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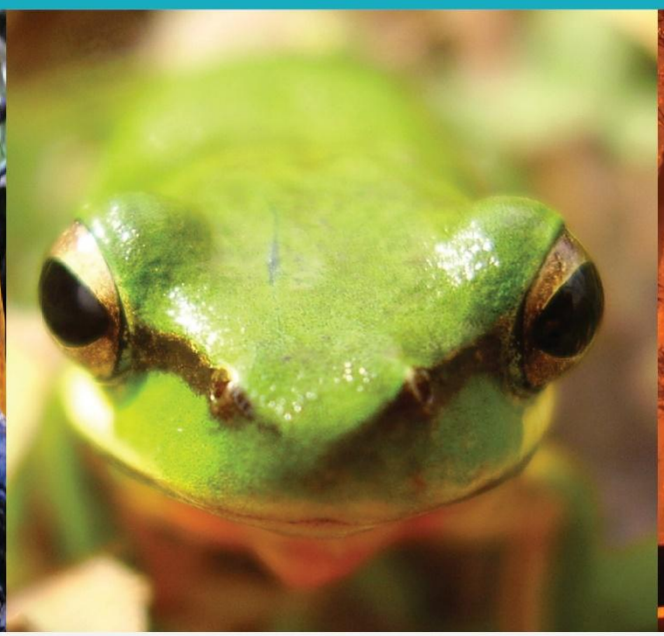

BIODIVERSITY DEVELOPMENT ASSESSMENT REPORT

Proposed State Significant Development - Cemetery

Lot 2 DP 250359

430-490 Douglas Park Drive

DOUGLAS PARK

27 October 2025 (Updated -10 April 2026)

(REF: HTB03ECO)

BIODIVERSITY DEVELOPMENT ASSESSMENT REPORT

Proposed State Significant Development - Cemetery

Lot 2 DP 250359, 430-490 Douglas Park Drive, Douglas Park

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Date:	27 October 2025 (updated 10 April 2026)
File:	HTB03ECO

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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.

CONSULTANT DECLARATION

Project Details	
Douglas Park Memorial Park – Concept Plan and Stage 1	
Application number	SSD-68287712
Address of subject-land	430-490 Douglas Park Drive, Douglas Park
Lot/ DP	Lot 2 in DP 250359
Applicant Details	
Applicant name	Benima Pty Ltd
Applicant address	PO Box A769, Sydney South, NSW 1235
Report Details	
Name of report this declaration relates	Biodiversity Development Assessment Report – Douglas Park Memorial Park – Concept Plan and Stage 1.
Report reference no	HTB03ECO
Report date	24 October 2025
Company name (ABN/ ACN)	Travers Bushfire & Ecology (ABN: 85 624 419 8700/ACN: 624 419 870)
Author name	Lindsay Holmes B. Sc. – Principal Ecologist – Accredited Assessor no. BAAS17032
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Declaration By Consultant	
Name	Mr Michael Sheather-Reid - Managing Director of TBE Environmental Pty Ltd
Registration no.	ABN - 85 624 419 870
Organisation registered with	Australian Securities and Investments Commission
Declaration	The undersigned declares that the Biodiversity Development Assessment Report (BDAR) • Has been declared in accordance with the following policy, guidelines, or legislative requirements: - *Environmental Planning and Assessment Act 1979 (EP&A Act)* - *Biodiversity Conservation Act 2016 (BC Act)* - *Fisheries Management Act 1994 (FM Act)* - *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)* - *Coastal Management Act 2016 (CM Act)* - Biodiversity Assessment Methodology (BAM) 2020 • Contains all available information relevant to the environmental assessment of the development, activity or infrastructure to which the Biodiversity Development Assessment Report relates. • Does not contain information that is false or misleading. • Identifies and addresses the relevant Planning Secretary's environmental assessment requirements (SEARs) for the project. • Identifies and addresses the relevant statutory requirements for the project, including any relevant matters for consideration in environmental planning instruments to which the Biodiversity Development Assessment Report relates. • Contains a consolidated summary of the proposed or necessary mitigation measures.
Signature	
Date	27 October 2025 (mitigation measures in section 5.2 updated on 26 March 2026)

EXECUTIVE SUMMARY

Travers bushfire & ecology has been engaged to prepare a Biodiversity Development Assessment Report (BDAR) for the proposed cemetery development at 430-490 Douglas Park Drive, Douglas Park. The entire area bounded by Lot 2 DP 250359 has been subject to detailed survey effort and will hereafter be referred to as the 'study area'.

The area of direct impact from the development will hereafter be referred to as the 'development footprint'.

Development approval history

A Concept Plan (DA/2018/780/1) was approved by Wollondilly Shire Local Planning Panel in July 2020 for a Cemetery including 27,784 plots earthworks, landscaping, water storage, roads and car parking and approval for building envelopes at 430-490 Douglas Park Drive, Douglas Park. The concept approval outlined the requirement for future detailed design DAs for the implementation of the cemetery as follows:

- Stage 1 involves the erection of an internal fence, the purpose of which is to provide protection for flora and fauna from subsequent excavation and construction works;
- Stage 2 involves the erection of a perimeter fence around the outside of the site; and
- Stages 3-6 involve the excavation, construction and finalisation of the cemetery itself.

In December 2024, Wollondilly Shire Council approved a modification to the concept consent (DA/2018/780/1). The approval modified various conditions of consent in respect of the matters to be addressed at each of the stages outlined above.

In April 2025, development consent was approved by the NSW Land and Environmental Court for the flora and fauna protective fence envisaged as Stage 1 of the concept approval.

Development proposal

The SSDA application seeks to improve the cemetery design that reflects the natural surroundings and to provide a modern approach to cemetery design and management. The proposed design is more organic and avoids parts of the site with mature canopy vegetation was envisaged to be protected.

The development layout shown below involves the development of a cemetery and associated facilities likely including administrative building, café, chapel, crematorium, storage shed/garage, car parking, memorial gardens and lawn / monumental burial plots.

Asset Protection Zones (APZs), internal roads, infrastructure and burial lots where varying impacts on existing vegetation will occur have been depicted.

Proposed development layout (Concept site plan)
(Source: Arcadia Landscape Architecture)

Recorded biodiversity

Ecological surveys and assessments 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*). Compliant survey and limitations for candidate species are explained in Section 2, Section 4.2 (flora) and Section 4.3 (fauna).

BC Act species and threatened communities that have been recorded on site include the following:

- Cumberland Plain Woodland
- Shale Sandstone Transition Forest
- *Persoonia bargoensis*
- *Grevillea parviflora subsp. parviflora*
- Eastern Coastal Free-tailed Bat [PO]
- Eastern False Pipistrelle [PO]
- Greater Broad-nosed Bat [PO]
- Grey-headed Flying Fox
- Large Bent-winged Bat
- Large-eared Pied Bat [PR]
- Little Lorikeet
- Southern Myotis [PO]

Note: [PO], Potential; [PR], Probable.

In respect of matters required to be considered under the EPBC Act, two (2) threatened fauna species Grey-headed Flying-fox (*Pteropus poliocephalus*) and Large-eared Pied Bat (*Chalinolobus dwyeri*), two (2) threatened flora species *Grevillea parviflora* subsp. *parviflora* and *Persoonia bargoensis* and two (2) threatened ecological communities (TECs), Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest and Shale-Sandstone Transition Forest, listed under this Act were recorded within the development footprint.

In respect of matters relative to the *FM Act*, no suitable habitat for threatened marine or aquatic species was observed within the development footprint.

Impact assessment

Avoidance actions are outlined in Section 5.1. The resultant direct, indirect and cumulative ecological impacts of the proposal have been carefully considered in the same section of the report. Further recommended mitigation measures to minimise/offset these impacts, to address threatening processes and to create a more positive ecological outcome for threatened biodiversity have been outlined within Section 5.3.

The development proposal will see the impact of 9.63 ha of native vegetation. The impacted native vegetation includes two Plant Community Types (PCT) divided in the following vegetation zones:

- PCT 3321 Cumberland Shale – Sandstone Ironbark Forest (High Sandstone Influence) – 0.45 ha (0.04 ha impacted) - equivalent to the CEEC Cumberland Shale – Sandstone Transition Forest
- PCT 3321 Cumberland Shale – Sandstone Ironbark Forest (Low Sandstone Influence) – 4.8 ha (1.28 ha impacted) - equivalent to the CEEC Shale – Sandstone Transition Forest
- PCT 3321 Cumberland Shale – Sandstone Ironbark Forest (Low Sandstone influence regrowth) – 6.86 ha (5.74 ha impacted) - equivalent to the CEEC Shale – Sandstone Transition Forest of the Sydney Basin Bioregion
- PCT 3321 Cumberland Shale – Sandstone Ironbark Forest (poor) – 1.43 ha (1.15 ha impacted) - equivalent to the CEEC Shale – Sandstone Transition Forest of the Sydney Basin Bioregion
- PCT 3320 Cumberland Shale Plains Woodland – 0.63 ha (0.34 ha impacted) – equivalent to the CEEC Cumberland Plain Woodland in the Sydney Basin Bioregion
- PCT 3320 Cumberland Shale Plains Woodland (Derived Native Grassland) – 1.1 ha (1.08 ha impacted) – (equivalent to the CEEC under the *BC Act*, not equivalent under the *EPBC Act*)

Additionally, the proposed development will impact the following non-native vegetation:

- Exotic pasture – 1.28 ha (1.1 ha impacted)

The assessment of Serious and Irreversible Impacts (SAII) is set out under *Section 6.7.2 of the BC Reg 2017* to guide the determining authority on this decision. These principles have been reviewed and assessed in Appendix 2 & Appendix 3. It is considered that the proposal will not cause any serious and irreversible impacts on threatened biodiversity.

There will be no significant impact on matters listed under the *FM Act.*

Biodiversity Offsets Scheme (BOS) – Threshold assessment

The Biodiversity Offsets Scheme applies to all state significant development and state significant infrastructure applications. As the proposed development is a state significant development therefore biodiversity offsets are required under the Biodiversity Offsets Scheme (BOS).

BAM Calculator results

The BAM Calculator provides a means of objectively determining the loss of biodiversity as a result of a proposed development. The credits required (Table A & B) are the number of credits needed to be 'retired' to offset residual impacts.

Table A – Requirement for ecosystem credits

Zone	Veg. zone name	Veg. integrity loss	Area (ha)	Sensitivity to gain	Biodiversity risk weighting	Potential SAII	Ecosystem credits
Cumberland Shale Plains Woodland							
1	3320_moderate-good	32.7	0.34	Very High Sensitivity to Gain	2.5	True	7
2	3320_poor	11	1.1	High Sensitivity to Gain	2.5	True	0
							Subtotal: 7
Cumberland Shale – Sandstone Ironbark Forest							
3	3321_high sandstone	29.2	0.04	High Sensitivity to Gain	2.5	True	1
4	3321_low sandstone	51.6	1.3	High Sensitivity to gain	2.5	True	41
5	3321_regrowth	35.4	5.7	High Sensitivity to gain	2.5	True	127
6	3321_poor	34.9	1.2	High Sensitivity to gain	2.5	True	25
							Subtotal: 194 **Total: 201**

*Note: the BAM calculator rounds impact requirements to the nearest 0.1 ha, hence the discrepancy with the values stated elsewhere in the BDAR.

Table B – Requirement for species credits

Veg. zone name	Veg. integrity loss	Area (ha) / count	Biodiversity risk weighting	Potential SAII	Ecosystem credits
***Chalinolobus dwyeri* / Large-eared Pied Bat (Fauna)**					
3320_moderate-good	32.7	0.34	3	True	8
3320_poor	11	1.1	3	True	9
3321_high sandstone	29.2	0.04	3	True	1
3321_low sandstone	51.6	1.3	3	True	49
3321_regrowth	35.4	5.7	3	True	152
3321_poor	34.9	1.2	3	True	30
					Subtotal: 249
***Grevillea parviflora subsp. parviflora* / Small Flower Grevillea (Flora)**					
3321_high sandstone	29.2	0.02	2	False	1

Veg. zone name	Veg. integrity loss	Area (ha) / count	Biodiversity risk weighting	Potential SAII	Ecosystem credits
3321_low sandstone	51.6	0.21	2	False	5
3321_regrowth	35.4	0.08	2	False	1
3321_poor	34.9	0.01	2	False	1
					Subtotal: 8
***Myotis macropus* / Southern Myotis (Fauna)**					
3320_moderate-good	32.7	0.34	2	False	6
3320_poor	11	1.1	2	False	6
3321_low sandstone	51.6	0.38	2	False	10
3321_regrowth	35.4	3.6	2	False	64
3321_poor	34.9	0.99	2	False	17
					Subtotal: 103
***Persoonia bargoensis* / Bargo Geebung (Flora)**					
3321_low sandstone	51.6	0.03	2	False	1
3321_poor	35.4	0.01	2	False	1
					Subtotal: 2

As of October 2022, accredited assessors cannot access the BOP-C payment calculator to provide an estimation of costs for credits. For estimates on credit values, the proponent may need to speak with the Biodiversity Conservation Trust (BCT). The BCT provides a credit costing service for a nominal fee.

Travers bushfire & ecology advises that species credit requirements can be refined further subject to the completion of target surveys, particularly during the spring period.

Mitigation measures

Mitigation measures are detailed further in section 5.2.

- Preparation of a Biodiversity management plan for the site that requires protection of the perimeter conservation zone, ecological restoration, and ongoing maintenance of retained areas of native vegetation, threatened species, threatened ecological communities and their habitat on the subject land
- Protection of SSTF and CPW remnants around the perimeter of the site to maintain local connectivity for fauna and gene movement of plant material
- Landscaping to utilise species of SSTF and CPW origin for internal plantings
- Target weed control in retained vegetation areas to maintain and improve the vegetation and habitat, and minimise edge effects
- Fauna friendly fencing to exclude general access to quality bushland areas
- Supervision of construction activities and pre-clearance fauna surveys
- Implement prevention and control *Phytophthora cinnamomi* and Myrtle Rust, to limit potential for a local outbreak
- Monitor for *Armillaria luteobubalina* (Australian Honey Fugus) for all retained trees in the cometary landscape and adopt landscape management and treatment protocols to maintain tree health (avoid turfing and plant native vegetation over the root zone)
- Erosion control to be undertaken at selected locations to prevent sediment deposition and erosion rills
- To install fauna friendly fencing to allow for the movement of fauna through the landscape. Barbed wire fencing is to be excluded as an option
- All fencing is to be installed to avoid the removal of native vegetation
- It is proposed that vegetation will be cleared in stages to allow resident fauna ample opportunity to disperse, while also providing shelter habitat

- Management of hollows and hollow-dependent fauna, including hollow supervision where these trees are to be felled. Hollows of high quality or with fauna recorded residing within should be sectionally dismantled for relocation and all hollows should be inspected for occupation, signs of previous activity and potential for reuse
- A hollow management and augmentation and nest box strategy is to be prepared to guide the enrichment of hollows and nest resources including monitoring of the number, size and install location, and allow for replacement of hollows as part of ongoing maintenance and or replacement of artificial and salvaged hollows.
- Undertake feral pest management including control of foxes, cats, pigs, goats, avian pests, horses and any other miscellaneous species as required
- Integrated weed management and control of high threat exotics
- Adaptive management processes to improve on mitigation measures that fail or are partially successful
- Require ashes for scattering to be treated prior to release for bush scatterings.
- When scattering treated ashes in the site designated areas may be nominated and moved to minimise risk of adverse impacts.
- A restrictive covenant placed on the conservation area to maintain as a conserved native vegetation visual buffer and to protect threatened species habitat.

In order to minimise impacts at the conservation/cemetery interface, the landscape is to be managed to avoid the invasion of non-native groundcovers and exotic plants into the conservation area. The following mitigation measures are specific to protecting native vegetation in the conservation area and to mitigate edge effects:

- No spraying excess grass and regrowth at the base of the protective fencing but managed by hand or whipper snipper slashing to the base of the fenceline within the development footprint.
- Fencing installed by hand avoiding the removal of native vegetation and scalping the soil by a Bobcat or small grader plate
- Weeds treated by hand pulling or direct application of herbicide, that is, cut and paint or swiping methods.
- Use of native landscape species within 20m of the conservation boundary/cemetery interface.
- Lighting controls in accordance with the National Light Pollution Guidelines for Wildlife - DCCEEW 2023.

LIST OF ABBREVIATIONS

APZ	asset protection zone
BAM	Biodiversity Assessment Method (2020)
BAR	Biodiversity Assessment Report
BC Act	Biodiversity Conservation Act (2016)
BC Reg	Biodiversity Conservation Regulation (2017)
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
CM Act	Coastal Management Act 2016
Core koala habitat	core koala habitat means— (a) an area of land which has been assessed by a suitably qualified and experienced person as being highly suitable koala habitat and where koalas are recorded as being present at the time of assessment of the land as highly suitable koala habitat, or (b) an area of land which has been assessed by a suitably qualified and experienced person as being highly suitable koala habitat and where koalas have been recorded as being present in the previous 18 years.
DAWE	Department of Agriculture, Water and the Environment (superseded by DCCEEW)
DCCEEW	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 OEH 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
DPIE	NSW Department of Planning, Industry and Environment (superseded by DPE Dec 2021)
EEC	endangered ecological community
EPA	Environment Protection Authority
EP&A Act	Environmental Planning and Assessment Act (1979)
EPBC Act	Environment Protection and Biodiversity Conservation Act (1999)
FM Act	Fisheries Management Act
IBRA	Interim Biogeographic Regionalisation for Australia
LEP	local environmental plan
LGA	local government area
LLS Act	Local Land Services Act (2013)
NES	national environmental significance
NPW Act	National Parks and Wildlife Act (1974)
NRAR	Natural Resources Access Regulator (NSW)
NSW DPI	NSW Department of Industry and Investment
OEH	Office of Environment and Heritage (superseded by DPIE from August 2019)
PCT	plant community type
PFC	projected foliage cover
Potential koala habitat	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.
RFS	NSW Rural Fire Service
ROTAP	rare or threatened Australian plants

SAII	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
TSC Act	Threatened Species Conservation Act (1995) – superseded by the Biodiversity Conservation Act (2016)
VMP	vegetation management plan

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1. INTRODUCTION

This Biodiversity Development Assessment Report (BDAR) has been prepared by *Travers bushfire & ecology* (TBE) on behalf of Benima Pty Ltd for a combined Concept Plan approval and Stage 1 detailed works for a new multi-denominational cemetery at 430-490 Douglas Park Drive, Douglas Park (Douglas Park Memorial Park - Concept Plan and Stage 1).

The site is located at 430-490 Douglas Park Drive, Douglas Park within the Wollondilly Local Government Area (LGA). The site is irregular in shape with a total size of 16,790m^2. It is legally described as Lot 2 in DP 250359. The site is mostly vacant with scattered vegetation and a single, residential dwelling with driveway accessible from Douglas Park Drive. The site comprises two street frontages, to the east is Mitchell Place and to the west is Douglas Park Drive.

This report accompanies a State Significant Development Application that seeks approval for a combined Concept Plan approval and Stage 1 detailed works for a new multi-denominational cemetery.

Concept approval is sought for the use and operation of the site as a cemetery with a maximum, staged capacity of up to 37,107 burial plots including a crematorium, chapel, administration building, vaults, remembrance sanctuaries, general site layout and all associated groundworks, roads, parking, pathways, landscaping and ancillary buildings. Refer to Figure 1-4.

This lot is subject to a proposed development application (DA) and will hereafter be referred to as the 'study area'.

The area containing the proposed development and all associated impact on habitat features is hereafter referred to as the 'development footprint' (refer to Figure 1-7).

Detail of the proposed works is listed in section 1.7.

Site specific SEARs and responses are provided in Table 1-1, whilst agency responses are provided in Table 1-2. Note, that the agency questions arose in March 2024.

NOTE: The BDAR and BAM-C were lodged in October 2025. This report has been updated only in the executive summary and section 5.2 in March 2026 to address additional mitigation measures.

Table 1-1 – Secretary's Environmental Assessment Requirements (Biodiversity Development Assessment Report)

SEARs	Response
Assess any biodiversity impacts associated with the concept development in accordance with the Biodiversity Conservation Act 2016 and the Biodiversity Assessment Method (BAM) 2020, including the preparation of a Biodiversity Development Assessment Report (BDAR), unless a waiver is granted or the site is on biodiversity certified land.	The site is not located on biodiversity certified land. Given that the proposal will impact more flora and/or fauna habitat than what could typically be reviewed in a BDAR waiver. A full BDAR has been undertaken to accommodate the proposal and its ecological impacts as streamlined assessments cannot be utilised for SSD applications.
If the concept development is on biodiversity certified land, provide information to identify the site (using associated mapping) and demonstrate the proposed development is consistent with the relevant biodiversity	Not applicable.

SEARs	Response
measure conferred by the biodiversity certification.	
Address Sections 7.1 and 7.2 of the BAM and Wollondilly Shire Council's Sustainability Policy of 'Protecting Biodiversity Principle'.	Sections 7.1 and 7.2 relate to designing the proposal to avoid and minimise direct, indirect and prescribed impacts. These are reference in section 5.1 – 5.3 of the BDAR.
include details of the measures proposed to address the offset obligation as follows: • the total number and classes of biodiversity credits required to be retired for the development/project. • the number and classes of like-for-like biodiversity credits proposed to be retired. • the number and classes of biodiversity credits proposed to be retired in accordance with the variation rules. • any proposal to fund a biodiversity conservation action. • any proposal to make a payment to the Biodiversity Conservation Fund.	Offset obligations are summarised in section 7 of the BDAR. Copies of the BAM-C outputs are attached in Appendix 8.
Provide spatial data associated with the survey and assessment as per the BAM.	Spatial data to be submitted with the BAM-C.

Table 1-2 – Agency advice

Agency	Agency Requirement	Relevant Section of Report
Wollondilly Council	Legislative framework The previous biodiversity related comments were based on the Threatened Species Conservation Act under the provisions of the *State Environmental Planning Policy (Savings and Transition) 2017* that has been superseded by the Biodiversity Conservation Act 2016. The statement in the Scoping Report "In this regard, the submitted Proposal is noted to involve the removal of native vegetation on land covered by the Biodiversity Values Map, one of the triggers for the Biodiversity Offset Scheme. The statement in the Scoping Report that Biodiversity impacts associated with the proposal will be assessed in accordance with the Biodiversity Conservation Act 2016 and the Biodiversity Assessment Method 2020 in the form of a Biodiversity Development Assessment Report" is consequently supported in principle. Council would expect the BDAR to demonstrate consistency with its Sustainability Policy that must include the following Biodiversity Protection: Protecting biodiversity Considering the broader planning framework, all decisions are made in accordance with the following order of priority, where achievable: 1. Avoidance of potential impacts to biodiversity. Where avoidance cannot be achieved then; 2. Mitigation of any unavoidable impacts of the decision on the site affected. Where mitigation cannot be achieved then; 3. Offsetting of any residual impacts of the decision within the Wollondilly LGA. Those proposals prepared under biodiversity frameworks at the state and/or Commonwealth level involving offsetting must demonstrate compliance with the above position in accordance with all relevant documents including legislation and Environmental Planning Instruments. It is Council's view that this approach will promote positive sustainable biodiversity outcomes on the site affected consistent with the objectives of this Policy.	This BDAR forms the required update to address ecological matters under the current legislation. A separate Koala Assessment Report has been written to address the koalas under the updated legislation.
Wollondilly Council	Applicable Koala Policy framework The previous Scoping Report was prepared in accordance with the applicable *State Environmental Planning Policy (Koala Habitat) Protection 44*. Council Environment Staff have received legal advice that there are no savings provisions between this document and the current applicable *State Environmental Planning Policy (Koala Habitat) 2019* (now Chapter 4 of the *Biodiversity and Conservation SEPP 2022*). The preparation of a Koala Assessment Report in accordance with Section 4.9 of this SEPP is viewed as appropriate given that impacts of the proposal on koala habitat will be likely more than low. This Report is requested to be prepared broadly based on the Template for such Reports in Part 3.3 of the Koala Guidelines 2019 in the absence of Guidelines for *Koala SEPP 2021* (now Chapter 4 within the *Biodiversity and Conservation SEPP*).	A KAR has been prepared as a standalone document to address the current SEPP.

Agency	Agency Requirement	Relevant Section of Report
Wollondilly Council	Requirements for the Biodiversity Development Assessment Report The following requirements for the BDAR, based on the Biodiversity Assessment Methodology, should be addressed: Note: It is assumed that a Biodiversity Development Assessment Report will be required for the development in accordance with comments above. A Flora and Fauna Report will be required in the event of a BDAR not being required based on the Biodiversity Offset Scheme Triggers.	
Wollondilly Council	Vegetation Mapping The Scoping Report in regard to Flora and Fauna is noted to state "A previous flora and fauna assessment undertaken on the site identified Critically Endangered Ecological Community (CEEC) Shale Sandstone Transition Forest (SSTF) and Cumberland Plains Woodland (CPW) on the site. This statement is based on the Tozer Vegetation Mapping that has been replaced by the East Coast Vegetation Mapping that formally commenced in mid-2023. This mapping has classified part of the site as the Critical Endangered Ecological Community and part of the site as the nonthreatened ecological community Sydney Hinterland Grey Gum Transition Forest These communities share a number of common species and identification can be difficult. The East Coast Mapping, while more ecologically rigorous requires ground-truthing to verify the actual community on a development site in terms of condition, extent and species diversity. It is requested that the BDAR be required to address the following regarding this matter based on the BAM: • Sufficient BAM Plots to obtain an accurate understanding of the boundaries between the vegetation communities across the site • Details of the assessment of vegetation assessment and production of mapping in accordance with Section 4 of the BAM. • Ecological based justification based on the species list for PCT Sydney Hinterland Transition Forest associated with the East Coast Mapping. It is noted that there are parts of the site that were classified as an ecological community under the former Tozer Mapping but not the new East Coast Mapping. It is requested that these parts of the site also be required to be assessed given the need for ground truthing.	DPE 2022 State Vegetation Type Map for Eastern NSW has been reviewed, and the vegetation mapping has been modified to suit current nomenclature for PCT naming. Justification of PCTs is provided in section 3.1.3. Required mapping for BDARs is supported throughout the report. BAM plots have been undertaken across the site to delineate the zones of condition. A minimum number of plots are required (section 2.4) for assessment to run the BAM-C.
Wollondilly Council	Flora and Fauna Surveys It is requested that the BDAR be required to involve targeted surveys of threatened flora and fauna species that are consistent with Guidelines separate to the BAM wherever achievable. It is further requested that the BDAR consider potential impacts to koala corridors and to consult Wollondilly Shire Council as part of this process based on Section 1.4 of the BAM.	Given the age of surveys on site, new plots were undertaken to ensure that survey methodology was current. Target surveys have been conducted for several flora and fauna groups, as discussed in sections 2 and 3. Impacts are discussed primarily in section 5.

Agency	Agency Requirement	Relevant Section of Report
Wollondilly Council	Application of avoidance and mitigation measures for impacts (direct/indirect and prescribed) The BDAR must be required to have demonstrated consistency with Sections 7.1 and 7.2 of the Biodiversity Assessment Methodology. The BDAR must also demonstrate this consistency in accordance with the component of the Protecting Biodiversity Principle of Council's Sustainability Policy.	The application of avoidance and mitigation measures are discussed primarily in section 5.
Wollondilly Council	Protecting biodiversity Considering the broader planning framework, all decisions are made in accordance with the following order of priority, where achievable: • Avoidance of potential impacts to biodiversity. Where avoidance cannot be achieved then; • Mitigation of any unavoidable impacts of the decision on the site affected. Where mitigation cannot be achieved then; • Offsetting of any residual impacts of the decision within the Wollondilly LGA. Those proposals prepared under biodiversity frameworks at the state and/or Commonwealth level involving offsetting must demonstrate compliance with the above position in accordance with all relevant documents including legislation and Environmental Planning Instruments. It is Council's view that this approach will promote positive sustainable biodiversity outcomes on the site affected consistent with the objectives of this Policy. The submitted proposal based on available information has been interpreted as resulting in the largescale clearance of native vegetation on the site. This is viewed as having a level of inconsistency with the above Principle and should not be supported without suitable mitigation measures that should include those below: • Retention of native vegetation and preferably on-site offsetting: Council requested a site-specific offset strategy for the initial proposed Concept Plan that involves reduced level of clearance to that currently being proposed. • Establishment of the Asset Protection Zone: Provision shall be made for Asset Protection Zones based on any Bushfire Assessment Report within the design of the proposal.	The application of avoidance and mitigation measures are discussed primarily in section 5. Offsetting residual impacts to areas within Wollondilly Shire is not a requirement of the BAM-C but would be considered highly appropriate. The credits may not be fully available though within just Wollondilly. APZs have been updated for the proposed land use, as detailed in the Bushfire Protection Assessment Report. A number of trees will be retained within the development footprint and should be protected through tree protection measures as addressed in the Arboricultural Impact Assessment as a mitigation measures. Within the BDAR, all vegetation within the development footprint has been assessed as impacted as per the requirements of the BAM section 8.1.1 which advises that in an area is likely to continue to degrade, then a full loss should be assumed.

Agency	Agency Requirement	Relevant Section of Report
Wollondilly Council	Consideration of Serious and Irreversible Harm by the Proposal The consent authority is required to refuse an application in accordance with s7.16(2) of the Biodiversity Conservation Act 2016 if it determines that that an activity will result in a serious and irreversible impact on biodiversity values (including listed species SAII entities). This provision has relevance to the identified Critical Endangered Ecological Community (CEEC) in accordance with Principle 1 within the SAII Guidelines produced by the Environment and Heritage Group. Council utilises a broad hierarchical approach in this regard of initially avoiding then mitigating impacts to retain the SAII entity on site to avoid adverse consideration of refusal on this ground. For the submitted proposal, Council would request that the BDAR apply this approach to the extent of the CEEC identified from the site-specific assessment component of the document.	An SAII assessment is provided in appendix 2 (species) and 3 (communities)
NSW Greater Sydney Branch – Biodiversity and Conservation	According to the Scoping Report, A previous flora and fauna assessment undertaken on the site identified Critically Endangered Ecological Community (CEEC) Shale Sandstone Transition Forest (SSTF) and Cumberland Plains Woodland (CPW) on the site. The high biodiversity value of portions of the site is also evidenced by the fact that areas of the site are mapped on the Biodiversity Values Map, which identifies land with high biodiversity value particularly sensitive to impacts from development and clearing. Based on the information provided, the development has the potential to impact the vegetation communities on the site. It is important to note that: • Both CPW and SSTF have undergone a very large reduction in distribution since European settlement. Today, only 9% of the original extent of CPW remains intact, and only 22% of SSTF. • In the opinion of the NSW Scientific Committee, CPW and SSTF are facing an extremely high risk of extinction in NSW in the immediate future. • CPW and SSTF contain several threatened plant and animal species which potentially occur on the site. CPW and SSTF are also entities at risk of serious and irreversible impacts (SAII entity), given their current rapid rate of decline, and given the extent of reduction in ecological function. BCS considers the proposed impact to the CPW and SSTF is likely to increase the extinction risk of both CPW and SSTF and would therefore likely be classified as a SAII. To alter this outcome, impacts on CPW and SSTF should be avoided. BCS therefore recommends that the proposal be subject to further refinement and revision to avoid impacts to the high biodiversity values including the CEECs, CPW and SSTF. The site is also adjacent to the St Marys Towers Biodiversity Stewardship Agreement site. The assessment must include adequate mitigation measures to ensure adverse impacts on these lands are avoided.	The accredited assessor can't make note on what constitutes an SAII, that is the decision for the consent authority. An SAII assessment has been undertaken in appendix 2 (species) and appendix 3 (communities) to present the relevant information for determination. Impacts to the St Marys Towers Biodiversity Stewardship Site Agreement are considered in section 5.2.3.

Agency	Agency Requirement	Relevant Section of Report
NSW Greater Sydney Branch – Biodiversity and Conservation	1. Biodiversity impacts related to the proposed development are to be assessed in accordance with Section 7.9 of the Biodiversity Conservation Act 2016 the Biodiversity Assessment Method and documented in a Biodiversity Development Assessment Report (BDAR). The BDAR must include information in the form detailed in the Biodiversity Conservation Act 2016 (s6.12), Biodiversity Conservation Regulation 2017 (s6.8) and Biodiversity Assessment Method 2020, including an assessment of the impacts of the proposal (including an assessment of impacts prescribed by the regulations).	Hence the preparation of this BDAR, to address 1.
NSW Greater Sydney Branch – Biodiversity and Conservation	2. The BDAR must document the application of the avoid, minimise and offset framework including assessing all direct, indirect and prescribed impacts in accordance with the Biodiversity Assessment Method 2020.	Avoidance and minimisation is discussed in section 5.1.
NSW Greater Sydney Branch – Biodiversity and Conservation	3. The BDAR must include details of the measures proposed to address the offset obligation as follows: • The total number and classes of biodiversity credits required to be retired for the development/project; • The number and classes of like-for-like biodiversity credits proposed to be retired; • The number and classes of biodiversity credits proposed to be retired in accordance with the variation rules; • Any proposal to fund a biodiversity conservation action; • Any proposal to conduct ecological rehabilitation (if a mining project); • Any proposal to make a payment to the Biodiversity Conservation Fund. If seeking approval to use the variation rules, the BDAR must contain details of the reasonable steps that have been taken to obtain requisite like-for-like biodiversity credits.	Section 6.2 and Appendix 8.
NSW Greater Sydney Branch – Biodiversity and Conservation	4. The BDAR must be submitted with all spatial data associated with the survey and assessment as per the BAM.	To be submitted with the finalisation of the BDAR.
NSW Greater Sydney Branch – Biodiversity and Conservation	5. The BDAR must be prepared by a person accredited in accordance with the Accreditation Scheme for the Application of the *Biodiversity Assessment Method Order* 2017 under s6.10 of the *Biodiversity Conservation Act* 2016.	Accredited authors are listed on the inside page, signed under section 1.3 and detailed of qualifications are listed in Appendix 7.

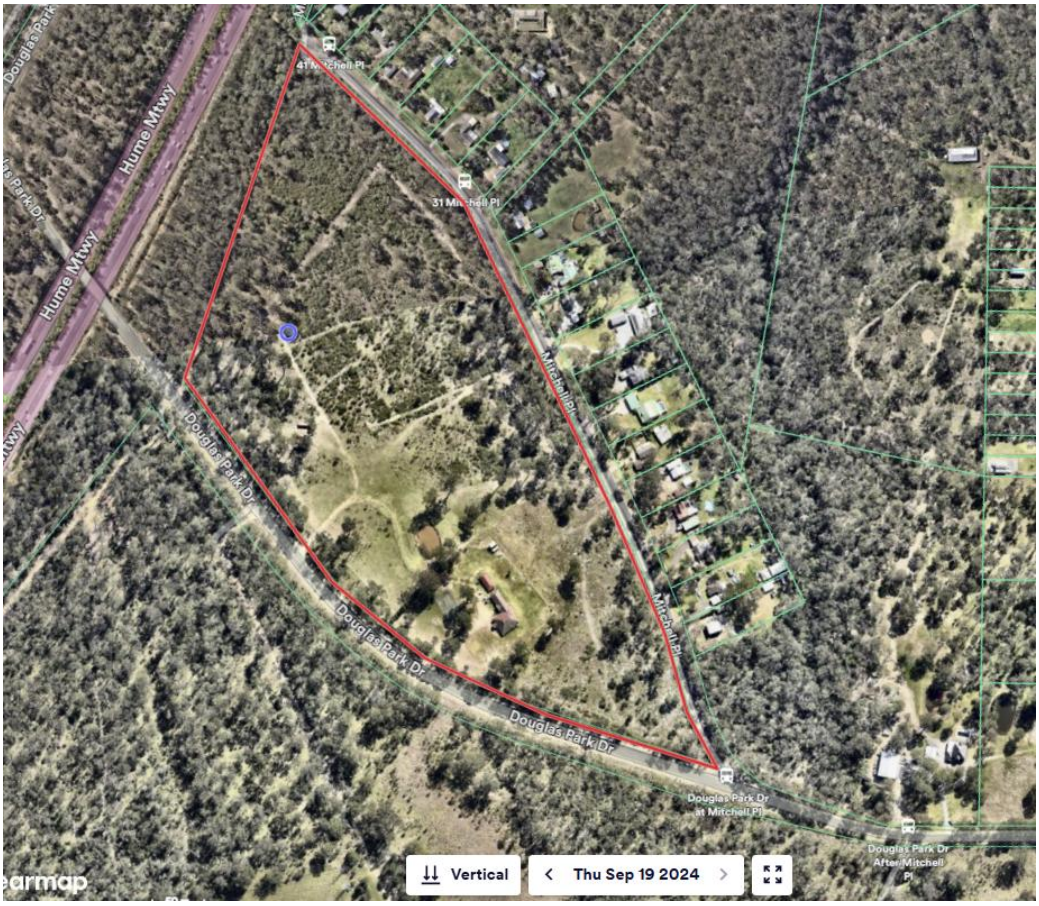


Figure 1-1 – Study area

1.1 Purpose

The purpose of this BDAR is to undertake assessment of impact on biodiversity, including threatened species, populations and ecological communities. Consequently, the following tasks have been completed:

- Undertake botanical survey to describe the vegetation communities and their conditions
- Undertake fauna habitat survey for the detection and assessment of fauna and their potential habitats
- Complete targeted surveys for threatened species, populations and ecological communities
- Prepare a BDAR in accordance with the requirements of the:
    a) Environment Protection and Biodiversity Conservation Act 1999 (*EPBC Act*),
    b) Biodiversity Conservation Act 2016 (*BC Act*),
    c) Biodiversity Conservation Regulation 2017 (*BC Reg.*),
    d) Fisheries Management Act 1994 (*FM Act*), and
- Prepare a BDAR in accordance with the Biodiversity Assessment Methodology (BAM) 2020

1.2 BOS thresholds

This project is a State Significant Project which automatically triggers offsetting under the BOS and therefore threshold criteria does not need consideration. Therefore, the proposal is assessed under the *Biodiversity Conservation Act* (*BC Act*), 2016.

1.2.1 Biodiversity Values Land

This section is not strictly necessary due to automatic entry into the BOS because the proposal is an SSD, however as the site contains areas containing lands mapped as having Biodiversity Values, the Biodiversity Values map is provided below for reference (refer to Figure 1-2).

Figure 1-2 – Biodiversity Values Map (purple) relative to the study area (yellow)
(Source: https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=BosetMap)

1.2.2 Area clearing threshold

This section is not strictly necessary due to automatic entry into the BOS because the proposal is an SSD, we have still provided the Threshold report below for reference (Table 1-3). The proposal is impacting biodiversity values and is not eligible for a BDAR Waiver.

Table 1-3 – BOS entry threshold report

Biodiversity Values Map and Threshold Report		
Date of Report Generation		25/02/2025 12:01 PM
1. Biodiversity Values (BV) Map - Results Summary (Biodiversity Conservation Regulation Section 7.3)		
1.1	**Does the development Footprint intersect with BV mapping?**	yes
1.2	**Was ALL BV Mapping within the development footprinted added in the last 90 days?** (dark purple mapping only, no light purple mapping present)	no
1.3	**Date of expiry of dark purple 90 day mapping**	N/A
1.4	**Is the Biodiversity Values Map threshold exceeded?**	yes
2. Area Clearing Threshold - Results Summary (Biodiversity Conservation Regulation Section 7.2)		
2.1	**Size of the development or clearing footprint**	112,787.2 sqm
2.2	**Native Vegetation Area Clearing Estimate (NVACE)** (within development/clearing footprint)	86,315.6 sqm
2.3	**Method for determining Minimum Lot Size**	LEP
2.4	**Minimum Lot Size** (10,000sqm = 1ha)	400,000 sqm
2.5	**Area Clearing Threshold** (10,000sqm = 1ha)	10,000 sqm
2.6	**Does the estimate exceed the Area Clearing Threshold?** (NVACE results are an estimate and can be reviewed using the Guidance)	yes
REPORT RESULT: Is the Biodiversity Offset Scheme (BOS) Threshold exceeded for the proposed development footprint area? (Your local council will determine if a BDAR is required)		**yes**

The development proposal would exceed the nominated clearing thresholds had it not required to automatically enter the BOS. Items 2.1 and 2.2 above should be ignored as these have been ground truthed.

1.3 Certification of BAM compliance

Section 6.15 of the *BC Act* regarding the currency of a BDAR requires:

(1) A biodiversity assessment report cannot be submitted in connection with a relevant application unless the accredited person certifies in the report that the report has been prepared on the basis of the requirements of (and information provided under) the biodiversity assessment method as at a specified date and that date is within 14 days of the date the report is so submitted.

(2) A relevant application is an application for planning approval, for vegetation clearing approval, for biodiversity certification or in respect of a biodiversity stewardship agreement.

Lindsay Holmes (BAAS 17032) is an accredited person under the *BC Act*. I L Holmes certify here that the report has been prepared on the basis of the requirements of (and information provided under) the BAM and I declare that I have no conflict of interest with this proposal. The data finalised in the BAM-C is 27 October 2025. The BDAR is to be lodged within 14 days of this date for compliance.

