & 3	Record(s) from recent years (y/n) Notes 1,2 & 3	Potential to occur	
<i>Leucopogon fletcheri</i> subsp. <i>fletcheri</i> DPE	E1	-	Shrub to 1.8 m high growing in woodland on lateritic soils. Distribution limits N-St Albans S-Springwood.	No	No	No	No	No	No
<i>Melaleuca deanei</i> DPE EPBC	V	V	Shrub to 3 m high. Grows in heath on sandstone. <i>Distribution limits N-Gosford S-Nowra.</i>	No	No	3 records within 10 km	2021	Unlikely	No
<i>Micromyrtus blakelyi</i> DPE EPBC	V	V	Low erect shrub. Grows in cracks and fissures on Hawkesbury sandstone rock platforms. <i>Distribution limits N-Maroota S-Berowra.</i>	No	No	No	No	No	No
<i>Micromyrtus minutiflora</i> DPE EPBC	E1	V	Spreading shrub to 2 m high. Grows in dry sclerophyll forest dominated by Scribbly gums and Ironbarks on Tertiary Alluviums. <i>Distribution limits western part of Cumberland Plain.</i>	No	No	No	No	No	No
<i>Olearia cordata</i> DPE EPBC	V	V	Shrub to 2 m high. Grows in dry sclerophyll forest and shrubland on Hawkesbury sandstone. <i>Distribution limits N-Wollombi S-Wiseman's Ferry.</i>	No	No	No	No	No	No
<i>Persicaria elatior</i> DPE EPBC	V	V	Herb to 90 cm tall which grows in damp places especially beside streams and lakes. Occasionally in swamp forest or associated with disturbance. <i>Varied distribution from SE NSW to QLD.</i>	No	No	No	No	No	No

Scientific name DATABASE SOURCE	BC Act	EPBC Act	Growth form and habitat requirements Distribution limit	Recorded on site (y/n)	If not recorded on site				Considered in test of significance test (✓) Refer to Appendix 3
					Suitable habitat present (y/n)	Nearby and / or high number of record(s) (y/n) Notes 1,2 & 3	Record(s) from recent years (y/n) Notes 1,2 & 3	Potential to occur	
<i>Persoonia bargoensis</i> DPE EPBC	E1	V	Erect shrub to 1 m high. Grows in woodland to Dry sclerophyll forest, on sandstone and laterite. <i>Restricted to the Bargo area.</i>	No	Yes	No	No	Unlikely	No
<i>Persoonia glaucescens</i> DPE EPBC	E1	V	An erect shrub with moderately hairy young branchlets. Restricted to small populations in the Southern Highlands between Picton and Berrima.	No	No	No	No	No	No
<i>Persoonia hirsuta</i> DPE EPBC	E1	E	Erect to decumbent shrub. Grows in dry sclerophyll forest and woodland on Hawkesbury sandstone with infrequent fire histories. <i>Distribution limits N-Glen Davis S-Hill Top.</i>	No	No	12 records within 10 km	2021	Unlikely	No
<i>Persoonia nutans</i> DPE EPBC	E1	E	Erect to spreading shrub. Grows in dry sclerophyll forest and woodland on laterite and alluvial sands. <i>Distribution limits Cumberland Plain.</i>	No	No	No	No	No	No
<i>Pimelea curviflora</i> <i>var. curviflora</i> DPE EPBC	V	V	Woody herb or sub-shrub to 0.2-1.2 m high. Grows on Hawkesbury Sandstone near shale outcrops. <i>Distribution Sydney.</i>	No	No	No	No	No	No
<i>Pimelea spicata</i> DPE EPBC	E1	E	Decumbent or erect shrub to 0.5 m high. Occurs principally in woodland on soils derived from Wianamatta Shales. <i>Distribution limits N-Lansdowne S-Shellharbour.</i>	No	Yes	3 records within 10 km	2019	Unlikely	No

Scientific name DATABASE SOURCE	BC Act	EPBC Act	Growth form and habitat requirements Distribution limit	Recorded on site (y/n)	If not recorded on site				Considered in test of significance test (✓) Refer to Appendix 3
					Suitable habitat present (y/n)	Nearby and / or high number of record(s) (y/n) Notes 1,2 & 3	Record(s) from recent years (y/n) Notes 1,2 & 3	Potential to occur	
<i>Pomaderris brunnea</i> DPE EPBC	V	V	Shrub to 3 m high. Confined to Upper Nepean and Colo Rivers where it grows in open forest.	No	Yes	22 records within 10 km	2022	Moderate	Yes
<i>Pterostylis saxicola</i> DPE EPBC	E1	E	Terrestrial orchid. Grows in shallow sandy soil above rock shelves, usually near Wianamatta / Hawkesbury transition. <i>Distribution limits N- Hawkesbury River S-Campbelltown.</i>	No	Yes	34 records within 10 km	No	Unlikely	No
<i>Pultenaea aristata</i> DPE EPBC	V	V	A small shrub, mostly 20-40 cm tall. <i>Restricted to the Woronora Plateau, a small area between Helensburgh, south of Sydney, and Mt Kiera above Wollongong.</i> Occurs in either dry sclerophyll woodland or wet heath on sandstone. Flowers in winter and spring.	No	No	1 record within 10 km	Yes	Unlikely	No
<i>Pultenaea parviflora</i> DPE EPBC	E1	V	Erect shrub. Grows in dry sclerophyll forest at the intergrade between Tertiary Alluviums and Wianamatta Shales. <i>Distribution limits Cumberland Plain.</i>	No	No	No	No	No	No

Scientific name DATABASE SOURCE	BC Act	EPBC Act	Growth form and habitat requirements Distribution limit	Recorded on site (y/n)	If not recorded on site				Considered in test of significance test (✓) Refer to Appendix 3
					Suitable habitat present (y/n)	Nearby and / or high number of record(s) (y/n) Notes 1,2 & 3	Record(s) from recent years (y/n) Notes 1,2 & 3	Potential to occur	
<i>Pultenaea pedunculata</i> DPE	E1	-	Prostrate shrub. Grows in dry sclerophyll forest and disturbed sites. On the Cumberland Plain it grows in clay or sandy-clay soils (Blacktown Soil Landscape) on Wianamatta Shale-derived soils, usually near the Shale-Sandstone interface (at Appin). All sites have a lateritic influence with ironstone gravel (nodules) present. <i>Distribution confined to north-west of Appin between the Nepean River and Devines Tunnel Number 2 (Upper Sydney water Supply Canal), Prestons and Villawood in NSW.</i>	No	Possibly	2 records within 10 km	No	Moderate	Yes
<i>Rhodamnia rubescens</i> DPE EPBC	E4A	CE	Shrub or small tree to 25 m high found in rainforest and riparian vegetation along the coast and up to 600 m ASL. Flowers in late winter through to spring, with a peak in October, and fruits typically begin to appear in December in the Sydney region. Distribution limits N-Tweed Heads S-Batemans Bay.	No	No	No	No	No	No

Scientific name DATABASE SOURCE	BC Act	EPBC Act	Growth form and habitat requirements Distribution limit	Recorded on site (y/n)	If not recorded on site				Considered in test of significance test (✓) Refer to Appendix 3
					Suitable habitat present (y/n)	Nearby and / or high number of record(s) (y/n) Notes 1,2 & 3	Record(s) from recent years (y/n) Notes 1,2 & 3	Potential to occur	
<i>Solanum armorense</i> DPE	E1	-	Shrub 1-1.8m tall with dense, grey or brown, stellate-haired branches that are sparsely-armed with long prickles on the branches and leaves and sometimes the calyx. Occurs in Eucalypt woodland in shallow soil on steep rocky hillsides. <i>Distribution limits: Confined to small area west and southwest of Sydney, from Kowmung Valley and Kanangra Boyd NP and South to Wombeyan area.</i>	No	No	No	No	No	No
<i>Syzygium paniculatum</i> DPE EPBC	V	V	Small tree. Subtropical and littoral rainforest on sandy soil. <i>Distribution limits N-Forster S-Jervis Bay.</i>	No	No	2 records within 10 km	Yes	Unlikely unless planted	No
<i>Tetratheca glandulosa</i> DPE	V	-	Spreading shrub to 0.2 m high. Sandy or rocky heath or scrub. <i>Distribution limits N-Mangrove Mountain S-Port Jackson.</i>	No	No	No	No	No	No