Parent BAM-C – 00049659

Child BAM-C – 00049660

Revision: 5

1.4 Terminology

Throughout this report the terms development footprint and study area are used. It is important to have a thorough understanding of these terms as they apply to the assessment.

Development footprint means the area directly affected by the proposal. It has the same meaning as "subject land" defined below.

Study area is the portion of land that encompasses all surveys undertaken and is usually all land contained within the designated property boundary. The study area extends as far as is necessary to assess all important biodiversity values known and likely to occur within the subject land and includes the development footprint and any additional areas which are likely to be affected by the proposal, either directly or indirectly.

Subject land is land to which the BAM is applied in Stage 1 & 2 to assess the biodiversity values. It includes land that may be a development site, clearing site, proposed for biodiversity certification or land that is proposed for a biodiversity stewardship agreement. In this case, it refers to the area designated as the development footprint and has the same meaning for the purposes of this report. The terms "subject land" and "development footprint" are interchangeable in this regard.

Direct impacts are those that directly affect the habitat and individuals. They include, but are not limited to, death through clearing, predation, trampling, poisoning of the animal/plant itself and the removal of suitable habitat. When applying each factor, consideration must be given to all of the likely direct impacts of the proposed activity or development.

Indirect impacts occur when project-related activities affect species, populations or ecological communities in a manner other than direct loss. Indirect impacts can include loss of individuals through starvation, exposure, predation by domestic and/or feral animals, loss of breeding opportunities, loss of shade/shelter, deleterious hydrological changes, increased soil salinity, erosion, inhibition of nitrogen fixation, weed invasion, fertiliser drift, or increased human activity within or directly adjacent to sensitive habitat areas. As with direct impacts, consideration must be given, when applying each factor, to all the likely indirect impacts of the proposed activity or development.

1.5 Site description

1.5.1 Site overview

Table 1-4 provides an overview the planning, cadastral and topographical details of the study area and an overview of the site and surrounds is shown on Figure 1-7 and Figure 1-8 (site and location maps).

Table 1-4 – Site features

Location	Lot 2 in DP 250359. 430-490 Douglas Park Drive, Douglas Park
Location description	The site is located approximately 1.8 km south of Douglas Park train station and has existing residence on the east and the Hume Motorway to the north.
Area	Approximately 16.79 ha
Local government area	Wollondilly LGA
Zoning	RU2 – Rural Landscape
Grid reference MGA-56	289030E 6213360N

Elevation	Approximately 132-150 m AHD
Topography	The site has gentle slopes generally between 1-3% and is situated close to a low ridgetop within low rolling hills. Local relief to 30 m, slopes are usually <5%. Broad rounded crests and ridges with gently inclined slopes.
Catchment and drainage	One (1) stream is mapped on site. However, site investigations reveal that it has not distinct channel development and discharges through a small shallow dam. The stream is not considered to be a watercourse.
Existing land use	Rural

1.5.2 Landscape features

Table 1-5 summarises the landscape features of the proposed development site in accordance with the BAM.

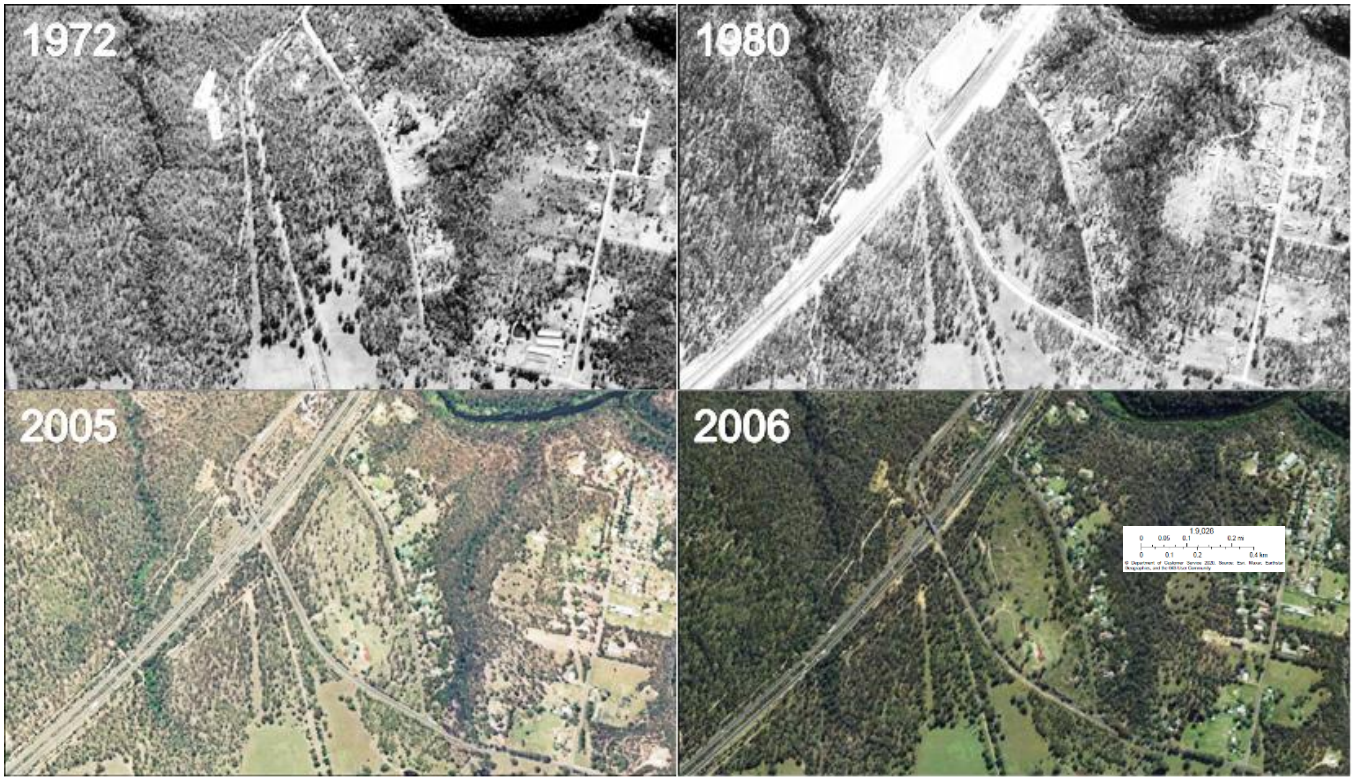
Table 1-5 – Landscape features

Patch size	>100 ha
IBRA bioregions and subregions	Sydney Basin bioregion – Cumberland subregion (Figure 1-7 and Figure 1-8)
NSW landscape region and area (ha)	Picton – Razorback Hills
Native vegetation extent in the buffer area (1500 m)	658 ha approx. and 66% Cover classes: 0–10%, 10–30%, **30–70%** and >70%
Cleared areas	Approximately 9-10 ha of the site has been cleared or extensively grazed in the past, with the majority of the area is a state of regrowth except for around the existing dwelling. Clearing has occurred throughout most of the site. However, there are remnant trees and scrub scattered around the margins of the study area and large portions of the former grazing lands in the northern and southern parts are disused and are in the early stages (3-10yrs) of regeneration.
Evidence to support differences between mapped vegetation extent and aerial imagery	Mapped vegetation closely matches aerial imagery. Unmapped vegetation is exotic.
Rivers and streams classified according to stream order	The site map (Figure 1-7) shows the study area with first, second and third order streams
Wetlands within, adjacent to and downstream of the site, including important wetlands	There is one dam across the site, shown on the site map (Figure 1-7). There are no wetlands within, adjacent or downstream of the site.

Connectivity features	The vegetation within the subject site has been significantly disturbed in the past. Much of the native vegetation in the central parts of the site has been removed and used as a lightly grazed pasture as illustrated in Figure 3-1. These central parts are in the early stages of regrowth with few tree saplings and a native shrub layer between 0.7 and 2 metres tall and 50 to 65% cover. The ground layer within this area is also mostly native, however it appears depauperate with regards to species diversity.
Geology and soils	Gently undulating rises on Wianamatta Group shales and Hawkesbury shale. Blacktown soil landscape.
Identification of method applied (i.e. linear or site-based)	Site based assessment

1.5.3 Historical Clearing and Land uses

Historical clearing was undertaken in the subject land prior to 2005. It is now used in part for grazing cattle, goats, sheep, cows and horses.



1.5.4 Zoning

The site is currently zoned RU2 under the Wollondilly LEP of 2011 (Figure 1-3) which is for rural use.

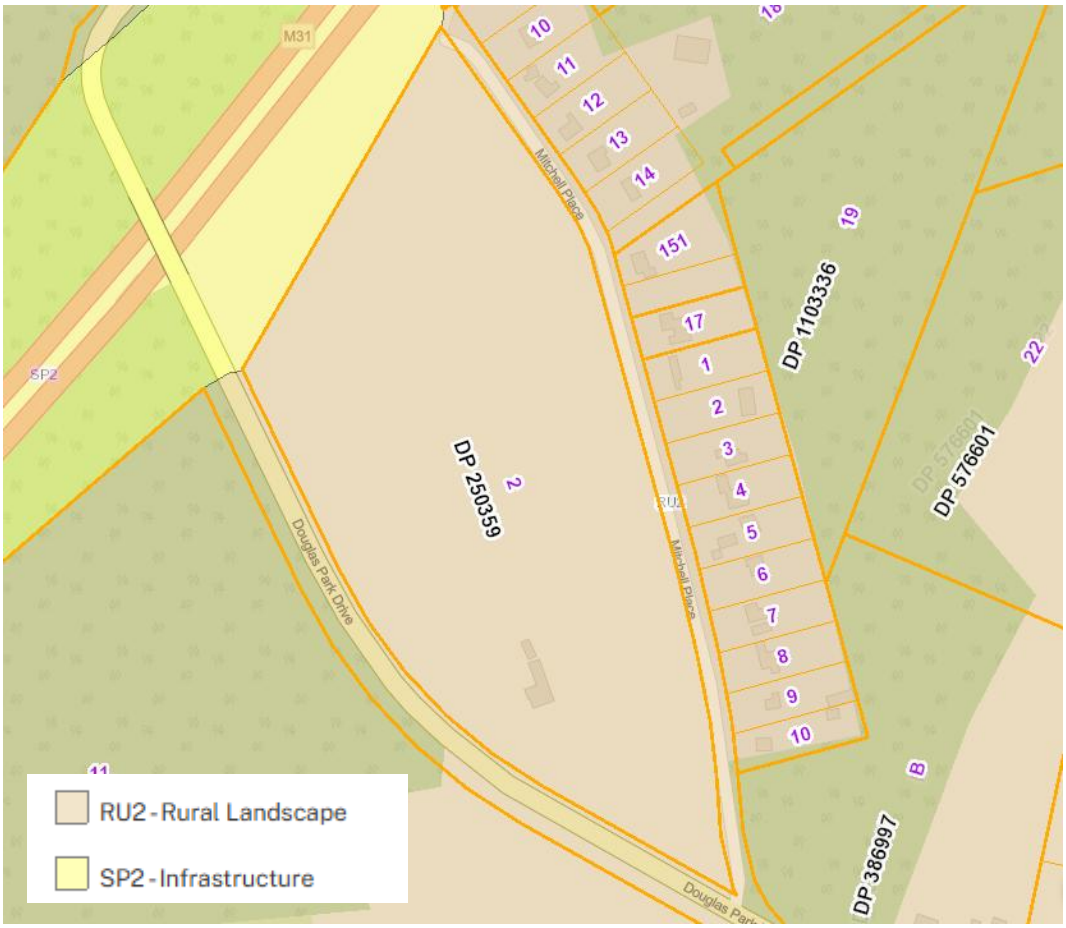


Figure 1-3 – Zoning
(Source: Planning Portal, 2026)

1.6 Development history

A Concept Plan (DA/2018/780/1) was approved by Wollondilly Shire Local Planning Panel in July 2020 for a Cemetery including 27,784 plots earthworks, landscaping, water storage, roads and car parking and approval for building envelopes at 430-490 Douglas Park Drive, Douglas Park. The concept approval outlined the requirement for future detailed design DAs for the implementation of the cemetery as follows:

- Stage 1 involves the erection of an internal fence, the purpose of which is to provide protection for flora and fauna from subsequent excavation and construction works;
- Stage 2 involves the erection of a perimeter fence around the outside of the site; and
- Stages 3-6 involve the excavation, construction and finalisation of the cemetery itself.

In December 2024, Wollondilly Shire Council approved a modification to the concept consent (DA/2018/780/1). The approval modified various conditions of consent in respect of the matters to be addressed at each of the stages outlined above.

In April 2025, development consent was approved by the NSW Land and Environmental Court for the flora and fauna protective fence envisaged as Stage 1 of the concept approval. The construction of the fence is to be / was undertaken in May 2025.

Note that the SSDA will supersede the previous concept approval, and approval for flora and fauna protection fencing will be sought again as part of this SSDA.

1.7 Proposed development

The development layout shown in Figure 1-4 involves the development of a cemetery and associated facilities including administrative building, café, chapel, crematorium, storage shed/garage, car parking, memorial gardens and lawn / monumental burial plots.

Asset Protection Zones (APZs), internal roads, infrastructure and burial lots where varying impacts on existing vegetation will occur have been depicted.

This BDAR has assessed the entire Concept site plan area, comprising both the Stage 1 and Stage 2 areas.

Figure 1-4 – Proposed development layout (Concept site plan)

(Source: Arcadia Landscape Architecture)

The Stage 1 works comprise the following:

- All preparatory site works including vegetation protection, enhancement and removal, demolition of existing structures, bulk excavation for burial zones, general ground works and utility service augmentation;
- Vehicular access / egress from Douglas Park Drive with separate vehicular egress only to Mitchell Place;

- Construction of internal roads, pathways and parking areas for approximately 118 car parking spaces inclusive of 1 hearse car parking space;
- Perimeter memorial pedestrian pathway with remembrance sanctuaries;
- Burial zones with a maximum capacity of 15,447 comprising shallow, single and triple layered burial plots;
- Construction of single storey chapel, single storey administration building and single storey storage shed and garage;
- Site landscaping, fencing, lighting and entry signage; and
- The cemetery operating hours, including public access, will be between the hours of 6:00am and 6:00pm, 7 days a week. The opening hours of the Chapel and Administration Building (including café) will be between 8:00am and 5:00pm, 7 days a week.

The burial zone preparation works within Stage 1 will be carried out sequentially within each burial zone and will be based on the demand for burial plots.

For a detailed project description refer to the Environmental Impact Statement prepared by Colliers Urban Planning.

Whilst the entire site is approximately 16.79 ha, the amount of native vegetation is estimated at 13.84 ha. 9.63 ha will be directly impacted through the construction of internal roads, buildings, APZs and boundary fences (illustrated on Figure 1-6).

Figure 1-5 - Extent of Stage 1 works

(Source: Arcadia Landscape Architecture)

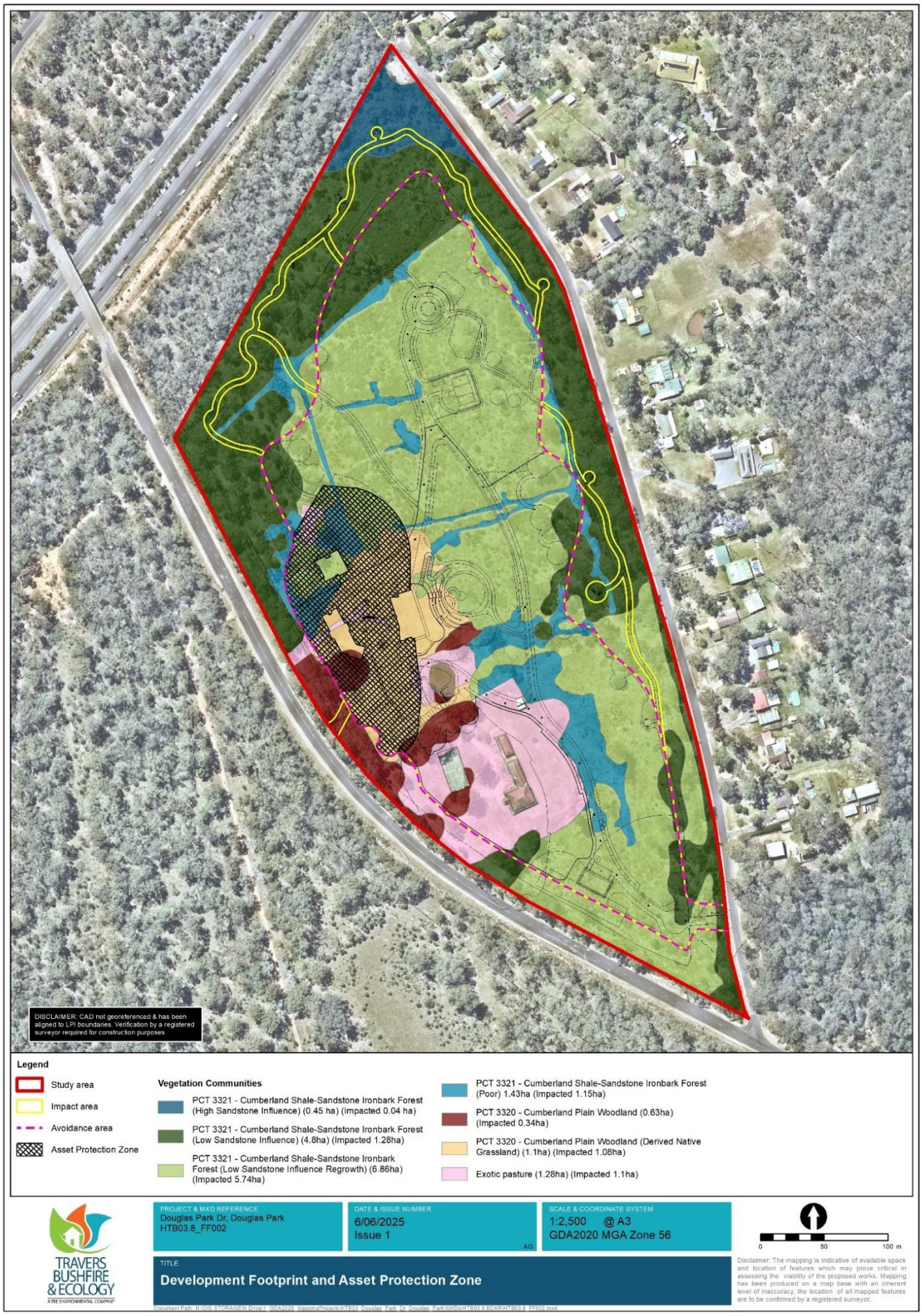


Figure 1-6 - Development footprint and asset protection zones

1.7.1 Environmental Planning and Assessment Act 1979 (EP&A Act)

Prior to any development taking place in New South Wales, a formal assessment needs to be made of the proposed work to ensure it complies with relevant planning controls and, according to its nature and scale, confirm that it is environmentally and socially sustainable. State, regional and local planning legislation indicates the level of assessment required, and outlines who is responsible for assessing the development. The development assessment and consent system are outlined in Part 4 and the infrastructure and environmental impact assessment system is outlined in Part 5 of the *EP&A Act*.

Section 7.14 State significant development or infrastructure

(1) This section applies to an application for development consent for State significant development under Part 4, or an application for approval for State significant infrastructure under Part 5.1, that is required under Division 2 to be accompanied by a biodiversity development assessment report.

(2) The Minister for Planning, when determining in accordance with the *EP&A Act* any such application, is to take into consideration under that Act the likely impact of the proposed development on biodiversity values as assessed in the biodiversity development assessment report. The Minister for Planning may (but is not required to) further consider under that Act the likely impact of the proposed development on biodiversity values.

(3) If the Minister for Planning decides to grant consent or approval and the biodiversity offsets scheme applies to the proposed development, the conditions of the consent or approval may require the applicant to retire biodiversity credits to offset the residual impact on biodiversity values (whether of the number and class specified in the report or other number and class). The residual impact is the impact after the measures that are required to be carried out by the terms or conditions of the consent or approval to avoid or minimise the impact on biodiversity values of the proposed development.

(4) A condition to retire biodiversity credits is required to be complied with before any development is carried out that would impact on biodiversity values. If the retirement of particular biodiversity credits applies to a stage of the development, compliance with the condition for their retirement is postponed until it is proposed to carry out that stage of the development.

(5) This section does not operate to limit the matters that the Minister for Planning may take into consideration in relation to the impact of proposed development on biodiversity values, the measures that the Minister may require to avoid or minimise those impacts or the power of the Minister to refuse to grant consent or approval because of those impacts.

1.7.2 Biodiversity Conservation Act 2016 (*BC Act*)

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.

The *BC Act* and the BC Reg establishes a regulatory framework for assessing and offsetting impacts on biodiversity values due to proposed developments and clearing. It establishes a framework to avoid, minimise and offset impacts on biodiversity from development through the Biodiversity Offsets Scheme. 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 new Biodiversity Assessment Method (BAM).

Development that is subject to the BAM includes development requiring consent under Part 4 of the *Environmental Planning and Assessment Act* 1979 (*EP&A Act*) (excluding complying

development) and State Significant Development and State Significant Infrastructure. Some types of development are deemed to have State significance due to the size, economic value or potential impacts. A proposal for any of the identified development types is SSD if it is either 1) is over a certain size, 2) is located in a sensitive environmental area, and/or 3) will exceed a specific capital investment. Major Projects that are State Significant Development (SSD) or State Significant Infrastructure (SSI) will usually need to assess impacts and to offset these. SSD applications are assessed by the Department of Planning and Environment.

Section 7.14 (State significant development or infrastructure), Point 4, of the *BC Act* states:

"A condition to retire biodiversity credits is required to be complied with before any development is carried out that would impact on biodiversity values."

Under Section 7.14 of the *BC Act,* major projects are required to enter the Biodiversity Offsets Scheme (BOS).

Development consent cannot be granted for non-State significant development under Part 4 of the *EP&A Act* if the consent authority is of the opinion, it is likely to have serious and irreversible impacts (SAII) on biodiversity values. The determination of SAII is to be made in accordance with principles prescribed section 6.7 of the BC Regulation 2017. The principles have been designed to capture those impacts which are likely to contribute significantly to the risk of extinction of a threatened species or ecological community in New South Wales.

The threatened species test of significance is used to determine if a development or activity is likely to significantly affect threatened species or ecological communities, or their habitats. It is applied as part of the Biodiversity Offsets Scheme entry requirements and for Part 5 activities under the Environmental Planning and Assessment Act (*EP&A Act*), 1979.

The test of significance is set out in s.7.3 of the *BC Act.* If the activity is likely to have a significant impact, or will be carried out in a declared area of outstanding biodiversity value, the proponent must either apply the Biodiversity Offsets Scheme or prepare a species impact statement (SIS).

The environmental impact of activities that will not have a significant impact on threatened species will continue to be assessed under the *EP&A Act.*

1.7.3 Fisheries Management Act 1994 (*FM Act*)

The *FM Act* provides a list of threatened aquatic species that require consideration when addressing the potential impacts of a proposed development. Where a proposed activity is located in an area identified as critical habitat, or such that it is likely to significantly affect threatened species, populations, ecological communities, or their habitats, an SIS is required to be prepared.

1.7.4 Environment Protection and Biodiversity Conservation Act 1999 (*EPBC Act*)

The *EPBC Act* requires that Commonwealth approval be obtained for certain actions. It provides an assessment and approvals system for actions that have a significant impact on matters of national environmental significance (NES). These may include:

- World Heritage Properties and National Heritage Places
- Wetlands of International Importance protected by international treaty
- Nationally listed threatened species and ecological communities
- Nationally listed migratory species
- Commonwealth marine environment

Actions are projects, developments, undertakings, activities, and series of activities or alteration of any of these. An action that needs Commonwealth approval is known as a controlled action. A controlled action needs approval where the Commonwealth decides the action would have a significant effect on an NES matter.

Where a proposed activity is located in an area identified to be of NES, or such that it is likely to significantly affect threatened species, ecological communities, migratory species or their habitats, then the matter needs to be referred to the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) for assessment. In the case where no listed federal species are located on site then no referral is required. The onus is on the proponent to make the application and not the Council to make any referral.

A threshold criterion applies to specific NES matters which may determine whether a referral is or is not required, such as for the EPBC-listed ecological communities Cumberland Plain Woodland and Shale-Gravel transition Forest. Consultation with DCCEEW may be required to determine whether a referral is or is not required. If there is any doubt as to the significance of impact or whether a referral is required, a referral is generally recommended to provide a definite decision under the *EPBC Act* thereby removing any further obligations in the case of 'not controlled' actions.

A significant impact is regarded as being:

> "important, notable, or of consequence, having regard to its context or intensity and depends upon the sensitivity, value, and quality of the environment which is impacted and upon the duration, magnitude, and geographical extent of the impacts. A significant impact is likely when it is a real or not a remote chance or possibility."

Source: EPBC Policy Statement

Guidelines on the correct interpretation of the actions and assessment of significance are located on the department's web site http://www.environment.gov.au/epbc/publications.

1.7.5 Coastal Management Act 2016 (CM Act)

The *Coastal Management Act* (*CM Act*, 2016) establishes the framework and overarching objects for coastal management in New South Wales. The Act commenced on 29 June 2018 and replaces the previous *Coastal Protection Act* (1979).

The purpose of the *CM Act* is to manage the use and development of the coastal environment in an ecologically sustainable way, for the social, cultural and economic well-being of the people of New South Wales.

The *CM Act* also supports the aims of the *Marine Estate Management Act* 2014, as the coastal zone forms part of the marine estate.

The *CM Act* defines the coastal zone, comprising four (4) coastal management areas:

1. coastal wetlands and littoral rainforests area; areas which display the characteristics of coastal wetlands or littoral rainforests that were previously protected by *SEPP 14* and *SEPP 26*
2. coastal vulnerability area; areas subject to coastal hazards such as coastal erosion and tidal inundation
3. coastal environment area; areas that are characterised by natural coastal features such as beaches, rock platforms, coastal lakes and lagoons and undeveloped headlands. Marine and estuarine waters are also included
4. coastal use area; land adjacent to coastal waters, estuaries and coastal lakes and lagoons.

The *CM Act* establishes management objectives specific to each of these management areas, reflecting their different values to coastal communities.

1.7.6 Licences

Individual staff members of *Travers bushfire & ecology* are licensed under Clause 20 of the National Parks and Wildlife (Land Management) Regulation 1995 and Sections 120 & 131 of the *National Parks and Wildlife Act* 1974 to conduct flora and fauna surveys within service and non-service areas. NPWS Scientific Licence Numbers: SL100848.

Travers bushfire & ecology staff are licensed under an Animal Research Authority issued by the NSW Department of Primary Industries. This authority allows *Travers bushfire & ecology* staff to conduct various fauna surveys of native and introduced fauna for the purposes of environmental consulting throughout New South Wales.

Figure 1-7 – Site map

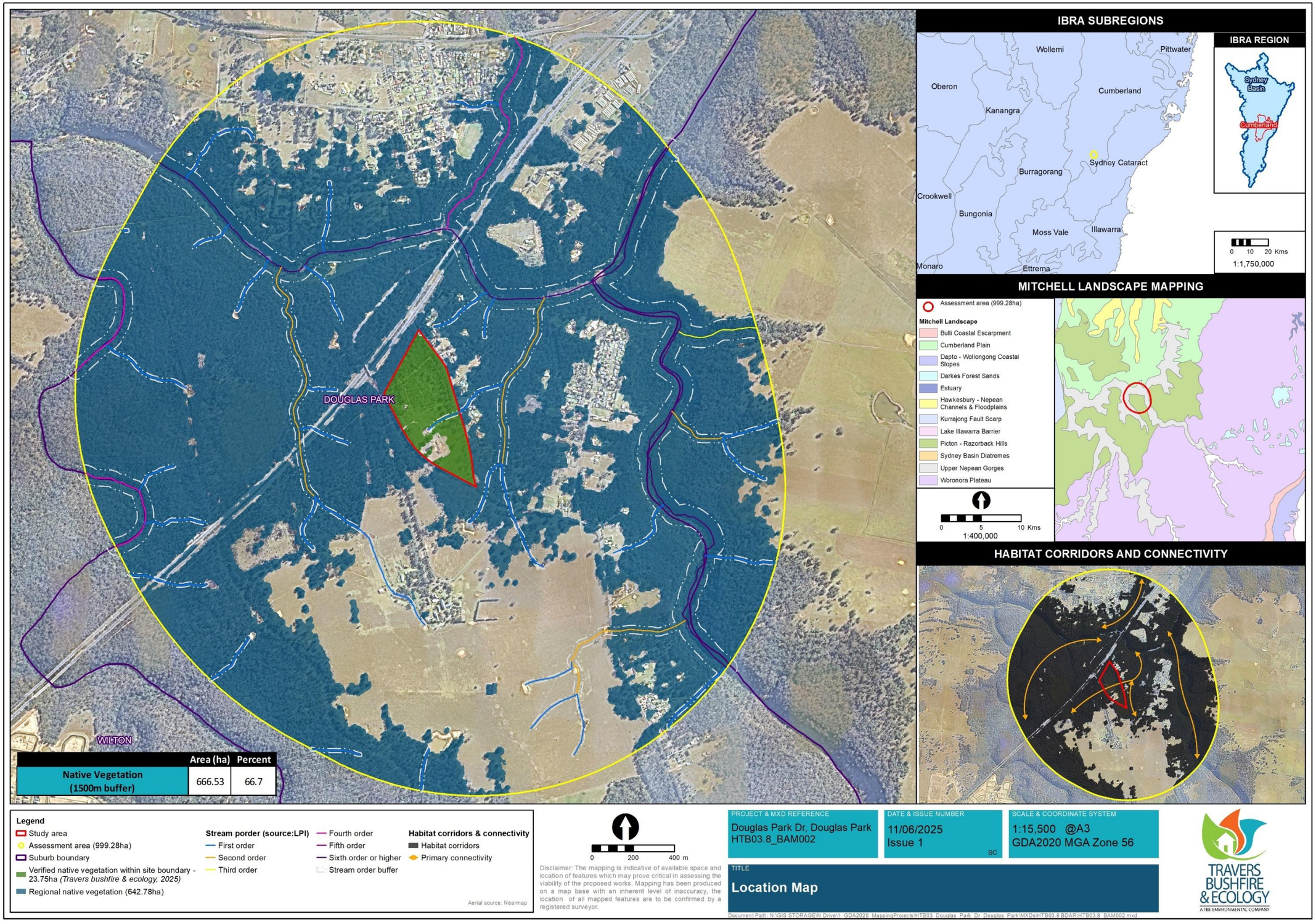


Figure 1-8 – Location map

2. SURVEY METHODOLOGY

2.1 Presurvey information collation & resources

Documents reviewed:

The following documents, reports and information sources were utilised in the preparation of this report:

- Concept Plan prepared by John M. Daly & Associates Pty Ltd.
- Vegetation Management Plan prepared by Travers bushfire & ecology (2019)
- Flora and Fauna Assessment Report prepared by Travers bushfire & ecology (2019)
- Flora and Fauna Assessment Report - Lot 2 DP 250359, 430–490 Douglas Park Drive, Douglas Park, prepared by Travers bushfire & ecology for Stage 1 Internal Fenceline Development Application (2025)

Technical resources utilised:

Legislation

- Environment Protection and Biodiversity Conservation Act 1999 (*EPBC Act*)
- Biodiversity Conservation Act 2016 (*BC Act*)
- Biodiversity Conservation Regulation 2017 (*BC Reg.*)
- Fisheries Management Act 1994 (*FM Act*)

Survey guidelines

- Survey guidelines for Australia's threatened birds (DEWHA 2010)
- Survey guidelines for Australia's threatened frogs (DEWHA 2010)
- Survey guidelines for Australia's threatened mammals (DEWHA 2011)
- Survey guidelines for Australia's threatened bats (DEWHA 2010)
- Survey guidelines for Australia's threatened reptiles (DEWHA 2011)
- Matters of National Environmental Significance (Commonwealth of Australia 2013)
- Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities 2004 (working draft), Department of Environment and Conservation (DEC)
- Threatened Species Survey and Assessment Guidelines: Field Survey Methods for Fauna – Amphibians (DECC – April 2009a)
- Hygiene Protocol for the Control of Diseases in Frogs (DECC 2008)
- Region based guide to the echolocation calls of Microchiropteran bats (DEC 2004)
- Species credit threatened bats and their habitats (DPIE 2018)
- Field survey methods: Best practice field survey methods for environmental consultants and surveyors when assessing proposed development sites or other activities on sites containing threatened species, populations or ecological communities (OEH 2004)
- Surveying threatened plants and their habitats: NSW survey guide for the Biodiversity Assessment Method (DPIE 2020)

Mapping resources

- Aerial photographs (Google Earth Pro / Spatial Information Exchange / NearMap)
- Topographical maps (scale 1:25,000)

Threatened species records

- BioNet database which holds data from a number of custodians - DCCEEW (2024 to 10 km)
- Atlas of NSW Wildlife (OEH 2019)
- Atlas of Living Australia (NCRIS/GBIF 2017)
- Birdata (Birdlife Australia 2017)
- NSW Bird Atlas (NSWBA 2017)
- OZCAM (Online Zoological Collection of Australian Museums 2017)
- EPBC Protected Matters Search Tool - DCCEEW (2024 to 10 km)

Vegetation mapping/resources:

- BioNet Vegetation Classification System
- NSW State Vegetation Type Map (DPE 2022)
- The Native Vegetation of the Cumberland Plain (OEH 2002)
- Remnant Vegetation of the Western Cumberland subregion (OEH 2013)
- Surveying threatened plants and their habitats: NSW survey guide for the Biodiversity Assessment Method (DPIE 2020*)*

Previous ecological reports:

Flora & Fauna Assessment, Proposed Cemetery, Lot 2 DP 250359, 430 – 490 Douglas Park Drive, Douglas Park prepared by Travers bushfire & ecology (2019)

Four (4) threatened fauna species Little Lorikeet (*Glossopsitta pusilla*), Grey-headed Flying-fox (*Pteropus poliocephalus*), Eastern Bentwing-bat (*Miniopterus orianae oceanensis*) and Eastern Falsistrelle (*Falsistrellus tasmaniensis*) no threatened flora species, and two (2) EECs, Shale Sandstone Transition Forest in the Sydney Basin Bioregion and Cumberland Plain Woodland in the Sydney Basin Bioregion, were recorded within the study area. The Eastern Falsistrelle was recorded to a 'possible' level of certainty.

In respect of matters required to be considered under the *EPBC Act,* one threatened fauna species Grey-headed Flying-fox (*Pteropus poliocephalus*), no protected migratory bird species, no threatened flora species, and two (2) EECs, Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest and Shale-Sandstone transition Forest, listed under this Act were recorded within the study area.

Flora and Fauna Assessment Report - Lot 2 DP 250359, 430–490 Douglas Park Drive, Douglas Park, prepared by Travers bushfire & ecology for Stage 1 Internal Fenceline Development Application (2025)

No further threatened species were recorded on site as part of this Flora and Fauna Assessment Report.

2.2 Flora survey methodology

Survey has been undertaken over the following periods. The flora surveys previously undertaken for vegetation integrity assessment and targeted threatened surveys on site are illustrated on Figure 3-1.

2018

Botanical survey was initially undertaken on 8 and 13 February 2018.

Botanical survey included a random meander in accordance with Cropper (1993) to gain a full species list of the plants within the site. Four (4) 20 m x 20 m quadrats flora quadrats were conducted with a 50 m transect in accordance with the BAM to accurately determine the vegetation communities within the site. A review of the Atlas of NSW Wildlife (OEH 2019) and the Commonwealth protected matters search tool (DOEE 2019) was undertaken prior to the site visit to determine threatened species previously recorded within 10 km of the subject site.

2019

Nine (9) additional BAM quadrats were assessed on the 23rd May, and the 3rd, 17th and 18th of June, 2019.

Threatened species and opportunistic fauna habitat searches were conducted during the random meander and during stratified surveys. Targeted threatened species survey was undertaken on the 17th and 18th of June, 2019 as near-parallel belt transects in accordance with the NSW Guide to Surveying Threatened Plants (OEH 2016) for *Grevillea parviflora* subsp. *parviflora, Melaleuca deanei* & *Persoonia bargoensis.*

Given that this survey is now just past 5 years old, the threatened species records from the survey abovementioned are not compliant and will therefore not be included as part of the BAM-C.

2024

Additional flora survey was undertaken:

- 27th and 28th of May 2024: *Acacia bynoeana, A. pubescens, Darwinia biflora, Grevillea parviflora subsp. parviflora*, *Persoonia hirsuta* & *Persoonia nutans*
- 17th and 18th of June 2024: *Grevillea parviflora* subsp. *parviflora, Melaleuca deanei* & *Persoonia bargoensis*
- 23rd of July 2024: *Grammitis stenophylla, Hibbertia superans, Micromyrtus minutiflora* & *Pimelea spicata*

A review of the Atlas of NSW Wildlife (DPE 2022) was undertaken prior to the site visit to determine threatened species previously recorded within 10 km of the subject site, and relevant target searches were undertaken as suited, generally as near linear transects underneath or adjacent to remnant canopy vegetation.

Stratified survey using the BAM was undertaken for eleven (11) BAM plots.

All plot sheets utilised for the BAM calculator are in Appendix 4.

2025

Additional targeted surveys for threatened flora species were undertaken on the subject land in March for *Epacris purpurascens* var. *purpurascens, Callistemon linearifolius, Grevillea parviflora* subsp. *parviflora, Persoonia bargoensis, Genoplesium baueri, Leucopogon exolasius, Persoonia glaucescens* and *Pimelea curviflora* var. *curviflora*. One (1) additional *Persoonia bargoensis* was observed on site.

In May 2025, parts of PCT 3321 regrowth were revised and split into a new zone titled PCT 3321_poor which appears to be areas where there is newer regrowth, a lack of trees above 10cm DBH or ongoing management, e.g., tracks with native groundcovers. Two (2) additional BAM plots were undertaken, and a handheld Trimble GPS was used to delineate the boundary at these locations. Areas of exotic groundcover (85% or higher) were delineated around the dam also.

In October 2025, additional 5m parallel transect target surveys were undertaken on the subject land for *Hibbertia puberula, Pterostylis saxicola, Pultenaea pedunculata* and *Tetratheca glandulosa.*

The additional BAM plot sheets have been added to Appendix 4.

2.3 Fauna survey methodology

Site survey effort accounting for techniques deployed, duration, and weather conditions are outlined in Table 2-1 and are depicted on Figure 3-5.

Diurnal birds

Diurnal birds are typically identified visually and / or by calls during diurnal surveys. Habitat searches to identify nests, feathers, eggs, or signs of foraging may be utilised more specifically for identifying threatened diurnal bird species.

Visual observations are made more accurate with the use of binoculars and where necessary or practical, with the use of a spotting scope. Binoculars are carried by the fauna surveyor at all times during nocturnal and diurnal fauna surveys. A birding field guide is always available in the field when required for verifications.

Calls are identified in the field by the fauna surveyor. If an unknown call is heard it is cross matched to comprehensive bird call reference libraries taken into the field. A call library of birds occupying the NSW coastal areas is also stored into a mobile phone for a quick reference. This phone is carried into the field at all times and may be used for call-playback methods and recording calls for later analysis.

Six (6) diurnal bird census points were undertaken within the study area. A minimum of 20 minutes of survey was undertaken at each census point in an area radiating out to between 30-50m. Bird census points were selected to give an even spread and representation across the site and its communities (see Figure 3-5). Census points were also commenced in locations where bird activity was apparent, as often different small bird species are found foraging together. Opportunistic diurnal bird survey was conducted between census points and whilst undertaking other diurnal surveys.

Targeted searches for signs of Glossy Black-Cockatoos and Gang-gang Cockatoos foraging activity were carried out. Seeding Allocasuarina trees were searched below for presence of chewed cones by Glossy Black-Cockatoos.

Observational day time surveys were conducted for Little Eagle and White bellied Sea-Eagle.

Diurnal walking transects were undertaken through the regrowth scrub areas of the subject site to flush out any ground / shrub birds.

Nocturnal birds

Searches for evidence of Owl roosts, key perches and potential Owl roosting / breeding hollows are made during diurnal site searches. Whitewash, feathers or regurgitated pellets give key information.

Generally, the presence of nocturnal birds during the nocturnal period is first determined by quiet listening after dusk for calls by individuals emerging from diurnal roosts. Following this, and provided no calls are heard, call-playback techniques are employed for threatened species that have suitable habitat present.

Masked Owl (*Tyto novaehollandiae*), Powerful Owl (*Ninox strenua*) and Barking Owl (*Ninox connivens*) were targeted during 2019 survey by call-playback techniques given the possibility of foraging habitat present.

No suitable nesting habitat for Owls was identified within the study site.

Diurnal survey included searches for any signs of threatened Owl roosting activity.

Arboreal and terrestrial mammals

Koala (*Phascolarctos cinereus*), Yellow-bellied Glider (*Petaurus australis*) and Squirrel Glider (*Petaurus norfolcensis*) were also targeted during 2019 survey by nocturnal call-playback techniques given a degree of habitat potential.

Given numerous local surrounding records of Koala the complete Spot Assessment Technique described by Phillips & Callaghan (2008) was undertaken as a measure of Koala 'activity'. In this case the proportion of trees showing signs of Koala use is calculated and the location and density of droppings found were documented. Four (4) SAT points survey were undertaken. SAT points were spread across study area to give an accurate representation of the site and located to account for almost all potential Koala feed trees (*Eucalyptus tereticornis*).

Specially constructed denning (nesting) tubes made from both timber and PVC and in accordance with findings from Rueegger et al (2012) and approved by Dr Ross Goldingay were deployed to target presence of Eastern Pygmy-possum, particularly nesting females.

The PVC tubes (80 mm diameter x 240 mm long) have both ends covered and sealed with PVC caps. A 60 mm diameter cardboard post-pack tube wrapped in bubble wrap for insulation and capped at the base is placed inside the PVC pipe. A 33 mm drill hole on the side at one end permits access and Velcro tape stuck down the internal cylinder allows the animal to climb down to the base. Cut lines around the outer surface of the tube permit small mammals to climb up the outside. Denning tubes are placed vertically in shrub trees (preferably flowering banksias). If no animals are found residing within the tube after a prolonged survey period (generally 6 weeks) use may then instead also be identified from bedding material present. Pygmy Possums use fine bedding material such as Isopogon and Banksia ericifolia by comparison to Feather-tail Gliders and Antechinus which use eucalypt leaves.

The timber tubes were constructed from either sourced naturally hollow and cleaned didgeridoos or thick bamboo sections; all of similar internal diameter, insulation and 33mm entry hole.

Bats

Mega-chiropteran bat species, such as Grey-headed Flying-fox, are surveyed by targeting flowering / fruiting trees during spotlighting activities and by listening to distinctive vocalisations.

One (1) passive microbat recording station was deployed and active microbat recording was undertaken during spotlighting during the 2019 survey period. One (1) passive microbat recording station was deployed during the 2024 survey period at a potential cleared flyway area. Three (3) passive microbat recording stations were deployed during the 2025 survey period in the northern side of the study area at potential cleared flyways.

Amphibians

Calls are identified in the field by the fauna surveyor. For similar calling species, or if an unknown male call is heard, it is cross matched to frog call reference libraries taken into the field. A call library of frogs occupying the NSW coastal areas is also stored into a mobile phone

for a quick reference. This phone is carried into the field at all times and may be used for call-playback methods and recording calls for later analysis.

Diurnal opportunistic habitat searches for extant amphibian species during diurnal survey and nocturnal survey effort of spotlighting and call identification.

Reptiles

Diurnal opportunistic searches for extant reptile species during diurnal and nocturnal survey.

Invertebrates

Given the proximity to previous Bionet records of Cumberland Plain Land Snail (*Meridolum corneovirens*) and the recorded presence of its typical host community, target surveys were undertaken. Searches were detailed within the Cumberland Plain Woodland Community however as this community is the most highly degraded portion on site at the existing homestead, further searches were undertaken opportunistically throughout the remaining study area where suitable shelter habitat was present as well as simultaneously whist undertaking SAT assessment for Koala.

Mostly logs were turned but also artificial debris providing shelter opportunities.

Habitat trees

Hollow-bearing trees were identified and recorded within the subject site on a Trimble handheld GPS unit during 2019 and 2024 surveys. All data such as hollow types, hollow size, tree species, diameter at breast height, canopy spread, and overall height were collected and a metal tag with the tree number placed on the trunk for field relocation purposes.

A summary of hollow-bearing tree results is provided in Table 3-9.

Significant habitat trees

Survey was also undertaken for presence of any significant habitat trees within the study area (entire lot) beyond the study area boundary. Significant habitat trees are defined as trees containing large hollows suitable for use by owls and/or containing a number of good quality hollows typically consisting of more than one medium (10-30cm) sized hollow. A tree may also be considered significant where evidence of use by select fauna is found such as Yellow-bellied Glider sap feed tree, raptor nest, or owl roost. Therefore, significant habitat trees are identified beyond the development landscape as indirect impacts on such important habitat features need consideration.

No significant habitat trees were identified during survey.

2.4 Field survey effort

Table 2-1 and Table 2-2 below detail the flora and fauna survey effort undertaken for the development footprint.

Table 2-1 – Fauna survey effort

Fauna group	Date	Weather conditions	Survey technique(s)	Time effort (24hr)
Diurnal birds	16/7/19	0/8 cloud, Light wind WSW, no rain, temp 10-12ºC	Diurnal census / opportunistic	2hrs 55mins 1420 - 1715
	17/7/19	0/8 cloud, no wind, no rain, temp 14-20ºC	Diurnal census / opportunistic	4hrs 10mins 1005 - 1415
	3/6/24	4/8 cloud, Light wind W, no rain, temp 4.3-17 ºC	Hollow inspection / Raptor nest search / Diurnal census / opportunistic	2hrs 45mins 1330 - 1615
	4/6/24	4/8 cloud, Light wind SSW, no rain, temp 4.5-16.9 ºC	Hollow inspection / Raptor nest search / Diurnal census / opportunistic	5hrs 30mins 1000 - 1230, 1320 - 1620
	20/6/24	2/8 cloud, Light wind N, no rain, temp 0-16.5 ºC	Raptor nest search / opportunistic	4hrs 1130-1530
	24/1/25	7/8 cloud, strong winds, SSE, no rain, temp 21-25ºC	Targeted search for raptor nests, Targeted aural-visual search for Gang-gang Cockatoos	4hrs 10mins 1020-1430
	9/10/25	0/8 cloud, no winds, no rain, temp 26-30ºC	Diurnal census / opportunistic	6hrs 30mins 0900-1530
Nocturnal birds	16/7/19	0/8 cloud, Light wind WSW, no rain, temp 10-12ºC	Spotlighting	3hrs 15mins 1715 - 2030
			Call playback (section 2.5 species)	Commenced @ 1800
	3/6/24	4/8 cloud, Light wind W, no rain, temp 4.3-17 ºC	Spotlighting	2hrs 25mins 1750 - 815
	4/6/24	4/8 cloud, Light wind SSW, no rain, temp 4.5-16.9 ºC	Spotlighting	1hr 1730 - 1830
Arboreal mammals	16/7/19	0/8 cloud, Light wind WSW, no rain, temp 10-12ºC	Spotlighting	3hrs 15mins 1715 - 2030
			Call playback (section 2.5 species)	Commenced @ 1800
	3/6/24	4/8 cloud, Light wind W, no rain, temp 4.3-17 ºC	Spotlighting	2hrs 25mins 1750 - 815
	4/6/24	4/8 cloud, Light wind SSW, no rain, temp 4.5-16.9 ºC	Spotlighting	1hr 1730 - 1830
	24/1/25 – 11/3/25	Various weather conditions	Targeted survey for Eastern Pygmy Possum – 16 x denning tubes deployed	6.5 weeks (46 days)
Terrestrial mammals	16/7/19	0/8 cloud, Light wind WSW, no rain, temp 10-12ºC	Spotlighting	3hrs 15mins 1715 - 2030
	3/6/24	4/8 cloud, Light wind W, no rain, temp 4.3-17 ºC	Spotlighting	2hrs 45mins 1330 - 1615
	4/6/24	4/8 cloud, Light wind SSW, no rain, temp 4.5-16.9 ºC	Spotlighting	1hr 1730 - 1830
Bats	16/7/19	0/8 cloud, Light wind WSW, no rain, temp 10-12ºC	Spotlighting & active monitoring	3hrs 15mins 1715 - 2030
			Anabat (Passive monitoring)	Overnight from 1715
	3/6/24	4/8 cloud, Light wind W, no rain, temp 4.3-17 ºC	Spotlighting & active monitoring	2hrs 25mins 1750 - 815
			Anabat (Passive monitoring)	Overnight from 1750
	4/6/24	4/8 cloud, Light wind SSW, no rain, temp 4.5-16.9 ºC	Spotlighting & active monitoring	1hr 1730 - 1830

Fauna group	Date	Weather conditions	Survey technique(s)	Time effort (24hr)
	24/1 – 3/2/25	Variable weather conditions	3 x Anabat (Passive monitoring)	10 nights (30 recorder nights)
Reptiles	16/7/19	0/8 cloud, Light wind WSW, no rain, temp 10-12ºC	Opportunistic habitat searches	2hrs 55mins 1420 - 1715
	17/7/19	0/8 cloud, no wind, no rain, temp 14-20ºC	Opportunistic habitat searches	4hrs 10mins 1005 - 1415
	3/6/24	4/8 cloud, Light wind W, no rain, temp 4.3-17 ºC	Opportunistic habitat searches	2hrs 45mins 1330 - 1615
	4/6/24	4/8 cloud, Light wind SSW, no rain, temp 4.5-16.9 ºC	Opportunistic habitat searches	5hrs 30mins 1000 - 1230, 1320 - 1620
	20/6/24	2/8 cloud, Light wind N, no rain, temp 0-16.5 ºC	Opportunistic habitat searches	4hrs 1130-1530
Amphibians	16/7/19	0/8 cloud, Light wind WSW, no rain, temp 10-12ºC	Opportunistic habitat searches	2hrs 55mins 1420 - 1715
		0/8 cloud, Light wind WSW, no rain, temp 10-12ºC	Spotlighting & call identification	3hrs 15mins 1715 - 2030
	3/6/24	4/8 cloud, Light wind W, no rain, temp 4.3-17 ºC	Opportunistic habitat searches	2hrs 45mins 1330 - 1615
			Spotlighting & call identification	2hrs 25mins 1750 - 815
	4/6/24	4/8 cloud, Light wind SSW, no rain, temp 4.5-16.9 ºC	Opportunistic habitat searches	5hrs 30mins 1000 - 1230, 1320 - 1620
			Spotlighting & call identification	1hr 1730 - 1830
	20/6/24	2/8 cloud, Light wind N, no rain, temp 0-16.5 ºC	Opportunistic habitat searches	4hrs 1130-1530
Molluscs	16/7/19	0/8 cloud, Light wind WSW, no rain, temp 10-12ºC	Opportunistic habitat searches	2hrs 55mins 1420 - 1715
	17/7/19	0/8 cloud, no wind, no rain, temp 14-20ºC	Opportunistic habitat searches	4hrs 10mins 1005 - 1415
	4/6/24	4/8 cloud, Light wind SSW, no rain, temp 4.5-16.9 ºC	Opportunistic habitat searches	5hrs 30mins 1000 - 1230, 1320 - 1620
	20/6/24	2/8 cloud, Light wind N, no rain, temp 0-16.5 ºC	Opportunistic habitat searches	4hrs 1130-1530

Table 2-2 – Flora survey effort

Flora survey	Survey technique(s)	Dates
Vegetation communities	Survey of the boundaries of all communities – field verification and aerial photographic interpretation Vegetation condition assessment – Biometric field method or as per BAM 2020	8 &13 February 2018 23 May 2019 3 &17-18 June 2019 27-28 May 2024 17- 18 June 2024 4 June 2025
Stratified sampling	Four (4) 20 m x 20 m BAM plots within the subject land Nine (9) 20 m x 50 m BAM plots within the subject land One (1) 40 m x 100 m BAM plot within the subject land One (1) 20 m x 50 m BAM plot within the subject land Two (2) 20 m x 20 m BAM plots within the subject land	08 &13 February 2018 23 May 2019 3 &17-18 June 2019 28 May 2024, 17-18 June 2024 18 June 2024 23 July 2024

Flora survey	Survey technique(s)	Dates
		4 June 2025
Targeted searches	Target searches (belt transects) in known habitats Target search along proposed stage 1 fence line 23 July 2024	8 &13 February 2018 17-18 June 2019 27-28 May 2024 18 June 2024 23 July 2024 25 March 2025 9 October 2025

Table 2-3 – Plot and transect survey effort – development footprint

Veg zone no.	PCT	Condition	Area impacted (ha)	Minimum plots required	Plot sampled	Plot identifier	Plot size	Easting centroid	Northing centroid	Bearing
1	3320	Moderate – Good	0.34	1	1	Q8	10 m x 100 m	288963.2 E	6213200 N	322.91
2	3320 (Derived)	Poor	1.08	1	2	Q5 Q11	20 m x 50 m	289006.9 E 288948.6 E	6213353 N 6213314 N	279.11 150.30
3	3321 High Sandstone Influence	high_sandstone	0.04	1	1	Q3	20 m x 50 m	289016.8 E	6213685 N	172.12
4	3321 Low Sandstone Influence	low_sandstone	1.28	1	4	Q1 Q2 Q6 Q7	20 m x 50 m	289024 E 288927.2 E 289154.1 E 289217.8 E	6213619 N 6213534 N 6213361 N 6213112 N	214.85 205.78 105.5 264.21
5	3321 Low Sandstone Influence Regrowth	regrowth	5.74	3	3	Q4 Q9 Q10	20 m x 50 m	289006.9 E 289072.1 E 289180.7 E	6213418 N 6213270 N 6213064 N	225.38 73.93 166.52
6	3321 Low Sandstone Influence Regrowth	poor	1.15	1	2	L1 L2	20 m x 50 m	289139 E 289062 E	6213211 N 6213279 N	158.37 79.42

2.5 Survey limitations

It is important to note that field survey data collected during the survey period is representative of species occurring within the development footprint for that occasion. Due to effects of fire, breeding cycles, migratory patterns, camouflage, weather conditions, time of day, visibility, predatory and / or feeding patterns, increased species frequency or richness may be observed within the development footprint outside the nominated survey period. Habitat assessments based on the identification of micro-habitat features for various species of interest, including regionally significant and threatened species, have been used to minimise the implications of this survey limitation.

Flora survey limitations

It is important to note that field survey data collected during the survey period is representative of species occurring within the development footprint for that occasion. Due to effects of fire, breeding cycles, migratory patterns, camouflage, weather conditions, time of day, visibility, predatory and / or feeding patterns, increased species frequency or richness may be observed within the development footprint outside the nominated survey period. Habitat assessments based on the identification of micro-habitat features for various species of interest, including regionally significant and threatened species, have been used to minimise the implications of this survey limitation.

Flora survey limitations

The species list does not include all household garden / landscaping species and those species which could not be identified at the time of the survey past genus level. Cryptic species not flowering at the time of the survey may not be observed during survey outside of peak flowering periods. Likewise cryptic orchid species are generally only recognisable when flowering.

Flora survey within the last 5 years has focussed on threatened flora that can be surveyed in the winter season. Additional target surveys for species credit species have not been undertaken throughout the year for survey compliance which means they are likely retained in the BAM-C as assumed present. Targeted survey periods for species credit species are listed in the table below.

Table 2-4 - Survey adequacy for species credit species (flora)

Scientific name	*BC Act*	Potential to occur (presence status) / Habitat	Preferred survey period	Actual survey period	Survey sufficient to rule out presence
Acacia bynoeana	E	✓ (low)	Anytime	May 2024	✓
Acacia pubescens	V	✓ (low)	Anytime	May 2024	✓
Callistemon linearifolius	V	✓ (unlikely)	Oct-Jan	March 2025	See justification
Darwinia biflora	V	✓ (low)	Anytime	May 2024	✓
Dillwynia tenuifolia	V	✓ (unlikely)	Aug-Oct	-	See justification
Epacris purpurascens var. *purpurascens*	V	✓ (unlikely)	Sept-Oct	March 2025	See justification

Scientific name	*BC Act*	Potential to occur (presence status) / Habitat	Preferred survey period	Actual survey period	Survey sufficient to rule out presence
Genoplesium baueri	E	✓ (unlikely)	Feb-Mar	March 2025	✓
Grammitis stenophylla	E	✓ (unlikely)	Anytime	July 2024	✓
Grevillea parviflora subsp. *parviflora*	V	recorded on site	Aug-Nov	May 2024, June 2024	present
Hibbertia puberula	E	✓(unlikely)	Oct-Dec	October 2025	✓
Hibbertia superans	E	✓(unlikely)	Jul-Dec	July 2024	✓
Lasiopetalum joyceae	V	✓ (unlikely)	Sept-Nov	-	See justification
Leucopogon exolasius	V	✓ (low)	Aug-Sept	-	See justification
Leucopogon subsp. *fletcheri*	E	✓(unlikely)	Aug-Sept	-	See justification
Melaleuca deanei	V	✓(low)	Anytime	June 2024	✓
Micromyrtus minutiflora	E	✓ (unlikely)	Anytime	July 2024	✓
Persoonia bargoensis	E	recorded on site	Anytime	June 2024, March 2025	present
Persoonia glaucescens	E	✓(unlikely)	Jan-Mar	March 2025	✓
Persoonia hirsuta	E	✓	Anytime	May 2024	✓
Persoonia nutans	E	✓ (unlikely)	Anytime	May 2024	✓
Pimelea curviflora var. *curviflora*	V	✓ (low)	Oct-Mar	March 2025	✓
Pimelea spicata	E	✓ (low)	Anytime	July 2024	✓
Pterostylis saxicola	E	✓(unlikely)	Oct	October 2025	✓
Pultenaea pedunculata	E	✓ (low)	Sept-Nov	October 2025	✓
Tetratheca glandulosa	V	✓ (unlikely)	Aug-Nov	October 2025	✓

Fauna survey limitations

The BAM-C has identified a list of threatened fauna species credit species that have potential habitat associated with the recorded PCTs in the development footprint (refer to Section 4.3). Species credit species require survey to rule out presence on site otherwise these species must be assumed to be present and will generate subsequent credits for offsetting.

Following a habitat assessment of the site and surrounding study area, as well as the elimination of select species where breeding habitat is absent, the following species require seasonal survey.

Table 2-5 – Survey adequacy for species credit species (fauna)

Common name	BC Act	Potential to occur (presence status) / Habitat	Preferred survey period (DCCEEW)	Actual survey period	Survey sufficient to rule out presence
Eastern Osprey (breeding)	V	unlikely	Apr-Nov	Jun 2024	✓
Eastern Pygmy-possum	V	low	Oct–Mar	Jun 2024, Jan 2025 (denning tubes have not been collected)	✓
Gang-gang Cockatoo (breeding)	V	low	Oct-Jan	Jan 2025	✓
Large-eared Pied Bat (breeding)	E	✓	Nov-Jan	Jan 2025	Recorded
Little Eagle (breeding)	V	✓	Aug–Oct	Jun 2024, Jan 2025 Oct 2025	✓
South-eastern Glossy Black-Cockatoos	V	✓	Jan-Sept	Jun 2024	✓
Southern Myotis	V	✓	Oct-Mar	Jan 2024	Recorded
Square-tailed Kite (breeding)	V	✓	Sep-Jan	Jan 2025	✓
White-bellied Sea-Eagle	V	low	Jul-Dec	Jun 2024, Jan 2025 Oct 2025	✓

Cave dependant microbat species, Large-eared Pied Bat, has habitat constraints defined by the TBDC including “Within two kilometres of rocky areas containing caves, overhangs, escarpments, outcrops, crevices or boulder piles, or within two kilometres of old mines, tunnels, old buildings or sheds”. As the study site is located within 2km of rocky areas containing escarpments and there is a probable recorded within the study area, species credits offsets are required.

Southern Myotis has habitat constraints defined by the TBDC including “Waterbodies with permanent pools/stretches 3m or wider, including rivers, large creeks, billabongs, lagoons, estuaries, dams and other waterbodies, on or within 200m of the site.” As the study site has a dam 3m wide within the site and there is a possible recorded within the study area, species credits offsets are required.

Further searches for the recorded microbat (Large-eared Pied Bat and Southern Myotis) habitat and trapping survey (for breeding individuals) is recommended during the seasonal survey periods articulated within Table 2-5.

Survey for stick nests in October 2025 were undertaken, and no Little Eagle or White-bellied Sea-Eagle activity was recorded on site.

2.6 Accuracy of identification

Predator scats samples were sent to Barbara Triggs for analysis during 2019 survey.

Images of snail, location and habitat identified specimen as Woronora Woodland Snail (*Meridolum sheai*) by Michael Shea and Stephanie Clark during 2024 survey.

Remote camera images of potential Squirrel Gliders were sent to BAM accredited Senior Fauna Ecologist Corey Mead for identification.

Specimens of plants not readily discernible in the field were collected for identification. Structural descriptions of the vegetation were made according to Specht et al (1995).

3. SURVEY RESULTS

3.1 Flora results

3.1.1 Native vegetation extent

The native vegetation extent within the study area has been ground-truthed. The amount of native vegetation is 13.84 ha.

The native vegetation to be impacted measures 9.63 ha. This is a combination of impacts from roads, building envelopes, APZs, and impacts from external pathways through the conserved area.

An existing dwelling surrounded by exotic pasture subject land (the details are described in Figure 3-1).

DISCLAIMER: CAD not georeferenced & has been aligned to LPI boundaries. Verification by a registered surveyor required for construction purposes

Legend

Study area

Flora Survey Results 2025

Persoonia bargoensis

Flora Survey Results 2024

Grevillea parviflora subsp. parviflora

Persoonia bargoensis

Flora Survey Effort (2019)

Targeted threatened flora transect (TBE 2019)

Flora Survey Effort (2024)

Flora transect survey June

Flora transect survey July

Flora Survey Effort (2025)

Threatened Flora Transects

Epacris purpurascens var. purpurascens, Genoplesium baueri, Leucopogon exolasius, Leucopogon fletcheri subsp. fletcheri, Pimelia curviflora var. curviflora.

Callistemon linearifolius, Grevillea parviflora subsp. parviflora, Persoonia bargoensis, Persoonia glaucescens

Tetratheca juncea, Hibbertia puberula, Pterostylis saxicola & Pultenaea pedunculata

Vegetation Communities

PCT 3321 - Cumberland Shale-Sandstone Ironbark Forest (High Sandstone Influence) (0.45 ha) (Impacted 0.04 ha)

PCT 3321 - Cumberland Shale-Sandstone Ironbark Forest (Low Sandstone Influence) (4.8ha) (Impacted 1.28ha)

PCT 3321 - Cumberland Shale-Sandstone Ironbark Forest (Low Sandstone Influence Regrowth) (6.86ha) (Impacted 5.74ha)

PCT 3321 - Cumberland Shale-Sandstone Ironbark Forest (Poor) 1.43ha (Impacted 1.15ha)

PCT 3320 - Cumberland Plain Woodland (0.63ha) (Impacted 0.34ha)

PCT 3320 - Cumberland Plain Woodland (Derived Native Grassland) (1.1ha) (Impacted 1.08ha)

Exotic pasture (1.28ha) (Impacted 1.1ha)

TRAVERS BUSHFIRE & ECOLOGY
A TBE ENVIRONMENTAL COMPANY

PROJECT & MXD REFERENCE
Douglas Park Dr, Douglas Park
HTB03.14_FL008

DATE & ISSUE NUMBER
13/10/2025
Issue 1
SC

SCALE & COORDINATE SYSTEM
1:2,800 @ A3
GDA2020 MGA Zone 56

0 50 100 m

TITLE
Threatened Flora Survey Effort & Results

Disclaimer: 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 are to be confirmed by a registered surveyor.

Document Path: N:\GIS STORAGE\N Drive\1_GDA2020_MappingProjects\HTB03_Douglas_Park_Dr_Douglas_Park\MXDs\HTB03.14\HTB03.14_FL008.mxd

Figure 3-1 - Flora survey effort and results

3.1.2 Flora species

The plants observed within the vegetation communities of the study area are listed in the Table 3-1 below. The following threatened flora species have been located within the study area:

- *Persoonia bargoensis*
- *Grevillea parviflora* subsp. *parviflora*

Table 3-1 – Flora observations within the study area

Family	Scientific name	Common name
Trees and shrubs		
Fabaceae	*Acacia binervata*	Two-veined Hickory
Fabaceae	*Acacia decurrens*	Black Wattle
Fabaceae	*Acacia parramattensis*	Sydney Green Wattle
Casuarinaceae	*Allocasuarina littoralis*	Black She-oak
Myrtaceae	*Angophora bakeri*	Narrow-leaved Apple
Myrtaceae	*Angophora floribunda*	Rough-barked Apple
Myrtaceae	*Eucalyptus crebra*	Narrow-leaved Ironbark
Myrtaceae	*Eucalyptus eugenioides*	Thin-leaved Stringybark
Myrtaceae	*Eucalyptus fibrosa*	Broad Leaved Ironbark
Myrtaceae	*Eucalyptus globoidea*	White Stringybark
Myrtaceae	*Eucalyptus moluccana*	Grey Box
Myrtaceae	*Eucalyptus punctata*	Grey Gum
Myrtaceae	*Eucalyptus sclerophylla*	Scribbly Gum
Myrtaceae	*Eucalyptus tereticornis*	Forest Red Gum
Santalaceae	*Exocarpos cupressiformis*	Native Cherry
Fabaceae	*Acacia implexa*	Hickory Wattle
Fabaceae	*Acacia binervia*	Coast Myall
Fabaceae	*Acacia brownii*	Heath Wattle
Fabaceae	*Acacia falcata*	Sickle Wattle
Fabaceae	*Acacia fimbriata*	Fringed Wattle
Fabaceae	*Acacia spp.*	-
Fabaceae	*Acacia longifolia*	Sydney Golden Wattle
Fabaceae	*Acacia ulicifolia*	Prickly Moses
Asparagaceae	*Asparagus officinalis**	Asparagus
Fabaceae	*Bossiaea prostrata*	-
Pittosporaceae	*Bursaria spinosa*	Native Blackthorn
Myrtaceae	*Callistemon linearis*	Narrow-leaved Bottlebrush
Myrtaceae	*Callistemon salignus*	Willow Bottlebrush
Asteraceae	*Cassinia cunninghamii*	Cunningham's Everlasting
Rhamnaceae	*Cryptandra spinescens*	-
Fabaceae	*Daviesia squarrosa*	-
Fabaceae	*Daviesia ulicifolia*	Gorse Bitter Pea
Fabaceae	*Dillwynia sp.*	-
Fabaceae	*Dillwynia retorta*	-
Proteaceae	*Grevillea mucronulata*	-

Family	Scientific name	Common name
Proteaceae	*Grevillea parviflora subsp. parviflora*[TS]	Small-flower Grevillea
Proteaceae	*Grevillea sphacelata*	Grey Spider Flower
Proteaceae	*Hakea dactyloides*	Broad-leaved Hakea
Proteaceae	*Hakea sericea*	Needlebush
Dilleniaceae	*Hibbertia aspera subsp. aspera*	Rough Guinea Flower
Clusiaceae	*Hypericum sp.**	-
Myrtaceae	*Kunzea ambigua*	Tick Bush
Myrtaceae	*Kunzea capitata*	-
Verbenaceae	*Lantana camara**	Lantana
Malvaceae	*Lasiopetalum ferrugineum*	-
Myrtaceae	*Leptospermum polygalifolium*	Tantoon
Ericaceae	*Leucopogon ericoides*	Pink Beard-heath
Epacridaceae	*Leucopogon setiger*	-
Ericaceae	*Leucopogon sp.*	-
Oleaceae	*Ligustrum sinense**	Small-leaf Privet
Epacridaceae	*Lissanthe strigosa subsp. strigosa*	Peach Heath
Myrtaceae	*Melaleuca armillaris*	Bracelet Honey Myrtle
Myrtaceae	*Melaleuca erubescens*	Pink Honey Myrtle
Myrtaceae	*Melaleuca nodosa*	Ball Honey Myrtle
Myrtaceae	*Melaleuca thymifolia*	Thyme Honey Myrtle
Oleaceae	*Olea europaea subsp. cuspidata**	African Olive
Asteraceae	*Ozothamnus diosmifolius*	Ball Everlasting
Proteaceae	*Persoonia bargoensis*[TS]	-
Proteaceae	*Persoonia linearis*	Narrow-leaved Geebung
Euphorbiaceae	*Phyllanthus hirtellus*	Thyme Spurge
Thymelaeaceae	*Pimelea linifolia*	Slender Rice Flower
Rhamnaceae	*Pomaderris lanigera*	Woolly Pomaderris
Rhamnaceae	*Pomaderris ligustrina*	-
Fabaceae	*Pultenaea villosa*	Bronze Bush-pea
Myrtaceae	*Sannantha pluriflora*	-
Ground covers (grass & grasslike / forbs)		
Poaceae	*Anisopogon avenaceus*	Oat Speargrass
Asparagaceae	*Asparagus aethiopicus**	Ground Asparagus
Poaceae	*Aristida vagans*	Three-awn Speargrass
Poaceae	*Aristida ramosa*	Purple Wire Grass
Poaceae	*Aristida warburgii*	-
Rubiaceae	*Asperula conferta*	Common Woodruff
Epacridaceae	*Astroloma humifusum*	Native Cranberry
Poaceae	*Austrostipa pubescens*	Tall Speargrass
Poaceae	*Axonopus fissifolius**	Narrow-leaved Carpet Grass
Poaceae	*Bothriochloa macra*	Red Grass
Acanthaceae	*Brunoniella australis*	Blue Trumpet
Anthericaceae	*Caesia parviflora*	Pale Grass Lily
Asteraceae	*Calotis lappulacea*	Yellow Burr Daisy

Family	Scientific name	Common name
Asteraceae	*Carthamus lanatus**	Saffron Thistle
Poaceae	*Cenchrus clandestinus**	Kikuyu, Kikuyu Grass
Gentianaceae	*Centaurium erythraea**	Common Centaury
Apiaceae	*Centella asiatica*	Swamp Pennywort
Adiantaceae	*Cheilanthes sieberi*	Rock Fern
Poaceae	*Chloris gayana**	Rhodes Grass
Poaceae	*Chloris truncata*	Windmill Grass
Asteraceae	*Cirsium vulgare**	Spear Thistle
Asteraceae	*Conyza bonariensis**	Flax-leaf Fleabane
Asteraceae	*Cotula australis*	Common Cotula
Cyperaceae	*Cyathochaeta diandra*	-
Poaceae	*Cymbopogon refractus*	Barbwire Grass
Poaceae	*Cynodon dactylon*	Common Couch
Cyperaceae	*Cyperus gracilis*	Slender Flat Sedge
Phormiaceae	*Dianella caerulea*	Blue Flax-lily
Phormiaceae	*Dianella longifolia*	Blueberry Lily
Phormiaceae	*Dianella revoluta*	Blueberry Lily
Poaceae	*Dichelachne micrantha*	Short-hair Plume Grass
Convolvulaceae	*Dichondra repens*	Kidney Weed
Poaceae	*Digitaria spp.*	-
Droseraceae	*Drosera peltata*	-
Chenopodiaceae	*Dysphania carinata*	Keeled Goosefoot
Poaceae	*Echinopogon caespitosus*	Bushy Hedgehog-grass
Poaceae	*Echinopogon ovatus*	Forest Hedgehog Grass
Chenopodiaceae	*Einadia hastata*	Berry Saltbush
Chenopodiaceae	*Einadia trigonos*	Fishweed
Poaceae	*Entolasia marginata*	Bordered Panic
Poaceae	*Entolasia stricta*	Wiry Panic
Poaceae	*Eragrostis brownii*	Brown's Lovegrass
Poaceae	*Eragrostis curvula**	African Lovegrass
Asteraceae	*Euchiton sphaericus*	-
Cyperaceae	*Fimbristylis dichotoma*	Common Fringe-rush
Cyperaceae	*Gahnia aspera*	Saw Sedge
Asteraceae	*Gamochaeta sp.**	-
Haloragaceae	*Gonocarpus tetragynus*	Poverty Raspwort
Haloragaceae	*Gonocarpus teucroides*	Raspwort
Goodeniaceae	*Goodenia hederacea*	Ivy Goodenia
Dilleniaceae	*Hibbertia aspera*	Rough Guinea Flower
Dilleniaceae	*Hibbertia diffusa*	Wedge Guinea Flower
Dilleniaceae	*Hibbertia obtusifolia*	Grey Guinea Flower
Hypericaceae	*Hypericum gramineum*	Small St. John's Wort
Asteraceae	*Hypochaeris radicata**	Flatweed
Poaceae	*Imperata cylindrica*	Blady Grass
Juncaceae	*Juncus usitatus*	Common Rush

Family	Scientific name	Common name
Asteraceae	*Lagenophora stipitata*	Blue Bottle-daisy
Anthericaceae	*Laxmannia gracilis*	Slender Wire Lily
Cyperaceae	*Lepidosperma gunnii*	-
Cyperaceae	*Lepidosperma laterale*	Variable Sword-sedge
Lobeliaceae	*Lobelia purpurascens*	Whiteroot
Lomandraceae	*Lomandra filiformis*	Wattle Matt-rush
Lomandraceae	*Lomandra gracilis*	
Lomandraceae	*Lomandra longifolia*	Spiky-headed Mat-rush
Lomandraceae	*Lomandra multiflora subsp. multiflora*	Many-flowered Mat-rush
Lomandraceae	*Lomandra obliqua*	Twisted Mat-rush
Fabaceae	*Lotus sp.**	-
Fabaceae	*Medicago sp.**	A Medic
Poaceae	*Microlaena stipoides*	Weeping Grass
Malvaceae	*Modiola caroliniana**	Red-flowered Mallow
Rubiaceae	*Opercularia diphylla*	-
Oxalidaceae	*Oxalis corniculata subsp. corniculata**	Creeping Woodsorrel
Oxalidaceae	*Oxalis perennans*	Yellow-flowered Wood Sorrel
Poaceae	*Panicum effusum*	Hairy Panic
Poaceae	*Panicum simile*	Two Colour Panic
Poaceae	*Paspalum dilatatum**	Paspalum
Euphorbiaceae	*Phyllanthus virgatus*	-
Plantaginaceae	*Plantago lanceolata**	Ribwort
Poaceae	*Poa labillardierei var. labillardierei*	Tussock Grass
Poaceae	*Poa spp.*	-
Rubiaceae	*Pomax umbellata*	Pomax
Acanthaceae	*Pseuderanthemum variabile*	Pastel Flower
Rubiaceae	*Richardia stellaris**	-
Poaceae	*Rytidosperma fulvum*	Wallaby Grass
Poaceae	*Rytidosperma longifolia*	Long-leaved Wallaby Grass
Poaceae	*Rytidosperma spp.*	-
Asteraceae	*Senecio linearifolius*	Fireweed groundsel
Asteraceae	*Senecio madagascariensis**	Fireweed
Poaceae	*Setaria parviflora**	-
Malvaceae	*Sida rhombifolia**	Paddy's Lucerne
Solanaceae	*Solanum nigrum**	Blackberry Nightshade
Solanaceae	*Solanum prinophyllum*	Forest Nightshade
Asteraceae	*Soliva sessilis**	Bindii
Asteraceae	*Sonchus oleraceus**	Common Sow-thistle
Poaceae	*Sporobolus creber*	Slender Rat's Tail Grass
Poaceae	*Sporobolus elongatus*	Slender Rat's Tail Grass
Stackhousiae	*Stackhousia viminea*	Slender Stackhousia
Poaceae	*Stenotaphrum secundatum**	Buffalo Grass
Asteraceae	*Taraxacum officinale**	Dandelion
Poaceae	*Themeda triandra*	Kangaroo Grass

Family	Scientific name	Common name
Verbenaceae	*Verbena bonariensis**	Purpletop
Scrophulariaceae	*Veronica plebeia*	Trailing Speedwell
Asphopdelaceae	*Xanthorrhoea concava*	-
Asphodelaceae	*Xanthorrhoea media*	Forest Grass Tree
Fabaceae	*Zornia dyctiocarpa var. dyctiocarpa*	Zornia
Vines & other		
Asparagaceae	*Asparagus asparagoides**	Bridal Creeper
Pittosporaceae	*Billardiera scandens*	Hairy-apple Vine
Lauraceae	*Cassytha glabella*	
Fabaceae	*Desmodium varians*	Slender Tick-trefoil
Fabaceae	*Glycine clandestina*	-
Fabaceae	*Glycine tabacina*	Twining Glycine
Fabaceae	*Hardenbergia violacea*	False Sarsparilla
Dilleniaceae	*Hibbertia dentata*	Twining Guinea Flower
Apocynaceae	*Parsonsia straminea*	Monkey Rope
*** denotes exotic species** **TS denotes threatened species**		

3.1.3 Plant community types (PCTs)

Evidence used to identify a PCT

Evidence used to identify the PCTs within the site: the entire list of PCTs was exported from the online BioNet Vegetation Classification Tool. Dominant canopy species, mid-stratum species, ground cover species, and Interim Biogeographic Regionalisation for Australia (IBRA) region (Sydney Basin Bioregion) and sub-region (Cumberland) information were utilised to produce a short list of potential PCTs (Table 3-2). Final PCTs were then chosen based on species composition and presence, and similarity to descriptive attributes and distributional information provided in the BioNet Vegetation Classification Tool. Justification for inclusion or exclusion of each shortlisted PCT is provided in Table 3-2

Table 3-3 provides a summary of the PCTs occurring within the development site, including vegetation formation, percent cleared within and extent within the development site.

All plot sheets utilised for the BAM calculator are in Appendix 4.

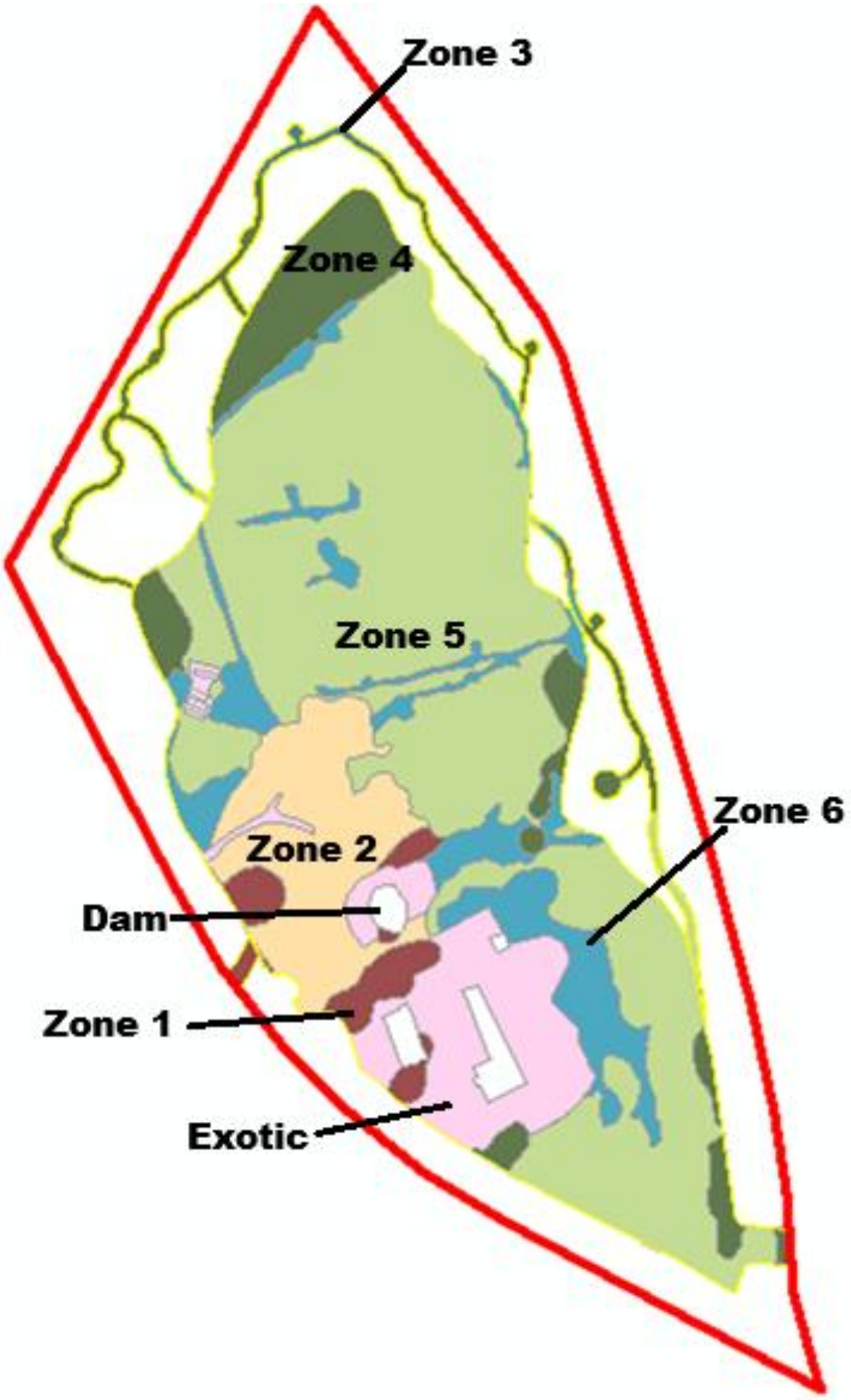


Figure 3-2 - PCT zones

Table 3-2 – PCT shortlist and justification

Zone	Shortlisted PCTs	PCT name	Match	Justification
1 Moderate_good	**3320**	**Cumberland Shale Plains Woodland**	✓	**Correct landscape position, presence of upper strata dominants.**
	3319	Cumberland Shale Hills Woodland	x	Absence of mid-strata *Acacia implexa*
	3321	Cumberland Shale-Sandstone Ironbark Forest	x	Incorrect canopy dominants.
2 Derived Native Grassland	**3320**	**Cumberland Shale Plains Woodland**	✓	**Ground layer species have a dominance that aligns more closely with this PCT.**
	3319	Cumberland Shale Hills Woodland	x	No discernible difference between 3320 and 3319, but the topography aligns better with 3320.
	3321	Cumberland Shale-Sandstone Ironbark Forest	x	Limited groundcover dominants.
3 High sandstone influence Moderate_good	**3321**	**Cumberland Shale-Sandstone Ironbark Forest**	✓	**All diagnostic species present for upper and mid strata. Correct landscape position.**
	3448	Castlereagh Ironbark Forest	x	Landscape position poor match. PCT not present in the locality.
	3320	Cumberland Shale Plains Woodland	x	Canopy and mid-storey species poor match.
	3616	Sydney Hinterland Grey Gum Transition Forest	x	Canopy and mid-storey species poor match.
4 Low sandstone influence Moderate_good	**3321**	**Cumberland Shale-Sandstone Ironbark Forest**	✓	**All diagnostic species present for upper and mid strata. Correct landscape position.**
	3448	Castlereagh Ironbark Forest	x	Landscape position poor match. PCT not present in the locality.
	3320	Cumberland Shale Plains Woodland	x	Canopy and mid-storey species poor match.
	3616	Sydney Hinterland Grey Gum Transition Forest	x	Canopy and mid-storey species poor match.
5 Low sandstone influence regrowth	**3321**	**Cumberland Shale-Sandstone Ironbark Forest**	✓	**Similar species to previous zone but higher dominance of selected shrub species from regrowth.**
	3448	Castlereagh Ironbark Forest	x	Landscape position poor match. PCT not present in the locality.
	3320	Cumberland Shale Plains Woodland	x	Regrowth juvenile trees include those that like sandstone derived soils, not just shale.
	3616	Sydney Hinterland Grey Gum Transition Forest	x	Mid-storey species poor match.