Scientific name DATABASE SOURCE	BC Act	EPBC Act	Growth form and habitat requirements Distribution limit	Recorded on site (y/n)	If not recorded on site				Considered in test of significance test (✓) Refer to Appendix 3
					Suitable habitat present (y/n)	Nearby and / or high number of record(s) (y/n) Notes 1,2 & 3	Record(s) from recent years (y/n) Notes 1,2 & 3	Potential to occur	
<i>Zieria involucreta</i> DPE EPBC	E1	V	Tall erect shrub to 2 m tall. Occurs primarily on Hawkesbury sandstone. Also occurs on Narrabeen Group sandstone and on Quaternary alluvium. Found primarily in sheltered forests on mid- to lower slopes and valleys although some populations extend upslope into drier vegetation. The canopy typically includes Syncarpia glomulifera, Angophora costata, Eucalyptus agglomerata and Allocasuarina torulosa. <i>Distributed throughout Baulkham Hills, Hawkesbury, Hornsby and Blue Mountains LGAs.</i>	No	No	No	No	No	No
DPE	- Denotes species listed within 10 km of the development footprint on the <i>BioNet</i> Atlas of NSW Wildlife.								
EPBC	- Denotes species listed within 10 km of the development footprint in the <i>EPBC Act</i> habitat search.								
V	- Denotes vulnerable listed species under the relevant Act.								
E or E1	- Denotes endangered listed species under the relevant Act.								
E4a or CE	- Denotes critically endangered listed species under the relevant Act.								
Ext.	- Denotes extinct species listed under the relevant Act.								
NOTE:	This field is not considered if no suitable habitat is present within the development footprint. 'records' refer to those provided by the <i>BioNet</i> Atlas of NSW Wildlife. 'nearby' or 'recent' records are species specific accounting for home range, dispersal ability and life cycle.								

Table A2.2 – Threatened fauna species habitat assessment

Common name Scientific name Database source	BC Act	EPBC Act	Preferred habitat Distribution limit	Recorded on site (y/n)	If not recorded on site				Considered in test of significance (y/n) Refer to Appendix 3
					Suitable habitat present	# records within 5km since May 2003	# records within ~500m since May 2003	Potential to occur	
Eastern Coastal Free-tailed Bat <i>Micronomus norfolkensis</i> BIONET PMST	V	-	Inhabits open forests and woodlands foraging above the canopy and along the edge of forests. Roosts in tree hollows, under bark and buildings. <i>Distribution limit: N-Woodenbong. S-Pambula.</i>	Yes	-	-	-	-	Yes
Southern Myotis <i>Myotis macropus</i> BIONET	V	-	Roosts in caves, mines, tunnels, buildings, tree hollows and under bridges. Forages over open water. <i>Distribution limit: N-Border Ranges National Park. S-South of Eden.</i>	Yes	-	-	-	-	Yes
Large Bent-winged Bat <i>Miniopterus orianae oceanensis</i> BIONET	V	-	Prefers areas where there are caves, old mines, old buildings, stormwater drains and well-timbered areas. <i>Distribution limit: N-Border Ranges National Park. S-South of Eden.</i>	Yes	-	-	-	-	Yes
Yellow-bellied Sheath-tail-bat <i>Saccolaimus flaviventris</i> BIONET	V	-	Rainforests, sclerophyll forests and woodlands. <i>Distribution limit: N-North of Walgett. S-Sydney.</i>	No	Sub-optimal	1	0	Low	Yes
Little Bent-winged Bat <i>Miniopterus australis</i> BIONET	V	-	Roosts in caves, old buildings and structures in the higher rainfall forests along the south coast of Australia. <i>Distribution limit: N-Border Ranges National Park. S-Sydney.</i>	No	Marginal	7	1	Low	Yes
Little Eagle <i>Hieraaetus morphnoides</i> BIONET	V	-	Utilises plains, foothills, open forests, woodlands and scrublands; river red gums on watercourses and lakes. <i>Distribution limit - N-Tweed Heads. S-South of Eden.</i>	No	Sub-optimal	5	1	High	Yes
Square-tailed Kite <i>Lophoictinia isura</i>	V	-	Utilises mostly coastal and sub-coastal open forest, woodland or lightly timbered habitats and inland habitats along watercourses and	No	Sub-optimal	9	1	High	Yes

Common name <i>Scientific name</i> Database source	BC Act	EPBC Act	Preferred habitat <i>Distribution limit</i>	Recorded on site (y/n)	If not recorded on site				Considered in test of significance (y/n) Refer to Appendix 3
					Suitable habitat present	# records within 5km since May 2003	# records within ~500m since May 2003	Potential to occur	
BIONET			mallee that are rich in passerine birds. <i>Distribution limit: N-Goondiwindi. S-South of Eden.</i>						
Little Lorikeet <i>Glossopsitta pusilla</i> BIONET	V	-	Inhabits forests, woodlands; large trees in open country; timbered watercourses, shelterbeds, and street trees. <i>Distribution limit: N-Tweed Heads. S-South of Eden.</i>	Yes	-	-	-	-	Yes
Masked Owl <i>Tyto novaehollandiae</i> BIONET	V	-	Open forest and woodlands with cleared areas for hunting and hollow trees or dense vegetation for roosting. <i>Distribution limit: N-Border Ranges National Park. S-Eden.</i>	No	Yes	2	2	High	Yes
Dusky Woodswallow <i>Artamus cyanopterus cyanopterus</i> BIONET	V	-	Found in woodlands and dry open sclerophyll forests, usually dominated by eucalypts, including mallee associations. It has also been recorded in shrublands and heathlands and various modified habitats, including regenerating forests; very occasionally in moist forests or rainforests. Prefers habitat with an open understorey. Often observed in farmland tree patches or roadside remnants. <i>Widespread in eastern, southern and south-western Australia.</i>	No	Yes	10	1	High	Yes
Koala <i>Phascolarctos cinereus</i> BIONET PMST	V	V	Inhabits both wet and dry eucalypt forest on high nutrient soils containing preferred feed trees. <i>Distribution limit: N-Tweed Heads. S-South of Eden.</i>	No	Sub-optimal	1009	~50	High	Yes
Cumberland Plain Land Snail <i>Meridolum corneovirens</i> BIONET	E	-	Inhabits remnant eucalypt woodland of the Cumberland Plan. Shelters under logs, debris, clumps of grass, around base of trees and burrowing into loose soil. <i>Distribution limit: Cumberland Plain of Sydney Basin Bioregion.</i>	Yes	-	-	-	-	Yes
Greater Broad-nosed Bat	V	-	Inhabits areas containing moist river and creek systems, especially tree lined creeks.	Yes	-	-	-	-	Yes

Common name Scientific name Database source	BC Act	EPBC Act	Preferred habitat Distribution limit	Recorded on site (y/n)	If not recorded on site				Considered in test of significance (y/n) Refer to Appendix 3
					Suitable habitat present	# records within 5km since May 2003	# records within ~500m since May 2003	Potential to occur	
<i>Scoteanax rueppellii</i> BIONET			<i>Distribution limit: N-Border Ranges National Park. S-Pambula.</i>						
Large-eared Pied Bat <i>Chalinolobus dwyeri</i> BIONET PMST	V	V	Warm-temperate to subtropical dry sclerophyll forest and woodland. Roosts in caves, tunnels and tree hollows in colonies of up to 30 animals. <i>Distribution limit: N-Border Ranges National Park. S-Wollongong.</i>	No	Sub-optimal	9	2	Moderate	Yes
Eastern False Pipistrelle <i>Falsistrellus tasmaniensis</i> BIONET	V	-	Recorded roosting in caves, old buildings and tree hollows. <i>Distribution limit: N-Border Ranges National Park. S-Pambula.</i>	Yes	Sub-optimal	7	2	Moderate	Yes
Grey-headed Flying-fox <i>Pteropus poliocephalus</i> BIONET PMST	V	V	Found in a variety of habitats including rainforest, mangroves, paperbark swamp, wet and dry open forest and cultivated areas. Forms camps commonly found in gullies and in vegetation with a dense canopy. <i>Distribution limit: N-Tweed Heads. S-Eden.</i>	No	Marginal	39	1	Moderate	Yes
Scarlet Robin <i>Petroica boodang</i> BIONET	V	-	Found in foothill forests, woodlands, watercourses; in autumn-winter, more open habitats: river red gum woodlands, golf courses, parks, orchards, gardens. <i>Distribution limit: N-Tweed Heads. S-South of Eden.</i>	No	Sub-optimal	1	1	Moderate	Yes
Varied Sittella <i>Daphoenositta chrysoptera</i> BIONET	V	-	Open eucalypt woodlands / forests (except heavier rainforests); mallee, inland acacia, coastal tea-tree scrubs; golf courses, shelterbelts, orchards, parks, scrubby gardens. <i>Distribution limit: N-Border Ranges National Park. S-South of Eden.</i>	No	Sub-optimal	10	1	Moderate	Yes
Powerful Owl <i>Ninox strenua</i> BIONET	V	-	Forests containing mature trees for shelter or breeding and densely vegetated gullies for roosting. <i>Distribution limits: N-Border Ranges National Park. S-Eden.</i>	No	Sub-optimal	13	0	Moderate	Yes