Zone	Shortlisted PCTs	PCT name	Match	Justification
6 Low sandstone influence poor	**3321**	**Cumberland Shale-Sandstone Ironbark Forest**	✓	**As per previous zone but lacking dominance of shrubs. Good ground layer match.**
	3448	Castlereagh Ironbark Forest	x	Landscape position poor match. PCT not present in the locality.
	3320	Cumberland Shale Plains Woodland	x	Ground layer and shrubs have a better fit with PCT 3321.
	3616	Sydney Hinterland Grey Gum Transition Forest	x	Mid-storey species poor match.

Zone 1:

The identification of the most suitable PCT was based upon filtering for PCTs with *Eucalyptus tereticornis* and *Eucalyptus moluccana* as dominant upper strata species and floristic data from Q8 (2024) within the Cumberland IBRA sub-region. Three PCTs, PCT 3319, PCT 3320 and PCT 3321 were selected based off these results as being the most representative of the community present in Zone 1. PCT 3321 canopy dominants including *Eucalyptus punctata* and *Eucalyptus crebra* as dominant species, which were generally absent from the community on site. PCT 3319 has *Acacia implexa* listed as a diagnostic species to distinguish between PCT 3320. As this species was absent from the community, PCT 3319 is not the best fit for this community. As a result, it can be determined that PCT 3320 is the best fit for this community.

Zone 2:

This vegetation is present within the centre of the site closest to Douglas Park Drive and the site entry, where there has been extensive clearing, although for most parts there is 15% or more of native vegetation cover. It is dominated by native species *Cynodon dactylon*, *Dichondra repens, Bothriochloa macra, Themeda triandra* and *Aristida vagans*, with the occasional *Bursaria spinosa* and *Kunzea ambigua* occurring within the shrub layer as regrowth. Exotic species present include *Eragrostis curvula, Setaria parviflora* and *Cenchrus clandestinus* as dominant exotic species present. It is in generally poor-moderate condition due to ongoing agricultural practices.

This grassland has a strong affiliation with the surrounding Shale Sandstone Transition Forest (SSTF) and Cumberland Plain Woodland (CPW) and is likely to be derived from those communities following past clearing and land use practices. The native grassland contains a minimum 8 diagnostic CPW species and should be treated as derived native grassland commensurate with CPW, as defined in the final determination.

Zone 3:

The identification of the most suitable PCT was based upon filtering for PCTs within the Cumberland IBRA sub-region with *Eucalyptus fibrosa, Acacia binervia* and *Acacia implexa* in the upper strata and based of species within Q3 (2024). This produced four PCTs: PCT 3321, PCT 3448, PCT 3320 and PCT 3616. PCT 3448 was ruled out due to a poor match with landscape position. PCT 3320 has canopy species *Eucalyptus tereticornis* and *Eucalyptus moluccana* which were absent within the vegetative landscape, as *Eucalyptus fibrosa* was the dominant species within this location. This left PCT 3321 and PCT 3616, which both overlap floristically. From the vegetative landscape, the canopy species associated with PCT 3616, *Eucalyptus punctata* and *Corymbia gummifera* were absent from the landscape and mid-

storey species in high frequencies *Phyllanthus hirtellus*, *Persoonia linearis* and *Leptospermum trinervium* were generally absent from the community. Of the short list of PCTs for consideration PCT 3321 was the best fit with floristic composition and landscape position. It is considered that this community has a higher influence of sandstone geology and has species that are typically associated with greater sandstone influences are more frequent within the community.

Zone 4:

Zone 4 contains a species assemblage considered to be the same community type as Zone 3, based off the same justification. This community has a lower sandstone influence and thus has a higher frequency of Stringybark Eucalypt species present within the dominant canopy, with stringybarks being a diagnostic feature within this community. Floristically PCT 3321 is the best fit with this community.

Zone 5:

Zone 5 has been determined to be the same community type as Zone 4, but due to ongoing or previous management, is in a different condition class and has been allocated a separate vegetation zone according to the BAM. This community consists of species comprised of PCT 3321 that are regenerating from past land use practices, particularly clearing, and would have previously been considered to be the be PCT in Zone 4.

Zone 6:

This is a condition-based subzone derived from PCT 3321 that includes areas without trees (generally all less that a 10 cm DBH) and areas of low regrowth that may undergo occasional management (eg. grazing), or tracks that contain a high proportion of native groundcovers.

Zone 7:

This vegetation occupies 1.24 ha and occurs surrounding the existing dwellings. It is dominated *by Cenchrus clandestinus* and *Paspalum dilatatum,* with *Plantago lanceolata* and *Cirsum vulgare* present.

These exotic areas have been excised out of the native vegetation communities and are not subject to biodiversity offsetting.

Note:

Derived grasslands are not included as part of the Commonwealth listed EEC under the *EPBC Act* for Cumberland Plains Shale Woodland and Shale-Gravel Transition Forest (Threatened Species Scientific Community, 2009).

Table 3-3 – PCTs

PCT code	PCT name	Species relied upon	Vegetation formation	Vegetation class	% Cleared	Area within development site (ha)	TEC status
3320	Cumberland Shale Plain Woodland	E. *tereticornis* E. *moluccana*	Grassy Woodlands	Coastal Valley Grassy Woodlands	93.03	0.34 ha mod_good 1.08 ha poor (derived native grassland)	Cumberland Plains Shale Woodland

PCT code	PCT name	Species relied upon	Vegetation formation	Vegetation class	% Cleared	Area within development site (ha)	TEC status
3321	Cumberland Sandstone – Ironbark Forest	*E. fibrosa* *E. eugenioides*	Grassy Woodlands	Coastal Valley Grassy Woodlands	20.63	0.04 ha of high sandstone influence 1.28 ha of low sandstone influence 5.74 ha of low sandstone influence regrowth 1.15 ha of poor	Shale Sandstone Transition Forest

3.1.4 Vegetation descriptions of observed communities

The following vegetation communities were identified within the development footprint through ground truthing. Threatened ecological communities under the *BC Act* are denoted with 'CEEC'.

- PCT 3320 - Cumberland Shale Plains Woodland - CEEC
- PCT 3320 – Derived Native Grassland - CEEC
- PCT 3321 – Cumberland Shale-Sandstone Ironbark Forest (High Sandstone Influence) - CEEC
- PCT 3321 – Cumberland Shale-Sandstone Ironbark Forest (Low Sandstone Influence) - CEEC
- PCT 3321 – Cumberland Shale – Sandstone Ironbark Forest (Low Sandstone Influence Regrowth) - CEEC
- PCT 3321 – Cumberland Shale – Sandstone Ironbark Forest (Low Sandstone Influence Poor) - CEEC
- Exotic Pasture

Zone 1: PCT 3320 – Cumberland Shale Plains Woodland

This vegetation community occurs in a narrow band along the south-western boundary of the study site and occupies 0.63 ha. Past disturbances and current land use practices, such as intensive grazing by goats and cattle, have resulted in a sparse shrub layer, however the ground layer is still dominated by native species.

Canopy – *Eucalyptus tereticornis* and *E. moluccana* with a projected foliage cover (PFC) of up to 40%.

Mid-storey – Generally limited to a sparse layer of *Bursaria spinosa*.

Groundcovers – dominated by grasses including *Microlaena stipoides, Entolasia stricta, Themeda triandra* and includes, *Dichondra repens, Aristida vagans, Asperula conferta, Mentha satureioides, Cyperus gracilis, Desmodium varians, Einadia hasta*ta and *Lobelia purpurascens.*

Classification:

This vegetation community corresponds to Cumberland Plain Woodland in the Sydney Basin Bioregion (CPW) which is listed as a Critically Endangered Ecological Community (CEEC) within the NSW *BC Act* (2016). This vegetation community is also commensurate with Cumberland Plain Shale Woodlands and Shale Gravel Transition Forest which is listed as a CEEC within the Commonwealth *EPBC Act* (1999).

Of the 24 native species recorded within Q6 (2024), 19 are listed within the final determination for CPW.

Zone 2: PCT 3320 – Cumberland Shale Plains Woodland – Derived Native Grassland

This vegetation community is present in the centre of the site and covers an area of 1.1 ha. It is dominated by native species, which provide a PFC of 30–50% on average. Common species are *Cynodon dactylon, Microlaena stipoides, Aristida vagans, Lepidosperma laterale, Themeda triandra, Cyperus gracilis, Goodenia hederacea, Gahnia aspera* and *Dichondra repens*. Occasional regrowing *Bursaria spinosa, Kunzea ambigua* and *Eucalyptus spp*. also occur. Common exotics present include *Eragrostis curvul*a and *Setaria parviflora*.

This grassland has strong affiliation with the surrounding SSTF and CPW and is likely to be derived from those communities following past clearing and land use practices. The native grassland within the central parts of the site also contains a minimum 8 diagnostic CPW species and should be treated as derived native grassland commensurate with CPW, as defined in the final determination for this community.

Derived grasslands are not included as part of the national-listed EEC under the *EPBC Act* according to the Commonwealth Listing Advice for that community (Threatened Species Scientific Community, 2009).

Illustration 1 – Derived native grassland (PCT 3320 – Cumberland Shale Plains Woodland) within centre of the site looking west)

Zone 3: PCT 3321 – Cumberland Shale-Sandstone Ironbark Forest (High Sandstone Influence)

This community covers a small area (0.45 ha) in the northern corner of the study area.

Canopy – Provides 20% PFC. Common species present within the community are *Angophora bakeri, Eucalyptus fibrosa, Eucalyptus eugenioides* and *Acacia binervia*.

Mid-storey – Provides 30-40% PFC. Common species present are *Kunzea ambigua* and *Allocasuarina littoralis.* Less abundant species include *Daviesia squarrosa, Callistemon linearis, Ozothamnus diosmifolius, Persoonia linearis* and *Dillwynia retorta*.

Groundcovers – Quite diverse and provides 25 - 30% PFC. Common species include *Imperata cylindrica, Lepidosperma laterale, Entolasia stricta, Microlaena stipoides, Themeda triandra and Gahnia aspera. Lomandra obliqua, Lomandra multiflora, Goodenia hederacea* and *Gonocarpus teucrioides* are also present.

Illustration 2 – PCT 3321 - Cumberland Shale-Sandstone Ironbark Forest (HSI) within Q3 (2024)

Classification:

This vegetation community corresponds to Shale Sandstone Transition Forest in the Sydney Basin Bioregion which is listed as a Critically Endangered Ecological Community (CEEC) within the NSW *BC Act* (2016) and the Commonwealth *EPBC Act* (1999).

Of the 33 native species recorded within Q3, 15 are listed within the final determination for SSTF.

Illustration 3 – Shale Plains Woodland within Q6 (2024)

Zone 3, Zone 4 & Zone 5: PCT 3321 – Cumberland Shale-Sandstone Ironbark Forest – Low Sandstone Influence (LSI)

This community covers 12.76 ha of the study area. There is 4.8 ha of moderate-good quality vegetation, and the remainder is regrowth with occasional juvenile trees.

Zone 3 is the more intact vegetation near the site boundaries.

Zone 4 is regrowth with dense shrubs averaging 1 - 3 m high.

Zone 5 is the young regrowth area where edge effects are event, or areas of native vegetation that persist such as on-site tracks. Where shrubs are present, they rarely exceed 10% coverage, and most are below 1.5 m tall. Any juvenile trees are generally below 10 cm DBH.

Canopy – Dominated by *Eucalyptus fibrosa*, contributing 20-30% Projected Foliage Cover (PFC), with *E. tereticornis* and *E. eugenioides* also present.

Mid-storey – Provides 10-20% PFC. Common species present are *Allocasuarina littoralis, Kunzea ambigua* and *Bursaria spinosa*. Mid-storey coverage may be up to 85% PFC in some parts of the regrowth area, but below 10% in the poor condition area.

Groundcovers – Provides 25-50% PFC and is dominated by grasses. Some sedges and herbaceous species are also present. Common species include *Aristida vagans, Microlaena stipoides, Entolasia stricta, Themeda triandra, Gahnia aspera, Lomandra multiflora* and *Lepidosperma laterale*,

Classification:

This vegetation community corresponds to Shale Sandstone Transition Forest in the Sydney Basin Bioregion which is listed as a Critically Endangered Ecological Community (CEEC) within the NSW *BC Act* (2016) and within the Commonwealth *EPBC Act* (1999).

Of the 56 native species recorded within the fully structured SSTF, 30 are listed within the final determination for SSTF. Within the regrowth, 23 of native species recorded are listed within the finale determination for SSTF.

Illustration 4 – PCT 3321 – Cumberland Shale – Ironbark Transition Forest (LSI) at Q6 (2024)

Illustration 5 – Regrowth PCT 3321 – Cumberland Shale – Ironbark Transition Forest (LSI) within Q10 (2024)

Illustration 6 – Managed regrowth PCT 3321 (poor) with mixed native and exotic groundcovers around quadrat L2

Illustration 7 – Containers with combined exotic and native groundcovers surrounding

Illustration 8 – Vegetation in quadrat L1 just to the east of the house with managed regrowth (3321 low sandstone influence regrowth – poor)

Exotic Pasture

This vegetation occupies 1.28 ha and occurs surrounding the existing dwellings. Exotic species present include *Eragrostis curvula, Setaria parviflora* and *Cenchrus clandestinus* as dominant exotic species present.

Illustration 9 – Exotic pasture dominated groundcovers approximately 20m from the dam

3.1.5 Threatened species habitat suitability

In this section, the likelihood of habitat suitability for threatened species is being discussed. To synthesise what has been formulated until now and illustrated on Figure 3-1, approximately 1.28 ha of exotic pasture is present around the existing dwelling and dam area. Most of the site (~8 ha) comprises impacted low sandstone influence regrowth of the PCT 3321 Cumberland Shale-Sandstone Ironbark Forest with an absent tree layer. The same PCT with a low sandstone influence but with a thinned canopy stratum is present on the outer edge of the site (Figure 3-1). Finally, PCT 3321 is also present in the northern end of the site however with a high sandstone influence. Based on the assessment of the vegetation, the subject land comprises heterogeneous vegetation communities that have different implications on threatened species habitat suitability and likelihood of occurrence.

The likely location of threatened species habitat on site is discussed below for species found on site and assumed present.

Pterosylis saxicola – The Sydney Plains Greenhood occurs primarily on the Cumberland Plain along an ecological gradient from clay soils derived from Ashfield Shale to thin accumulations of humus rich sandy soils on Hawkesbury Sandstone sheets and rock shelves. Habitat ranges from grassy woodland on flat to gently sloping landscapes on shale soils, to open forest on hilly landscapes on transitional soils, and woodland on the rims and steep sides of river valleys

on sandstone soils. The combination of historical clearing, grazing from goats and presence of cattle makes most of the site unsuitable for *P. saxicola*. For these reasons, the area of the subject land used by domesticated animals has barely any ground cover and is lacking the required humic and richer soils for *P. saxicola* to occur. Additionally, the ground is compacted from cattle movement on site. However, the area covered with transition woodland in the northern part of the subject land (PCT 3321) mapped in blue on Figure 3-1 is deemed suitable for *P. saxicola*. This likely area of potentially suitable habitat for *P. saxicola* is already located in the conserved area that will be fenced off and inaccessible.

Grevillea parviflora subsp*. parviflora* – All specimen of *G. parviflora* subsp. *parviflora* have been identified on the subject land and grow in the conservation area.

Persoonia bargoensis – The habitat suitable for *P. bargoensis* is located in the conservation area. The habitat may have been suitable without cattle grazing on the subject land, however the combination of grazing from goats, presence of cattle and competition with the *Kunzea ambigua* regrowth makes most of the site unsuitable for *P. bargoensis* (see Illustration 10). For these reasons, the area of the subject land used by domesticated animals is lacking the required habitat for *P. saxicola* to occur.

Illustration 10 - Regrowth dominated by Kunzea ambigua of the Vegetation Zone PCT 3321 Cumberland Shale-Sandstone Ironbark Forest with an absent tree layer

3.1.6 EPBC Act determinations for the Cumberland Plain Shale Woodland and Shale-Gravel Transition Forest

PCT 3321 is commensurate with Shale Sandstone Transition Forest of the Syndey Basin Bioregion listed under the *EPBC Act* as Critically Endangered. To be classified as part of this CEEC, the vegetation must meet key diagnostic and conditional criteria:

1. Limited to the Sydney Basin Bioregion (IBRA v 7)
2. Occurs at the transition between shales and sandstones of the Wianamatta and Hawkesbury Groups, including the transitional Mittagong Formation
3. Occurs as a forest or woodland, and may have a primarily shrubby or primarily grassy understorey, or be a mixture

4. 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* (forest red gum), *E. resinifera* subsp. *resinifera* (red mahogany), *E. eugenioides* (or *E. globoidea* depending on local species presence and sandstone influence) and *Angophora bakeri* (narrow-leaved apple)
5. 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).

6. 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. s*tipoides* (weeping grass), *Oxalis perennans* (wood-sorrel), *Pimelea linifolia* subsp. *linifolia, Pomax umbellata, Phyllanthus hirtellus, Pratia purpurascens* (*Lobelia purpurascens*) (white root), *Solanum prinophyllum* (forest nightshade) and *Themeda triandra* syn. *T. australis* (kangaroo grass). The ground layer may also contain small shrubs, including *Hibbertia aspera* (rough guinea flower).

<table>
<tr><th>Category and Rationale</th><th colspan="3">Thresholds</th></tr>
<tr><td>A. Moderate condition class
Represented by medium to large-size patch as part of a larger native vegetation remnant and/or with mature trees</td><td colspan="3">Patch size ≥0.5ha
And
≥30% of the perennial understorey vegetation cover is made up of native species.
And</td></tr>
<tr><td></td><td>The patch is contiguous with a native vegetation remnant (any native vegetation where cover in each layer present is dominated by native species) ≥1ha in area.</td><td>Or</td><td>The patch has at least one tree with hollows or at least one large locally indigenous tree (>80cm dbh).</td></tr>
<tr><td>B. Moderate condition class
Represented by medium to large size patch with high quality native understorey</td><td colspan="3">Patch size ≥0.5ha
And
≥50% of the perennial understorey vegetation cover is made up of native species.</td></tr>
<tr><td>C. High condition class
Represented by medium to large size patch with very high quality native understorey</td><td colspan="3">Patch size ≥0.5ha
And
≥70% of the perennial understorey vegetation cover is made up of native species.</td></tr>
<tr><td>D. High condition class
Represented by larger size patch with high quality native understorey</td><td colspan="3">Patch size ≥2ha
And
≥50% of the perennial understorey vegetation cover is made up of native species.</td></tr>
<tr><td colspan="4">Perennial understorey vegetation cover 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.
Contiguous 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.</td></tr>
</table>

Figure 3-3 – *EPBC Act* conditional criteria for Shale Sandstone Transition Forest

For recognition under the definition, the vegetation must meet the selected criteria. PCT 3321 in all vegetation zones within the site meets all the key characteristic diagnostic criteria and meets condition class B. Moderate condition class.

PCT 3320 is commensurate with Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest listed under the *EPBC Act* as Critically Endangered.

The key diagnostic attributes for the Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest ecological community are as follows:

1. Distribution is limited to the Sydney Basin Bioregion with most occurrences in the Cumberland Sub-region. This covers a geographic area commonly known as the Cumberland Plain, a rainshadow coastal valley in western Sydney.
2. Most occurrences are on clay soils derived from Wianamatta Group geology, with limited to rare occurrences on soils derived from Tertiary Alluvium, Holocene Alluvium, the Mittagong Formation, Aeolian Deposits and Hawkesbury Sandstone.
3. Upper tree layer species must be present with these features:
    - The minimum projected foliage cover of canopy trees is 10% or more; and
    - The tree canopy is typically dominated by *Eucalyptus moluccana* (Grey Box), *E. tereticornis* (Forest Red Gum) and/or *E. fibrosa* (Red Ironbark). Other canopy species may occur in association with the typical dominants and may be locally dominant at some sites.
4. A sparse lower tree layer may be present, typically with young eucalypts of upper tree canopy species and species of Acacia, Exocarpos and Melaleuca.
5. The understorey typically is dominated by the ground layer and shows these features:

- The ground layer typically comprises a variety of perennial native graminoids and forbs;
- Native graminoid species that are often present include: the grasses *Aristida ramosa* (Purple Wiregrass), *A. vagans* (Threeawn Speargrass), *Cymbopogon refractus* (Barbed Wire Grass), *Dichelachne micrantha* (Plumegrass), *Echinopogon caespitosus* var. *caespitosus* (Tufted Hedgehog Grass), *Eragrostis leptostachya* (Paddock Lovegrass), *Microlaena stipoides* subsp. *stipoides* (Weeping Grass), *Paspalidium distans* and *Themeda triandra* (Kangaroo Grass), and other graminoids *Carex inversa* (Knob Sedge), *Cyperus gracilis* (Slender Sedge), *Lomandra filiformis* subsp. *filiformis* (Wattle Mat-rush) and *L. multiflora* subsp. *multiflora* (Manyflowered Mat-rush);
- Native forb and other herb species present include: *Asperula conferta* (Common Woodruff), *Brunoniella australis* (Blue Trumpet), *Cheilanthes sieberi* (Poison Rock-Fern), *Desmodium varians* (Slender Tick-trefoil), *Dianella longifolia* (Blue Flax-Lily), *Dichondra repens* (Kidney Weed), *Glycine spp., Hardenbergia violacea* (Native Sarsparilla), *Opercularia diphylla* (Stinkweed), *Oxalis perennans, Pratia purpurascens* (Whiteroot) and *Wahlenbergia gracilis* (Australian Bluebell); and
- A shrub layer may be present, to variable extent, and is often dominated by Bursaria spinosa (Blackthorn) while other species include: *Daviesia ulicifolia* (Gorse Bitter Pea), *Dillwynia sieberi, Dodonaea viscosa* subsp. *cuneata* (Wedge-leaf Hop-bush), *Indigofera australis* (Native Indigo) and *Lissanthe strigosa* (Peach Heath).

Category and rationale	Thresholds
A. Core thresholds that apply under most circumstances: patches with an understorey dominated by natives and a minimum size that is functional and consistent with the minimum mapping unit size applied in NSW.	Minimum patch[3] size is ≥0.5ha; **AND** ≥50% of the perennial understorey vegetation cover[4] is made up of native species.
OR	
B. Larger patches which are inherently valuable due to their rarity.	The patch size is ≥5ha; **AND** ≥30% of the perennial understorey vegetation cover is made up of native species.
OR	
C. Patches with connectivity to other large native vegetation remnants in the landscape.	The patch size is ≥0.5 ha; **AND** ≥30% of the perennial understorey vegetation cover is made up of native species; **AND** The patch is contiguous[5] with a native vegetation remnant (any native vegetation where cover in each layer present is dominated by native species) that is ≥5ha in area.
OR	
D. Patches that have large mature trees or trees with hollows (habitat) that are very scarce on the Cumberland Plain.	The patch size is ≥0.5 ha in size; **AND** ≥30% of the perennial understorey vegetation cover is made up of native species; **AND** The patch has at least one tree with hollows per hectare or at least one large tree (≥80 cm dbh) per hectare from the upper tree layer species outlined in the Description and Appendix A.

Figure 3-4 – *EPBC Act* conditional criteria for Cumberland Plain Shale Woodland and Shale-Gravel Transition Forest

For recognition under the definition, the vegetation must meet the selected criteria. PCT 3320 within the site meets all the key diagnostic and key characteristics criteria under the *EPBC Act.*

Under the *EPBC Act*, PCT 3320 (Derived Native Grasslands) is not included as part of the definition for Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest.

A detailed impact assessment for Cumberland Plain Shale Woodlands and Shale Gravel Transition Forest is provided in Appendix 5.

3.1.7 Vegetation integrity assessment

A vegetation integrity assessment is an assessment on the site's condition. Vegetation patches are broken into zones of roughly equal quality and then surveyed by transect plots. The number of required transect plots is dependent upon the size of the zone.

Table 3-4 - Minimum required plots and transects per vegetation zone area (source: BAM 2020)

Vegetation zone area (ha)	Minimum number of plots/transects
<2	1 plot/transect
>2–5	2 plots/transects
>5–20	3 plots /transects
>20–50	4 plots/transects
>50–100	5 plots/transects
>100–250	6 plots/transects
>250–1000	7 plots/transects; more plots may be needed if the condition of the vegetation is variable across the zone
>1000	8 plots/transects; more plots may be needed if the condition of the vegetation is variable across the zone

Once data from the transect plot has been collected, the composition of native plant species per growth form is assessed, along with numbers of stems, percentages of exotic or high threat exotic species present, number and sizes of Eucalypt and non-Eucalypt tree stems, litter cover, rock cover, cryptogram cover, hollows and fallen logs. Therefore, the vegetation integrity assessment is a measure of composition, structure and function.

Figure 3-1 shows the location of the plots in relation to the impacted areas.

The vegetation integrity score is obtained using equations and weightings based upon a number of entities to calculate scores for composition, structure and function, for an overall current vegetation integrity score.

Table 3-5 shows the current vegetation integrity score across all zones.

Table 3-5 – Current vegetation integrity score

Vegetation zone name	Area (ha)	Composition condition score	Structure condition score	Function condition score	Current vegetation integrity score
3320_moderate_good	0.34	58.6	38.7	32	41.7
3320_poor	1.08	27.9	47.3	0.4	11
3321_high_sandstone	0.04	72.1	23	35.3	38.8
3321_low_sandstone	1.28	78.1	61.2	48.2	61.3
3321_regrowth	5.74	36.9	51	23.5	35.4
3321_poor	1.15	31.7	44	30.4	34.9

Future vegetation integrity score

The future VI score is based on removal or maintenance requirements of all vegetation across the development footprint, with the exception of retention of selected larger trees within the landscape, as supported by the Arboriculture Impact Assessment (*Travers bushfire & ecology*, 2025).

The retention of selected trees also assumes there will be limited leaf litter retained (part of the function score) and stem class sizes (part of the function score). Leaf litter was set at 5%.

The tree cover was adjusted to 15%, down from the average of the plot data coverage to account for the loss of smaller sized trees, yet still compliant with APZ requirements.

Large trees were absent from plot with the exception of 3320_low_sandstone, therefore only this zone can maintain a number <0 in the future VI score.

As there are no moderate-large sized trees in 3320_poor, 3321_regrowth and 3321_poor, the future VI score has been set to 0 for these zones.

The data entry used for future VI score for each management zone is shown below and summarised in Table 3-6.

PCT 3320_moderate_good

Composition

Item	Tree	Shrub	Grass & grass like	Forb	Fern	Other
Benchmark	5	8	12	14	2	4
Future mean (x̄) *	4	0	0	0	0	0

Structure

Item	Tree	Shrub	Grass & grass like	Forb	Fern	Other
Benchmark	52	15	59	9	1	4
Future mean (x̄) *	15	0	0	0	0	0

Function

Item	Number of large trees	Litter cover	Length of fallen logs	Stem size class	Tree regeneration <5cm diameter	High Threat Weed Cover
Benchmark	3	40	40	4	Present	
Future mean (x̄) *	0	5	0	2	Absent	0

PCT 3321_high_sandstone

Composition

Item	Tree	Shrub	Grass & grass like	Forb	Fern	Other
Benchmark	5	8	12	14	2	4
Future mean (x̄) *	3	0	0	0	0	0

Structure

Item	Tree	Shrub	Grass & grass like	Forb	Fern	Other
Benchmark	52	15	59	9	1	4
Future mean (x̄) *	15	0	0	0	0	0

Function

Item	Number of large trees	Litter cover	Length of fallen logs	Stem size class	Tree regeneration <5cm diameter	High Threat Weed Cover
Benchmark	3	40	40	4	Present	
Future mean (x̄) *	0	5	0	3	Absent	0

PCT 3321_low_sandstone

Composition

Item	Tree	Shrub	Grass & grass like	Forb	Fern	Other
Benchmark	5	8	12	14	2	4
Future mean (x̄) *	2.5	0	0	0	0	0

Structure

Item	Tree	Shrub	Grass & grass like	Forb	Fern	Other
Benchmark	52	15	59	9	1	4
Future mean (x̄) *	15	0	0	0	0	0

Function

Item	Number of large trees	Litter cover	Length of fallen logs	Stem size class	Tree regeneration <5cm diameter	High Threat Weed Cover
Benchmark	3	40	40	4	Present	
Future mean (x̄) *	1	5	0	2	Absent	0

Given the above clarification, the future vegetation integrity score will be 0 as indicated in Table 3-6.

Table 3-6 – Future vegetation integrity score

Vegetation zone name	Area (ha)	Composition condition score	Structure condition score	Function condition score	Future vegetation integrity score	Change in VI score	Total VI loss
3320_moderate_good	0.34	10.5	7.5	9.3	9	-32.7	-32.7
3320_poor	1.08	0	0	0	0	-11	-11
3321_high_sandstone	0.04	8.4	7.5	14.2	9.6	-29.2	-29.2
3321_low_sandstone	1.28	6.6	7.5	18.9	9.8	-51.6	-51.6
3321_regrowth	5.74	0	0	0	0	-35.4	-35.4

Vegetation zone name	Area (ha)	Composition condition score	Structure condition score	Function condition score	Future vegetation integrity score	Change in VI score	Total VI loss
3321_poor	1.15	0	0	0	0	-34.9	-34.9

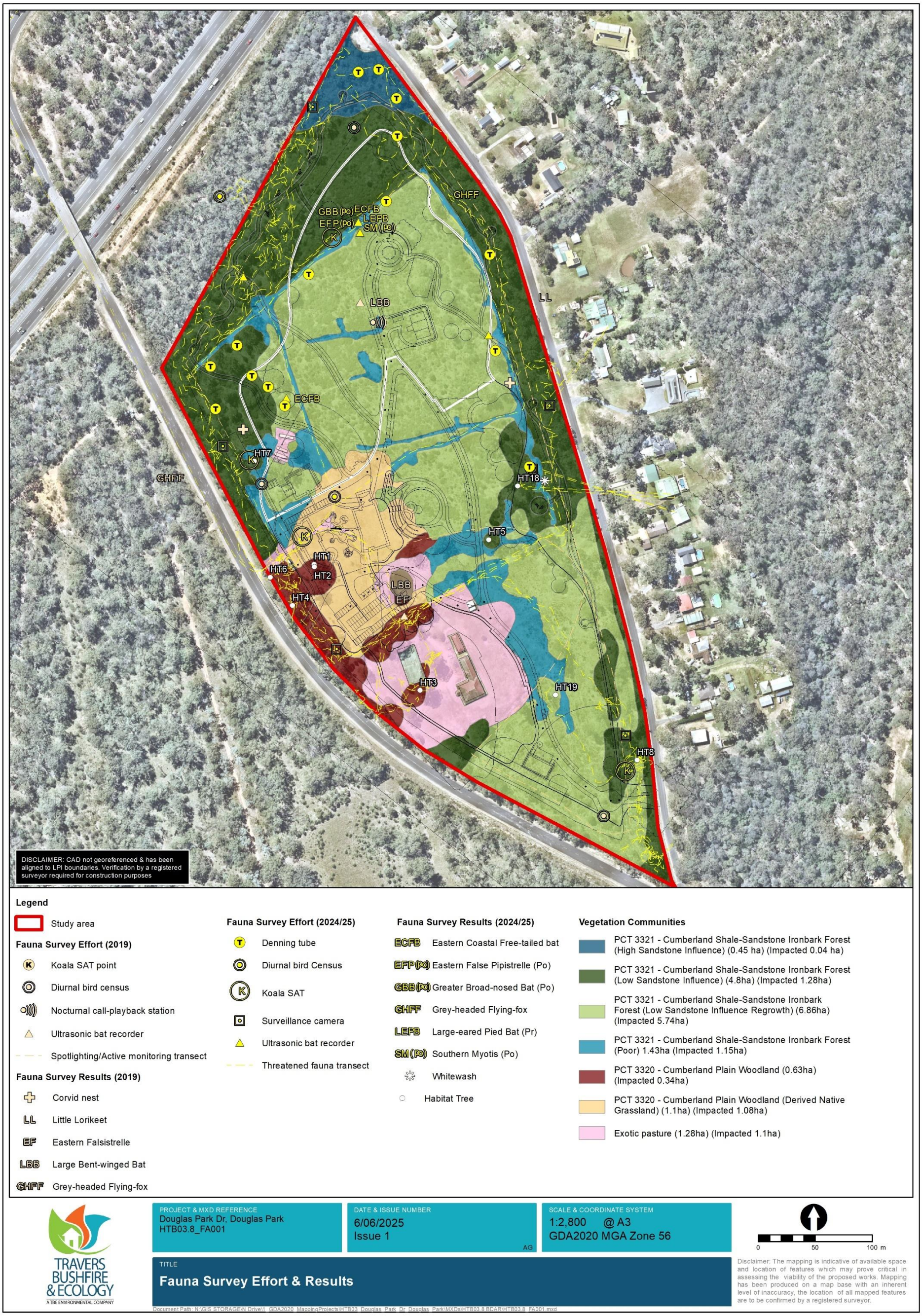


Figure 3-5 - Fauna survey effort and results

3.2 Fauna results

Fauna species observed throughout the duration of fauna surveys are listed below.

Table 3-7 – Fauna recorded within the study area

Common name	Scientific name	Method observed	
Birds		2019	2024/25
Australian Magpie	*Cracticus tibicen*	O	O
Australian Raven	*Corvus coronoides*	O W	O W
Australian Wood Duck	*Chenonetta jubata*	O W	O
Bar-shouldered Dove	*Geopelia humeralis*		O W
Chestnut Teal	*Anas castanea*		O
Common Bronzewing	*Phaps chalcoptera*	O	O
Crested Pigeon	*Ocyphaps lophotes*	O	O
Eastern Rosella	*Platycercus eximius*	W	W
Eastern Spinebill	*Acanthorhynchus tenuirostris*	W	W
Eastern Yellow Robin	*Eopsaltria australis*		W
Galah	*Eolophus roseicapillus*	O W	O W
Great Egret	*Ardea alba*		O
Grey Fantail	*Rhipidura albiscapa*	O W	O W
Little Corella	*Cacatua sanguinea*		O W
Little Pied Cormorant	*Microcarbo melanoleucos*	PO	O
Little Wattlebird	*Anthochaera chrysoptera*		W
Magpie-lark	*Grallina cyanoleuca*	W	O W
Masked Lapwing	*Vanellus miles*	O W	O W
New Holland Honeyeater	*Phylidonyris novaehollandiae*		W
Noisy Miner	*Manorina melanocephala*		O W
Pied Currawong	*Strepera graculina*	O W	O W
Rainbow Lorikeet	*Trichoglossus haematodus*	O W	O W
Red-browed finch	*Neochmia temporalis*		O W
Red-rumped Parrot	*Psephotus haematonotus*	O W	O W
Scarlet Honeyeater	*Myzomela sanguinolenta*		W
Spotted Pardalote	*Pardalotus punctatus*	W	O W
Straw-necked Ibis	*Threskiornis spinicollis*		O
Sulphur Crested Cockatoo	*Cacatua galerita*	W	O W
Superb Fairy-wren	*Malurus cyaneus*	O W	O W
Welcome Swallow	*Hirundo neoxena*		O
White-faced Heron	*Egretta novaehollandiae*		O
Willie Wagtail	*Rhipidura leucophrys*	O W	O W
Mammals			
Black Rat	*Rattus Rattus*		Q
Brown Antechinus	*Antechinus stuartii*		Q
Chocolate Wattled Bat	*Chalinolobus morio*	U[PO]	U
Common Brushtail Possum	*Trichosurus vulpecula*		O
Common Ringtail Possum	*Pseudocheirus peregrinus*		O
Cow	*Bos taurus*		O W P Q
Eastern Broad-nosed Bat	*Scotorepens orion*	U[PR]	U[PO]
Eastern Coastal Free-tailed Bat [TS]	*Mormopterus norfolkensis*		U[PO]
Eastern False Pipistrelle (Eastern Falsistrelle) [TS]	*Falsistrellus tasmaniensis*	U[PO]	U[PO]
Eastern Forest Bat	*Vespadelus pumilus*		U
Fox*	*Vulpes vulpes*		P
Gould's Long-eared Bat	*Nyctophilus gouldi*		U[PO]

Common name	Scientific name	Method observed	
Gould's Wattled Bat	*Chalinolobus gouldii*	U	U
Greater Broad-nosed Bat TS	*Scoteanax rueppelli*		U[PO]
Grey-headed Flying-fox TS	*Pteropus poliocephalus*	W	W
Goat *	*Capra hircus*	O P	O W P Q
Large-eared Pied Bat TS	*Chalinolobus dwyeri*		U[PR]
Large Forest Bat	*Vespadelus darlingtoni*		U
Lesser Long-eared Bat	*Nyctophilus geoffroyi*		U[PO]
Little Forest Bat	*Vespadelus vulturnus*		U
Ride's Free-tailed Bat	*Ozimops ridei*		U
Sheep *	*Ovis aries*	O P	O P
Southern Myotis TS	*Myotis Macropus*		U[PO]
Sugar Glider	*Petaurus breviceps*		Q
Swamp Wallaby	*Wallabia bicolor*	P[PR]	P[PR]
White-striped Free-tailed Bat	*Austronomus australis*	U	W U
Amphibians			
Common Eastern Froglet	*Crinia signifera*	W	W
Whistling Tree Frog	*Litoria verreauxii*	W	W
Invertebrates			
Asian Tramp Snail *	*Bradybaena similaris*	K	Y
Common Garden Snail*	*Cornu aspersum*		Y
Woronora Woodland Snail	*Meridolum sheai*		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

AR - Acoustic Recording E - Nest/roost F- Tracks/scratchings FB - Burrow G - Crushed cones	H - Hair/feathers/skin K- Dead O - Observed OW- Obs & heard call	P - Scat Q- Camera T - Trapped/netted U- Anabat/ultrasound	W - Heard call X- In scat Y - Bone/teeth/shell Z- In raptor/owl pellet

3.3 Habitat results

3.3.1 Fauna habitat observations

The fauna habitats present within the site are identified within the following table.