Common name Scientific name Database source	BC Act	EPBC Act	Preferred habitat Distribution limit	Recorded on site (y/n)	If not recorded on site				Considered in test of significance (y/n) Refer to Appendix 3
					Suitable habitat present	# records within 5km since May 2003	# records within ~500m since May 2003	Potential to occur	
Gang-gang Cockatoo <i>Callocephalon fimbriatum</i> BIONET PMST	V	-	Prefers wetter forests and woodlands from sea level to > 2,000 m on the Great Dividing Range, timbered foothills and valleys, timbered watercourses, coastal scrubs, farmlands and suburban gardens. <i>Distribution limit: mid north coast of NSW to western Victoria.</i>	No	Sub-optimal	18	0	Moderate	Yes
Glossy Black-Cockatoo <i>Calyptorhynchus lathamii</i> BIONET PMST	V	-	Open forests with <i>Allocasuarina</i> species and hollows for nesting. <i>Distribution limit: N-Tweed Heads. S-South of Eden.</i>	No	Marginal	8	2	Moderate	Yes
Swift Parrot <i>Lathamus discolor</i> BIONET PMST	E	E	Inhabits eucalypt forests and woodlands with winter flowering eucalypts. <i>Distribution limit: N-Border Ranges National Park. S-South of Eden.</i>	No	Sub-optimal	7	1	Moderate	Yes
White-bellied Sea Eagle (<i>Haliaeetus leucogaster</i>) BIONET	V	-	Occupies coasts, islands, estuaries, inlets, large rivers, inland lakes and reservoirs. <i>Sedentary; dispersive. N-Tweed Heads. S-South of Eden.</i>	No	Sub-optimal	7	0	Moderate	Yes
Giant Burrowing Frog <i>Heleioporus australiacus</i> PMST	V	V	Inhabits open forests and riparian forests along non-perennial streams, digging burrows into sandy creek banks. <i>Distribution limit: N-Near Singleton S-South of Eden.</i>	No	Marginal	0	0	Low	No
Stuttering Frog <i>Mixophyes balbus</i> PMST	E	V	Terrestrial inhabitant of rainforest and wet sclerophyll forests. <i>Distribution limit: N-near Tenterfield S-South of Bombala.</i>	No	Marginal	0	0	Low	No
Red-crowned Toadlet <i>Pseudophryne australis</i>	V	-	Prefers sandstone areas, breeds in grass and debris beside non-perennial creeks or gutters. Individuals can also be found under logs and	No	Marginal	1	No	Low	No

Common name <i>Scientific name</i> Database source	BC Act	EPBC Act	Preferred habitat <i>Distribution limit</i>	Recorded on site (y/n)	If not recorded on site				Considered in test of significance (y/n) Refer to Appendix 3
					Suitable habitat present	# records within 5km since May 2003	# records within ~500m since May 2003	Potential to occur	
BIONET			rocks in non-breeding periods. <i>Distribution limit:</i> N-Pokolbin. S-near Wollongong.						
Green and Golden Bell Frog <i>Litoria aurea</i> PMST	E	V	Prefers the edges of permanent water, streams, swamps, creeks, lagoons, farm dams and ornamental ponds. Often found under debris. <i>Distribution limit:</i> N-Byron Bay S-South of Eden.	No	Sub-optimal	0	0	Low	No
Littlejohn's Tree Frog <i>Litoria littlejohnii</i> PMST	V	V	Found in wet and dry sclerophyll forest associated with sandstone outcrops at altitudes 280-1,000 m on eastern slopes of Great Dividing Range. Prefers flowing rocky streams. <i>Distribution limit:</i> N-Hunter River S-Eden.	No	Marginal	0	0	Low	No
Watson's Tree Frog <i>Litoria watsoni</i> PMST			<i>Litoria watsoni</i> is a forest-dependent habitat generalist. The species occurs in several different vegetation communities, from heathland, to dry sclerophyll and wet forest.	No	Sub-optimal	0	0	Low	No
Striped Legless Lizard <i>Delma impar</i> PMST	V	V	Found primarily in natural temperate grasslands and secondary grasslands nearby with significant content of exotic grasses and/or surface rock. <i>Distribution limit:</i> ACT and surrounds.	No	Marginal	0	0	Low	No
Rosenberg's Goanna <i>Varanus rosenbergi</i> BIONET	V	-	Hawkesbury sandstone outcrop specialist. Inhabits woodlands, dry open forests and heathland sheltering in burrows, hollow logs, rock crevices and outcrops. <i>Distribution limit:</i> N-Nr Broke. S-Nowra Located in scattered patches near Sydney, Nowra and Goulburn.	No	Marginal	1	No	Low	No
Broad-headed Snake <i>Hoplocephalus bungaroides</i> PMST	E	V	Sandstone outcrops, exfoliated rock slabs and tree hollows in coastal and near coastal areas. <i>Distribution limit:</i> N-Mudgee Park. S-Nowra.	No	Marginal	3	No	Low	No
Australasian Bittern	E	E	Found in or over water of shallow freshwater or brackish wetlands with tall reedbeds, sedges, rushes, cumbungi, lignum and also in ricefields,	No	Sub-optimal	0	0	Low	No

Common name Scientific name Database source	BC Act	EPBC Act	Preferred habitat Distribution limit	Recorded on site (y/n)	If not recorded on site				Considered in test of significance (y/n) Refer to Appendix 3
					Suitable habitat present	# records within 5km since May 2003	# records within ~500m since May 2003	Potential to occur	
<i>Botaurus poiciloptilus</i> PMST			drains in tussocky paddocks, occasionally saltmarsh, brackish wetlands. <i>Distribution limit: N-North of Lismore. S- Eden.</i>						
Grey Falcon <i>Falco hypoleucos</i> PMST	V	-	Occurs over mainly inland drainage systems of open plains and lightly timbered country including the acacia scrub, spinifex and tussock grasslands. <i>Distribution limit: N-Mullumbimby. S-Bega.</i>	No	Sub-optimal	0	0	Low	No
Blue-winged Parrot PMST	V	V	It lives in savannah woodland, grasslands, orchards, farmlands, marshes, heath, dunes, and other open habitats up to 1,200 m (3,937 ft) above sea level.	No	Sub-optimal	0	0	Low	No
White-throated Needletail ^{MS} <i>Hirundapus caudacutus</i> BIONET PMST	-	V	Airspace over forests, woodlands, farmlands, plains, lakes, coasts, towns; companies often forage along favoured hilltops and timbered ranges. Breeds Siberia, Himalayas, east to Japan. Summer migrant to eastern Australia. <i>Distribution limit: N-Tweed Heads. S-South of Eden.</i>	No	Sub-optimal	1	0	Low	No
Brown Treecreeper <i>Climacteris picumnus victoriae</i> BIONET PMST	V	-	Occupies eucalypt woodlands, open woodland lacking a dense understorey with fallen dead timber. <i>Distribution limit: (Sub species victoriae) Central NSW west of Great Div. Cumberland Plains, Hunter Valley, Richmond, Clarence, and Snowy River Valleys.</i>	No	Sub-optimal	3	0	Low	No
Eastern Bristlebird <i>Dasyornis brachypterus</i> PMST	E	E	Coastal woodlands, dense scrubs and heathlands, especially where low heathland borders taller woodland or dense tall tea-tree. <i>Distribution limit: N-Tweed Heads. S-South of Eden.</i>	No	Marginal	0	0	Low	No
Pilotbird <i>Pycnoptilus floccosus</i> BIONET PMST	-	V	Strictly terrestrial, living on the ground in dense forests with heavy undergrowth. <i>Distribution limits: N-Newcastle, S-Melbourne.</i>	No	Marginal	3	0	Low	No

Common name Scientific name Database source	BC Act	EPBC Act	Preferred habitat Distribution limit	Recorded on site (y/n)	If not recorded on site				Considered in test of significance (y/n) Refer to Appendix 3
					Suitable habitat present	# records within 5km since May 2003	# records within ~500m since May 2003	Potential to occur	
Regent Honeyeater <i>Xanthomyza phrygia</i> BIONET PMST	E4A	CE	Found in temperate eucalypt woodland and open forest including forest edges, wooded farmland and urban areas with mature eucalypts. <i>Distribution limit: N-Urbanville. S-Eden.</i>	No	Sub-optimal	1	0	Low	No
Red Goshawk <i>Erythrorhynchus radiatus</i> PMST	CE	V	Red Goshawks inhabit open woodland and forest, preferring a mosaic of vegetation types, a large population of birds as a source of food, and permanent water, and are often found in riparian habitats along or near watercourses or wetlands. In NSW, preferred habitats include mixed subtropical rainforest, Melaleuca swamp forest and riparian Eucalyptus Forest of coastal rivers.	No	Marginal	0	0	Low	No
Painted Honeyeater <i>Grantiella picta</i> PMST	V	V	A nomadic bird occurring in low densities within open forest, woodland and scrubland feeding on mistletoe fruits. Inhabits primarily Boree, Brigalow and Box-Gum Woodlands and Box-Ironbark Forests. <i>Distribution limit: N-Boggabilla. S-Albury with greatest occurrences on the inland slopes of the Great Dividing Range.</i>	No	Sub-optimal	0	0	Low	No
Hooded Robin <i>Melanodryas cucullata</i> PMST	V	-	Found in eucalypt woodlands, <i>Acacia</i> scrubland, open forest, and open areas adjoining large woodland blocks, with areas of dead timber. <i>Distribution limit: N-Central Qld. S-Spencer Gulf SA.</i>	No	Sub-optimal	0	0	Low	No
Southern Whiteface PMST	-	V	Typically inhabits arid open woodlands with a shrubby or grassy understory, as well as grass plains throughout much of the continent's south.	No	Marginal	0	0	Low	No
Flame Robin <i>Petroica phoenicea</i> BIONET	V	-	Summer: forests, woodlands, scrubs, from sea-level to c. 1800 m. Autumn-winter: open woodlands, plains, paddocks, golf courses, parks, orchards. <i>Distribution limit: N northern NSW tablelands. S-South of Eden.</i>	No	Sub-optimal	1	0	Low	No

Common name Scientific name Database source	BC Act	EPBC Act	Preferred habitat Distribution limit	Recorded on site (y/n)	If not recorded on site				Considered in test of significance (y/n) Refer to Appendix 3
					Suitable habitat present	# records within 5km since May 2003	# records within ~500m since May 2003	Potential to occur	
Diamond Firetail <i>Stagonopleura guttata</i> BIONET PMST	V	-	Found in eucalypt woodlands, forests and mallee where there is grassy understorey west of the Great Div. also drier coastal woodlands of the Cumberland Plain and Hunter Richmond and Clarence River Valleys. <i>Distribution limit: N-Rockhampton Q. S-Eyre Pen Kangaroo Is. SA.</i>	No	Sub-optimal	1	0	Low	No
Spotted-tailed Quoll <i>Dasyurus maculatus</i> BIONET PMST	V	E	Dry and moist open forests containing rock caves, hollow logs or trees. <i>Distribution limit: N-Mt Warning National Park. S-South of Eden.</i>	No	Sub-optimal	5	0	Low	No
Southern Brown Bandicoot <i>Isodon obesulus</i> PMST	E	E	Utilises a range of habitats containing thick ground cover - open forest, woodland, heath, cleared land, urbanised areas and regenerating bushland. <i>Distribution limit: N-Kempsey. S-South of Eden.</i>	No	Marginal	0	0	Low	No
Eastern Pygmy Possum <i>Cercatetus nanus</i> BIONET	V	-	Found in a variety of habitats from rainforest through open forest to heath. Feeds on insects but also gathers pollen from banksias, eucalypts and bottlebrushes. Nests in banksias and myrtaceous shrubs. <i>Distribution limit: N-Tweed Heads. S-Eden.</i>	No	Sub-optimal	1	0	Low	No
Yellow-bellied Glider <i>Petaurus australis</i> PMST	V	-	Tall mature eucalypt forests with high nectar producing species and hollow bearing trees. <i>Distribution limit: N-Border Ranges National Park. S-South of Eden.</i>	No	Sub-optimal	0	0	Low	No
Greater Glider <i>Petauroides volans</i> PMST	-	V	Favours forests with a diversity of eucalypt species, due to seasonal variation in its preferred tree species. Population density is optimal at elevation levels at 845 m above sea level. Prefer overstorey basal areas in old-growth tree stands. Highest abundance typically in taller, montane, moist eucalypt forests, with relatively old trees and abundant	No	Sub-optimal	0	0	Low	No

Common name <i>Scientific name</i> Database source	BC Act	EPBC Act	Preferred habitat <i>Distribution limit</i>	Recorded on site (y/n)	If not recorded on site				Considered in test of significance (y/n) Refer to Appendix 3
					Suitable habitat present	# records within 5km since May 2003	# records within ~500m since May 2003	Potential to occur	
			hollows <i>Distribution limit: N-Border Ranges National Park. S- South of Eden.</i>						
Parma Wallaby <i>Macropus parma</i> PMST	V	-	Inhabits rainforests and wet and dry sclerophyll forests with a dense understorey and associated grassy patches. <i>Distribution limit: N-Border Ranges National Park. S-Morton National Park.</i>	No	Marginal	0	0	Low	No
Brush-tailed Rock-wallaby <i>Petrogale penicillata</i> PMST	E	V	Found in rocky gorges with a vegetation of rainforest or open forests to isolated rocky outcrops in semi-arid woodland country. <i>Distribution limit: N-North of Tenterfield. S-Bombala.</i>	No	Marginal	0	0	Low	No
Golden-tipped Bat <i>Kerivoula papuensis</i> BIONET	V	-	Rainforest and adjoining moist open forest habitats, roosting in tree hollows and dense vegetation. <i>Distribution limit: N-Border Ranges Nation Park. S-South of Eden.</i>	No	Marginal	2	0	Low	No
Dural Land Snail <i>Pommerhelix duralensis</i> PMST	E	E	Occurs on shale-sandstone transitional forest landscapes within the Blue Mountains, Penrith, The Hills, Wollondilly, Hornsby and Parramatta LGA's. Occurs in low abundance and shelters under rocks or inside curled-up bark, beneath leaves and light woody debris. <i>Distribution limit: St Albans to Mulgoa with most records from The Hills LGA.</i>	No	Marginal	1	0	Low	No
Sydney Hawk Dragonfly PMST	E	V	The Sydney Hawk lives around very slow sections of rivers with usually rocky, steep and high banks (at least on one side); and coastal, rocky river pools with cool water.	No	No	0	0	No	No
BIONET	- Denotes species listed within 5 km of the development footprint since June 2023 on the <i>Atlas of NSW Wildlife</i>								
PMST	- Denotes species listed within 5 km of the development footprint in the <i>Protected Matters Search Tool (PMST)</i> search								
V	- Denotes vulnerable listed species under the relevant Act								
E or E1	- Denotes endangered listed species under the relevant Act								
E4a or CE	- Denotes critically endangered listed species under the relevant Act								

Common name <i>Scientific name</i> Database source	BC Act	EPBC Act	Preferred habitat <i>Distribution limit</i>	Recorded on site (y/n)	If not recorded on site				Considered in test of significance (y/n) Refer to Appendix 3
					Suitable habitat present	# records within 5km since May 2003	# records within ~500m since May 2003	Potential to occur	
NOTE:	1. This field is not considered if no suitable habitat is present within the development footprint 2. 'records' refer to those provided by the <i>Atlas of NSW Wildlife</i> 3. 'nearby' or 'recent' records are species specific accounting for home range, dispersal ability and life cycle								
No or Low potential to occur	These categories represent an “unlikely” chance of occurrence and are therefore not included in the test of significance.								
Moderate or High potential to occur	These categories represent an at least somewhat “likely” chance of occurrence and are therefore included in the test of significance.								

A detailed assessment in accordance with Section 1.7 of the *EPA Act* will be completed for these species in Appendix 3 of this report.

Table provides an assessment of potential habitat within the study area for nationally *protected* migratory fauna species recorded within 5 km on the *EPBC Act* Protected Matters Tool. Nationally *threatened* migratory species are instead considered above in Table A2.2.

Table A2.3 – Protected migratory bird habitat assessment

Common name <i>Scientific name</i>	Preferred habitat <i>Migratory breeding</i>	Suitable habitat present (y/n)	Recorded on site (y/n)	Comments
Oriental Cuckoo (<i>Cuculus optatus</i>)	Mainly inhabits forests, occurring in coniferous, deciduous and mixed forest. It feeds mainly on insects and their larvae, foraging for them in trees and bushes as well as on the ground.	Yes	No	See Section 3.4 for assessment.
Latham's Snipe		Yes	Yes	See Section 3.4 for assessment.
Fork-tailed Swift (<i>Apus pacificus</i>)	Aerial: over open country, from semi-arid deserts to coasts, islands; sometimes over forests, cities. Breeds Siberia, Himalayas, east to Japan southeast Asia. Summer migrant to east Australia. Mass movements	Yes	No	See Section 3.4 for assessment.