Table 3-8 – Observed fauna habitat

Topography				
Flat ✓	Gentle ✓	Moderate	Steep	Drop-offs
Vegetation structure				
Closed Forest	Open Forest ✓	Woodland ✓	Heath	Grassland ✓
Disturbance history				
Fire	Under-scrubbing ✓	Cut and fill works		
Tree clearing ✓	Grazing ✓			
Soil landscape				

Topography				
DEPTH:	Deep ✓	Moderate ✓	Shallow ✓	Skeletal
TYPE:	Clay ✓	Loam ✓	Sand	Organic ✓
VALUE:	Surface foraging ✓	Sub-surface foraging ✓	Denning/burrowing ✓	
WATER RETENTION:	Well Drained ✓	Damp / Moist	Water logged	Swamp / Soak
Rock habitat				
CAVES:	Large	Small	Deep	Shallow
CREVICES:	Large	Small	Deep	Shallow
ESCARPMENTS:	Winter / late sunny aspects		Shaded winter / late aspects	
OUTCROPS:	High Surface Area Hides	Med. Surface Area Hides	Low Surface Area Hides	
SCATTERED / ISOLATED:	High Surface Area Hides	Med. Surface Area Hides	Low Surface Area Hides ✓	
Feed resources				
FLOWERING TREES:	Eucalypts ✓	Corymbias	Melaleucas	
	Banksias	Acacias ✓		
SEEDING TREES:	Allocasuarinas ✓	Conifers		
WINTER FLOWERING EUCALYPTS:	*C. maculata*	*E. crebra* ✓	*E. globoidea* ✓	*E. sideroxylon*
	E. squamosa	*E. grandis*	*E. multicaulis*	*E. scias*
	E. robusta	*E. tereticornis* ✓	*E. agglomerata*	*E. siderophloia*
FLOWERING PERIODS:	Autumn ✓	Winter ✓	Spring ✓	Summer ✓
OTHER:	Mistletoe ✓	Figs / Fruit	Sap / Manna	Termites ✓
Foliage protection				
UPPER STRATA:	Dense	Moderate ✓	Sparse	
MID STRATA:	Dense	Moderate	Sparse ✓	
PLANT / SHRUB LAYER:	Dense ✓	Moderate ✓	Sparse ✓	
GROUNDCOVERS:	Dense	Moderate ✓	Sparse ✓	
Hollows / logs				
TREE HOLLOWS:	Large	Medium ✓	Small ✓	
TREE HOLLOW TYPES	Spouts / branch	Trunk ✓	Broken Trunk	Basal Cavities	Stags ✓
GROUND HOLLOWS:	Large	Medium	Small ✓	
Vegetation debris				
FALLEN TREES:	Large	Medium	Small	
FALLEN BRANCHES:	Large	Medium	Small ✓	
LITTER:	Deep	Moderate ✓	Shallow ✓	
HUMUS:	Deep	Moderate	Shallow ✓	
Drainage catchment				
WATER BODIES	Wetland(s)	Soak(s)	Dam(s) ✓	Drainage line(s)	Creek(s)	River(s)
RATE OF FLOW:	Still ✓	Slow	Rapid	
CONSISTENCY:	Permanent ✓	Perennial	Ephemeral	
RUNOFF SOURCE:	Urban / Industrial	Parkland	Grazing ✓	Natural
RIPARIAN HABITAT:	High quality	Moderate quality	Low quality	Poor quality ✓
Artificial habitat				
STRUCTURES:	Sheds ✓	Infrastructure	Equipment	
SUB-SURFACE	Pipe / culvert(s)	Tunnel(s)	Shaft(s)	
FOREIGN MATERIALS:	Sheet ✓	Pile / refuse ✓		

3.3.2 Habitat tree data

A complete assessment of the location of habitat trees and the size of hollows within was undertaken as part of surveys within the subject site area. Table 3-9 below provides hollow-bearing tree data and Figure 3-5 shows locations. Three hollow-bearing trees (HT3, HT5, HT18) are located within the potential tree removal area of the subject site. Habitat tree HT5 had a trunk hollow being utilised by a Galah. These three trees will be recommended for retention. Remaining habitat trees recorded are located within the tree retention areas or just outside of the subject site boundary.

Table 3-9 – Habitat tree data

Tree No	Scientific name	Common name	DBH (cm)	Height (m)	Spread (m)	Vigour (%)	Hollows & other habitat features recorded
HT1	Forest Red Gum	*Eucalyptus tereticornis*	45	14	35	85	1x 0-5cm branch spout
HT2	Forest Red Gum	*Eucalyptus tereticornis*	60	14	35	80	1x 0-5cm trunk
HT3	Forest Red Gum	*Eucalyptus tereticornis*	110	18	38	80	1x 0-5cm branch spout, 1x 0-5cm trunk
HT4	Forest Red Gum	*Eucalyptus tereticornis*	40	10	20	65	1x 5-10cm trunk split
HT5	Grey Box	*Eucalyptus moluccana*	95	14	25	75	1x 15 cm trunk (Galah)
HT6	Stag		70	11	20	0	2x 0-5cm branch spout, 1x 5-10cm branch spout, 1x5-10cm trunk
HT7	Broad Leaved Ironbark	*Eucalyptus fibrosa*	50	10	30	85	1x 0-5cm branch spout
HT8	Forest Red Gum	*Eucalyptus tereticornis*	55	12	25	85	1x 15 cm trunk
HT18	Broad Leaved Ironbark	*Eucalyptus fibrosa*	80	25	15	60	Potential chimney type hollow in fork unable to be viewed from the ground 1 x Bark sheath (suitable roost habitat for microbats)
HT19	Broad Leaved Ironbark	*Eucalyptus fibrosa*	73	23	8	15	Bark sheath across entire length of tree (suitable roost habitat for microbats)

Survey was also undertaken for presence of any significant habitat trees within the study area (entire lot). Significant habitat trees are defined as trees containing large hollows suitable for use by owls and/or containing several good quality hollows typically consisting of more than one medium (10-30cm) sized hollow. A tree may also be considered significant where evidence of use by select fauna is found such as Yellow-bellied Glider sap feed tree, raptor nest, or owl roost. Therefore, significant habitat trees are identified beyond the development landscape as indirect impacts on such important habitat features need consideration. Despite this effort, no significant habitat trees were identified within the study area or the adjacent habitat between the study area and the Hume Motorway.

Habitat tree HT5 and HT18 provides a medium sized trunk hollow providing possibly suitable nesting habitat for Gang-gang Cockatoo. A Galah was recorded utilising the hollow in Habitat tree HT5 during 2019 survey. Therefore, these trees are recommended for retention.

4. BIODIVERSITY ASSESSMENT

4.1 Previous surveys reviewed

The following regional vegetation mapping examined to identify the potential vegetation communities onsite.

Mapping from the Native Vegetation of the Cumberland Plain (NPWS 2002) identifies the following vegetation communities within the study area (Figure 4-1):

- Shale Sandstone Transition Forest (Low Sandstone Influence)
- Shale Sandstone Transition Forest (High Sandstone Influence)
- Shale Plains Woodland

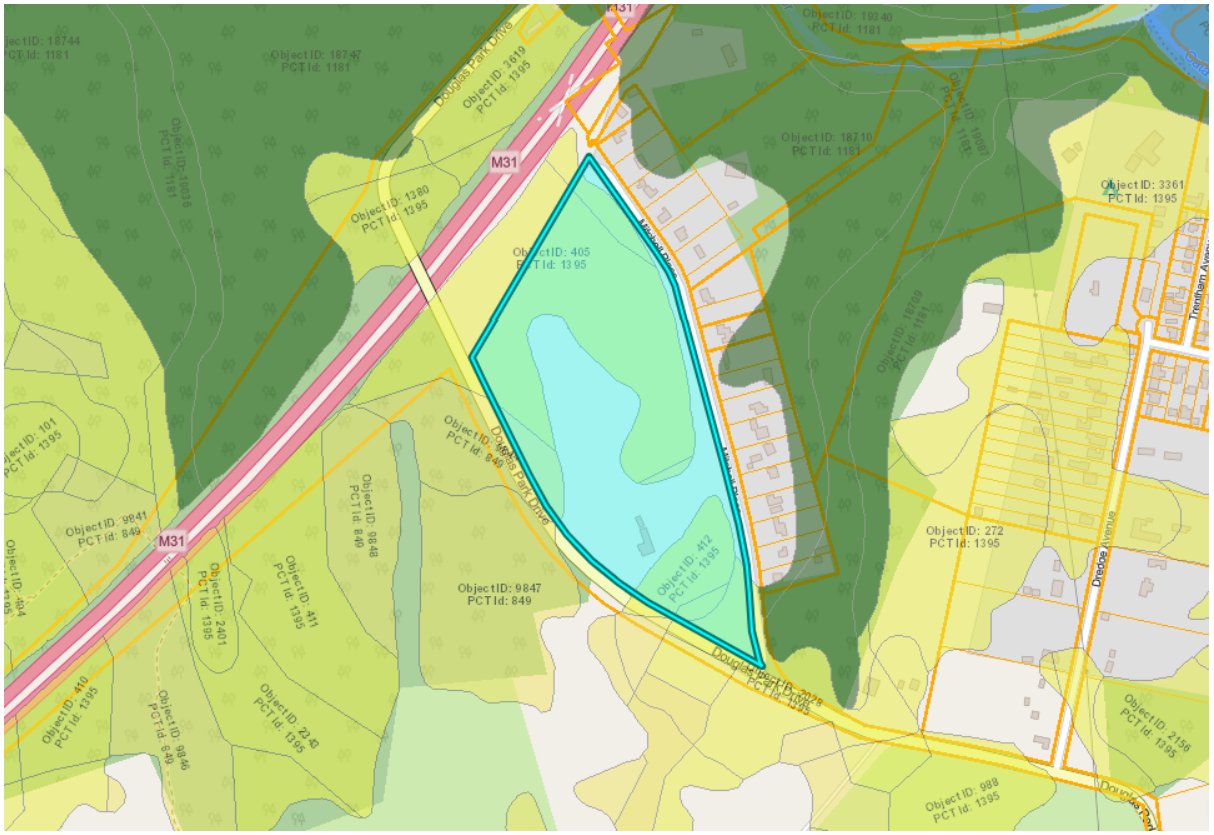


Figure 4-1 – Native Vegetation of the Cumberland Plain mapping on the subject land
(source: NSW Environment and Heritage, accessed circa March 2025)

Mapping from the Remnant Vegetation of the Western Cumberland subregion (OEH 2013) identifies the following vegetation communities within the study area:

- Shale Sandstone Transition Forest (Low Sandstone Influence) equivalent to PCT 1395 - Narrow-leaved Ironbark - Broad-leaved Ironbark - Grey Gum open forest of the edges of the Cumberland Plain, Sydney Basin Bioregion

- Shale Plains Woodland equivalent to PCT 849 Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion

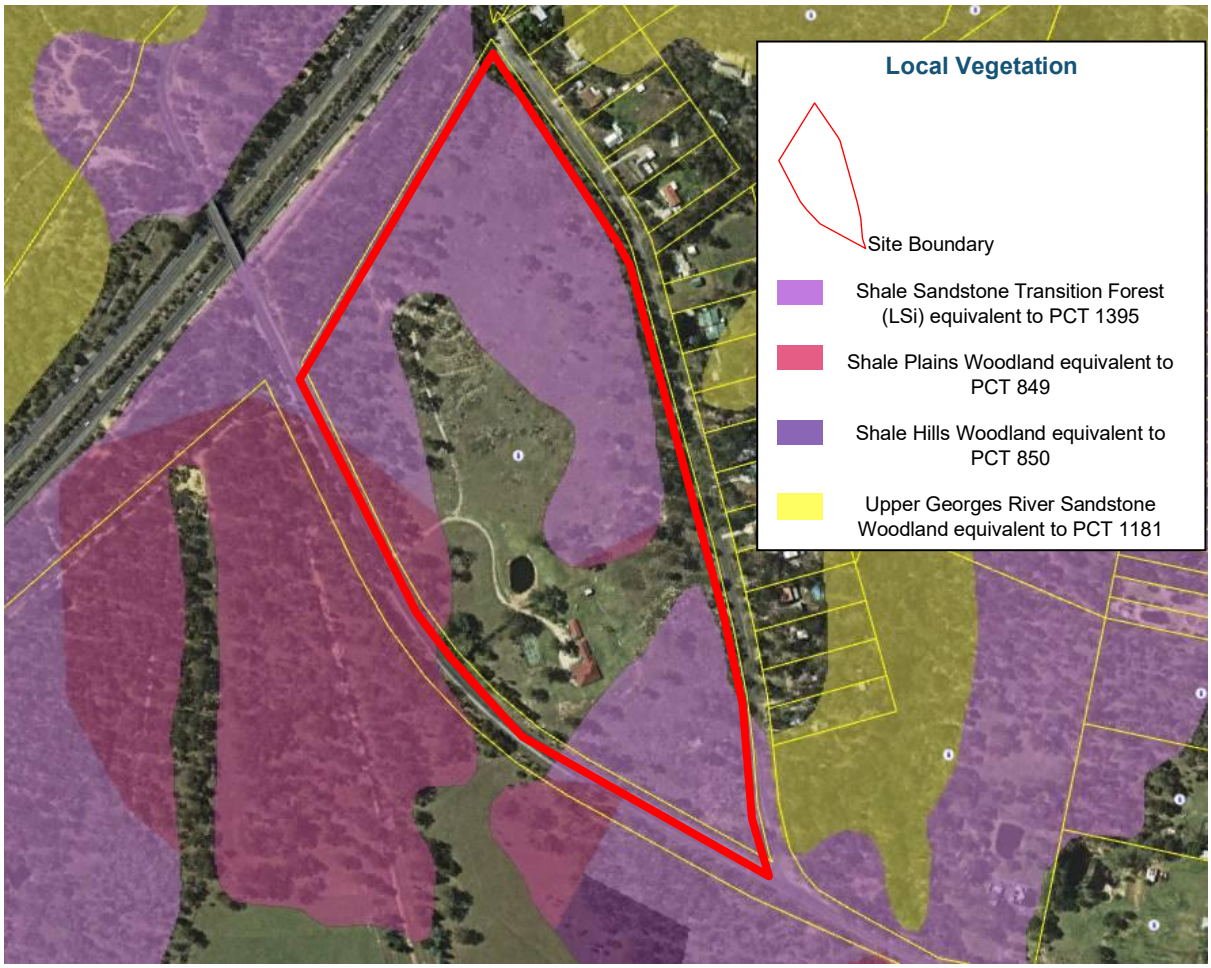


Figure 4-2 - Remnant Vegetation of the western Cumberland subregion (OEH 2013)

4.2 Flora

A few landscaping species were observed close to the existing dwelling. These were generally not taken into consideration in preparing the species list.

Two (2) state listed threatened flora species, *Grevillea parviflora subsp. parviflora* and *Persoonia bargoensis*, were observed during surveys undertaken. All species are listed in Table 3-1.

4.2.1 Local / Regional flora matters

The Wollondilly DCP and LEP do not list any regionally significant or keystone species.

4.2.2 State legislative flora matters

(a) Threatened flora species (NSW)

Based on habitat assessment, it is considered that the development footprint provides varying levels of potential habitat for the following state listed threatened flora species:

Table 4-1– State listed threatened flora species with suitable habitat present

Scientific name	BC Act	Potential to occur
Acacia bynoeana	E1	Low
Acacia pubescens	V	Low
Callistemon linearifolius	V	Unlikely
Darwinia biflora	V	Very unlikely
Epacris purpurascens var. purpurascens	V	Low
Genoplesium baueri	E	Low
Grevillea parviflora subsp. parviflora	V	✓
Hibbertia puberula	E	Unlikely
Hibbertia superans	E	Unlikely
Leucopogon exolasius	V	Low
Melaleuca deanei	V	Unlikely
Micromyrtus minutiflora	E	Unlikely
Persoonia bargoensis	E1	✓
Persoonia glaucescens	V	Unlikely
Persoonia hirsuta	V	Unlikely
Persoonia nutans	E	Unlikely
Pimelea curviflora var. curviflora	V	Low
Pimelea spicata	E1	Unlikely
Pterostylis saxicola	E	Very unlikely
Pultenaea pedunculata	E	Unlikely
Tetratheca glandulosa	V	Very unlikely

Two (2) state listed threatened flora species, *Grevillea parviflora subsp. parviflora* and *Persoonia bargoensis*, were observed during surveys undertaken.

(a) Endangered flora populations (NSW)

There are no endangered flora populations specific to the Wollondilly LGA.

(b) Threatened ecological communities (NSW)

Two (2) threatened ecological communities (TECs) occur within the study area:

Cumberland Plain Woodland in the Sydney Basin Bioregion (CPW):

This TEC occurs on the southwestern portion of the subject land in association with PCT 3320 and is listed as a Critically Endangered Ecological Community (CEEC) under the *NSW BC Act* 2016.

Shale-Sandstone Transition Forest in the Sydney Basin Bioregion (SSTF):

This TEC occupies the majority of the subject land and is in association with PCT 3321 and is listed as Endangered Ecological Community (EEC) *NSW BC Act 2016*.

These communities have been assessed in detail within Appendix 3.

(c) Species credit species

The determination of threatened flora species candidates for targeted surveys is described in Table 4-2. This species list was collated based upon the BAM calculator and field surveys to date. Species with green cells in the last column of the table are considered for species credit calculation. The threatened species presence/absence column marked with an asterisk (*) have additional information below for ruling them out as a candidate based on distribution or habitat constraints, or non-compliant survey.

Table 4-2 – Species credit species (flora)

Scientific name	Associated PCTs	Geographic limitations	Habitat constraint (Bionet - 2024)	Habitat degraded or micro habitats absent	Confirmed candidate species	Survey Adequacy			Presence / absence
						Required survey effort and period	Actual survey effort and period	Survey Compliant (yes / no)	
Acacia bynoeana	3321	-	no	no	yes	All months	May 2024	yes	Absent - survey
Acacia pubescens	3320 3321	-	no	no	yes	All months	May 2024	yes	Absent - survey
Callistemon linearifolius	3321	-	no	no	yes	Oct- Jan	March 2025	no	Absent – survey*
Darwinia biflora	3321	-	no	no	yes	All months	May 2024	yes	Absent – survey
Deyeuxia appressa	3320 3321	-	no	-	-	Dec	Not surveyed	n/a	Absent*
Dillwynia tenuifolia	3320 3321	-	no	no	yes	Aug – Oct	Not surveyed	no	Absent*
Epacris purpurascens var. purpurascens	3321	-	no	no	yes	Sept - Oct	Surveyed	no	Absent – survey*
Eucalyptus benthamii	3320	-	no	yes – micro habitat absent	yes	All Months	Not surveyed	n/a	Absent – excluded as a candidate*
Eucalyptus glaucina	3320	Yes	no	-	yes	All Months	Not surveyed	no	Absent*
Genoplesium baueri	3321	-	no	no	yes	Feb – Mar After significant rainfall	March 2025	no	Absent - survey
Grammitis stenophylla	3321	-	no	no	yes	All Months After significant rainfall	July 2024	yes	Absent – survey
Grevillea juniperina subsp. juniperina	3320 3321	Yes	no	no	yes	All Months	Not surveyed	n/a	Absent*
Grevillea parviflora subsp. parviflora	3321	no	no	no	yes	Aug - Nov	May 2024, June 2019/2024	no	Present - survey
Grevillea parviflora subsp. supplicans	3321	☐ north of Great Western Highway	no	no	yes	Aug - Nov	Not surveyed	n/a	Absent – excluded as a candidate*
Hibbertia puberula	3320 3321	no	no	no	yes	Oct - Dec	October 2025	yes	Absent - survey
Hibbertia superans	3321	no	no	no	yes	Jul - Dec	July 2024	yes	Absent - survey
Lasiopetalum joyceae	3321	no	no	no	yes	Sept - Nov	Not surveyed	n/a	Absent*
Leucopogon exolasius	3321	no	no	no	yes	Aug – Sept	March 2025	no	Absent - survey
Leucopogon fletcheri subsp. fletcheri	3321	no	no	no	yes	Aug - Sept	Not surveyed	n/a	Absent*

Scientific name	Associated PCTs	Geographic limitations	Habitat constraint (Bionet - 2024)	Habitat degraded or micro habitats absent	Confirmed candidate species	Survey Adequacy			Presence / absence
						Required survey effort and period	Actual survey effort and period	Survey Compliant (yes / no)	
Marsdenia viridiflora subsp. viridiflora – endangered population	3320 3321	Not within nominated LGAs	no	-	yes	-	Not surveyed	n/a	Absent – excluded as a candidate*
Melaleuca deanei	3321	no	no	no	yes	All Months	June 2019/2024	yes	Absent - survey
Micromyrtus minutiflora	3321	no	no	no	yes	All Months	July 2024	yes	Absent - survey
Persoonia bargoensis	3321	no	no	no	yes	All Months	June 2019/2024, March 2025	yes	Present - survey
Persoonia glaucescens	3321	no	no	no	yes	Jan - Mar	March 2025	yes	Absent - survey
Persoonia hirsuta	3321	no	no	no	yes	All months	May 2024	yes	Absent - survey
Persoonia nutans	3320 3321	no	no	no	yes	All months	May 2024	yes	Absent - survey
Pimelea curviflora var. curviflora	3320 3321	no	no	no	yes	Oct - Mar	March 2025	yes	Absent - survey
Pimelea spicata	3320 3321	no	no	no	yes	All Months	July 2024	yes	Absent - survey
Pomaderris brunnea	3320 3321	no	no	Micro Habitats absent	yes	-	Not surveyed	N/A	Absent – excluded as a candidate
Pomaderris prunifolia – Endangered population	3320 3321	Not within nominated LGAs	no	-	no	-	Not surveyed	N/A	Absent – excluded as a candidate*
Pterostylis saxicola	3320 3321	no	no	no	yes	Oct	October 2025	yes	Absent – survey
Pultenaea parviflora	3320 3321	no	no	Micro Habitats absent	yes	Sept - Nov	Not surveyed	N/A	Absent – excluded as a candidate*
Pultenaea pedunculata	3320 3321	no	no	no	yes	Sept - Nov	October 2025	yes	Absent – survey
Tetratheca glandulosa	3321	no	no	no	yes	Aug - Nov	October 2025	yes	Absent – survey
Wahlenbergia multicaulis – Endangered population	3320 3321	Not within nominated LGAs	no	-	no	-	Not surveyed	N/A	Absent – excluded as a candidate*
Zieria involucrata	3321	yes	no	-	yes	All Months	Not surveyed	N/A	Absent*

Exclusions based on habitat features and distributional constraints:

Exclusion of species from consideration as candidate species follows Section 5.1 of the BAM. Candidate species can be excluded from further consideration if:

- The distribution of the species does not include the IBRA subregion within which the subject land is located
- the subject land is outside any geographic limitations of the species distribution based on information from the threatened biodiversity profile search webpage. If no geographic limitations are listed for the species, then this step is not applicable
- none of the habitat constraints for the species as provided in the TBDC are present in a vegetation zone or subject land.
- the species is vagrant in the IBRA subregion.

After carrying out a field assessment, a candidate species can also be excluded if:

- the microhabitats required by a species are absent from the subject land (or specific vegetation zone).
- the habitat constraints or microhabitats are degraded to the point that the species is unlikely to use the subject land (or specific vegetation zones).

If a candidate species cannot be excluded based on the above criteria, targeted survey must be undertaken, the species assumed present, or an expert report obtained that states that the species is unlikely to be present on the subject land or specific vegetation zones.

<u>Exclusions based on geographic or distributional constraints</u>

- *Eucalyptus glaucina*

This species occurs from near Casino, to Taree, south to Broke and near Warragamba Dam. The site is located outside these geographic regions.

- *Grevillea juniperina subsp. juniperina*

This species is confined to Western Sydney and is known from the area bounded approximately St Marys – Londonderry – Prospect. It has been reported from LGAs of Blacktown, Hawkesbury, Liverpool, Parramatta and Penrith.

- *Grevillea parviflora subsp. supplicans*

Has a very restricted known distribution (approximately 8 by 10 km) and is confined to the north-west of Sydney near Arcadia and the Maroota–Marramarra Creek area, in Hornsby and Baulkham Hills local government areas (TBDC). The subject land is therefore outside the distribution of the species.

- *Lasiopetalum joyaceae*

This species has a restricted distribution associated with the lateritic to shaley ridgetops of the Hornsby Plateau, south of the Hawkesbury River. The subject land is therefore outside of the known distribution of the species.

- *Leucopogon fletcheri subsp. fletcheri*

This species in confined to north of Campbelltown and is known from the area bounded by approximately Kentlyn (S) – Koolewong & St. Albans (N) – Kenhurst (W) – Springwood (E). The subject land is therefore outside of the known distribution of the species.

- *Marsdenia viridiflora subsp. viridiflora* Endangered Population

This population is restricted to the Bankstown, Camden, Campbelltown, Fairfield, Holroyd, Liverpool and Penrith Local Government Areas. The subject land is outside these LGAs.

- *Pomaderris prunifolia* Endangered Population

This population is restricted to the Parramatta, Auburn, Strathfield and Bankstown Local Government Areas. The subject land is outside these LGAs

- *Pultenaea parviflora*

P. parviflora is confined to a restricted distribution in the Penrith, Windsor and Blacktown area. This species core habitat is scrubby/dry heath areas within Castlereagh Ironbark Forest and Shale Gravel Transition Forest, sometimes expending into adjoining Castlereagh Scribbly Gum Woodland (DCCEEW 2008). P. parviflora grows in dry sclerophyll woodlands dominated by *Eucalyptus fibrosa* and *Melaleuca decora* (De Kok and West 2002). Considering that there is no suitable habitat for *P. parviflora* on site, and that the most southern population was recorded at Kemps Creek, this species distribution does not overlap with the subject land.

- *Wahlenbergia multicaulis* - Endangered Population

This population is restricted to the Auburn, Bankstown, Baulkham Hills, Canterbury, Hornsby, Parramatta and Strathfield Local Government Areas. The subject land is outside these LGAs.

- *Ziera involucrata*

This species occupies a restricted geographic area with less than 20 populations within the Sydney Region between Yengo National Park in the north and Marramarra National Park in the south (NSW Scientific Committee – final determination). The subject land is outside this geographic area.

<u>Exclusions based on absence of habitat constraints or degradation of microhabitat</u>

- *Deyeuxia appressa*

Specimen of *D. appressa* have not been observed in over 60 years. The pre-1942 records of *D. appressa* were found at Herne Bay, Saltpan Creek and off the Georges River south of Bankstown. While the species habitat and ecology remain unknown, the species requires moist conditions for the habitat to be suitable. However, with the subject land being located on dry woodlands, the required microhabitat for *D. appressa* to occur is absent. Additionally, due to the ongoing farming practices undertaken on the subject land, the habitat is too degraded, making it even more unlikely for the species to occur on the subject land.

- *Dillwynia tenuifolia*

This species is known to occur in Western Sydney on alluvial soils (derived from Tertiary Alluvium and Laterised clays) within scrubby/dry heath areas within Castlereagh Ironbark Forest and Shale Gravel Transition Forest (Kemps Creek population) and soils derived from Wiannamatta Shale (Baulkham Hills population). It occurs as far north-west as Kurrajong Heights, as well as Falconbridge-Hazelbrook in the Blue Mountains with a large core population in western Sydney. The species distribution extends up from Windsor, towards Wisemans Ferry, and as far south as Liverpool. There are two records located to the south of Campbelltown as outliers. Based on the ecological descriptions of the habitat of *D. tenuifolia* (Environment Impact Assessment Guidelines – Dillwynia tenuifolia, NSW Office of Environment & Heritage), the subject land is not the suitable or preferred habitat of the species

and hasn't been recorded in the area. Additionally, the subject land is located outside of the species complex distribution according to its threatened biodiversity profile.

- *Eucalyptus benthamii*

Associated with Floodplains and occurs on riverbanks and alluvial tall open forest (NSW Scientific Committee - Final Determination). Alluvial floodplains and riverbanks absent from this site. Occurs on alluviums, shales and at the intergrade between shales and sandstones (TBDC). These edaphic features are absent from the site, which occurs on sandstone and ironstone without shale or alluvium.

- *Pomaderris brunnea*

This species grows in open forest on clay or alluvial soils of floodplains and riparian habitats (NSW Scientific Committee - Final Determination). These habitat features are absent within this site and therefore this species is unlikely to occur.

Non-compliant surveys

- *Callistemon linearifolius*

The *Callistemon* species occurring in the PCTs mapped on site - PCT 3320 – Cumberland Shale Plains Woodland & 3321 – Cumberland Shale-Sandstone Ironbark Forest - are C. salignus*, C. linearis* and *C. shiressii. C. shiressii* occurs in and between the Singleton and Richmond districts in moist forests and on ridges. *C. salignus* has very different morphology, very distinctive from *C. linearifolius* with much wider and shorter leaves. C. linearis also morphologically distinct from *C. linearifolius*, located on site in the northern part in PCT 3321 in a dense patch. C. linearis has distinctive stiff and narrow leaves almost needle-like and channelled. In comparison, *C. linearifolius* has flexible and wider leaves, linear to linear-lanceolate with visible leaf venation. These two species have clearly identifiable features and can be told apart in the field outside of their flowering period.

- *Epacris purpurascens var. purpurascens*

There are three morphologically similar species that are expected to occur on site and that could be confounded with *Epacris purpurascens var. purpurascens*. These species are *Daviesia squarrosa, Styphelia sieberi, Acacia brownii* and *Acacia ulicifolia. Daviesia squarrosa*, which occurs on site, is substantially different from a morphological standpoint to *E. purpurascens. D. squarrosa* is very distinguishable by the heart shape, stiff leaves with an elongated and prickly tip, and a visible protruding mid vein with a lighter shade, as for the leaf margins. Regarding *Styphelia sieberi*, *Acacia brownii* and *Acacia ulicifolia* - also occurring on site – showcase a similar small shrub formation with alternate prickly leaves fused to the stem. However, these species do not possess the thin wide and recurved egg-shaped leaves of *E. purpurascens*. As such, they have very distinguishable morphologies to a surveyor that is familiar with these species.. *E. purpurascens* can be confidentially identified outside of the flowering period on site. Hence, although outside of the recommended period, this species was surveyed in March 2025.

- *Leucopogon exolasius*

L. exolasius at the time of the survey (March 2025), could be confounded with *Acacia brownii* and *Acacia ulicifolia* due to the prickly shrub formation. However, both *A. ulicifolia* and *A. brownii* have phyllodes and A. brownii was found in the beginning of the flowering period and had the easily identifiable flower buds (round flower heads on elongated flower axils). *L. exolasius* could also be confounded with *Styphelia sieberi* which occurs on site, however *S.*

sieberi has flat to slightly recurved leaves while *L. exolasius* displays the opposite leaf morphology with the leaf edges curled under. Additionally, *S. sieberi* is a densely branched shrub with very short internodes compared to *L. exolasius*, which is a feature that can be identified from a distance.

(d) Local data

Local data has not been used in this case.

(e) Expert reports

Not undertaken.

4.2.3 Matters of national environmental significance - flora

(a) Threatened flora species (national)

EPBC Act – A search of the BioNet (DECCEW 2024) and the EPBC Search Tool provided a list of nationally threatened fauna species previously recorded, or with considered potential habitat, within a 10 km radius of the development footprint.

The nationally listed threatened flora species that could potentially occur or have previously been recorded on the subject land are described in Table 4-3.

Table 4-3 – Nationally listed threatened flora species

Scientific name	*EPBC Act*	Potential to occur	Response
Grevillea parviflora subsp. parviflora	V	Recorded	-
Persoonia bargoensis	V	Recorded	-
Acacia bynoeana	V	low	Survey undertaken, not recorded
Pimelea curviflora var. curviflora	V	low	Survey undertaken, not recorded
Pomaderris brunnea	V	unlikely	Microhabitats absent
Pterostylis saxicola	E	very low	Grow in small pockets of shallow soil in depressions of sandstone rocks above cliff lines – sub-optimal habitat onsite near the northern tip which is conserved, but potentially offsite and in nearby incised creek line. Flowers only in October. Survey undertaken Oct 2025 and not recorded
Melaleuca deanei	V	unlikely	Site located outside of geographic range and known populations
Pimelea spicata	E	low	Assumed absent based off survey

Two (2) nationally listed threatened flora species *Grevillea parviflora subsp*. *parviflora* and *Persoonia bargoensis*, were observed within the study area.

Grevillea parviflora subsp. parviflora

The population of *Grevillea parviflora subsp*. *parviflora* has been recorded onsite. The proposed development is not considered to have a significant impact on the population of *Grevillea parviflora subsp. parviflora* due to the locality of the population's occurrence being located within the retained vegetation.

The Biodiversity Management Plan (BMP) prepared by *Travers bushfire and ecology* (2026) specifies the ongoing management of *Grevillea parviflora subsp. parviflora*.

Persoonia bargoensis

Persoonia bargoensis has been recorded onsite in two locations. The proposed development is not considered to have a significant impact on the recorded *Persoonia bargoensis* as the locality of this species is within the retained vegetation onsite.

(b) Threatened ecological communities (national)

- Cumberland Plain Shale Woodlands and Shale Gravel Transition Forest
- Shale Sandstone Transition Forest

Both above communities occur within the development footprint.

4.3 Fauna

All fauna species recorded during 2019 2024/2025 surveys, key fauna habitat observations and habitat tree data are provided in Section 3.

4.3.1 Key fauna habitat

Most notable habitat features for threatened fauna species considered with most potential to occur include:

- Medium hollow (10-30cm)
- Small hollows (<10cm)
- Seeding Allocasuarina species present in high numbers given the recorded presence of Glossy Black-Cockatoo
- Diverse seasonal flowering opportunities for nectivorous species.
- Winter flowering trees
- Yellow-bellied Glider sap feed Grey Gums

A complete assessment of the location of habitat trees and the size of hollows within was undertaken as part of surveys.

Table 3.9 above provides hollow-bearing tree data and other habitat features recorded. Figure 3-5 provides locations of habitat trees.

No large hollows suitable for threatened owls were recorded present within the habitat tree survey area. Medium and small sized hollows were identified in relatively low density across the study area. Some hollow-dependent fauna species recorded during surveys include Brown Antechinus, Sugar Glider, Common Ringtail Possum, Common Brushtail Possum, Australian King Parrot, Eastern Rosella, Galah, Little Corella, Long-billed Corella, Rainbow Lorikeet, Scaly-breasted Lorikeet, Musk Lorikeet, Spotted Pardal

ote, Sulphur Crested Cockatoo, White-throated Treecreeper, including threatened Little Lorikeet.

Small hollows, bark sheaths and a structure were identified as potential microbat roosts. Microbat species recorded during 2019 surveys include White-striped Freetail Bat, Gould's Wattled Bat, Eastern Broad-nosed Bat, as well as threatened species, Eastern Falsistrelle and Large Bent-winged Bat. No survey targeting microbat species has been recently undertaken during high activity warmer months and therefore it is unknown if these species are still considered to occur within the locality.

No raptor nests or notable threatened bird species nests were identified to warrant specific protection. No other trees considered as important for habitat purposes were identified.

4.3.2 Local fauna matters

No significant local fauna is identified on the council's website or within locally relevant survey guidelines.

4.3.3 State legislative fauna matters

(a) Threatened fauna species (NSW)

BC Act – A search of the Atlas of NSW Wildlife (DCCEEW, 2024) provided a list of threatened fauna species previously recorded within a 10 km radius of the development footprint. These species are considered for potential habitat within the development footprint. Strictly estuarine and oceanic threatened species found within 10 km have not been included as no marine / aquatic habitats occur within the development footprint.

Based on the habitat assessment it is considered that the development footprint provides varying levels of potential habitat for the following state listed threatened fauna species:

Table 4-4 – State listed threatened fauna species with suitable habitat present

Common name	*BC Act*	Potential to occur
Little Lorikeet	V	Previously recorded (2019)
Grey-headed Flying-fox	V	Previously recorded (2019)
Eastern False Pipistrelle	V	Previously recorded (2019)
Large Bent-winged Bat	V	Previously recorded (2019)
Large-eared Pied Bat	E	Recorded (2025)
Southern Myotis	V	Recorded (2025)
Greater Broad-nosed Bat	V	Recorded (2025)
East-coast Freetail Bat	V	Recorded (2025)
Little Eagle	V	✓
Square-tailed Kite	V	✓
Glossy Black-Cockatoo	V	✓
Swift Parrot	E	✓
Speckled Warbler	V	✓
Varied Sittella	V	✓
Dusky Woodswallow	V	✓
Scarlet Robin	V	✓
Diamond Firetail	V	✓
Koala	E	✓
Yellow-bellied Sheathtail-bat	V	✓
Little Bent-winged Bat	V	✓
White-bellied Sea Eagle	V	low
Gang-gang Cockatoo	V	low
Turquoise Parrot	V	low

Common name	*BC Act*	Potential to occur
Barking Owl	V	low
Powerful Owl	V	low
Masked Owl	V	low
Brown Treecreeper	V	low
Black-chinned Honeyeater	V	low
Cumberland Plain Land Snail	E	low
Spotted Harrier	V	unlikely
Black Falcon	V	unlikely
Regent Honeyeater	E4A	unlikely
Painted Honeyeater	V	unlikely
Hooded Robin	V	unlikely
Flame Robin	V	unlikely
Spotted-tailed Quoll	V	unlikely
Yellow-bellied Glider	V	unlikely
Squirrel Glider	V	unlikely

Note: Full habitat descriptions for these species are provided in Section 3.3

During 2019 survey four (4) state listed threatened fauna species – including Little Lorikeet (*Glossopsitta pusilla*), Grey-headed Flying-fox (*Pteropus poliocephalus*), Large Bent-winged Bat (*Miniopterus orianae oceanensis*) and Eastern False Pipistrelle (*Falsistrellus tasmaniensis*) – were recorded within the development footprint during surveys.

As the data collected from 2019 survey is over five (5) years old, this data cannot be used for the calculation of offset credit obligations. For the purposes of this assessment only species detected during 2024/2025 survey and assumed species have been utilised for offset calculation.

FM Act – No habitats suitable for threatened aquatic species were observed within the development footprint and as such the provisions of this act do not require any further consideration.

(b) Endangered fauna populations (NSW)

There are no endangered fauna populations within the Wollondilly Shire LGA.

(c) State Environmental Planning Policy (Biodiversity and Conservation) 2021 – Koala Habitat Protection

Chapter 4 of *State Environmental Planning Policy (SEPP; Biodiversity and Conservation) 2021 (Koala Habitat Protection)* applies to land within LGAs listed under Schedule 2 of the Policy. As the study area falls under the Wollondilly LGA, it is considered that *Koala SEPP 2021* applies to this development proposal.

Land to which this policy applies in accordance with Section 4.4 of the *SEPP 2021* is as follows:

(1) This Chapter applies to each local government area listed in Schedule 2.
(2) The whole of each local government area is—
  (a) in the koala management area specified in Schedule 2 opposite the local government area, or
  (b) if more than 1 koala management area is specified, in each of those koala management areas.
(3) Despite subsection (1), this Chapter does not apply to—
  (a) land dedicated or reserved under the *National Parks and Wildlife Act 1974*, or acquired under Part 11 of that Act, or

(b) land dedicated under the *Forestry Act 2012* as a State forest or a flora reserve, or
(c) land on which biodiversity certification has been conferred, and is in force, under Part 8 of the *Biodiversity Conservation Act 2016*, or
(d) land in the following land use zones, or an equivalent land use zone, unless the zone is in a local government area marked with an * in Schedule 2—
    (i) Zone RU1 Primary Production,
    (ii) Zone RU2 Rural Landscape,
    (iii) Zone RU3 Forestry.

The land is listed in **Schedule 2 Wollondilly LGA and is zoned RU2**, therefore *SEPP 2021* applies. Please Note that *SEPP 2020* applies in lands zoned as RU1, RU2 and RU3 in accordance with SEPP 2020, however Wollondilly LGA is excluded.

In accordance with Section 4.9 of the *SEPP 2021* as there is currently no approved Koala Plan of Management (KPoM) for the LGA that this site is located in,

> (2) before council may grant consent to a development application for consent to carry out development on the land, the council must assess whether the development is likely to have any impact on Koalas or Koala habitat.
>
> (3) If the council is satisfied that the development is likely to have low or no impact on Koalas or Koala habitat, the council may grant consent to the development application.
>
> (4) If the council is satisfied that the development is likely to have a higher level of impact on Koalas or Koala habitat, the council must, in deciding whether to grant consent to the development application, take into account a Koala Assessment Report for the development.

However, as the proposed activity is a State Significant Infrastructure project, the determining body will be the NSW DCCEEW.

Under Chapter 4 Koala habitat protection SEPP 2021, Part 4.9 'koala assessment report' is defined for development as:

> a report prepared by a suitably qualified and experienced person about the likely and potential impacts of the development on koalas or koala habitat and the proposed management of those impacts.

Under Chapter 4 *Koala habitat protection SEPP 2021*, Part 4.1 'core koala habitat' is defined as:

> (a) an area of land which has been assessed by a suitably qualified and experienced person as being highly suitable koala habitat and where koalas are recorded as being present at the time of assessment of the land as highly suitable koala habitat, or
>
> (b) an area of land which has been assessed by a suitably qualified and experienced person as being highly suitable koala habitat and where koalas have been recorded as being present in the previous 18 years.

In Chapter 4 of *SEPP 2021*, the term "potential koala habitat" in *SEPP 2021* refers back to the specific definition provided in *SEPP 2020*, as outlined below:

Under Part 3.2 of *SEPP 2020* 'potential koala habitat' is defined as:

> "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."

One (1) tree species was recorded in the study area which is considered to be a Koala feed tree species under Schedule 1 of *SEPP 2021*. This species is:

- Eucalyptus tereticornis (Forest Red Gum)

Under Schedule 2 of *SEPP 2021*, Wollondilly falls within the Central and Southern Tablelands and Central Coast Koala Management Areas.

Eight (8) tree species were recorded in the study area which are considered Koala use tree species within these Management Areas under Schedule 3 of *SEPP 2021*. These species are:

- *Allocasuarina littoralis* (Black She-oak)
- *Corymbia gummifera* (Red Bloodwood)
- *Angophora floribunda* (Rough-barked Apple)
- *Eucalyptus crebra* (Narrow-leaved Ironbark)
- *Eucalyptus eugenioides* (Thin-leaved Stringybark)
- *Eucalyptus fibrosa* (Broad Leaved Ironbark)
- *Eucalyptus moluccana* (Grey Box)
- *Eucalyptus tereticornis* (Forest Red Gum)

According to the AIA prepared by Travers bushfire & ecology (2025), of the 566 trees assessed there are 13 *Eucalyptus tereticornis* on site, which comprises 2.3% (less than 15%) of the total number of trees in the upper or lower strata of the tree component. Therefore, it is concluded that the study site is not classified under *SEPP 2021* as 'potential koala habitat'.

No Koalas were directly observed at the time of fauna survey, which included diurnal searches of trees and spotlighting. In addition, there was no secondary evidence of Koala habitation in the area including characteristic scratches on trees and scats beneath trees. Six (6) complete Spot Assessment Technique (Phillips & Callaghan 2008) searches below 30 trees were undertaken (Two (2) during the 2019 survey and four (4) during the 2024 survey). One of these accounted for almost all the Forest Red Gum trees present in the CPW community, the others were spread out across the study area to give an accurate representation of the site. No Koala activity was recorded.

As of February 2025, there have been 2064 recorded Koala observations within a 10km radius from the study site within the last 18 years. Within the surrounding locality Koala observations are concentrated particularly along the connective forest habitats of the nearby Allens Creek and the Bargo River. Records extend to the south of Wilton and to the west along Cordeaux River as well as east to Appin, and beyond.

Despite this known local activity of Koalas, the study area itself does not appear to form part of an individual's active home range. Firstly, most of the trees surrounding the study area are Ironbarks within the Shale-sandstone Transition Forest Community. The small number of Forest Red Gum (the only listed Koala feed tree under Schedule 1 SEPP) is all contained within a fenced, highly cleared and grazed area surrounded by existing houses. SATs incorporating most of these trees did not record any Koala scats but also did not record scratches on these smooth-barked trees consistent with Koala historical use.

The number of these trees is also limited and Koalas incorporating them into a home range would need to cross either Douglas Park Drive or Mitchell Place to access the site. One of the residents on site provided anecdotal evidence of a single Koala making passage across the road in 2018 but said it did not stay long. Another anecdotal record from a resident provided information that a road-kill record was observed on Douglas Park Drive.

It would be expected that transient Koalas from the local population may utilise the surrounding habitat on site temporarily during dispersal. Despite this, the site is not considered potential koala habitat and further survey results and habitat considerations have concluded that this study site is not considered core koala habitat under the above definitions.

Although the site is not considered core koala habitat, a precautionary approach has been taken and as such a Koala Assessment Report has been prepared to satisfy Section 4.9 of the *Koala SEPP 2021*.

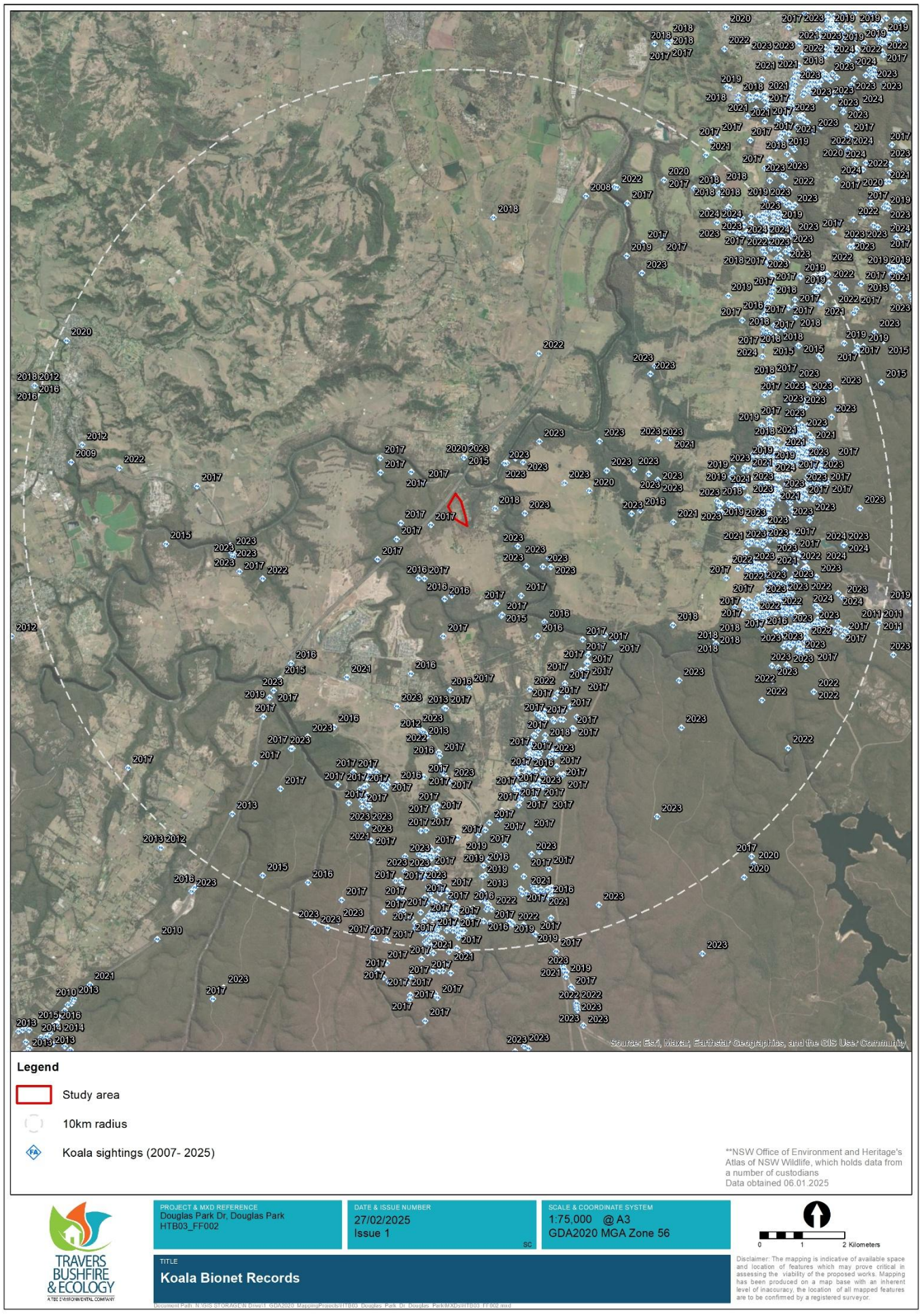


Figure 4-3 - Koala Bionet Records

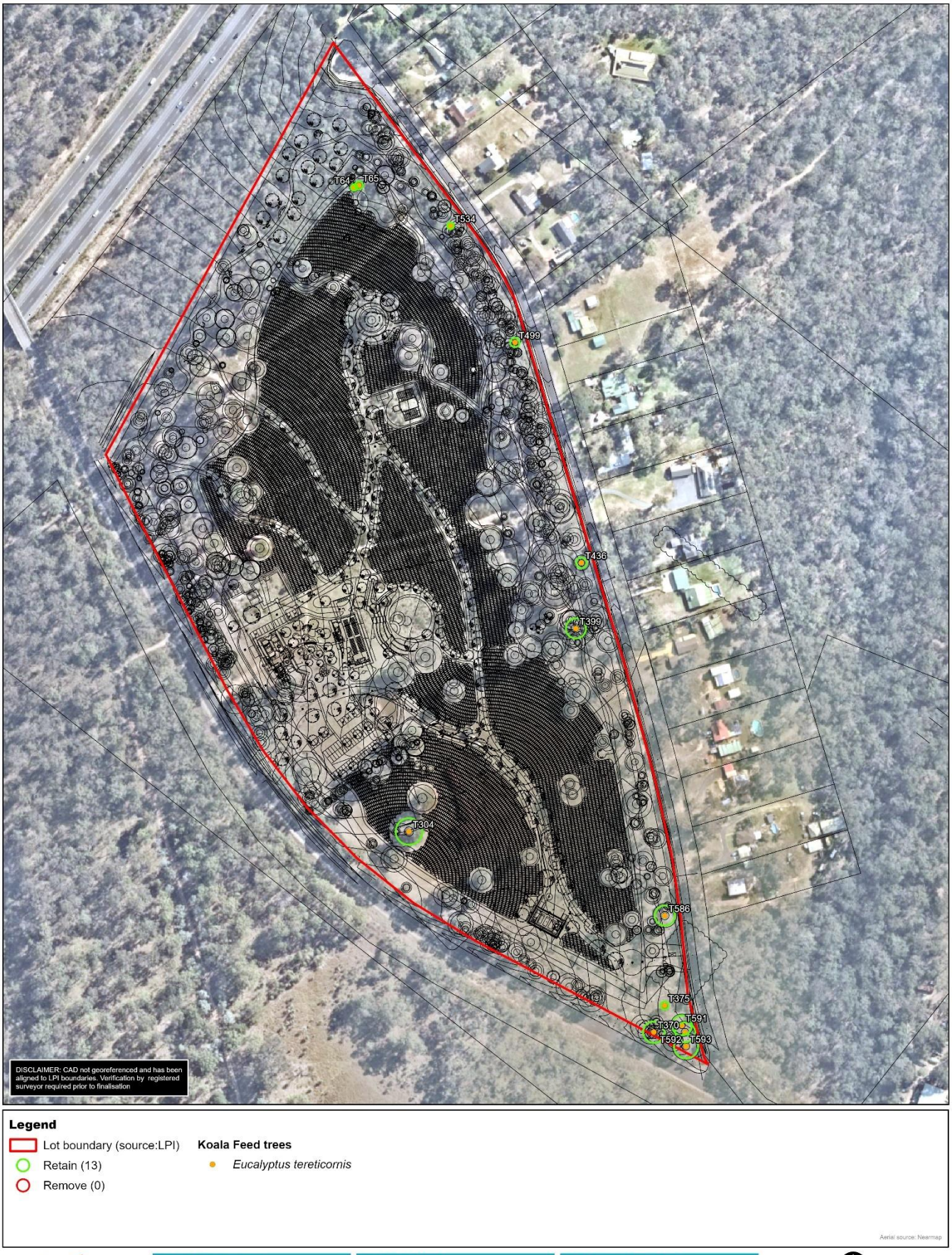


Figure 4-4 - Koala feed tree species identified on site

Figure 4-5 - Koala use tree species identified on site

(d) Ecosystem credit species

Based upon the BAM calculator and field surveys to date, the following threatened fauna species were considered as predicted species for ecosystem credit calculation:

Table 4-5 - Ecosystem credit species (fauna)

Common name	Associated PCT	Habitat constraint (TBDC – Feb 2025)	Habitat constraint presence	Confirmed predicted species
Black-chinned Honeyeater (eastern subspecies)	3320, 3321	No habitat constraints	N/A	Yes
Black Falcon	3320, 3321	No habitat constraints	N/A	Yes
Black-necked Stork	3320, 3321	Shallow, open freshwater or saline wetlands or shallow edges of deeper wetlands within 300m of these swamps.	Absent	No
Broad-headed Snake	3321	Within the southwest margins of the Cumberland sub-region	Outside of geographic limitation	No
Brown Treecreeper (eastern subspecies)	3320, 3321	No habitat constraints	N/A	Yes
Diamond Firetail	3320, 3321	No habitat constraints	N/A	Yes
Dusky Woodswallow	3320, 3321	No habitat constraints	N/A	Yes
Eastern Coastal Free-tailed Bat	3320, 3321	No habitat constraints	N/A	Yes
Eastern False Pipistrelle	3320, 3321	No habitat constraints	N/A	Yes
Eastern Osprey (foraging)	3320, 3321	No habitat constraints	N/A	Yes
Flame Robin	3320, 3321	No habitat constraints	N/A	Yes
Gang-gang Cockatoo (foraging)	3320, 3321	No habitat constraints	N/A	Yes
Greater Broad-nosed Bat	3320, 3321	No habitat constraints	N/A	Yes
Grey-headed Flying-fox (foraging)	3320, 3321	No habitat constraints	N/A	Yes
Large Bent-winged Bat (foraging)	3320, 3321	No habitat constraints	N/A	Yes
Little Bent-winged Bat (foraging)	3320, 3321	No habitat constraints	N/A	Yes

Common name	Associated PCT	Habitat constraint (TBDC – Feb 2025)	Habitat constraint presence	Confirmed predicted species
Little Eagle (foraging)	3320, 3321	No habitat constraints	N/A	Yes
Little Lorikeet	3320, 3321	No habitat constraints	N/A	Yes
Pilotbird	3321	South of Picton Road	Site is north of Picton Road	No
Regent Honeyeater (Foraging)	3320, 3321	No habitat constraints	N/A	Yes
Rosenberg's Goanna	3320, 3321	No habitat constraints	N/A	Yes
Scarlet Robin	3320, 3321	No habitat constraints	N/A	Yes
South-eastern Glossy Black-Cockatoo (foraging)	3320, 3321	Presence of Allocasuarina species	Absent in 3321_regrowth, 3321_poor and 3320_derived_native_grass	Yes (part)
Speckled Warbler	3320, 3321	No habitat constraints	N/A	Yes
Spotted Harrier	3320, 3321	No habitat constraints	N/A	Yes
Spotted-tailed Quoll	3320, 3321	No habitat constraints	N/A	Yes
Square-tailed Kite (foraging)	3320, 3321	No habitat constraints	N/A	Yes
Swift Parrot (foraging)	3320, 3321	No habitat constraints	N/A	Yes
Turquoise Parrot	3320, 3321	No habitat constraints	N/A	Yes
Varied Sittella	3320, 3321	No habitat constraints	N/A	Yes
White-bellied Sea-Eagle (foraging)	3320, 3321	Within 1km of a rivers, lakes, large dams or creeks, wetlands and coastlines	Present	Yes
White-throated Needletail	3320, 3321	No habitat constraints	N/A	Yes
Yellow-bellied Glider	3321	No habitat constraints	N/A	Yes
Yellow-bellied Sheathtail-bat	3320, 3321	No habitat constraints	N/A	Yes

Excluded species:

- Black-necked Stork

The ecosystem habitat constraint for this species as described by the TBDC includes: “shallow, open freshwater or saline wetlands or shallow edges of deeper wetlands within 300m of these swamps”. No such habitat exists within the study area and no such habitat is within 300m and as such this species can be excluded as a predicted species.

- Broad-headed Snake

The ecosystem habitat constraint for this species as described by the TBDC includes: “within the southwest margins of the Cumberland sub-region” study area is not located within the southwest margins of the Cumberland subregion and as such this species can be excluded as a predicted species.

- Pilotbird

Denoted in BioNet as geographically restricted to South of Picton Road. The site is within a few kilometres of Picton Road but to the north. There are many records of the species in the Woronora area and through the Blue Mountains up to Gulgong as well as a handful of records in Lake Macquarie to the Central Hunter. The species has been turned off as an ecosystem species, however turning it on would make no difference to the credit requirements.

(e) Species credit species

Based upon the BAM calculator and field surveys to date, the following predicted threatened fauna species were considered as candidate species for species credit calculation:

Table 4-6 – Species credit species (fauna)

Common name	Associated PCTs	IBRA subregion / geographic restriction	Habitat constraint (TBDC – Feb 2025)	Habitat degraded or micro habitats absent	Confirmed candidate Species (yes / no)	Survey adequacy			Presence / absence
						Required survey effort and period	Actual survey effort and period	Survey compliant (yes / no)	
Barking Owl (breeding)	3320 3321	-	☐ Living or dead trees with hollows greater than 20 cm diameter and greater than 4m above the ground		No	-	-	-	Absent (habitat constraints absent – no suitable hollows)
Broad-headed Snake	3321	-	☐ Rocky areas including escarpments, outcrops and pogodas within the Sydney Sandstone geologies		No	Suitable habitat searches, spotlighting transects (Aug, Sep, Dec-Feb)	Suitable habitat searches, spotlighting transects during June 2024	No	Absent (habitat constraints absent)
Bush Stone-curlew	3320 3321	-	☑ Fallen/standing dead timber including logs		Yes	Spotlighting & call-back (All months)	Spotlighting & call-back during June 2024	Yes	Absent (survey)
Cumberland Plain Land Snail	3320 3321	-	No habitat constraint		Yes	2 hour morning/evening searches during or after rain within ground and vegetation surfaces (All months)	2 hour searches during June 2024	Yes	Absent (survey)
Eastern Osprey (breeding)	3320 3321	-	☐ Presence of stick-nests in living and dead trees (>15m) or artificial structures within 100m of a floodplain for nesting ☑ Other		Yes	Raptor nest searches (Apr – Nov)	Raptor nest searches during June 2024	Yes	Absent (survey)
Eastern Pygmy-possum	3320 3321	-	No habitat constraints		Yes	Trapping survey over 6 weeks (Oct – Mar)	Spotlighting and Arboreal cameras in June 2024, denning tubes deployed over 6.5 weeks Jan-Mar 2025	Yes	Absent (survey)
Gang-gang Cockatoo population in the		☐ Hornsby and Ku-ring-gai LGAs	☑ Hollow bearing trees ☑ Eucalypt tree species with hollows 3 m above the ground		No	-	-	-	Absent (outside of geographic limitation)

Common name	Associated PCTs	IBRA subregion / geographic restriction	Habitat constraint (TBDC – Feb 2025)	Habitat degraded or micro habitats absent	Confirmed candidate Species (yes / no)	Survey adequacy			Presence / absence
						Required survey effort and period	Actual survey effort and period	Survey compliant (yes / no)	
Hornsby and Ku-ring-gai Local Government Areas			and with hollow diameter of 7 cm or larger						
Gang-gang Cockatoo (breeding)	3320 3321	-	☑ Hollow bearing trees ☑ Eucalypt tree species with hollows 3 m above the ground and with hollow diameter of 7 cm or larger		Yes	Hollow inspection and activity searches (Oct-Jan)	Hollow inspection and activity searches during Jan 2025	Yes	Absent (survey)
Giant Burrowing Frog	3321	-	No habitat constraints	Microhabitats absent	No	-	-	-	Absent (microhabitats abasent)
Green and Golden Bell Frog	3320 3321	-	☐ Semi-permanent/ephemeral wet areas ☐ Within 1km of wet areas ☐ Within 1km of swamp ☑ Within 1km of waterbody		No	4 x nights aural/visual survey & call identification (Nov – Mar)	2 x nights opportunistic habitat search during June 2024	No	Absent (subject land is beyond 200 m of suitable aquatic habitats considered as potential breeding areas)
Grey-headed Flying-fox (breeding)	3320 3321	-	☐ Breeding camps ☐ Other Individual detected during June 2024 survey but no presence of breeding camp		Yes	Opportunistic breeding camp search (Oct-Dec)	2 x nights opportunistic breeding camp search during June 2024	No	Absent (1 recorded foraging but no areas identified suitable for breeding camps)
Large-eared Pied Bat	3320 3321	-	☑ Within two kilometres of rocky areas containing caves, overhangs, escarpments, outcrops, or crevices, ☐ or within two kilometres of old mines or tunnels		Yes	16 x nights ultrasonic survey (Nov-Jan)	10 night / 30 recorder nights x ultrasonic survey during Jan-Feb 2025	Yes	Present (survey)
Little Bent-winged Bat (breeding)	3320 3321	-	☐ Cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding including species records in BioNet with microhabitat code 'IC – in cave';		No	-	-	-	Absent (habitat constraints absent)

Common name	Associated PCTs	IBRA subregion / geographic restriction	Habitat constraint (TBDC – Feb 2025)	Habitat degraded or micro habitats absent	Confirmed candidate Species (yes / no)	Survey adequacy			Presence / absence
						Required survey effort and period	Actual survey effort and period	Survey compliant (yes / no)	
			☐ observation type code 'E nest-roost'; ☐ with numbers of individuals >500; ☐ or from the scientific literature						
Large Bent-winged Bat (breeding)	3320 3321	-	☐Cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding including species records in BioNet with microhabitat code 'IC – in cave' ☐ observation type code 'E nest-roost' ☐ with numbers of individuals >500 ☐ or from the scientific literature		No	-	-	-	Absent (habitat constraints absent)
Little Eagle (breeding)	3320 3321	-	☐ Nest trees - live (occasionally dead) large old trees within vegetation) ☑ Other		Yes	Raptor nest searches (Aug – Oct)	Raptor nest searches during June 2024, Jan 2025 and Oct 2025	yes	Absent (survey)
Masked Owl (breeding)	3320 3321	-	☐ Hollow bearing trees ☐ Living or dead trees with hollows greater than 20 cm diameter		No	-	-	-	Absent (habitat constraints absent - no suitable hollows)
Powerful Owl (breeding)	3320 3321	-	☐ Hollow bearing trees ☐ Living or dead trees with hollows greater than 20 cm diameter		No	-	-	-	Absent (habitat constraints absent - no suitable hollows)
Regent Honeyeater (breeding)	3320 3321	-	☐ as per mapped areas ☐ Other		No	-	-	-	Absent (no mapped important areas)
Red-crowned Toadlet	3320 3321	-	No habitat constraints	Microhabitats absent	No	-	-	-	Absent (No microhabitats identified within the study area)
Southern Greater Glider	3320 3321	-	No habitat constraint		Yes	Spotlighting transect survey (All months)	Spotlighting transect survey	Yes	Absent (survey)

Common name	Associated PCTs	IBRA subregion / geographic restriction	Habitat constraint (TBDC – Feb 2025)	Habitat degraded or micro habitats absent	Confirmed candidate Species (yes / no)	Survey adequacy			Presence / absence
						Required survey effort and period	Actual survey effort and period	Survey compliant (yes / no)	
							during June 2024		
Southern Myotis	3320 3321	-	☑ Waterbodies with permanent pools/stretches 3m or wider, including rivers, large creeks, billabongs, lagoons, estuaries, dams and other waterbodies, on or within 200m of the site.		Yes	16 x nights ultrasonic survey (Oct-Mar)	10 night / 30 recorder nights x ultrasonic survey during Jan-Feb 2025	Yes	Present (survey)
South-eastern Glossy Black-Cockatoo (Breeding)	3320 3321	-	☑ Living or dead tree with hollows greater than 15cm diameter and greater than 8m above ground		Yes	Hollow inspection and activity searches (Jan – Sep)	Hollow inspection and activity searches during June 2024	Yes	Absent (survey)
Square-tailed Kite (breeding)	3320 3321	-	☐ Nest trees ☑ Other		Yes	Raptor nest searches (Sep – Jan)	Raptor nest searches during Jan 2025	Yes	Absent (survey)
Squirrel Glider	3320 3321	-	No habitat constraint		Yes	14 days x baited camera trapping, spotlighting (All months)	14 days x baited camera trapping, spotlighting during June 2024	Yes	Absent (survey)
Swift Parrot (breeding)	3320 3321	-	☐ as per mapped areas ☐ Other		No	-	-	-	Absent (no mapped important areas)
White-bellied Sea-Eagle	3320 3321	-	☑ Living or dead mature trees within suitable vegetation within 1km of a rivers, lakes, large dams or creeks, wetlands and coastlines ☐ Other		Yes	Raptor nest searches (Jul-Dec)	Raptor nest searches during June 2024 and Oct 2025	Yes	Absent (survey)
Koala	3320 3321	-	☑ Areas identified via survey as important habitat (see comments)		Yes	Survey (All months)	4 x SAT's, spotlighting during June 2024	Yes	Absent (survey)

Exclusions based on habitat features and distributional constraints:

Exclusion of species from consideration as candidate species follows Section 5.1 of the BAM. Candidate species can be excluded from further consideration if:

- The distribution of the species does not include the IBRA subregion within which the subject land is located
- the subject land is outside any geographic limitations of the species distribution based on information from the threatened biodiversity profile search webpage. If no geographic limitations are listed for the species, then this step is not applicable
- none of the habitat constraints for the species as provided in the TBDC are present in a vegetation zone or subject land.
- the species is a vagrant in the IBRA subregion.

After carrying out a field assessment, a candidate species can also be excluded if:

- the microhabitats required by a species are absent from the subject land (or specific vegetation zone).
- the habitat constraints or microhabitats are degraded to the point that the species is unlikely to use the subject land (or specific vegetation zones).

If a candidate species cannot be excluded based on the above criteria, targeted survey must be undertaken, the species assumed present, or an expert report obtained that states that the species is unlikely to be present on the subject land or specific vegetation zones.

Excluded species based on geographic limitation:

- Gang-gang Cockatoo population in the Hornsby and Ku-ring-gai LGAs

The study area is not located within the LGAs associated with this population.

Excluded species based on absence of habitat:

- Green and Golden Bell Frog

The NSW Survey Guide for Threatened Frogs (DPE 2020) identifies the breeding and non-breeding shelter habitat as any waterbody with emergent aquatic vegetation. While the study area is within 1km of waterbodies and the site does contain a dam, no emergent vegetation was present within the dam. Additionally, the site offers no opportunity for migrant frogs in the form of perennial or ephemeral drainage linkages to and from the dam if located within 1km and therefore it is considered that this species can be excluded as a candidate species credit species.

- Broad-headed Snake

The TBDC (DCCEEW 2024) identifies the habitat constraints for this species as rocky areas including escarpments, outcrops and pogodas within the Sydney Sandstone geologies. The study area does not contain any such habitat therefore it is considered that this species can be excluded as a candidate species credit species.

- Red-crowned Toadlet

The TBDC (DPE 2024) states that this species inhabits periodically wet drainage lines below sandstone ridges that often have shale lenses or capping. These features are absent from the subject land. Additionally, The NSW Survey Guide for Threatened Frogs (DPE 2020) defines

potential habitat as the following: “the species is found only on Triassic sandstones, and within that area, it uses areas of heathland and woodland. and suitable breeding habitat consists of ephemeral streams or pools located within areas of native vegetation on Triassic sandstones. Non-breeding habitat is native vegetation within 100 metres of suitable breeding habitat. As suitable potential and breeding habitat is absent from the subject land this species can be excluded as a candidate species.

- Giant Burrowing Frog

Credits for this species are associated with breeding and non-breeding habitat. The NSW Survey Guide for Threatened Frogs (DPE 2020) defines non-breeding habitats as any area of PCT on the subject land that is located within 300 m of suitable breeding habitat. Suitable breeding habitat consists of ephemeral flowing streams that have permanent pools, or in upland swamps, and are located within native vegetation. As suitable breeding habitat is absent from the subject land, and within 300 m, this species can be excluded as a candidate species.

Excluded species based on the absence of breeding habitat:

- Grey-headed Flying-fox

The TBDC (DCCEEW 2024) identifies the breeding habitat constraints for this species as the presence of breeding camps. The study area does not contain (nor is it close to) any known breeding camp or any habitat suitable for hosting breeding camps.

- Little and Large Bent-winged Bats

The TBDC (DCCEEW 2024) identifies the breeding habitat constraints for this species as Cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding including species records in BioNet with microhabitat code ‘IC – in cave’; observation type code ‘E nest-roost’; with numbers of individuals >500; or from the scientific literature. The study area does not contain any such habitat therefore it is considered that these species can be excluded as a candidate species credit species.

- Barking Owl, Masked Owl and Powerful Owl

The TBDC (DCCEEW 2024) identifies the breeding habitat constraints for this species as a living or dead tree with a hollow >20 cm diameter that occurs >4 metres above the ground. The study area does not contain any such habitat therefore it is considered that these species can be excluded as a candidate species credit species.

Excluded species based on the absence of important mapped habitat:

- Swift Parrot

The site is not mapped as containing important habitat for this species on the BAM - Important Areas (DCCEEW) mapping.

- Regent Honeyeater

The site is not mapped as containing important habitat for this species on the BAM - Important Areas (DCCEEW) mapping.

(f) Local data

Anecdotal evidence was obtained during survey however local data has not been used in this case.

(g) Expert reports

Expert reports have not been utilised for fauna on this project.

4.3.4 Matters of national environmental significance - fauna

(a) Threatened fauna species (National)

EPBC Act – A search of the BioNet (DCCEEW 2024) and the EPBC Search Tool provided a list of nationally threatened fauna species previously recorded, or with considered potential habitat, within a 10km radius of the development footprint. These species have been listed and considered for habitat potential based on proximity and year of records and those with potential habitat within the development footprint are considered for referral.

Based on this, it is considered that the development footprint provides varying levels of potential habitat for the following nationally listed threatened fauna species.

Table 4.8 – Nationally listed threatened fauna species with suitable habitat present

Common name	*EPBC Act*	Potential to occur
Grey-headed Flying-fox	V	recorded
Large-eared Pied Bat	E	recorded
Swift Parrot	E	✓
White-throated Needletail	V	✓
Koala	E	✓
Greater Glider	V	✓
Regent Honeyeater	CE	unlikely
Painted Honeyeater	V	unlikely
Spotted-tailed Quoll	E	unlikely

Two (2) nationally listed threatened fauna species, Grey-headed Flying-fox (*Pteropus poliocephalus*) and Large-eared Pied Bat (*Chalinolobus dwyeri*) was recorded foraging within the development footprint during surveys undertaken.

The Significant Impact Criteria for a vulnerable species listed under the *EPBC Act 1999* (Appendix 3) was reviewed to assess the impacts on this species as a result of proposed development. As the subject site does not contain any likely roosting or subsequent breeding habitat and foraging habitat will remain well represented in the locality, it is concluded that there will not be any significant impact on this species, or other nationally listed threatened fauna species with potential to occur, as a result of the proposal.

The number of these trees is also limited and koalas incorporating them into a home range would need to cross either Douglas Park Drive or Mitchell Place to access the site. One of the residents on site provided anecdotal evidence of a single koala making passage across in 2018 but said it did not stay long. Another anecdotal record from a resident provided information that a road-kill record was observed on Douglas Park Drive.

Under Chapter 4 'Core Koala habitat' protection *SEPP 2021, Part 4.1 Koala Habitat'* is defined as:

> (a) an area of land which has been assessed by a suitably qualified and experienced person as being highly suitable koala habitat and where koalas are recorded as being present at the time of assessment of the land as highly suitable koala habitat, or

(b) an area of land which has been assessed by a suitably qualified and experienced person as being highly suitable koala habitat and where koalas have been recorded as being present in the previous 18 years.

In Chapter 4 of *SEPP 2021*, there are definitions given for koala habitat, which are based on a management plan mentioned in this chapter or a previous *Koala SEPP*.

Chapter 4.2 definitions states that 'koala habitat' means koala habitat however described in a plan of management under this Chapter or a former *koala SEPP* and includes core koala habitat.

Under Part 3.2 of *SEPP 2020 Potential Koala Habitat'* is defined as:

- "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."

It would be expected that koalas from the local population may utilise the habitat on site temporarily during dispersal. Despite this, survey results and habitat considerations has concluded that the study area does not form Core Koala Habitat under the definitions of *SEPP 2021* or any former definitions provided in repealed SEPP's.

Travers bushfire & ecology confirm that feed trees for koalas and habitat connectivity will not be adversely impacted by proposal as there will be adequate road setbacks with retained tree areas allowing for flow and movement patterns to continue into the future. Consent under *SEPP (Biodiversity Conservation) 2021* can be granted on this basis.

(b) 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 10 km radius of the development footprint.

No nationally protected migratory bird species were recorded present during the preliminary survey or are considered likely to constrain development within the study area.

4.4 Watercourses, GDEs & Wetlands

4.4.1 Endangered wetland communities

Several wetland communities have been listed as TECs under the *BC Act*. We note that 'wetlands' are included in the definition of 'waterfront lands' in accordance with the *Water Management Act 2000 (WM Act)* due to their inclusion in the definition of a 'lake' under the same Act. TECs that are considered to be an endangered protected wetland are as follows:

- Artesian springs ecological community
- Castlereagh Swamp Woodland Community
- Coastal Saltmarsh in the NSW North Coast, Sydney Basin and South East 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 South East 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 South East Corner bioregions
- Swamp sclerophyll forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East 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
- Wingecarribee Swamp

No endangered wetland communities were present within the development footprint and therefore a referral under the *Water Management Act 2000* is not required for impacts on waterfront land.

4.4.2 Groundwater dependent ecosystems (GDEs)

Groundwater dependent ecosystems were not observed within the development footprint and therefore the policy does not require any further consideration. A referral under the *Water Management Act 2000* is not required for impacts on waterfront land.

4.4.3 Watercourses

There is mapped stream in the east of the subject land. Mapping by Water Management (General) Regulation 2018 shows this mapped stream into the subject land (Figure 4-6).

An inspection at multiple cross points was undertaken across the mapped stream and no channelisation or other forms of stream morphology were observed. Whilst a small shallow dam was present, the site evidence is that a watercourse is not present but rather is a drainage swale. A referral under the *Water Management Act 2000* for General Terms of Approval should not be required for this DA.

Figure 4-6 – Mapped hydrolines

(Source: NSW Department of Industry, 13/06/2024)

4.4.4 State Environmental Planning Policy (Resilience and Hazards) 2021 – Division 1 Coastal wetlands and littoral rainforests area

The *State Environmental Planning Policy (Resilience and Hazards) 2021* maps areas of coastal wetland and littoral rainforest that need consideration under Division 1 of this SEPP.

Wetlands on site or adjacent

The NSW DPE Coastal Wetlands and Littoral Rainforests Area Map (https://geo.seed.nsw.gov.au/Public_Viewer/index.html?viewer=Public_Viewer&locale=en-AU) identifies that the site is not mapped with areas within the wetland as "coastal wetlands", or buffer areas surrounding the margin of the wetland as "proximity area for coastal wetlands" as shown in (Figure 4-7). The nearest Coastal Wetlands and Littoral Rainforests Area is mapped approximately 12.8 km to the north-west of the site. And as such proposed development will not impact on the quantity and quality of surface and ground water flows to and from the adjacent coastal wetland.

Figure 4-7 – Coastal wetlands area map

5. IMPACT ASSESSMENT

5.1 Avoidance and minimisation actions

The following strategies and actions have been undertaken to either avoid or minimise impacts on biodiversity values:

Avoidance measures

Impacts from clearing native vegetation and threatened species habitat has been avoided or minimised by locating the proposal in areas:

- Avoiding broad areas mature and fully structure native vegetation of highest biodiversity value and takes advantage of the degraded portions of the site where the native vegetation and does not contain recorded threatened flora species.
- The native vegetation buffer fully conserves the observed specimens of both *Grevillea parviflora subsp. parviflora* and *Persoonia bargoensis*. There are two (2) observed specimens of *Persoonia bargoensis* to date. Both specimens are located within a setback area that will not be directly impacted.
- The proposal avoids 37% of the native vegetation on site (9.63/15.27 ha to be impacted.

The majority of centre of the site is regrowth vegetation that lacks mature trees.

- 38% of impacted vegetation on site has a VI score in regrowth areas of 35.4 and a further 7.5% had a VI score of 34.9
- 7% of the impact on native vegetation consists of poor condition Cumberland Plain Woodland which does not require offsetting due to the VI score being below 15.
- Only 8.4% of the site to be impacted has a VI score of greater than 50. (i.e. vegetation considered to be of good quality)
- Many remnant trees within the landscape will be retained in accordance with the Arboriculture Impact Assessment Report.

The specimens only have associated credits due to the requirement of a 30m polygon around each specimen. Whilst pathways may go within the species polygon, there should be no direct loss to either individual. For *Grevillea parviflora subsp. parviflora*, approximately 90% of the specimens are outside of the development footprint. The 30m buffer to specimens may be partly impacted by a pathway, however the impact should not lead to the incidental loss of those individuals if adequate measures are applied to ensure access is limited. Several of the individuals are located between the existing site fence and Mitchell Place.

Building locations including fencing and pathways have been designed to minimise the loss of trees of generally 150mm diameter at breast height or above. The Arboriculture Impact Assessment notes the requirement to only remove twenty-two (22) trees of over four hundred (400) assessed trees thus avoiding the majority of semi-mature to mature trees within the development footprint.

The proposal avoids actions that lead to isolation of habitats or fragmentation. Vegetation around the perimeter of the site is to be maintained to ensure that connectivity is not severed by the proposal.

The proposal meets several of the key elements of avoidance and minimisation, and sometimes the line is blurred between what is avoidance and what is minimisation.

Minimisation actions

The proposal has been located and/or designed to avoid or minimise prescribed biodiversity impacts

- Development has been located taking advantage of the disturbed zones – areas being used for an existing dwelling and grazing, along with mostly regrowth vegetation
- Access roads located on existing tracks or through existing cleared zones – avoiding the removal of mature trees
- Location of surface works to avoid direct impacts on the habitat features such as habitat trees and mature trees – only 34/532 assessed trees in the development footprint area and within 10-15 m are required for removal (6.4%)
- The location of the proposal seeks to avoid severing or interfering with corridors connecting different areas of habitat – maintaining connectivity from the adjoining biobanking lands at St Marys Towers to the Nepean River
- The proposal will have minimal impact or hydrological processes
- The earlier concept plans contained small recreational areas in the conservation areas. As a minimisation measure, the outer pathway for maintenance will have a dual usage and be suitable as a walking trail, however, there will be no additional clearing required to create the secondary usage, and the recreational facilities along the track have been taken out of the current plans to minimise impacts in the conservation portion of the site.

Mitigation actions are outlined in detail in section 5.2. A summary is provided below.

- Preparation of a Biodiversity management plan for the site that requires protection of the perimeter conservation zone, ecological restoration, and ongoing maintenance of retained areas of native vegetation, threatened species, threatened ecological communities and their habitat on the subject land.
- Protection of SSTF and CPW remnants around the perimeter of the site to maintain local connectivity for fauna and gene movement of plant material
- Landscaping to utilise species of SSTF and CPW origin for internal plantings
- Target weed control in retained vegetation areas to maintain and improve the vegetation and habitat, and minimise edge effects
- Fauna friendly fencing to exclude general access to quality bushland areas
- Supervision of construction activities and pre-clearance fauna surveys
- Implement prevention and control *Phytophthora cinnamomi* and Myrtle Rust, to limit potential for a local outbreak
- Monitor for *Armillaria luteobubalina* (Australian Honey Fugus) for all retained trees in the cometary landscape and adopt landscape management and treatment protocols to maintain tree health (avoid turfing and plant native vegetation over the root zone).
- Erosion control to be undertaken at selected locations to prevent sediment deposition and erosion rills
- To install fauna friendly fencing to allow for the movement of fauna through the landscape. Barbed wire fencing is to be excluded as an option
- All fencing is to be installed to avoid the removal of native vegetation
- It is proposed that vegetation will be cleared in stages to allow resident fauna ample opportunity to disperse, while also providing shelter habitat
- Management of hollows and hollow-dependent fauna, including hollow supervision where these trees are to be felled. Hollows of high quality or with fauna recorded residing within should be sectionally dismantled for relocation and all hollows should be inspected for occupation, signs of previous activity and potential for reuse

- A hollow management and augmentation and nest box strategy is to be prepared to guide the enrichment of hollows and nest resources including monitoring of the number, size and install location, and allow for replacement of hollows as part of ongoing maintenance and or replacement of artificial and salvaged hollows.
- Undertake feral pest management including control of foxes, cats, pigs, goats, avian pests, horses and any other miscellaneous species as required
- Integrated weed management and control of high threat exotics
- Adaptive management processes to improve on mitigation measures that fail or are partially successful
- Require ashes for scattering to be treated prior to release for bush scatterings.
- When scattering treated ashes in the site designated areas may be nominated and moved to minimise risk of adverse impacts.
- A restrictive covenant placed on the native vegetation buffer to maintain as a conserved native vegetation visual buffer and to protect threatened species habitat.

Treatment for ashes for scattered burials and living plant memorials

All ashes intended to be scattered or used in living plant memorials are to be treated to minimise impacts on the natural environment. The key concern regarding ashes is the pH and the salt content. Human ashes are alkaline and have pH level of 9-12. This means that essential nutrients are unavailable for plant use. Human ashes are predominantly made up of Calcium Phosphate and other salts; these have potential adverse impacts but are to be detoxified prior to supply back the patron scattering the ashes or use in living plant memorials.

The detoxification process ameliorates the ashes in the following manner:

- Leaching of Calcium Phosphate (a salt) from the ashes and rinsing
- Adjusting the pH (add gypsum) to return to an acceptable level.
- Incorporation with organic soil mix (if being used for planting) such as living plant burials

Trace amounts of metals in ashes are not significantly different to that contained in nature and do not pose a health or cause environmental harm.