Common name Scientific name	Preferred habitat Migratory breeding	Suitable habitat present (y/n)	Recorded on site (y/n)	Comments
	associated with late summer low pressure systems into east Australia. Otherwise, uncommon.			
Black-faced Monarch (<i>Monarcha melanopsis</i>)	Rainforests, eucalypt woodlands; coastal scrubs; damp gullies in rainforest, eucalypt forest; more open woodland when migrating. <i>Summer breeding migrant to coastal southeast Australia, otherwise uncommon.</i>	Yes	No	See Section 3.4 for assessment.
Spectacled Monarch (<i>Monarcha trivirgatus</i>)	Understorey of mountain / lowland rainforest, thickly wooded gullies, waterside vegetation, mostly well below canopy. <i>Summer breeding migrant to south-east Qld and north-east NSW down to Port Stephens from Sept / Oct to May. Uncommon in southern part of range.</i>	Yes	No	See Section 3.4 for assessment.
Satin Flycatcher (<i>Myiagra cyanoleuca</i>)	Heavily vegetated gullies in forests, taller woodlands, usually above shrub-layer; during migration, coastal forests, woodlands, mangroves, trees in open country, gardens. <i>Breeds mostly south-east Australia and Tasmania over warmer months, winters in northeast Qld.</i>	Yes	No	See Section 3.4 for assessment.
Rufous Fantail (<i>Rhipidura rufifrons</i>)	Undergrowth of rainforests / wetter eucalypt forests / gullies; monsoon forests, paperbarks, sub-inland and coastal scrubs; mangroves, watercourses; parks, gardens. On migration, farms, streets buildings. <i>Breeding migrant to south-east Australia over warmer months. Altitudinal migrant in north-east NSW in mountain forests during warmer months.</i>	Yes	No	See Section 3.4 for assessment.
Yellow Wagtail (<i>Motacilla flava</i>)	The yellow wagtail typically forages in damp grassland and on relatively bare open ground at edges of rivers, lakes and wetlands, but also feeds in dry grassland and in fields of cereal crops.	No	No	See Section 3.4 for assessment.

Appendix 3. Test of Significance

Flora and fauna survey and habitat assessments of the study area have resulted in the identification of suitable habitat for the following threatened biodiversity under the *BC Act* that was recorded present or considered otherwise with varying potential to occur. The potential for any direct or indirect impacts on species has been considered and noted.

Table A3.1 – Threatened flora impact summary

Scientific name	BC Act	Potential to occur	Potential habitat impact
<i>Acacia pubescens</i>	V	Moderate	Removal of potential habitat
<i>Pomaderris brunnea</i>	E	Moderate	Removal of potential habitat
<i>Pultenaea pedunculata</i>	E	Moderate	Removal of potential habitat

Table A3.2 – Threatened fauna impact summary

Common name	BC Act	Potential to occur	Potential habitat impact
Eastern Coastal Free-tailed Bat	V	Recorded	Direct to foraging and potential breeding habitat
Southern Myotis	V	Recorded	Direct to foraging and potential breeding habitat
Large Bent-winged Bat	V	Recorded	Direct to foraging habitat
Cumberland Plain Land Snail	E	Recorded	Direct on life-long habitat
Greater Broad-nosed Bat	V	Recorded	Direct to foraging and potential breeding habitat
Eastern False Pipistrelle	V	Recorded	Direct to foraging and potential breeding habitat
Little Lorikeet	V	Recorded	Direct to foraging and potential breeding habitat
Little Eagle	V	High	Direct to foraging and potential breeding habitat
Square-tailed Kite	V	High	Direct to foraging and potential breeding habitat
Masked Owl	V	High	Direct to foraging and potential breeding habitat
Dusky Woodswallow	V	High	Direct to foraging and potential breeding habitat
Koala	V	High	Direct to foraging and potential breeding habitat
Large-eared Pied Bat	V	Moderate	Direct to foraging habitat
Grey-headed Flying-fox	V	Moderate	Direct to foraging habitat
Scarlet Robin	V	Moderate	Direct to foraging and potential breeding habitat

Common name	BC Act	Potential to occur	Potential habitat impact
Varied Sittella	V	Moderate	Direct to foraging and potential breeding habitat
Powerful Owl	V	Moderate	Direct to foraging and potential breeding habitat
Gang-gang Cockatoo	V	Moderate	Direct to foraging and potential breeding habitat
Glossy Black-Cockatoo	V	Moderate	Direct to foraging and potential breeding habitat
Swift Parrot	E	Moderate	Direct to foraging habitat
White-bellied Sea Eagle	V	Moderate	Direct to foraging and potential breeding habitat

Endangered populations

- *Marsdenia viridiflora* R. Br. subsp. *viridiflora* population in the Bankstown, Blacktown, Camden, Campbelltown, Fairfield, Holroyd, Liverpool, and Penrith.

Threatened ecological communities

- Cumberland Plain Woodland in the Sydney Basin Bioregion – critically endangered
- Shale Sandstone Transition Forest in the Sydney Basin Bioregion – critically endangered, and
- River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin, and southeast Corner Bioregions – endangered.

BC ACT 2016 - SECTION 7.3 TEST OF SIGNIFICANCE

As outlined in Section 7.2 of the *BC Act* development or an activity is *likely to significantly affect threatened species* if:

- (a) It is likely to significantly affect threatened species or ecological communities, or their habitats, according to the test in Section 7.3, or
- (b) The development exceeds the threshold if the BOS applies to the impacts of the development on biodiversity values, or
- (c) It is carried out in a declared area of outstanding biodiversity value.

With respect to (a) above, and outlined in Section 7.3 of the *BC Act*, the following *test of significance* is a set of five main considerations, with sub-considerations for determining whether proposed development or activity 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,**

The direct and indirect impacts of the proposal are considered within Section 6.6.2.

With consideration to the relative direct and indirect impacts on all threatened species with moderate or high potential to occur, it is considered that the proposal is unlikely to disrupt the life cycle of these listed species such that a viable local population would be placed at risk of extinction. Species recorded present during survey, previously recorded nearby or with moderate or high potential to occur and requiring further discussion given potential impacts are further discussed in detail below.

***Acacia pubescens* (Vent.) R.Br. (Family Fabaceae, Subfamily Mimosoideae)**

Acacia pubescens is a spreading shrub, 1-5m high with brilliant yellow flowers, bipinnate leaves and conspicuously hairy branches. It is found concentrated around Bankstown-Fairfield-Rookwood area and the Pitt Town area, occurring on alluviums, shales and at the intergrade between shales and sandstones. The study area contains suitable habitat for this species. Recent BioNet atlas records indicate that species occurs to the northeast of the site approximately 9.5kms away. As a result, it is unlikely that the species will be placed at risk of extinction due to proposal. No specimens were recorded during flora survey.

***Pommaderis brunnea* N.A.Wakef. (Family Rhamnaceae)**

Pommaderis brunnea is a shrub to 3m tall that has distinctively hairy stems. The stem-hairs comprise long brownish hairs above a thick white hairy under-coat. It is found in a very limited area near the Colo, Nepean, and Hawkesbury Rivers. The study area contains suitable habitat for this species. Recent BioNet atlas records this species to the east of the site approximately 0.67kms (2019) away and 0.61kms (2014). It is unlikely that the proposal will have a significant impact on this species as the areas which the habitat is most suitable will be retained. No specimens were recorded during flora survey.

***Pultenaea pedunculata* Hook. (Family Fabaceae, Subfamily Faboideae)**

Pultenaea pedunculata is a shrub that forms carpets of 1m or wider, having branches that may be several meters long but usually less than 20cm off the ground. The stems are appressed pubescent with whitish hairs. In NSW it is represented within three disjunct populations, in the

Cumberland Plains in Sydney, coast between Tathra and Bermagui and the Windellama area of south Goulburn. It occurs in a range of habitats but generally among woodland vegetation. The study area contains suitable habitat for this species however the nearest record (2016) for this species is 1.65kms away to the southwest. It is unlikely that the proposal will have a significant impact on the lifecycle of this species such that a viable local population is likely to be placed at risk of extinction. No specimens were recorded during flora survey.