5.1.1 Prescribed impacts

Table 5-1 – 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	yes	Existing dwelling and wooden shelter / structure	Existing building may	demolition	The existing dwelling may provide potential roosting

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
		on the right side of the entry gate	provide potential roosting habitat for threatened microbat species		habitat within wall or ceiling cavities that have small openings to external foraging airspace. This habitat is not likely to support breeding habitat for threatened microbat species and roosting habitat in other structures is expected through the local landscape. Roosting and breeding habitats for each species are stated in species profiles (DCCEEW) and the TBDC (BioNet). Based on these profiles, the removal of human made structures from the site is not expected to have a significant impact on any entity being assessed under the BAM for roosting.
Non-native vegetation	yes	Planted and naturalised exotic vegetation providing foraging habitat	No threatened species recorded using habitat, but may be used sporadically by Grey-headed Flying Fox	Removal of vegetation	Recorded threatened species that are known to utilise non-native vegetation include Grey-headed Flying Fox, which is known to forage on flowering a fruiting tree. As this habitat is well represented within the surrounding locality it is considered that the proposal will not hinder the foraging behaviour and therefore there will be no consequences of these impacts. Foraging behaviour for each species is stated in species profiles (OEH) and the TBDC (BioNet). Based on these profiles, the removal of non-native vegetation from the site is not expected to have a significant impact on any

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
					entity being assessed under the BAM.
Habitat connectivity	yes	These central parts are in the early stages of regrowth with few tree saplings and a native shrub layer between 0.7 and 2 metres tall and 50 to 65% cover. The ground layer within this area is also mostly native, however it appears depauperate with regards to species diversity.	Various threatened and non-threated species	n/a	The proposed development is expected to retain native trees within a variable width 10-65m wide buffer around the property boundary. These large remnant trees (and variable condition understorey around the perimeter of the site provide a local and mostly arboreal secondary connectivity option for fauna passing between the gully to the east and habitat west of Douglas Park Drive (refer to Figure 5-1). This highlights the value of maintaining perimeter vegetation as part of the proposal, particularly for the benefits to local birds, bats, gliders and other arboreal mammals. Such connectivity also provides a temporary refuge and feed species habitat for Koalas in dispersal. The most important and quality habitat for connectivity and corridors for fauna passage in the locality will otherwise be retained
Waterbodies, water quality and hydrological processes	yes	There is one large dam located in the central southern portion of the subject site.	Southern Myotis	Potential dam dewatering	The removal of the dam has the potential to impact foraging habitat for the Southern Myotis which is considered to have the potential to occur.
Wind farm development	no	n/a	n/a	n/a	n/a
Vehicle strikes	yes	internal roads	Terrestrial mammals and	Collision leading to	The proposal will increase internal vehicle traffic, which could potentially lead to an increase in vehicle collisions with native fauna. All internal

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
			frogs as well as birds in flight.	injury or death	roads will have a low speed limit and as such collisions are very unlikely for most species. Slow-moving threatened species with potential to occur, such as Cumberland Plain Land Snail, have been adequately surveyed and found to be absent from the site, so it is predicted that there will be no likely consequences for the persistence of these species

5.2 Direct impacts

Table 5-2 – Direct impact assessment

Direct impact	*BC Act* status	SAII entity	Project phase/timing of impact	Extent (ha, number of individuals)
Removal / modification of PCT 3320 - CPW	CEEC	Yes	Demolition / clearing	1.42 ha
Removal / modification of PCT 3321 – SSTF	CEEC	Yes	Demolition / clearing	8.21 ha
Subsequent removal of threatened fauna species foraging habitat including seasonal flowering by myrtaceous trees and understorey shrub species.	Various	No	Demolition / clearing	9.63 ha maximum
Potential removal of small and medium hollows.	Various	No	Demolition / clearing	Up to 6 trees with recorded hollows occur in the development footprint
Removal of deadwood and trees.	Various	No	Demolition / clearing	Only 1.66 ha of the 9.63 ha of impacted native vegetation contains trees of semi-mature to mature nature. Trees in regrowth areas are mostly 10 cm DBH or less

5.2.1 Indirect impacts

Table 5-3 – Indirect impact assessment

Indirect impact description	Impacted entities (PCT, species, TEC)	Frequency	Duration	Project phase/ timing of impact	Likelihood and consequences
Edge effects	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. • Inappropriate protection for *Persoonia bargoensis* and *Grevillea parviflora* may include trampling of specimens or weed invasion outcompeting with regenerating specimens.
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
Impacts to the adjacent St Marys Towers Biobanking site	Impacts to connectivity and additional traffic that made lead to additional road kill	Constant	Lifetime of development	Clearing, construction and ongoing	• Crossing points from St Marys Towers to the cemetery site crossing Douglas Park Drive may become narrower in the future, but will have limited impact on the potential for fauna movement or seed dispersal. • There is likely to be more traffic in the future as more developments are approved in the locality. The cemetery would be a cumulative impact on pressures to local wildlife, and crossing of Douglas Park Drive will become more dangerous for particular fauna groups with roadkill likely to increase marginally, although not necessarily on any particular threatened entities. • Consequences of impacts of this DA to the adjoining St Marys Towers Biobanking site is expected to be negligible or very minor overall.

5.2.2 Serious & Irreversible Impacts (SAIIs)

An impact is to be regarded as serious and irreversible if it is likely to contribute significantly to the risk of a threatened species or ecological community most at risk of extinction. Threatened species and communities that are potential for serious and irreversible impacts are outlined in Appendix 2 of Guidance to assist a decision-maker to determine a serious and irreversible impact (DPIE 2017). The principles for determining serious and irreversible impacts are set out under *Section 6.7.2 of the BC Reg*.

SAII entities recorded or with potential to occur within the study area include:

Table 5-4 – SAII entities recorded or with potential to occur

Species / TEC (Scientific name)	Species (Common name)	*BC Act*	Species potential to occur
Cumberland Plain Woodland	CPW	CEEC	Recorded
Shale Sandstone Transition Forest	SSTF	CEEC	Recorded
Miniopterus orianae oceanensis	Large Bent-winged Bat	V	Recorded – no breeding habitat
Miniopterus australis	Little Bent-winged Bat	V	Assumed (probable) – no breeding habitat
Chalinolobus dwyeri	Large-eared Pied Bat	V	Assumed (probable)
Lathamus discolor	Swift Parrot	CE	Low – not on important habitat mapping
Anthochaera phrygia	Regent Honeyeater	CE	Low – not on important habitat mapping
Genoplesium baueri	Bauer's Midge Orchid	E	Low – not recorded during the 2025 flowering period
Pterostylis saxicola	Sydney Plains Greenhood	E	Low – not recorded during the 2025 flowering period

Species:

The SAII assessment provisions for threatened species are outlined under *Section 9.1.2 of the BAM (2020)* and have been applied to the recorded Large Bent-winged Bat and Large-eared Pied Bat within Appendix 2 of this report. An assessment has also been undertaken for Little Bent-winged Bat as prompted by the BAM calculator. Breeding habitat is the key factor in determining an SAII for Large and Little Bent-winged Bats. Breeding habitat is not being impacted by the proposal.

The site also does not likely support any breeding habitat or likely important roosting/foraging for other candidate SAII species with potential to occur including Swift Parrot or Regent Honeyeater. Additionally, the site is not mapped as important areas for these species.

The ecological data profiles of each of the remaining above listed candidate SAII species has been reviewed to determine any habitat features present. In particular the Broad-headed Snake. Habitat constraints (breeding) for this species includes escarpments, outcrops and pogodas within the Sydney Sandstone geologies, this species is also geographically confined to the south-east margins of the sub-region which the study site is not located in. There is no presence of these features identified on site and therefore SAII assessment provisions have not been applied for this species.

An assessment on *Pterostylis* is required due to a lack of survey in the required survey period.

Communities:

The SAII assessment provisions for TECs are outlined under Section 9.1.1 of the *BAM (2020)* and have been applied to the recorded CPW and SSTF within Appendix 3 of this report.

5.3 Mitigation measures

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

Table 5-5 – Measures to mitigate & manage impacts

Action / Technique	Outcome	Timing / Frequency	Responsibility
Prepare a Vegetation Management Plan (VMP) or Biodiversity Management Plan to identify mitigation actions and establish a protected and avoided area on the land			
Protection and conservation of SSTF and CPW (which will be variable in width from 15 to 100m) surrounding the development footprint. The development area is situated to take advantage of previously cleared and disturbed areas and avoids the majority of the good-quality and fully-structured vegetation around the margins of the study area. Where possible existing TECs (SSTF and CPW), should be restored or regenerated to achieve a maintain outcome. Boundaries of the conservation zone shall be clearly marked out on-site and protected by fencing, prior to construction. Target weed control is to be undertaken to control the invasion or spread of noxious or invasive environmental weed species. Landscaping is to use locally-occurring native species commensurate with SSTF or CPW, as appropriate to vegetation mapping in Figure 3-1 including tree, shrub and ground cover species to encourage local fauna use, to enhance the native vegetation within the external screening areas and to consolidate remnant vegetation linkages within the locality.	Prevent indirect impacts and maintain integrity of conserved habitats	Prior to construction / any clearing works. Ongoing	Project Ecologist as guided by the VMP/ Bushland regenerator / Landscaper
Construction activities should be intermittently supervised on-site and monitored by a project ecologist to ensure that the recommendations of this report are implemented. All staff involved with the development shall undergo an induction and training program to reinforce the ecological and environmental objectives of the development.	Ensure that the recommendations of the BDAR are implemented.	Prior to and during habitat clearance and construction of services	Project Ecologist

Action / Technique	Outcome	Timing / Frequency	Responsibility
Standard *Phytophthora cinnamomi* and Myrtle Rust protocol applies to the cleaning of all plant, equipment, hand tools and work boots prior to delivery onsite to ensure that there is no loose soil or vegetation material caught under or on the equipment and within the tread of vehicle tyres. Any equipment onsite found to contain soil or vegetation material is to be cleaned in a quarantined work area or wash station and treated with anti-fungal herbicides. This will help stop the spread of Myrtle Rust also.	Prevent accidental spread of pathogens	During-construction period, applied to all construction vehicles – vehicles to stay on designated tracks away from pooled water, and maintain site drainage. Temporary fencing will exclude machinery from sensitive areas. All machines entering the site for construction must be certified by the Contractor that they have been disinfected. All personnel entering the site for the first time must scrub and disinfect their boots. There shall be no access to the ecological protected zones with SAII species. If work needs to occur in these spaces, scrub boots / tools and disinfect prior to entering (this is construction and operational control). Post-construction – plant monitoring actions for Myrtle Rust.	Site foreman (preconstruction and construction phase) Site foreman and project ecology (post construction phase)

Action / Technique	Outcome	Timing / Frequency	Responsibility
Monitor for *Armillaria luteobubalina* (Australian Honey Fugus) for all retained trees in the cometary landscape and adopt landscape management and treatment protocols to maintain tree health (avoid turfing and plant native vegetation over the root zone).	Maintain the health of standing trees.	Annual tree inspection and control	Site Management
Erosion control measures are to be in place to reduce temporary erosion and sedimentation risks to adjacent vegetation and any nearby drainage channel.	Maintain integrity of conserved 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
Prior to any habitat removal, including human-made structures and non-native vegetation, 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. Pre-clearance protocol is be undertaken by experienced and qualified ecologists in accordance with the "*Biodiversity Guidelines" (RTA 2011)* which are considered as 'best practice'	Reduce potential for impact on native species	Immediately prior to land clearance	Project Ecologist
Clearing of vegetation is to be staged to allow resident fauna ample opportunity to disperse, while also providing shelter habitat. Timing recommended in April / May or September to avoid critical life cycle events such as breeding or torpor for threatened species recorded or assumed present: Recorded threatened microbat species (Large Bent-winged Bat, Large-eared Pied Bat, Eastern False Pipistrelle, Eastern Coastal Free-tailed Bat, Greater Broad-nosed Bat and Southern Myotis): breeding Oct–Mar, torpor mostly winter	Reduce potential for impact on native species	Immediately prior to land clearance	Project Ecologist

Action / Technique	Outcome	Timing / Frequency	Responsibility
Management of hollows and hollow-dependent fauna: Habitat trees HT5 & HT18 provide a medium sized trunk hollow providing possibly suitable nesting habitat for Gang-gang Cockatoo. Galah was recorded utilising Habitat tree HT5 during 2019 survey. Therefore, these trees and other recorded hollow-bearing trees within the development footprint are recommended for retention and are to be clearly marked prior to clearing.	Protection of hollow-dependent wildlife	Prior to any clearing works.	Project Ecologist / Contractors
Where the felling of hollow-bearing trees or demolition of any existing structures is required, this 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 sectionally 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	Project Ecologist
Subsequent hollows of retention value are to be relocated to nearby conservation areas. If these are placed as on ground habitat and are not reattached to a new recipient tree, then they are to be replaced with appropriately sized nest boxes affixed to a retained tree.	Maintain quality denning / hollow shelter opportunities	At time of removal	Project Ecologist
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
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
The relocated hollow section or 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
A hollow and nest box monitoring and management strategy is to be prepared to enable the number, size, location, construction, installation, monitoring and replacement of hollows to be planned for the ongoing maintenance and replacement of artificial and salvaged hollows. The strategy is also to assess unintended impacts such as providing pest species habitat.	Ensure hollow integrity is maintained	Each year for 5 years	Project Ecologist
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
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
Tree protection within the development footprint to be monitored by project arborist to ensure only the trees approved for removal are impacted, and that trees identified for retention have adequate measures in place either during construction works, or post construction. Pre-construction – tree protection fencing to be included around the base of all trees being protected, or as per the arboriculture impact assessment. Construction – arborist to attend site during vegetation clearance works and monitor any encroachments to the tree protection zones of trees. Post-construction – pending distance to actual development features, pathways should be on ground level in close proximity to structural root zones, some trees may require more permanent structures around them such as formal landscaping bed or fencing.	Ensure that only the trees approved for removal are cleared, and those nominated for retention are adequately protected before and after construction works	Just prior to vegetation removal and ongoing including annual monitoring	Project Arborist / Project Ecologist

Action / Technique	Outcome	Timing / Frequency	Responsibility
Environmental signage to be placed around conserved areas of the site that provides adequate notification to construction crews that access is prohibited or restricted. Add phone numbers for spillages and clean up, and wildlife carers for injured animals.	To ensure environmental awareness of workers, and provide emergency numbers for accidents	Pre-construction	Contractors / Site Supervisor
Treatment of ashes for scattering to be treated prior to release for patrons or use in living plant memorials. When scattering treated ashes in the site designated areas may be nominated and moved to minimise risk of adverse impacts.	To minimise adverse impacts of the scattering of ashes on the natura environment	Operations	Site Management
Any importing of fill to the site needs to be certified as weed-free. Visual inspections are to be undertaken at regularly intervals during the construction process by either the Contractor, Site Supervisor or Project Ecologist, noting types and cover of weed seedlings. Exotic growth is to be controlled.	Minimise importing of exotic flora to the site that is not already present, that may have detrimental impact on conserved vegetation.	Construction phase	Contractors / Site Supervisor / Project Ecologist
A restrictive covenant is to be placed on the native vegetation buffer to conserve native vegetation, threatened species habitat and to manage a natural visual buffer	Provide a protective mechanism for the retention of threatened species habitat and native vegetation.	Prior to commencement of earthworks	Siet Management
Management of the conservation and cemetery interface			

Action / Technique	Outcome	Timing / Frequency	Responsibility
In order to minimise impacts at the conservation/cemetery interface, the landscape is to be managed to avoid the invasion of non-native groundcovers and exotic plants into the conservation area. This may include: • No spraying excess grass and regrowth at the base of the protective fencing but managed by hand or whipper snipper slashing to the base of the fenceline within the development footprint. • Fencing installed by hand avoiding the removal of native vegetation and scalping the soil by a Bobcat or small grader plate • Weeds treated by hand pulling or direct application of herbicide, that is, cut and paint or swiping methods. • Use of native landscape species within 20m of the conservation boundary/cemetery interface. • Lighting controls in accordance with the National Light Pollution Guidelines for Wildlife - DCCEEW 2023.	Minimise impacts on the conservation area at the boundary and activity cemetery interface	Landscape design, Lighting design, site establishment and during operations	Project design team and Site Operations Manager
Lighting controls			
Lighting controls in accordance with the National Light Pollution Guidelines for Wildlife DCCEEW (2023) are to be incorporated into the cemetery lighting plans. The lighting design is to embody: 1. Natural darkness on the cemetery interface when cemetery is closed at night. 2. Use adaptive controls that switch on and off only when needed and control the lighting intensity and colour to be fauna friendly. 3. Light only the intended object or area – keep lights close to the ground, directed and shielded. 4. Use appropriate lighting - Lighting intensity should be appropriate for the activity. The minimum amount of light required to illuminate the area is to be assessed and utilised. 5. Use non-reflective, dark-coloured surfaces. 6. Use lights with reduced or filtered-out blue, violet and ultraviolet wavelengths.	Minimise the impact on the natural fauna patterns and encouraging foraging and use of the site at night by local night fauna.	At design of the lighting plan and during operations.	Project design team and operations manager

5.3.1 Addressing the absence of a buffer zone for TECs

The following is extracted from the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) Draft Conservation Advice for Shale Sandstone Transition Forest in the Sydney Basin Bioregion (Page 8).

Buffer zone:

A buffer zone is a contiguous area adjacent to a patch that is important for protecting the integrity of the ecological community. As the risk of damage to an ecological community is usually greater for actions close to a patch, the purpose of the buffer zone is to minimise this risk by guiding land managers to be aware when the ecological community is nearby and take extra care around the edge of patches.

The buffer zone will help protect the root zone of edge trees and other components of the ecological community from spray drift (fertiliser, pesticide or herbicide sprayed in adjacent land) and other damage. The buffer zone is not part of the ecological community; so whilst having a buffer zone is strongly recommended, it is not formally protected as a matter of national environmental significance. For EPBC Act approval, changes in use of the land that falls within the buffer zone must not have a significant impact on the ecological community, but there are exemptions for continuing use. If the use of an area (e.g. grazing land) that directly adjoins a patch of the ecological community is going to be intensified (e.g. fertilised or changed to cropping or urbanised), approval under the EPBC Act may also be required.

The recommended minimum buffer zone is 30 metres from the outer edge of the patch. This accounts for the maximum height of the vegetation and likely influences upon the root zone. A larger buffer zone may be applied, where practical, to protect patches that are of very high conservation value or if patches are downslope of drainage lines or a source of eutrophication.

We note that the conservation advice states:

> *"the purpose of the buffer zone is to minimise this risk by guiding land managers to be aware when the ecological community is nearby and take extra care around the edge of patches. The buffer zone will help protect the root zone of edge trees and other components of the ecological community from spray drift (fertiliser, pesticide or herbicide sprayed in adjacent land) and other damage."*

As the site is managed by the Cemetery Operations and the conservation area forms part of the protected management area and fully delineated, the land managers will be fully aware of the ecological community and its boundary of protection. The root zone of all trees are adequately protected as assessed in the Arboriculture Impact Assessment and therefore there is no utility in providing further root zone protection. There is also commensurate very low risk that herbicide draft or the use of fertilisers, pesticides etc will be sprayed in the conservation area as the conservation area will be adjoining a cemetery operation where such activities are minimised and not significant. This is a cemetery operation not an agricultural operation subject to extensive spaying or other activities that will adversely impact the TEC in the conservation area when the adjoining land is used for intensive agriculture.

The site is 80% surrounded by local roads and associated edge effects and there is limited utility to be gained by imposing further buffers to what has been provided.

The conservation area is a linear protected zone and is immediately adjoined by local roads except the northern most boundary. There is limited utility to be gained by imposing further buffers to the conservation area that is impacted by the edge effects of the adjoining roads

and can otherwise be managed as part of the cemetery operations and appropriate operational controls.

Lighting controls have been specified in the Biodiversity Management Plan to minimise the impacts of night lighting on the surrounding bushland.

The long-term impacts can be effectively managed as part of the Cemetery Operations. This is a well-known aspect of cemeteries that have the capacity and ability to minimise impacts, protect threatened species habitat and don't contain activities that are likely to cause significant adverse impacts or edge effects other than the direct loss of any disturbed vegetation areas as already identified in the proposal.

The conservation/cemetery interface is to be managed to avoid the invasion of non-native groundcovers and exotic plants into the conservation area. This may include:

- No spraying excess grass and regrowth at the base of the protective fencing but managed by hand or whipper snipper slashing to the base of the fenceline within the development footprint.
- Fencing installed by hand avoiding the removal of native vegetation and scalping the soil by a Bobcat or small grader plate.
- Weeds treated by hand pulling or direct application of herbicide, that is, cut and paint or swiping methods.
- Use of native landscape species within 20m of the conservation boundary/cemetery interface.
- Lighting controls in accordance with the National Light Pollution Guidelines for Wildlife - DCCEEW 2023. Lighting controls are further expanded in the EPBC Act Ecological Assessment Report and the BDAR.

The use of native landscaping, operations controls and protection measures replace the function of the "buffer zone". The Biodiversity Management Plan 2026 for the proposed development has been prepared and submitted outlining how the conservation area and lands will be management for biodiversity purposes.

The approach taken for the SSDA is to improve upon the outcomes achieved by the existing concept masterplan approval, responding organically to the surrounding tree scape and creating an integrated sensitively managed landscape.

5.4 Vegetation connectivity and habitat corridors

The vegetation within the subject site has been cleared and disturbed and is grazed.

These central parts are in the early stages of regrowth with few tree saplings and a native shrub layer between 0.7 and 2 metres tall and 50 to 65% cover (see Photo 3-4). The ground layer within this area is also mostly native, however it appears depauperate with regards to species diversity.

The proposed development is expected to retain native trees within a variable width native vegetation buffer around the property boundary. These large remnant trees (and variable condition understorey around the perimeter of the site provide a local and mostly arboreal secondary connectivity option for fauna passing between the gully to the east and habitat west of Douglas Park Drive (refer to Figure 5-1).

This highlights the value of maintaining perimeter vegetation as part of the proposal, particularly for the benefits to local birds, bats, gliders and other arboreal mammals. Such connectivity also provides a temporary refuge and feed species habitat for Koalas in dispersal. The most important and quality habitat for connectivity and corridors for fauna passage in the locality will otherwise be retained.

Figure 5-1 – Local connectivity

Figure 5-2 – Species credit species polygons for species groups A and B

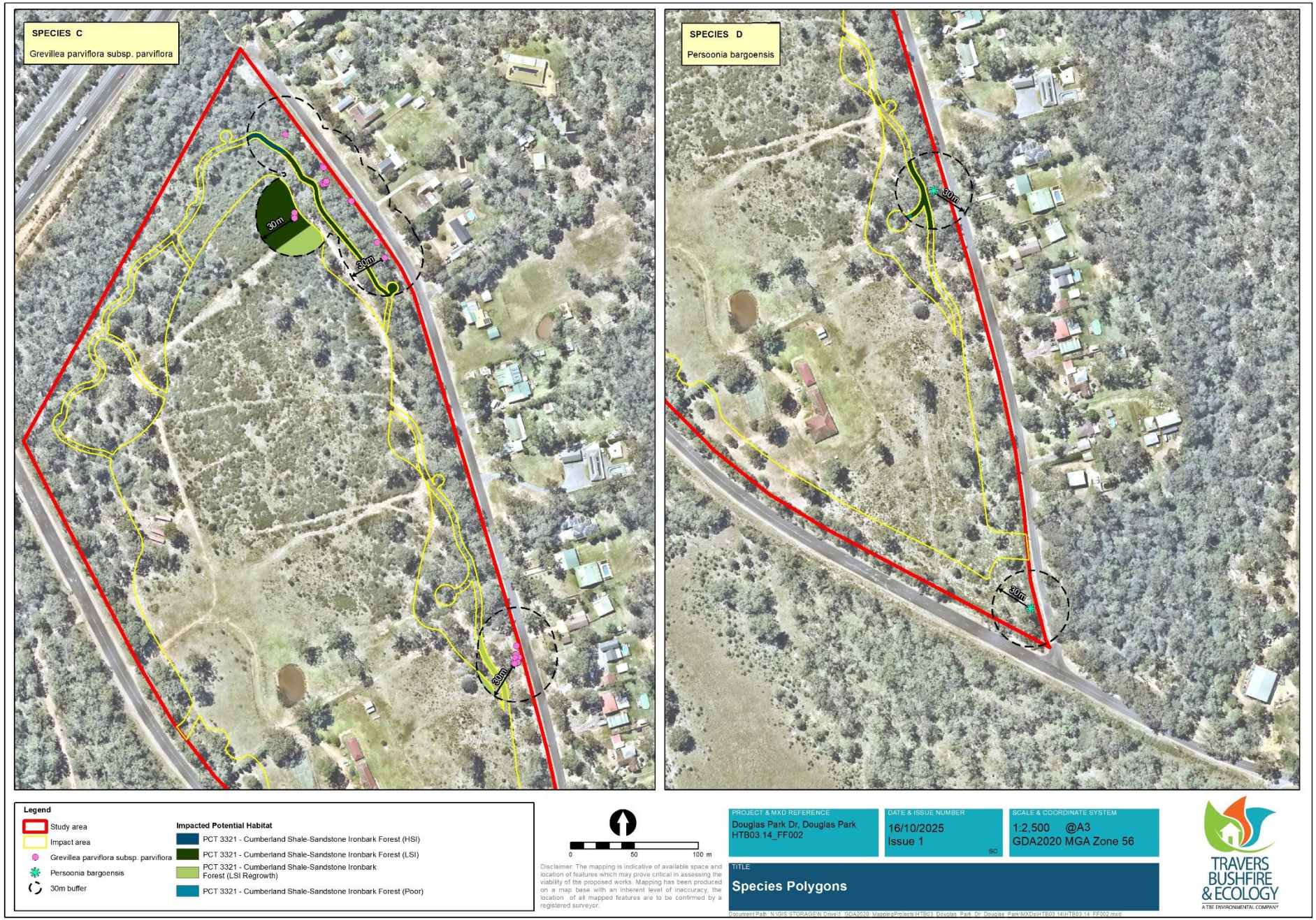


Figure 5-3 – Species credit species for species polygons groups C and D

6. CONCLUSION

Travers bushfire & ecology has been engaged to undertake Biodiversity Development Assessment for a proposed state significant cemetery development within Lot 2 DP 250359 at 430-490 Douglas Park Drive, Douglas Park.

6.1 Recorded biodiversity

Ecological surveys and assessments 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 *Environmental Planning and Assessment Act 1979* and relating to the species / provisions of the *Biodiversity Conservation Act 2016*, threatened species and threatened communities that have been recorded on site include the following:

- Cumberland Plain Woodland
- Shale Sandstone Transition Forest
- *Persoonia bargoensis*
- *Grevillea parviflora* subsp. *parviflora*
- Eastern Coastal Free-tailed Bat [PO]
- Eastern False Pipistrelle [PO]
- Greater Broad-nosed Bat [PO]
- Grey-headed Flying Fox
- Large Bent-winged Bat
- Large-eared Pied Bat [PR]
- Little Lorikeet
- Southern Myotis [PO]

In respect of matters required to be considered under the *EPBC Act*, the following were recorded on site:

- two (2) threatened fauna species Grey-headed Flying-fox (*Pteropus poliocephalus*) and Large-eared Pied Bat (*Chalinolobus dwyeri*),
- two (2) threatened flora species *Grevillea parviflora subsp. parviflora* and *Persoonia bargoensis*
- two (2) threatened ecological communities (TECs), Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest and Shale-Sandstone Transition Forest, listed under this Act were recorded within the development footprint.

A referral to Department of Climate Change, Energy, the Environment and Water (DCCEEW) has been undertaken for significant impacts on Cumberland Plain Shale Woodland and Shale-Gravel Transition Forest, and Shale Sandstone Transition Forest, *Grevillea parviflora subsp. parviflora* and *Persoonia bargoensis*. The proposed development was not considered to have a significant impact on Grey-headed Flying-fox (*Pteropus poliocephalus*) and Large-eared Pied Bat (*Chalinolobus dwyeri*). An EPBC referral has been undertaken since the original submission of the October 2025 BDAR.

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.

6.2 Biodiversity credit requirements

6.2.1 Impacts requiring offset

The following impacts will require offsetting:

- 1.42 ha* of PCT 3320
- 8.21 ha* of PCT 3321
- Loss of (potential or known) habitat, variable in area for threatened species, including species credits for, *Grevillea parviflora subsp. parviflora*, Large-eared Pied Bat, Southern Myotis and *Persoonia bargoensis*.

*Note: the BAM calculator rounds impact requirements to the nearest 0.1 ha for impacts above 1 ha, hence the discrepancy with the values stated elsewhere in the BDAR.

6.2.2 Impacts not requiring offset

The following impacts do not require offset:

- Impacts on non-native vegetation
- Indirect impacts on remaining native vegetation areas as outlined in Section 5.2.1.

All areas of native vegetation impact will require offsetting and have been accounted for in the BAM calculator. All the zones had a vegetation integrity score above the minimum requirements.

6.2.3 Areas not requiring assessment

Native vegetation that has not been directly impacted by this proposal, both within the study area and beyond, do not require credit assessment.

Indirect impacts are not anticipated to be large or permanent. The proposed management actions will assist in reducing these, so they are only temporary, potential only, or immeasurable.

7. BAM CREDIT RESULTS

7.1 Ecosystem credits and species credits

Ecosystem credits and species credits that measure the impact of the development on biodiversity values have been calculated, assuming full removal of vegetation for roads, removal of trees and shrubs for fence lines.

Semi-mature or mature trees occur in 3/6 of the zones used in the BAM-C, with the regrowth zones and derived native grassland zones excluded. Within these 3 zones, the design has considered their location and has attempted to retain many of the remnant trees as part of the landscape features. For that reason, we have calculated a partial VI score loss for those zones assuming a proportion of the trees within those zones can be retained, and there will be variable stem size classes, a tree cover reduced to 15% (APZ compliant), and a 5% litter coverage. Only 'large' trees were retained in PCT 3321_low_sandstone, as 1.

Given the application of these retention measures which are supported by the Arboriculture Impact Assessment, this reduced the VI score considerably for the 3 zones, but they remained above 0. A more detailed description of the BAM-C inputs is presented in section 3.1.7. Retention of a small amount of trees across the development landscape assists in showing avoidance of mature trees, minimisation of impacts to trees by retaining a high proportion of assessed individuals and reduces the overall credit obligation.

Habitat suitability for threatened species has been considered in Section 4. Some species are considered for species credits, particularly if potential breeding habitat is compromised or impacted.

Ecosystem credits for plant community types (PCTs), ecological communities and threatened species habitat is shown below in Table 7-1. Species credits for threatened species are shown in Table 7-2

Table 7-1 – Requirement for ecosystem credits

Zone	Veg. zone name	Veg. integrity loss	Area (ha)	Sensitivity to gain	Biodiversity risk weighting	Potential SAII	Ecosystem credits
Cumberland Shale Plains Woodland							
1	3320_moderate-good	32.7	0.34	Very High Sensitivity to Gain	2.5	True	7
2	3320_poor	11	1.1	Very High Sensitivity to Gain	2.5	True	0
							Subtotal: 7
Cumberland Shale – Sandstone Ironbark Forest							
3	3321_high sandstone	29.2	0.04	High Sensitivity to Gain	2.5	True	1
4	3321_low sandstone	51.6	1.3	High Sensitivity to gain	2.5	True	41
5	3321_regrowth	35.4	5.7	High Sensitivity to gain	2.5	True	127
							Subtotal: 194 **Total: 201**

Table 7-2 – Requirement for species credits

Veg. zone name	Veg. integrity loss	Area (ha) / count	Biodiversity risk weighting	Potential SAII	Ecosystem credits
***Chalinolobus dwyeri* / Large-eared Pied Bat (Fauna)**					
3320_moderate-good	32.7	0.34	2	True	8
3320_poor	11	1.1	2	True	9
3321_high sandstone	29.2	0.04	3	True	1
3321_low sandstone	51.6	1.3	3	True	49
3321_regrowth	35.4	5.7	3	True	152
3321_poor	34.9	1.2	3	True	30
					Subtotal: 249
***Grevillea parviflora subsp. parviflora* / Small Flower Grevillea (Flora)**					

Veg. zone name	Veg. integrity loss	Area (ha) / count	Biodiversity risk weighting	Potential SAII	Ecosystem credits
3321_high sandstone	29.2	0.02	2	False	1
3321_low sandstone	51.6	0.21	2	False	5
3321_regrowth	35.4	0.08	2	False	1
3321_poor	34.9	0.01	2	False	1
					Subtotal: 8
***Myotis macropus* / Southern Myotis (Fauna)**					
3320_moderate-good	32.7	0.34	2	False	6
3320_poor	11	1.1	2	False	6
3321_low sandstone	51.6	0.38	2	False	10
3321_regrowth	35.4	3.6	2	False	64
					Subtotal: 103
***Persoonia bargoensis* / Bargo Geebung (Flora)**					
3321_low sandstone	51.6	0.03	2	False	1
3321_poor	34.9	0.01	2	False	1
					Subtotal: 2

7.2 Ecosystem credit classes

Table 7-3 – Ecosystem credit summary

PCT	TEC	Area (ha)	Credits
3320 – Cumberland Shale Plains Woodland	Cumberland Plain Woodland in the Sydney Basin Bioregion	1.4	7
3321 – Cumberland Shale-Sandstone Ironbark Forest	Shale Sandstone Transition Forest in the Sydney Basin Bioregion	8.2	194

Table 7-4 – Credit classes for PCT 3320 and 3321 - Like for like options

PCT	Vegetation Class	Trading group	TEC	Containing hollow-bearing trees?	IBRA region	Credits
3320	Coastal Grassy Woodlands	Cumberland Plain Woodland in the Sydney Basin Bioregion	Cumberland Plain Woodland in the Sydney Basin Bioregion PCT 3319, 3320	Yes	Cumberland, Burragorang, Pittwater, Sydney Cataract, Wollemi and Yengo OR any IBRA subregion that is within 100 km of the outer edge of the impacted site	7
3320	Coastal Grassy Woodlands	Cumberland Plain Woodland in the Sydney Basin Bioregion	Cumberland Plain Woodland in the Sydney Basin Bioregion PCT 3319, 3320	No	Cumberland, Burragorang, Pittwater, Sydney Cataract, Wollemi and Yengo OR any IBRA subregion that is within 100 km of the outer edge of the impacted site	0
3321	Coastal Grassy Woodlands	Shale Sandstone Transition Forest in the Sydney Basin Bioregion	Shale Sandstone Transition Forest in the Sydney Basin Bioregion PCT 3321	No	Cumberland, Burragorang, Pittwater, Sydney Cataract, Wollemi and Yengo OR any IBRA subregion that is within 100 km of the outer edge of the impacted site	1

PCT	Vegetation Class	Trading group	TEC	Containing hollow-bearing trees?	IBRA region	Credits
3321	Coastal Grassy Woodlands	Shale Sandstone Transition Forest in the Sydney Basin Bioregion	Shale Sandstone Transition Forest in the Sydney Basin Bioregion PCT 3321	No	Cumberland, Burragorang, Pittwater, Sydney Cataract, Wollemi and Yengo OR any IBRA subregion that is within 100 km of the outer edge of the impacted site	41
3321	Coastal Grassy Woodlands	Shale Sandstone Transition Forest in the Sydney Basin Bioregion	Shale Sandstone Transition Forest in the Sydney Basin Bioregion PCT 3321	No	Cumberland, Burragorang, Pittwater, Sydney Cataract, Wollemi and Yengo OR any IBRA subregion that is within 100 km of the outer edge of the impacted site	127
3321	Coastal Grassy Woodlands	Shale Sandstone Transition Forest in the Sydney Basin Bioregion	Shale Sandstone Transition Forest in the Sydney Basin Bioregion PCT 3321	No	Cumberland, Burragorang, Pittwater, Sydney Cataract, Wollemi and Yengo OR any IBRA subregion that is within 100 km of the outer edge of the impacted site	25

7.3 Species credit classes

Table 7-5 – Species credit summary

Species	Area (ha) / Count	Credits
Chalinolobus dwyeri / Large-eared Pied Bat	9.6	249
Grevillea parviflora subsp. parviflora / Small flowered Grevillea	0.32	8
Myotis macropus / Southern Myotis	6.4	103
Persoonia bargoensis / Bargo Geebung	0.04	2

As of October 2022, accredited assessors cannot access the BOP-C payment calculator to provide an estimation of costs for credits. For estimates on credit values, the proponent may need to speak with the Biodiversity Conservation Trust (BCT). The BCT will be providing a credit costing service in early 2023 for a nominal fee.

7.4 Staging of credit retirement

The calculated ecosystem and species credits relate to the entire Concept site plan area, comprising both the Stage 1 and Stage 2 areas. It is intended to apportion credit retirement obligations between the Stage 1 and Stage 2 areas, such that Stage 2 credit obligations are deferred to align with the clearing that is associated with the Stage 2 development proposal which will subject of a future development application for Stage 2.

As identified in Section 1.7, the burial zone preparation works within the Stage 1 area will be carried out sequentially based on the demand for burial plots. In particular, it is expected that the initial sub-stage of the Stage 1 burial zone preparation works will be limited to Burial Zone A.

It is therefore requested that the conditions imposing offset credit obligations account for the apportionment between Stage 1 and Stage 2 and allows for the sub-staging of Stage 1 offsets commensurate with the sub-staging of clearing works associated with the Stage 1 burial zone areas.

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Appendix 2. SAII impact assessment - species

The additional impact assessment provisions for threatened species to determine a Serious and Irreversible Impact (SAII) are outlined under Section 9.2 of the BAM (2020) and have been applied to the species listed in the table below. The study area does also contribute to Important Mapped Areas for Swift Parrot and therefore SAII assessment provisions has also been applied to this species below.

Common Name	Principle				Justification		Reference
	1	2	3	4			
Large Bent-winged Bat					✓	Species unlikely to respond to management (for breeding habitat only) as it depends on cave-like structures for breeding habitat (i.e. cave, tunnel mine, culvert or other structure known for breeding)	TBDC
Little Bent-winged Bat					✓	Species is unlikely to respond to management (for breeding habitat only) as it depends on cave-like structures for breeding habitat (i.e. cave, tunnel, mine, culvert or other structure known for breeding)	TBDC
Swift Parrot		✓				Data from listing determination.	Final Determination
Large-eared Pied Bat					✓	Species unlikely to respond to management for breeding habitat. The species is dependent on caves scarps, cliffs etc.	TDBC
Regent Honeyeater		✓	✓			Data from listing determination.	Final Determination
Pterostylis saxicola					✓	Species is unlikely to respond to management; it is reliant on abiotic habitats which cannot be restored or replaced.	TBDC

Measures taken to avoid the direct and indirect impact on species at risk of SAII are outlined in Section 5.1. The assessment for serious and irreversible impacts on biodiversity values was undertaken according to the BAM 2020. The following four principles set out in clause 6.7 of the BC Regulation have been reviewed:

- evidence of rapid decline (Principle 1, clause 6.7(2)(a) BC Regulation)
- evidence of small population size (Principle 2, clause 6.7(2)(b) BC Regulation)
- evidence of limited geographic range for the threatened species (Principle 3, clause 6.7(2)(c) BC Regulation)
- evidence that the species is unlikely to respond to management (**Principle 4**, clause 6.7(2)(d) BC Regulation)

The Threatened Biodiversity Data Collection (TBDC) and other sources were reviewed to enable the application of these principles. The determination of serious and irreversible impacts for the listed species is described below under each principle.

Principle 1 Species:

The following species have been identified within TDBC as consideration for *Principle 1, clause 6.7(2) BC Reg:*

> (a) it will cause a further decline of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to be in a rapid rate of decline

Although SAII assessment provisions have not been applied to Swift Parrot and Regent Honeyeater, a summary has been provided below:

Swift Parrot – This species sensitivity to loss is indicated by the TDBC as 'very high'. Species sensitivity to potential gain for breeding and foraging are both 'moderate'.

Swift Parrot was not recorded present during survey and does not breed on the mainland of Australia, however the species credit value for breeding is in accordance with important mapped areas identified by DCCEEW. As outlined by the TDBC these mapped areas do not require survey as it is presumed that the species is present. Any impact from development could potentially be serious and irreversible. Ecosystem credit areas are unlikely to have potential serious and irreversible impacts.

The study site is not mapped as Important Mapped Habitat area and is therefore not required to be included as species credits for offsetting. The proposal involves the removal of one Red Bloodwood (*Corymbia gummifera*), a preferred winter feed tree species for the Swift Parrot. This removal is not considered to have a significant impact on the Swift Parrot population, and as such, no further assessment is necessary.

Regent Honeyeater – This species sensitivity to loss is indicated by the TDBC as 'very high'. Species sensitivity to potential gain for breeding and foraging are both 'high'.

Regent Honeyeater was not recorded present during survey, however the species credit value for breeding is in accordance with important mapped areas identified by DCCEEW. As outlined by the TDBC these mapped areas do NOT require survey as it is presumed that the species is present. Any impact from development could potentially be serious and irreversible. Ecosystem credit areas are unlikely to have potential serious and irreversible impacts.

The study site is not mapped as Important Mapped Habitat area and is therefore not required to be included as species credits for offsetting.

Principle 4 Species:

The following species have been identified within TDBC as consideration for *Principle 4, clause 6.7(2) BC Reg:*

(d) The impacted species or ecological community is unlikely to respond to measures to improve its habitat and vegetation integrity and therefore its members are not replaceable.

The criteria as specified in *Section 9.1.2.4 of the BAM* required to be considered for candidate SAII species nominated is with respect to Principles 1–3 only. As these do not apply to above species identified for consideration under Principle 4, a summary is provided for each species in line with the below Guidelines.