Cave-dependent microbats

The cave-dependent microbats considered to have a moderate or high potential to occur include Large Bent-winged Bat and Large-eared Pied Bat. These bats rely on caves or cave-like structures (e.g., mines or cliff lines) for a maternity roost. They rely on similar but more varied habitat features for over-winter roosts including sheds and old buildings. Foraging habitat is broad ranging and includes most forest types. The study area does not contain any habitat features suitable for use as a maternity roost. Although, the study area contains suitable foraging habitat. However, removed vegetation is expected to be at least partially compensated for by the retention and enhancement of the on-site riparian corridor. Considering the lack of roosting habitat and insignificant impact on foraging habitat, it is considered unlikely that the proposal will 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.

Hollow-dependent microbats

The hollow-dependent microbats recorded or considered to have a moderate or high potential to occur include Eastern-coastal Freetail Bat, Greater Broad-nose Bat, Eastern False Pipistrelle, and Southern Myotis. We note that all four of these threatened microbat species were recorded during 2019 and 2023 survey. These bats rely on tree hollows for breeding and the rearing of young. They use similar habitat for over-winter roosting. We note that Southern Myotis can also use other subterranean habitat features such as caves and road culverts for roosting. Foraging habitat is broad ranging and includes most forest types. The study area contains a variety of tree hollow sizes that provide potential breeding and over-winter habitat. Further survey should include stag-watching of most suitable roosting trees. Survey cast be costly to observe all suitable hollows within the study area however a demonstrated effort to locate and protect roosts should be undertaken as part of further surveys. Any tree identified as a roost by these species would be a constraint to development.

Little Eagle, Square-tailed Kite & White-bellied Sea Eagle

Recent records of these species are known to the locality however no large raptor nests were recorded present during survey, therefore these species are not considered likely to constrain development.

The raptors considered to have a moderate or high potential to occur include White-bellied sea eagle, Little Eagle, and Square-tailed Kite. They construct nests in the tops of trees and foraging with a few kilometres' radius of the nest. The study area contains many potential nest trees and a mosaic of foraging areas that meet the preferences of each raptor species. However, almost all of the on-site good-quality vegetation is being retained and the riparian corridor is being enhanced. Therefore, it is considered unlikely that the proposal will have an adverse effect on the life cycle of at least some raptor species.

Gang-gang Cockatoo, Glossy Black-Cockatoo, Powerful Owl & Masked Owl

The site provides suitable large nesting hollows for these species, most notably the Masked Owl which is well known to utilise broken trunk hollows and has been recorded on the adjacent

lands to the north in 2014. No evidence of owl activity surrounding the three large broken trunk hollows within the study area (SHT3, SHT4 & SHT7) however further survey in the winter to early spring period is required to ensure these hollows are not utilised during the breeding period. Any recorded use by these species would require retention of the tree, an appropriate buffer and connectivity maintained. Each of the large hollows occur just within the northern-eastern boundary therefore this woodland strip may be maintained alongside the adjacent Bio-banking site due to its potential value as future contributing habitat without impacting far into the potential remaining development landscape.

Varied Sitella, Scarlet Robin and Dusky Woodswallow

The woodland birds considered to have a moderate or high potential to occur include Varied Sitella, Scarlet Robin and Dusky Woodswallow. These species create small cone/dome-like nest made of materials such as bark, grass, twigs etc. Nests are created in a variety of forested habitats. However, almost all of the on-site good-quality vegetation is being retained and the riparian corridor is being enhanced. Therefore, it is considered unlikely that the rezoning will likely to offer constraint given extent of surrounding forest habitats unless a nest location is found.

Little Lorikeet

This species nests and roosts in small hollows and was recorded during 2019 survey. Survey should ideally be undertaken during the nesting period (May – Sept) and any hollow within the study area found to be utilised by this species at this time is considered a constraint to development.

Grey-headed Flying-fox

Grey-headed Flying-foxes are canopy feeding frugivores and nectarivores, inhabiting a wide range of habitats including rainforest, mangroves, paperbark forests, wet and dry sclerophyll forests, and cultivated areas. This species roosts in camps, which may contain tens of thousands of individuals. Camps are commonly formed in gullies, typically not far from water and usually in vegetation with a dense canopy. Camps can be found in riparian rainforest patches, Melaleuca stands, mangroves, riparian woodland, or modified vegetation in urban areas.

The study site does not offer any suitable breeding or important roosting habitat for this species and foraging habitat for this species is otherwise well represented in vegetated surrounds. Therefore, it is considered unlikely that the proposal will have an adverse effect on the life cycle of Grey-headed Flying-fox.

Cumberland Plain Land Snail

Meridolum corneovirens is wholly restricted to western Sydney and is primarily associated with the Cumberland Plain and Castlereagh Woodland vegetation types. The species occasionally occurs along the edges of Coastal River Flat Forest, where it meets either of the above forest types. *M. corneovirens* generally occurs in areas characterised by moist soils together with growths of various species of lichen. This species is known to shelter under logs, other debris, and in leaf litter or around the base of trees where exfoliations occur. Where conditions permit it will bury into loose soil especially under logs and around the bases of large trees. Three dead shell specimens of this endangered snail were found in the strip of vegetation fronting Appin Road. Identification was confirmed by Frank Koehler from the Australian Museum. BioNet records are also known on the other side of this part of Appin Road. The species is typically associated with its host critically endangered community Cumberland Plain Woodland

(CPW), but is also known to disperse slightly into adjacent Shale-Sandstone Transition Forest (SSTF). CPW has not been identified within the site however the recording of this snail species suggests that it would be prudent to undertake further survey along this road frontage strip as part of future surveys.

Where dead shell specimens are found living individuals are considered to also occur, as the species is known to burrow below the soil surface. They come to the surface after rainfall and moist conditions therefore further survey for the presence of living specimens should be undertaken at such a time. Living specimens will offer a constraint to development. Where living specimens are located in degraded habitat and where better-quality adjacent habitat occur, relocation of individuals may be undertaken. It is expected that the species would only occur in the road frontage strip where it was recorded however more detailed surveys through the study area are required.

Koala

A koala population is well known to the east of Appin Road and extending along the Georges River to the north and south. This is an important population and is the only one known within the state that is free of the chlamydia disease. The patch of native vegetation to the immediate north of the study area which is a Bio-banking site has several Koala records from different recent years (see Figure 3) suggesting it constitutes core Koala habitat (CKH). Such habitat is defined under State Environmental Planning Policy SEPP44 and requires the preparation of a management plan on sites where development is proposed.

Three Koala activity survey points (SATs) were undertaken within the study area during survey, which included two within the norther boundary and one in the far south-western corner. The south-western SAT targeting presence of all Grey Gum (in the south-west) in this patch which occurred only in this far corner. No Koala activity was recorded by scats however some older scratches on some smooth-barked trees may be deemed consistent with Koala. A Koala record from within the study area is recorded on *BioNet* database from 16/5/18. A road kill on the stretch of Appin Road fronting the study area was also recorded recently on 14/8/17.

At this stage the study area does not appear to provide CKH however does likely provide dispersal and perhaps periodic habitat as a minimum. Young male Koalas will eventually disperse out to new habitat areas to establish their own core habitat home range and all forested landscapes in this locality providing any degree of connectivity would facilitate this function on occasion. Any future proposal within the site would need ensure that the current connectivity and temporary habitat values within the study area are maintained and appropriate measures are undertaken to ensure Koala security (e.g. from dogs and vehicles) as part of future development applications.

(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

Three (3) EECs were mapped within the area subject to a rezoning application with the potential for impact on those EECs, as follows:

- Cumberland Plain Woodland in the Sydney Basin Bioregion (PCT3319),
- Cumberland Shale-Sandstone Transition Forest in the Sydney Basin Bioregion (PCT3321), and

- River-Flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin, and southeast corner Bioregions (PCT4058).

Cumberland Plain Woodland in the Sydney Basin Bioregion (CPW) occurs where PCT3319 is mapped. This is mainly on the eastern portion of land with a number of small patches in the southwest. This community occurs in a remnant form and occupies a total 5.2 ha of the site, of which 2.04 ha will be impacted by the development.

Cumberland Plain Woodland was estimated to occur within an extent of occurrence of 2,810 km², and an area of occupancy of just under 2,100 km². It is considered to be facing an extremely high risk of extinction in NSW in the immediate future.

Cumberland Shale-Sandstone Transition Forest in the Sydney Basin Bioregion (SSTF) is considered to be facing an extremely high risk of extinction in NSW in the immediate future. SSTF has been mapped across 9600 ha in NSW, with an estimated 20-40% of its original extent remaining with just 260 ha of that in conservation reserves (Final Determination). Within the study area it occurs where PCT3321 is mapped. This is mainly on the eastern portion of land in the vicinity of the riparian/koala corridor and along the northern and western boundary. This community occupies approximately 8.91 ha of the site. The proposed rezoning will have an impact on 0.84 ha of this TEC across the study area. The TEC will be retained as a part of the riparian corridor.

With respect to both CPW and SSTF, the cumulative local impacts of these communities are large in terms of proportion to the extent on site and should be considered as a significant impact whereby the extent may be placed at risk of local extinction.

River-Flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin, and southeast corner Bioregions (RFEF) occurs in the southern portion of the site where PCT4058 is mapped. It occurs in the vicinity of a proposed conservation corridor, linking northern and southern vegetation. This community occupies approximately 1.75 ha of the site. The proposed rezoning is likely to impact upon approximately 0.2 ha of this community's extent across the study area. However, its local occurrence is unlikely to be placed at risk of extinction.

The Threatened Species Test of Significance Guidelines (OEH 2018c) defines local occurrence as:

“the ecological community that occurs within the study area. However, the local occurrence may include adjacent areas if the ecological community on the study area forms part of a larger contiguous area of that ecological community and the movement of individuals and exchange of genetic material across the boundary of the study area can be clearly demonstrated.”

- 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,**

A high proportion of the vegetation in the study area is impacted by previous land-use, weeds and edge effects. Further modification to the communities CPW and SSTF, reducing and narrowing their extent, as well as future APZs have the ability to substantially and adversely modify their composition such that its local occurrence is likely to be placed at risk of extinction.

For RFEF, the local extent is far more protected being located primarily within riparian buffers or on floodplain where development is often excluded. The RFEF is relatively well connected

and extensive locally and should not be modified such that it will be placed at risk of local extinction.

(c) In relation to the habitat of threatened species or ecological community:

It is considered that the habitat attributes of the development footprint provide known or potential habitat for *Acacia pubescens*, *Pomaderris brunnea*, *Pultenaea pedunculata*, *Cumberland Plain Woodland*, *Cumberland Shale-Sandstone Transition Forest*, *River-flat Eucalypt Forest*, Eastern Coastal Free-tailed Bat, Southern Myotis, Large Bent-winged Bat, Little Eagle, Square-tailed Kite, Little Lorikeet, Masked Owl, Dusky Woodswallow, Koala, Cumberland Plain Land Snail, Greater Broad-nosed Bat, Large-eared Pied Bat, Eastern False Pipistrelle, Grey-headed Flying-fox, Scarlet Robin, Varied Sittella, Powerful Owl, Gang-gang Cockatoo, Glossy Black-Cockatoo, Swift Parrot and White-bellied Sea Eagle.

i. The extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and

The rezoning proposal is maximising areas that are already modified or cleared for development. The development footprint contains an area which comprises of 50.87 ha of exotic dominated grassland of which 47.01 ha will be removed and modified as a result of the proposed development. The proposal is maximising areas that are already modified and cleared.

There will be an impact on CPW comprising an area of approximately 2.04 ha (cleared understorey) as a result of this proposal and it is likely to remove and modify this vegetation.

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

The development footprint is covered by a mixture of disturbed natural bushland and cleared areas and is currently fragmented by Appin Road which adjoins the boundary to the west. The site is connected to the northeast and northwest by vegetation. The proposal is retaining the connective corridor and north-south riparian zone where current connectivity of habitat occurs.

Therefore, it is considered that the known habitat for threatened species, population or ecological community within the local area and region is unlikely to become isolated or fragmented as a result of the proposal.

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

In respect of threatened fauna species recorded or with potential to occur, the proposed area of impact to native vegetation is of moderate importance relative to the high-quality vegetation being retained. The good quality vegetation along the northern boundary in the eastern half of the site and the north-south riparian vegetation is not only being retained but also enhanced to compensate for impacts to vegetation elsewhere on site. The vegetation proposed to be removed in the eastern half of the site is under scrubbed and lacks hollow-bearing trees, resulting in lesser importance. However, the species that it may be of importance to is the Koala. The vegetation along the western boundary proposed to be removed contains hollows of small-moderate sizes and may be important to species such as microbats, small birds, Cumberland Plain Land Snail, and threatened raptors with the potential to occur.

The proposed rezoning poses the risk of degrading the watercourses on the site, primarily due to potential obstruction and alteration of connectivity between dams situated within the avoided lands. The modification of this aquatic habitat is considered of foraging importance for the recorded Southern Myotis and Latham's Snipe. Whilst it is not considered that the modification

of this aquatic habitat is not likely to have any long-term effects on these species' local populations at current, the cumulative impacts on similar aquatic habitats within avoided lands under the CPCP need to be considered in terms of loss of foraging habitat. It is therefore recommended that further consideration to alternative proposals which limit the potential impact on watercourse connectivity, particularly concerning the access road be examined.

The proposal impacts upon three (3) threatened ecological communities, two (2) of which are listed as critically endangered under the *BC Act*.

The proposal will have incremental impacts on threatened fauna and potential threatened species through cumulative removal of native vegetation and edge effects in particular, however some of these impacts may be short-term and overcome through strategic planning and minimisation measures within the proposed VMP. The site is quite well connected vegetatively that major corridors for fauna movement will not be fragmented or patches left heavily isolated.

The impacts upon TECs are considered very important, particular CPW and SSTF where cumulative loss and edge effects severely reduce the ability to regenerate due to the pressures of urban expansion. The importance of the habitat for all TEC vegetation though is considered very high, and the reduction of extent due to the proposal is considered important.

(d) Whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),

The subject area is not within any declared area of outstanding biodiversity value. Therefore, the proposal will not have any adverse effects on any declared area of outstanding biodiversity value (either directly or indirectly).

(e) Whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

A key threatening process is defined as a process that threatens, or could threaten, the survival or evolutionary development of species, populations, or ecological communities.

The current list of key threatening processes, and whether the proposed activity is recognised as a threatening process, is shown below.

Table A3.3 – Key threatening processes

Listed key threatening process	Development a threatening process?		
	Likely	Possible	Unlikely
Aggressive exclusion of birds by Noisy Miners (<i>Manorina melanocephala</i>)			✓
Alteration of habitat following subsidence due to longwall mining			✓
Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands	✓		
Anthropogenic Climate Change	✓		
Bushrock removal	✓		
Clearing of native vegetation	✓		
Competition and habitat degradation by feral goats			✓
Competition and grazing by the feral European Rabbit (<i>Oryctolagus cuniculus</i>)		✓	
Competition from feral honeybees			✓

Listed key threatening process	Development a threatening process?		
Death or injury to marine species following capture in shark control programs on ocean beaches			✓
Entanglement in, or ingestion of anthropogenic debris in marine and estuarine environments			✓
Forest Eucalypt dieback associated with over-abundant psyllids and bell miners			✓
High frequency fire resulting in the disruption of life-cycle processes in plants and animals and loss of vegetation structure and composition			✓
Herbivory and environmental degradation caused by feral deer			✓
Importation of red imported fire ants into NSW			✓
Infection by <i>Psittacine circoviral</i> (beak and feather) disease affecting endangered psittacine species and populations			✓
Infection of frogs by amphibian chytrid causing the disease <i>Chytridiomycosis</i>			✓
Introduction and establishment of Exotic Rust Fungi of the order Pucciniales pathogenic on plants of the family Myrtaceae		✓	
Infection of native plants by <i>Phytophthora cinnamomi</i>		✓	
Introduction of the large earth bumblebee (<i>Bombus terrestris</i>)			✓
Invasion and establishment of exotic vines and scramblers		✓	
Invasion and establishment of Scotch Broom (<i>Cytisus scoparius</i>)			✓
Invasion and establishment of the Cane Toad (<i>Bufo marinus</i>)			✓
Invasion, establishment and spread of <i>Lantana camara</i>		✓	
Invasion of native plant communities by bitou bush and boneseed <i>Chrysanthemoides monilifera</i>			✓
Invasion of native plant communities by exotic perennial grasses		✓	
Invasion of native plant communities by African Olive (<i>Olea europaea</i> subsp. <i>cuspidata</i>)		✓	
Invasion of the Yellow Crazy Ant (<i>Anoplolepis gracilipes</i>)			✓
Loss of hollow-bearing trees	✓		
Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants		✓	
Loss and/or degradation of sites used for hill-topping by butterflies			✓
Predation and hybridisation by feral dogs (<i>Canis lupus familiaris</i>)			✓
Predation by the European Red Fox (<i>Vulpes vulpes</i>)			✓
Predation by the Feral Cat (<i>Felis catus</i>)			✓
Predation by <i>Gambusia holbrooki</i> Girard, 1859 (plague minnow or mosquito fish)			✓
Predation by the Ship Rat (<i>Rattus rattus</i>) on Lord Howe Island			✓
Predation, habitat degradation, competition, and disease transmission from Feral pigs (<i>Sus scrofa</i>)			✓
Removal of dead wood and dead trees	✓		

The above key threatening processes have been considered in reference to the proposal. It was considered that the proposal may contribute to a small degree to a number of these processes as described below. It was not considered that the proposal will have a large or

significant impact on any of the following key threatening processes. Some mitigation measures have been listed under each process to minimise or reduce such impacts upon those processes.

Summary of “likely” or “possible” Key Threatening Processes

This section identifies what mitigation measures can be implemented to address threatening processes.

Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands

Alteration to low order streams may be undertaken by the proposal which has flow on affects downstream to the higher order ones. It is expected that stabilisation works will be undertaken to minimise the changes to local hydrological flows, including MUSIC modelling, bank and revegetation such that impacts or changes are minimal and short-term.

Anthropogenic Climate Change

The proposal will require the removal of a small amount of vegetation which will result in a negative or positive contribution to climate change. Vegetation is considered to act as a sink for a range of greenhouse gases but in particular, Carbon Dioxide. The maintenance of native vegetation cover is a key strategy to combat the contributing impacts of the proposed action on Climate Change. Increased risk of bushfire, flooding and storms are to be considered as part of the proposed action. Vegetation also acts as a heat sink, and provides important shade, particularly in urban areas. This issue requires total systems management including consideration of energy use throughout the lifecycle of the proposed action including all aspects of the actions processes, materials supply, and production. Whilst almost insignificant in size, the proposal is part of the accumulative effect and thus should be considered as contributing to this threatening process.

Bushrock removal

The proposal will remove naturally occurring surface bushrock within the development and access road areas and as such is of a class of development or activity that is recognised as a threatening process. The proposed landscape post development is to maintain bush rock cover onsite and generally to provide habitat niches for a range of terrestrial based fauna and foraging opportunities. The bush rocks present in these areas are generally individually located within the landscape and not in clumps or part of a rocky escarpment which represent higher quality habitat of this type.

Clearing of native vegetation

The proposal is of a class of development recognised as a threatening process. It is generally recommended that all sites should aim to achieve a maintain or improve outcome on the quality and quantity of native vegetation cover through protection and restoration measures. The vegetation management process is to be undertaken in accordance with the conditions of consent and any required vegetation and tree management plans for the planning proposal. Offsetting the loss of native vegetation including trees is to be considered as part of the proposed works. The removal of native vegetation is to be offset through the Biodiversity Offset Scheme or in accordance with the CPCP Conservation Measures.

Competition and grazing by the feral European rabbit

It is expected that the planning proposal will alter the potential for rabbit invasion. Rabbit management and control such as through exclusion fencing, destruction of warrens and target “Pindone” baiting is recommended as a standard protocol.

Invasion, establishment and spread of Lantana camara

The site currently contains this species; however, it is expected that the planning proposal will provide an opportunity to remove, control and manage this species throughout the whole of the site by the application of a bushland management plan or weed control program.

Invasion of native plant communities by African Olive (Olea europaea subsp. cuspidata)

This species is present on the development footprint. The planning proposal may provide an opportunity to ameliorate the effect of this key threatening process by the application of suitable weed control measures.

Invasion of native plant communities by exotic perennial grasses

The proposal could potentially be a class of development recognised as a threatening process due to the presence of five (5) exotic perennial grasses within the allotment such as *Axonopus fissifolius* (Narrow-leafed Carpet Grass), *Cynodon dactylon* (Common Couch), *Ehrharta erecta* (Panic Veldtgrass), *Paspalum dilatatum* (paspalum), *Sporobolus* sp. These species may result in possible incursions of exotic perennial grasses if exotic lawn is utilised as part of the landscaping and allowed to spread into adjoining bushlands. It is therefore recommended that native ground covers be utilised as part of the future landscaping works and weed control is applied to reduce spread and establishment of exotic perennial grasses into remnant native vegetation.

Loss of hollow-bearing trees

Hollow-bearing tree surveys identified eleven hollow-bearing trees containing small, medium and large sized hollows within the development footprint. The proposal will require the removal of three of these hollow-bearing trees and as such is of a class of development recognised as a threatening process. Threatened species with suitable habitat within the site and dependant on hollows of this nature include Eastern Coastal Free-tailed Bat, Southern Myotis, Large Bent-winged Bat, Little Lorikeet, Masked Owl, Dusky Woodswallow, Greater Broad-nosed Bat, Eastern False Pipistrelle, Powerful Owl, Gang-gang Cockatoo, and Glossy Black-Cockatoo.

Eastern Coastal Free-tailed Bat, Southern Myotis, and Large Bent-winged Bat were recorded during surveys undertaken. The replacement of hollows within the conservation areas of the site at a ratio of 3:1 is recommended to supplement the loss of natural hollows.

Removal of dead wood and dead trees

The proposal will require the removal of deadwood and dead trees and as such is of a class of development recognised as a threatening process. Threatened fauna species with potential habitat within the development footprint and likely dependent on dead wood or dead trees include Varied Sittella, Scarlet Robin, and Cumberland Plain Land Snail. Cumberland Plain Land Snail has been recorded on site previously. Given the moderate-quality habitat associated with deadwood and dead trees present within the development areas, the removal of dead wood and dead trees is considered to have potential to impact on threatened species or the biodiversity of the local area.

Appendix 4. EPBC Significance Assessment Criteria

Under the *EPBC Act* an action will require approval from the Australian Government Environment Minister if the action has, will have, or is likely to have, a significant impact on a matter of national environmental significance. The following significant impact criteria were sourced from the *EPBC Act* Policy Statement 1.1 (May 2006):

CRITICALLY ENDANGERED AND ENDANGERED SPECIES

Significant impact criteria

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.
- Reduce the area of occupancy of the species.
- Fragment an existing population into two or more populations.
- Adversely affect habitat critical to the survival of a species.
- Disrupt the breeding cycle of a population.
- Modify, destroy, remove, isolate, or decrease the availability or quality of habitat to the extent that the species is likely to 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.
- Introduce disease that may cause the species to decline; or
- Interfere with the recovery of the species.

What is a population of a species?

A 'population of a species' is defined under the *EPBC Act* as an occurrence of the species in a particular area. In relation to critically endangered, endangered or vulnerable threatened species, occurrences include but are not limited to:

- a geographically distinct regional population, or collection of local populations; or
- a population, or collection of local populations, that occurs within a particular bioregion.

What is habitat critical to the survival of a species or ecological community?

- What is habitat critical to the survival of a species or ecological community?
- 'Habitat critical to the survival of a species or ecological community' refers to areas that are necessary:
- For activities such as foraging, breeding, roosting, or dispersal.
- For the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators).
- To maintain genetic diversity and long-term evolutionary development; or
- For the reintroduction of populations or recovery of the species or ecological community.

VULNERABLE SPECIES

Significant impact criteria

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.
- reduce the area of occupancy of an important population.
- fragment an existing important population into two or more populations.
- adversely affect habitat critical to the survival of a species.
- disrupt the breeding cycle of an important population.
- modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.
- result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat.
- introduce disease that may cause the species to decline; or
- interfere substantially with the recovery of the species.

What is an important population of a species?

An 'important population' is a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:

- Key source populations either for breeding or dispersal.
- Populations that are necessary for maintaining genetic diversity; and/or
- Populations that are near the limit of the species range.

COMMUNITIES

Significant impact criteria

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.
- Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines.
- Adversely affect habitat critical to the survival of an ecological 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.
- 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.
- 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
- Interfere with the recovery of an ecological community.

MIGRATORY SPECIES

Significant impact criteria

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

- Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species.

- Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species; or
- Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.

What is important habitat for a migratory species?

An area of 'important habitat' for a migratory species is:

- a) Habitat utilised by a migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species; and/or
- b) Habitat that is of critical importance to the species at particular life-cycle stages; and/or
- c) Habitat utilised by a migratory species which is at the limit of the species range; and/or
- d) Habitat within an area where the species is declining.

What is an ecologically significant proportion?

Listed migratory species cover a broad range of species with different life cycles and population sizes. Therefore, what is an 'ecologically significant proportion' of the population varies with the species (each circumstance will need to be evaluated). Some factors that should be considered include the species' population status, genetic distinctiveness, and species-specific behavioural patterns (for example, site fidelity and dispersal rates).

What is the population of a migratory species?

'Population', in relation to migratory species, means the entire population or any geographically separate part of the population of any species or lower taxon of wild animals, a significant proportion of whose members cyclically and predictably cross one or more national jurisdictional boundaries including Australia.