In accordance with the DPIE (2019) 'Guidance to assist a decision maker to determine a serious and irreversible impact', there are two factors for consideration of whether an impact on an entity (for consideration as a principle 4 species) is unlikely to respond to management and therefore considered irreplaceable:

- Likely success in achieving gain in condition, abundance or habitat area (i.e. the likelihood of achieving an offset gain is extremely low or highly uncertain).

- Impact on habitat components that cannot readily be re-created (i.e. essential habitat such as caves or cliff lines that are used by threatened species).

Large Bent-winged Bat & **Little Bent-winged Bat** – These species are allocated to species credit class for breeding habitat only. Species sensitivity to loss is indicated by the TBDC as 'moderate'. Species sensitivity to potential gain for breeding is 'very high'. Species sensitivity to potential gain for foraging is 'high'.

The Large Bent-winged Bat was recorded foraging during the 2019 survey through ultrasonic recording.

The 'Species credit' threatened bats and their habitats – NSW survey guide for the Biodiversity Assessment Method (The BAM Bat Guide) outline how to define presence of important 'breeding habitat'.

'Potential breeding habitat' as defined by The BAM Bat Guide for these species includes:

> Caves, tunnels, mines or other structures known or suspected to be used.

The study area does not contain any such habitat nor is any such habitat identified within 100m, therefore it is considered that these species can be excluded as a candidate species credit species.

Therefore, Travers bushfire & ecology consider that no such potential breeding habitat exists within the study area. As it is considered there is no potential breeding habitat, there is no requirement for an offset gain and breeding habitat components for these species is not proposed to be impacted by the proposed development.

Large-eared Pied Bat - Insufficient information is available on the species' distribution and ecology to guide effective management (DPE – Saving Our Species Strategies). This is a species credit species. Species sensitivity to loss is indicated by the TDBC as 'moderate'. Species sensitivity to potential gain is 'very high'.

The Large-eared Pied Bat has been recorded within the study area during the January 2025 survey period (see Figure 3-5).

The 'Species credit' threatened bats and their habitats – NSW survey guide for the Biodiversity Assessment Method (The BAM Bat Guide) outline how to define presence of important 'breeding habitat'. Species polygons for offsetting calculations have also been generated in accordance with Table 1 of this guide.

'Potential habitat' as defined by The BAM Bat Guide for this species include:

> All areas with the PCTs associated with the species (as per the TBDC) on the subject land where the subject land is within 2 kilometres of caves, scarps, cliffs, rock overhangs and disused mines.

'Potential breeding habitat' as defined by The BAM Bat Guide for this species include:

> All potential habitat on the subject land where the subject land is within 100 metres of caves, scarps, cliffs, rock overhangs and disused mines.

Excerpts from The BAM Bat Guide suggests the following:

- Breeding habitat is cryptic and therefore roost searches should only be combined with other techniques to determine breeding habitat.
- Breeding habitat is considered present if there is 1) potential breeding habitat, and 2. Breeding individuals of the target species on the subject land. Note: It does not say that breeding individuals need to be in the potential breeding habitat.

- If presence is assumed, species habitat should be mapped in accordance with Table 1. If breeding habitat is assumed breeding habitat should be mapped in accordance with Table 2.
- All surveys for bats where breeding habitat must be identified require an assessment of the sex, age and reproductive condition of any bats observed to identify breeding bats, unless the species is assumed to be present (development and biocertification sites only), in which case breeding habitat is also assumed, and mapped accordingly. Any bats of the target species observed (or previously recorded) that are pregnant, carrying pups, lactating, juveniles (i.e. less than six months old) should be considered positive confirmation of breeding habitat, which is to be mapped in accordance with Table 2. Note: Trapping guides the decision of breeding habitat more so than habitat searches. This reasoning is not explained in The BAM Bat Guide.
- If acoustic detectors are the only survey method used and the target species is detected, breeding must be assumed and mapped in accordance with Table 2.

In conclusion, there are no caves within the study area, and no areas considered suitable breeding habitat for this species within 100m of the development footprint. Therefore, as there is not expected to be any suitable breeding habitat within 100m, Travers bushfire & ecology conclude the proposed development will not impact on breeding habitat.

Nonetheless, in accordance with The BAM Bat Guide, as there is potential habitat within 2km and in the absence of further trapping effort during the advised survey / breeding period to determine actual presence of breeding individuals, species credits are required for offsetting. Further searches in surrounding areas for suitable habitat and trapping survey during the mid-November to end of January period is recommended to finalise the SAII assessment for these species.

Pterostylis saxicola

As per *Section 9.1.2.4 of the BAM 2020* the following information, where available, is provided to determine SAII:

- **evidence that the species is unlikely to respond to management (*Principle 4, clause 6.7(2)(d) BC Regulation*) because:**

    (i) known reproductive characteristics severely limit the ability to increase the existing population on, or occupy new habitat (e.g. species is clonal), or

Pterostylis saxicola*:* The species is distributed from Freemans Reach to Picton, however the few known populations of *P. saxicola* are restricted and isolated from one another. *P. saxicola* is known from only five current localities: Georges River National Park (near Yeramba Lagoon), Ingleburn, Holsworthy, Peter Meadows Creek and St Marys Towers near Douglas Park. As other species of the *Pterostylis* genus, *P. saxicola* is pollinated by small gnats of the order Diptera (Northern 1972; Jones and Clements 2002) with relatively short flight ranges for a single individual (cm to m; see discussion in Janes et al. 2012). The combinatory effect of reduced pollination range and restricted suitable habitat may potentially limit this species ability to increase the existing populations.

Like many other orchid species, the ecology and habitat requirements of *P. saxicola* are poorly understood. The required knowledge of the biological systems and processes associated with the survival and decline of *P. saxicola* is still lacking for appropriate conservation and management.

Survey was undertaken during the species' flowering period in October 2025. No specimens were found to occur on site.

Appendix 3. SAII impact assessment - communities

The additional impact assessment provisions for threatened ecological communities (TECs) to determine a Serious and Irreversible Impact (SAII) are outlined under Section 9.1.1 of the BAM (2020) and have been applied to the recorded Cumberland Plain Woodland (CPW) and Shale Sandstone Transition Forest (SSTF) as follows:

Measures taken to avoid the direct and indirect impact on species at risk of SAII are outlined in Section 5.2. We have consulted the Threatened Biodiversity Data Collection (TBDC) and other sources to enable the application of the four principles set out in clause 6.7 of the BC Reg.

TEC Name	Principle				Justification	Reference
	1	2	3	4		
CPW	✓	✓			Community at extremely high risk in NSW in the immediate future	TBDC
SSTF		✓	✓		Community at extremely high risk in NSW in the immediate future	TBDC

The following information has been provided in relation to the impacts from the proposal on the TEC at risk of an SAII, to determine how the impacts relate to each of the four principles for determining an SAII:

(a) The impact on the geographic extent of the TEC (Principles 1 and 3) by estimating the total area of the TEC to be impacted by the proposal:

(i) in ha
(ii) as a percentage of the current geographical extent of the TEC in NSW

A total of 1.42 ha of CPW, including derived native grassland, will be impacted by the proposal.

The DPE profile for CPW TEC and Tozer (2003) indicate that approximately 11,054 ha of this TEC remains in NSW. Thus, the impact caused by the proposal will equate to approximately 0.013%, of the total area of the TEC within NSW.

A total of 8.21 ha of SSTF will be impacted by the proposal.

The DPE profile for SSTF TEC and Bionet Vegetation Classification (2024) indicate that approximately 24,813 ha of this TEC remains in NSW. Thus, the impact caused by the proposal will equate to approximately 0.034%, of the total area of the TEC within NSW.

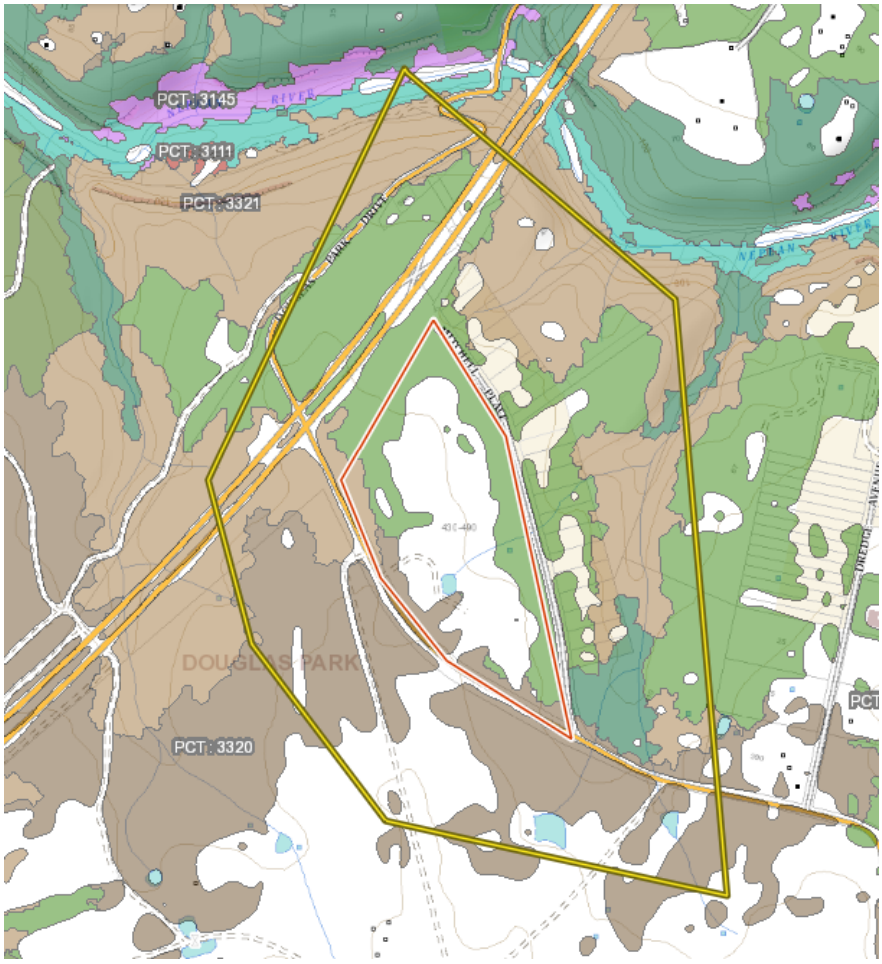
Additional indirect impacts which are likely to contribute to the loss of flora and/or fauna species characteristic of the TEC include (although not limited to):

- Invasion by exotic plants
- Edge effects, fragmentation and likelihood of disturbance.
- Trampling for foot traffic or occasional vehicle,
- Garden escapes from landscaping entering retained conservation areas.

These impacts are addressed in Section 5.3 of this BDAR.

(b) The extent that the proposed impacts are likely to contribute to further environmental degradation or the disruption of biotic processes (Principle 2) of the TEC:

(iii) Estimation of the size of any remaining, but now isolated, areas of the TEC; including areas of the TEC within 500 m of the development footprint or equivalent area for other types of proposals



The site boundary (red) and approximate 500 m buffer (yellow) is shown above. PCT 3320 (dark brown) is equivalent to CPW and PCT 3321 (Light brown) is equivalent to SSTF. Ground-truthing by Travers bushfire & ecology identifies what is shown as PCT 3616 (Green) above, is a better PCT fit with PCT 3321 which is equivalent to SSTF vegetation.

It is estimated that approximately 16.94 ha of CPW vegetation occurs within the 500m vegetation buffer

It is estimated that approximately 56.32 ha of SSTF vegetation occurs within the 500 m vegetation buffer.

(iv) Description of the impacts on connectivity and fragmentation of the remaining areas of TEC measured by:

- distance between isolated areas of the TEC, presented as the average distance if the remnant is retained AND the average distance if the remnant is removed as proposed, and

The average distance between areas of CPW in the immediate vicinity is estimated to be between 50 m – 200 m. This distance will not change under the proposed development.

The average distance between areas of SSTF in the immediate vicinity is estimated at approximately 220 m. This distance will not change under the proposed development.

- estimated maximum dispersal distance for native flora species characteristic of the TEC, and

  Most characteristic flora species from CPW and SSTF would be expected to be able to disperse from the study area to surrounding vegetation. SSTF and CPW vegetation will retain current connectivity except for the small portion impacted by the proposal. The vegetation will not become isolated by the proposal, and therefore the dispersal distance for native flora species will not change.

- other information relevant to describing the impact on connectivity and fragmentation, such as the area to perimeter ratio for remaining areas of the TEC as a result of the development.

  it is expected that there will be a significant change to the ratio as the main impacts are along edges of the larger remnants and that the mitigation measures proposed under the VMP will greatly reduce the affection of edge effects.

(v) Description of the condition of the TEC according to the vegetation integrity score for the relevant vegetation zone(s), including the relevant composition, structure and function condition scores for each vegetation zone.

Table 3-5 contains values of the current vegetation integrity score for the relevant vegetation, including the composition, structure and function condition scores. These range between 11 to 41.7 for the CPW zones, and 34.9 to 61.3 for the SSTF on the site.

Appendix 4. Plot datasheets

-This document has not been endorsed or approved by Office of Environment and Heritage or Muddy Boots Environmental Training-

BAM Site – Field Survey Form | Site Sheet no: 1 of

		Survey Name	Zone ID	Recorders			
Date	28/5/24	Douglas Park					
Zone	Datum	Plot ID	Q1	Plot dimensions	20x50	Photo #	✓
Easting	Northing	IBRA region	[illegible]	Midline bearing from 0 m		Magnetic	
Vegetation Class		Heathy regrowth Development Footprint				Confidence: H M L	
Plant Community Type				EEC:		Confidence: H M L	

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m² plot)		Sum values
Count of Native Richness	Trees	
	Shrubs	
	Grasses etc.	
	Forbs	
	Ferns	
	Other	
Sum of Cover of native vascular plants by growth form group	Trees	
	Shrubs	
	Grasses etc.	
	Forbs	
	Ferns	
	Other	
High Threat Weed cover		

BAM Attribute (1000 m² plot)		
DBH	# Tree Stems Count	# Stems with Hollows
80 + cm		
50 – 79 cm	–	
30 – 49 cm	✓	
20 – 29 cm	–	
10 – 19 cm	✓	
5 – 9 cm		
< 5 cm	✓	n/a
Length of logs (m) (≥10 cm diameter, >50 cm in length)	6m	Tally sparse

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

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

BAM Attribute (1 x 1 m plots)	Litter cover (%)	Bare ground cover (%)	Cryptogam cover (%)	Rock cover (%)
Subplot score (% in each)	70 | 2 | 2 | 5 | 10	a | b | c | d | e	a | b | c | d | e	a | b | c | d | e
Average of the 5 subplots				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

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

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

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

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

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400 m² plot: Sheet 2 of 3	Survey Name	Plot Identifier	Recorders
Date ../../..		PM QQ1 Q1	

GF Code		Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable	N, E or HTE	Cover	Abund	stratum	voucher
	1	Angophora leiocarpa		3			
	2	Eucalyptus fibrosa		5			
	3	Melaleuca nodosa		25			
	4	Grevillea sp.		0.2			
	5	Kunzea ambigua		10			
	6	Kunzea capitata		7			
	7	Allocasuarina littoralis		7			
	8	Pimelea linifolia		0.5			
	9	Pomax umbellata		0.1			
	10	Eragrostis brownii		5			
	11	Conospermum teretifolium		0.2			
	12	Entolasia marginata		3			
	13	Phyllanthus hirtellus		0.1			
	14	Daviesia squarrosa		0.2			
	15	Lepidosperma laterale		5			
	16	Micrantha					
	17	Lagenophora		0.1			
	18	Conyza		0.1			
	19	Lomandra sp.		0.5			
	20	Andropogon virginicus		0.2			
	21	Lomandra Operculata		0.1			
	22	Entolasia stricta		0.2			
	23	Dillwynia retorta		1			
	24	Lepidosperma smell		0.2			
	25	Aristida ramosa		0.5			
	26	Cheilanthes		0.1			
	27	Lomandra obliqua		0.1			
	28	Lissanthe strigosa		0.5			
	29	Themeda triandra		1			
	30	Lomandra longifolia		0.5			
	31	Echinopogon caespitosus		0.2			
	32	Fabaceae (suppressed)		0.5			
	33	Poa		1			
	34	Digitaria		0.2			
	35	Persoonia linearis		0.1			
	36	Cassytha glabella		0.1			
	37	Grevillea mucronulata		0.5			
	38	Xanthorrhoea		1			
	39	Dianella revoluta		0.5			
	40	Xanthorrhoea		0.5			

GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code** if 'top 3'.

Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

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20 m² plot: Sheet _ of _	Survey Name	Plot identifier	Recorders
Date / /		[redacted] G1	

GF Code	Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable	N, E or HTE	Cover	Abund	stratum	voucher
	1 Callistemon linearis	N	10			
	2 Drosera	N	0.1			
	3 Acacia brownii / melanox / echin le	N	0.1			
	4 Hypericum gramineum	N	0.1			
	5 Glycine clandestina	N	0.1			
	6 Melaleuca armillaris	N	0.5			
	7 Lobelia purpurascens	N	0.1			
	8 Eragrostis curvula	HTE	0.2			
	9 Bursaria spinosa	N	0.1			
	10 Ambopogon refractus	N	0.2			
	11 Echinopogon ovatus	N	0.2			
	12					
	13					
	14					
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GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code if 'top 3'.**

Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

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BAM Site – Field Survey Form

Site Sheet no: 1 of

		Survey Name	Zone ID	Recorders			
Date	28/5/24	Douglas Park					
Zone	Datum	Plot ID	Q1	Plot dimensions	20x50	Photo #	✓
Easting	Northing	IBRA region	[illegible]	Midline bearing from 0 m		Magnetic	
Vegetation Class		Heathy regrowth Development				Confidence: H M L	
Plant Community Type		Photpoint		EEC:		Confidence: H M L	

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m² plot)		Sum values
Count of Native Richness	Trees	
	Shrubs	
	Grasses etc.	
	Forbs	
	Ferns	
	Other	
Sum of Cover of native vascular plants by growth form group	Trees	
	Shrubs	
	Grasses etc.	
	Forbs	
	Ferns	
	Other	
High Threat Weed cover		

BAM Attribute (1000 m² plot)		
DBH	# Tree Stems Count	# Stems with Hollows
80 + cm		
50 – 79 cm	—	
30 – 49 cm	✓	
20 – 29 cm	—	
10 – 19 cm	✓	
5 – 9 cm		
< 5 cm	✓	n/a
Length of logs (m) (≥10 cm diameter, >50 cm in length)	6m	fully spars

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

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

BAM Attribute (1 x 1 m plots)	Litter cover (%)	Bare ground cover (%)	Cryptogam cover (%)	Rock cover (%)
Subplot score (% in each)	70 | 2 | 2 | 5 | 10	a | b | c | d | e	a | b | c | d | e	a | b | c | d | e
Average of the 5 subplots				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

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

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

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

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

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400 m² plot: Sheet 2 of 3	Survey Name	Plot Identifier	Recorders
Date ../../..		PM 002 01	

GF Code	Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable	N, E or HTE	Cover	Abund	stratum	voucher
	1 Angophora leiocarpa		3			
	2 Eucalyptus fibrosa		5			
	3 Melaleuca nodosa		25			
	4 Grevillea sp.		0.2			
	5 Kunzea ambigua		10			
	6 Kunzea capitata		7			
	7 Allocasuarina littoralis		7			
	8 Pimelea linifolia		0.5			
	9 Pomax umbellata		0.1			
	10 Eragrostis brownii		5			
	11 Conospermum teretifolium		0.2			
	12 Entolasia marginata		3			
	13 Phyllanthus hirtellus		0.1			
	14 Daviesia squarrosa		0.2			
	15 Lepidosperma laterale		5			
	16 Micrantha					
	17 Lagenophora		0.1			
	18 Conyza		0.1			
	19 Lomandra sp.		0.5			
	20 Andropogon virginicus		0.2			
	21 Lomandra Operculata		0.1			
	22 Entolasia stricta		0.2			
	23 Dillwynia retorta		1			
	24 Hybiscosperma involucrata		0.2			
	25 Brunonia australis		0.5			
	26 Cheilanthes		0.1			
	27 Lomandra obliqua		0.1			
	28 Lissanthe strigosa		0.5			
	29 Themeda triandra		1			
	30 Lomandra longifolia		0.5			
	31 ~~Hakea sericea~~ Echinopogon caespitosus		0.2			
	32 Fabaceae ? (appressed)		0.5			
	33 Poa		1			
	34 Digitaria		0.2			
	35 Persoonia linearis		0.1			
	36 Cassytha glabella		0.1			
	37 Grevillea mucronulata		0.5			
	38 Hyalosperma		1			
	39 Dianella revoluta		0.5			
	40 Xanthorrhoea		0.5			

GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code** if 'top 3'.

Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

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100 m² plot: Sheet _ of _	Survey Name	Plot identifier	Recorders
Date / /		[redacted] G1	

GF Code	Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable	N, E or HTE	Cover	Abund	stratum	voucher
	1 Callistemon linearis	N	10			
	2 Drosera	N	0.1			
	3 Acacia brownii/melanox/echinula	N	0.1			
	4 Hypericum gramineum	N	0.1			
	5 Glycine clandestina	N	0.1			
	6 Melaleuca armillaris	N	0.5			
	7 Lobelia purpurascens	N	0.1			
	8 Eragrostis curvula	HTE	0.2			
	9 Bursaria spinosa	N	0.1			
	10 Ymbopogon refractus	N	0.2			
	11 Echinopogon ovatus	N	0.2			
	12					
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GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF** – circle code if 'top 3'.

Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

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BAM Site – Field Survey Form

Site Sheet no: 1 of

		Survey Name	Zone ID	Recorders			
Date	28/5/24	Dayglar	Park				
Zone	Datum	Plot ID	MB Q2	Plot dimensions	20×50	Photo #	✓
Easting	Northing	IBRA region	In m	Midline bearing from 0 m		Magnetic °	
Vegetation Class		Understorey shrubs & tree derived grass				Confidence: H M L	
Plant Community Type		Scattered shrubs & canopy		EEC:		Confidence: H M L	

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot. Development footprint

BAM Attribute (400 m² plot)		Sum values
Count of Native Richness	Trees	
	Shrubs	
	Grasses etc.	
	Forbs	
	Ferns	
	Other	
Sum of Cover of native vascular plants by growth form group	Trees	
	Shrubs	
	Grasses etc.	
	Forbs	
	Ferns	
	Other	
High Threat Weed cover		

BAM Attribute (1000 m² plot)		
DBH	# Tree Stems Count	# Stems with Hollows
80 + cm	X	X
50 – 79 cm	11	X
30 – 49 cm	X	X
20 – 29 cm	X	X
10 – 19 cm	X	X
5 – 9 cm	✓	X
< 5 cm	✓	n/a
Length of logs (m) (≥10 cm diameter, >50 cm in length)	7m	Tally space

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

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

BAM Attribute (1 x 1 m plots)	Litter cover (%)	Bare ground cover (%)	Cryptogam cover (%)	Rock cover (%)
Subplot score (% in each)	5 80 10 40 5	a b c d e	a b c d e	a b c d e
Average of the 5 subplots				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

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

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

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

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

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400 m² plot: Sheet _ of _	Survey Name	Plot Identifier	Recorders
Date 28 / 5 / 24		AM 02	

GF Code	Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable	N, E or HTE	Cover	Abund	stratum	voucher
	1 Eucalyptus fibrosa		15			
	2 Allocasuarina littoralis		8			
	3 Dianella caerulea		0.5			
	4 Themeda triandra		60			
	5 lobelia purpurascens		0.5			
	6 Dichondra repens		0.2			
	7 cymbopogon refractus		5			
	8 lepidosperma laterale		0.1			
	9 Setaria parviflora		1			
	10 Hibbertia aspera		0.5			
	11 Cissanthe strigosa		0.2			
	12 asteracea (calotis)		0.1			
	13 Micrantheum sp		5			
	14 Eragrostis curvula		1			
	15 pultenaea villosa		0.4			
	16 Acacia falcata		0.5			
	17 verbena bonariensis		0.1			
	18 Lomandra longifolia		0.3			
	19 Eragrostis brownii		10			
	20 Cheilanthes		0.1			
	21 Gonocarpus teucrioides		0.2			
	22 Kunzea ambigua		2			
	23 Aristida ramosa		2			
	24 Hypericum gramineum		0.1			
	25 Daviesia ulicifolia		0.1			
	26 Sida rhombifolia		0.1			
	27 Echinopogon caespitosus		0.5			
	28 sedges - dead seed head	N	0.1			
	29 Glycine clandestina		0.1			
	30 Gahnia aspera?		0.2			
	31 senecio madagascariensis		0.1			
	32 Gomphocarpus fruticosus		0.1			
	33 Operculeria		0.1			
	34 Solanum prinophyllum		0.1			
	35 persoonia linearis		0.1			
	36 plantago lanceolata		0.1			
	37 Lagerophora		0.1			
	38 Bursaria spinosa		0.1			
	39 Hypochaeris		0.1			
	40 Cryptandra		0.3			

GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code** if 'top 3'.

Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

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400 m² plot: Sheet _ of _	Survey Name	Plot identifier	Recorders
Date _ _ / _ _ / _ _		M2 Q2	

GF Code	Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable	N, E or HTE	Cover	Abund	stratum	voucher
	1 Eucalyptus tereticornis		0.1			
	2 Acacia fimbriata		0.1			
	3 Vicia sativa		0.1			
	4 conyza		0.1			
	5 Cirsium vulgare		0.1			
	6 veronica plebeia		0.2			
	7 poa		0.5			
	8					
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GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code** if 'top 3'.
Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

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BAM Site – Field Survey Form

Site Sheet no: 1 of

		Survey Name	Zone ID	Recorders			
Date	14/06/24						
Zone	Datum	Plot ID	Q3	Plot dimensions	20 x 20	Photo #	
Easting 289028	Northing 6213680	IBRA region		Midline bearing from 0 m		Magnetic	
Vegetation Class						Confidence: H M L	
Plant Community Type				EEC:		Confidence: H M L	

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m² plot)		Sum values
Count of Native Richness	Trees	
	Shrubs	
	Grasses etc.	
	Forbs	
	Ferns	
	Other	
Sum of Cover of native vascular plants by growth form group	Trees	
	Shrubs	
	Grasses etc.	
	Forbs	
	Ferns	
	Other	
High Threat Weed cover		

BAM Attribute (1000 m² plot)		
DBH	# Tree Stems Count	# Stems with Hollows
80 + cm		
50 – 79 cm		
30 – 49 cm	✓ 1	1
20 – 29 cm	✓ ///	
10 – 19 cm	✓ //	
5 – 9 cm	✓ //	
< 5 cm	✓ ///	n/a
Length of logs (m) (≥10 cm diameter, >50 cm in length)	No logs (Silly space)	

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

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

BAM Attribute (1 x 1 m plots)	Litter cover (%)	Bare ground cover (%)	Cryptogam cover (%)	Rock cover (%)
Subplot score (% in each)	10 10 20 20 15	0 0 0 0 0		
Average of the 5 subplots				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

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

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

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

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

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400 m² plot: Sheet _ of _	Survey Name	Plot Identifier	Recorders
Date 17/06/24		Q3	Sara

GF Code	Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable	N, E or HTE	Cover	Abund	stratum	voucher
	1 Acacia implexa	N	5			
	2 Acacia ~~binervata~~. Parvipinnula. binervia.	N	5			
	3 Kunzea Ambigua.	N	10			
	4 Cheilanthes siberiana.	N	0.1			
	5 Gahnia. aspera	N	0.2			
	6 Themeda triandra	N	5			
	7 Euc fibrosa.	N	10			
	8 Cassytha glabela.	N	0.1			
	9 Lissanthe strigosa.	N	0.1			
	10 Allocasuarina littoralis.	N	0.5			
	11 Lobelia purp.	N	0.1			
	12 Dillwynia retorta.	N	0.1			
	13 Daviesia squarrosa.	N	0.2			
	14 Echinopogon ovatus.	N	0.2			
	15 Lepidosperma laterale.	N	0.2			
	16 Lomandra multiflora. Opercularia	N	0.1			
	17 (Plant with fluffy seedhead) → ~~diphylla~~.	N	0.1			
	18 Entolasia stricta.	N	5			
	19 Gonocarpus tricrioides.	N	0.1			
	20 Really fine poacea → Rhytidosperma.	N	0.2			
	21 Goodenia ~~ovata~~ hederaceae.	N	0.1			
	22 Callistemon linearis (check) ✓	N	0.5			
	23 ~~Breynia oblongifolia 74~~					
	24 Bill. scandens.	N	0.1			
	25 Glycine clandestina.	N	0.1			
	26 Xanthorrhoea concava.	N	0.2			
	27 Hakea ~~teretifolia~~ sericea.	N	0.2			
	28 Imperata cylindrica.	N	0.5			
	29 Dichondra repens.	N	0.1			
	30 Ozothamnus diosmifolius.	N	0.2			
	31 Parsonsia straminea	N	0.1			
	32 Grevillea parv. (check) 75.	N	0.2			
	33 Eragrostis brownii	N	1			
	34 Melaleuca thymifolia	N	0.1			
	35					
	36					
	37					
	38					
	39					
	40					

GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code** if 'top 3'.

Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

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BAM Site – Field Survey Form

Site Sheet no: 1 of

		Survey Name	Zone ID	Recorders			
Date	17/06/24		[illegible] Q4	Sara			
Zone	Datum	Plot ID		Plot dimensions	20 x 20	Photo #	
Easting 289013	Northing 6213424	IBRA region	In m	Midline bearing from 0 m	7	Magnetic	
Vegetation Class						Confidence: H M L	
Plant Community Type				EEC:		Confidence: H M L	

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m² plot)		Sum values
Count of Native Richness	Trees	
	Shrubs	
	Grasses etc.	
	Forbs	
	Ferns	
	Other	
Sum of Cover of native vascular plants by growth form group	Trees	
	Shrubs	
	Grasses etc.	
	Forbs	
	Ferns	
	Other	
High Threat Weed cover		

BAM Attribute (1000 m² plot)		
DBH	# Tree Stems Count	# Stems with Hollows
80 + cm		
50 – 79 cm		
30 – 49 cm		
20 – 29 cm		
10 – 19 cm		
5 – 9 cm		
< 5 cm	1	n/a
Length of logs (m) (≥10 cm diameter, >50 cm in length)	No logs [illegible]	

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

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

BAM Attribute (1 x 1 m plots)	Litter cover (%)	Bare ground cover (%)	Cryptogam cover (%)	Rock cover (%)
Subplot score (% in each)	2 2 3 1 2	0 0 0 5 10	0 0 0 0 0	0 10 0 0 0
Average of the 5 subplots				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

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

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

Plot Disturbance	Severity code	Age code	Observational evidence:
Clearing (inc. logging)	3	O	No trees.
Cultivation (inc. pasture)	2	R	Goats.
Soil erosion			
Firewood / CWD removal			
Grazing (identify native/stock)			
Fire damage			
Storm damage			
Weediness			
Other			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

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400 m² plot: Sheet _ of _	Survey Name	Plot Identifier	Recorders
Date 17/06/24		Spp. Q4	Sara

GF Code	Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable	N, E or HTE	Cover	Abund	stratum	voucher
	1 Bursaria spinosa		10			
	2 Kunzea ambigua.		20			
	3 Glycine clandestina.		0.1			
	4 Lomandra longifolia.		0.2			
	5 Cynodon Dactylon.		05			
	6 Hypochaeris radicata.		0.1			
	7 Eragrostis curvula.		10			
	8 Richardia stellaris.		0.2			
	9 Avonopus fissifolius.		0.5			
	10 Solvila sessilis.		0.1			
	11 Lepidosperma laterale.		0.2			
	12 Euc seedling → likely fibrosa.		0.2			
	13 Plantago lanceolata.		0.1			
	14 Gahnia aspera.		0.5			
	15 Aristida ramosa.		6.5			
	16 Setaria parviflora.		0.1			
	17 Eragrostis brownii	~~50~~	~~50~~ 02			
	18 Lissanthe strigosa.	~~0.2~~	0.2			
	19 Leucopogon [illegible] sp.	~~0.2~~	0.2			
	20 Dysoxea peltata.	~~0.1~~	0.1			
	21 Lobelia purp.	~~0.1~~	0.1			
	22 Cheilanthes Siberia.	~~0.1~~	0.1			
	23 Gonocarpus tricicides.	~~0.1~~	0.1			
	24 Themeda triandra.	~~5~~	5			
	25 Senecio Madagascariensis		0.1			
	26					
	27					
	28					
	29					
	30					
	31					
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					

GF Code: see Growth Form definitions in Appendix 1 N: native, E: exotic, **HTE:** high threat exotic **GF – circle code** if 'top 3'.

Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

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BAM Site – Field Survey Form

Site Sheet no: 1 of ____

		Survey Name	Zone ID	Recorders			
Date	17/06/24			Sara			
Zone	Datum	Plot ID	BB Q5	Plot dimensions	20 x 20	Photo #	
Easting 289006	Northing 6213364	IBRA region	In m	Midline bearing from 0 m		Magnetic °	
Vegetation Class						Confidence: H M L	
Plant Community Type				EEC:		Confidence: H M L	

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m² plot)		Sum values
Count of Native Richness	Trees	
	Shrubs	
	Grasses etc.	
	Forbs	
	Ferns	
	Other	
Sum of Cover of native vascular plants by growth form group	Trees	
	Shrubs	
	Grasses etc.	
	Forbs	
	Ferns	
	Other	
High Threat Weed cover		

BAM Attribute (1000 m² plot)		
DBH	# Tree Stems Count	# Stems with Hollows
80 + cm	–	–
50 – 79 cm	–	–
30 – 49 cm	–	–
20 – 29 cm	–	–
10 – 19 cm	–	–
5 – 9 cm	–	–
< 5 cm	–	n/a
Length of logs (m) (≥10 cm diameter, >50 cm in length)	2 m	

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

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

BAM Attribute (1 x 1 m plots)	Litter cover (%)	Bare ground cover (%)	Cryptogam cover (%)	Rock cover (%)
Subplot score (% in each)	2 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0
Average of the 5 subplots				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

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

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

Plot Disturbance	Severity code	Age code	Observational evidence:
Clearing (inc. logging)	3	R	No trees.
Cultivation (inc. pasture)	3	R	Goats, Cows, Sheep.
Soil erosion			
Firewood / CWD removal			
Grazing (identify native/stock)			
Fire damage			
Storm damage			
Weediness			
Other			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

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400 m² plot: Sheet _ of _	Survey Name	Plot Identifier	Recorders
Date 12/06/24		MMB Q5	Sara .

GF Code	Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable	N, E or HTE	Cover	Abund	stratum	voucher
	1 Eragrostis curvula.	20				
	2 Hydrocotyl sp.	0.1				
	3 Cynodon dactylon.	5				
	4 Hypochaeris radicata.	0.1				
	5 Bursaria spinosa.	5 10				
	6 Kunzea ambigua. Sonchus oleaceus	5 10				
	7 ~~Sonchus~~ o prickly lettuce → lactuca.	0.1				
	8 Dichondra repens	0.2				
	9 Oxalis sp.	0.1				
	10 Chenchrus clandestinus ~~tectorius~~	0.5				
	11 Setaria. parviflora.	0.2				
	12 Axonopus fissifolius.	5				
	13 Bothriochloa macra	0.2				
	14 Themeda triandra.	0.5				
	15 Solivia sessilis.	0.2				
	16 Senecio madagascariensis	0.2				
	17 Lysmachia arvensis.	0.1				
	18 Richardia stellaris.	0.2				
	19 Aristida vagans.	0.5				
	20 Asperula conferta.	0.1				
	21 Lomandra longifolia.	0.2				
	22 Plantago lanceolata.	0.1				
	23 Yellow pea flower → Zornia dyctiocarpa	0.1				
	24 Gonocarpos teucriodes.	0.1				
	25 Glycine clandestina.	0.1				
	26 Lomandra multiflora	0.1				
	27 Modiola caroliana.	0.1				
	28 Eragrostis brownii.	0.1				
	29 Taraxacum officinale.	0.1				
	30					
	31					
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					

GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code if 'top 3'.**

Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

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BAM Site – Field Survey Form

Site Sheet no: 1 of

		Survey Name	Zone ID	Recorders			
Date	17/06/24			Sara			
Zone	Datum	Plot ID	SP4. Q6	Plot dimensions	20 x 20	Photo #	
Easting 289153	Northing 6213349	IBRA region	[illegible]	Midline bearing from 0 m		Magnetic	
Vegetation Class						Confidence: H M L	
Plant Community Type				EEC:		Confidence: H M L	

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m² plot)		Sum values
Count of Native Richness	Trees	
	Shrubs	
	Grasses etc.	
	Forbs	
	Ferns	
	Other	
Sum of Cover of native vascular plants by growth form group	Trees	
	Shrubs	
	Grasses etc.	
	Forbs	
	Ferns	
	Other	
High Threat Weed cover		*

BAM Attribute (1000 m² plot)		
DBH	# Tree Stems Count	# Stems with Hollows
80 + cm		
50 – 79 cm	/	
30 – 49 cm	///	
20 – 29 cm	////	
10 – 19 cm	//	
5 – 9 cm	/	
< 5 cm		n/a
Length of logs (m) (≥10 cm diameter, >50 cm in length)	[illegible]	

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

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

BAM Attribute (1 x 1 m plots)	Litter cover (%)	Bare ground cover (%)	Cryptogam cover (%)	Rock cover (%)
Subplot score (% in each)	60 30 50 40 30	0 5 30 0 20	0 0 0 0 0	0 0 0 0 0
Average of the 5 subplots				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

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

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

Plot Disturbance	Severity code	Age code	Observational evidence:
Clearing (inc. logging)	1	NR	ADZ
Cultivation (inc. pasture)			
Soil erosion			
Firewood / CWD removal			
Grazing (identify native/stock)			
Fire damage			
Storm damage			
Weediness			
Other			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

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400 m² plot: Sheet _ of _	Survey Name	Plot Identifier	Recorders
Date 17/06/24		~~PB4~~ Q6	Sara

GF Code	Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable	N, E or HTE	Cover	Abund	stratum	voucher
	1 Euc fibrosa.		60			
	2 Bursaria spinosa.		05			
	3 Allocasuarina ~~torulosa~~ littoralis		0·5			
	4 Gahnia aspera.		0·5			
	5 Bothriochloa macra.		0·1			
	6 Entolasia stricta.		0·5			
	7 Setaria parviflora		0·2			
	8 Lobelia purpurescens.		0·1			
	9 Dichondra repens		0·1			
	10 ~~Cassytha~~ Opercularia diphylla.		0·1			
	11 Aspenula conferta.		0·1			
	12 Sonchus oleaceus.		0·1			
	13 Lomandra multiflora.		0·5			
	14 Eragrostis brownii		0·2			
	15 Entolasia marginata.		0·5			
	16 Themeda triandra.		1			
	17 Microlaena stipoides.		0·5			
	18 Plantago lanceolata.		0·1			
	19 Echinopogon caespitosus.		0·2			
	20 Cheilanthes sieberiana.		0·1			
	21 Glycine clandestina.		0·1			
	22 Eragrostis curvula.		0·5			
	23 ~~Lomandra multiflora~~		~~0·5~~			
	24 Acacia ~~decurrens~~ parramattensis.		0·2			
	25 ~~Dianella longifolia~~ Asparagus aethiopicus (fine leaf)		0·2			
	26 Echinopogon obtusus.		0·1			
	27 Kunzea ambigua.		0·5			
	28 Glycine tabacina.		0·1			
	29 Sida rhombifolia.		0·1			
	30 Asparagus (vine one) asparagoides.		0·1			
	31 Oxalis sp.		0·1			
	32 Gonocarpus ~~teucrioides~~ tetragynus		0·2			
	33 Dianella ~~sp.~~ longifolia.		0·2			
	34					
	35					
	36					
	37					
	38					
	39					
	40					

GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code** if 'top 3'.

Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

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BAM Site – Field Survey Form

Site Sheet no: 1 of

		Survey Name	Zone ID	Recorders			
Date	17/06/24			Sara			
Zone	Datum	Plot ID	QT	Plot dimensions	20 x 20	Photo #	
Easting	Northing	IBRA region		Midline bearing from 0 m			
289221	6213121						
Vegetation Class						Confidence: H M L	
Plant Community Type				EEC:		Confidence: H M L	

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m² plot)		Sum values
Count of Native Richness	Trees	
	Shrubs	
	Grasses etc.	
	Forbs	
	Ferns	
	Other	
Sum of Cover of native vascular plants by growth form group	Trees	
	Shrubs	
	Grasses etc.	
	Forbs	
	Ferns	
	Other	
High Threat Weed cover		

BAM Attribute (1000 m² plot)		
DBH	# Tree Stems Count	# Stems with Hollows
80 + cm		
50 – 79 cm	//	
30 – 49 cm		
20 – 29 cm		
10 – 19 cm	/	
5 – 9 cm	////	
< 5 cm		n/a
Length of logs (m) (≥10 cm diameter, >50 cm in length)	No logs - fully spaced	

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

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

BAM Attribute (1 x 1 m plots)	Litter cover (%)	Bare ground cover (%)	Cryptogam cover (%)	Rock cover (%)
Subplot score (% in each)	90 20 5 30 2	0 5 5 2 90	80 20 5 0 5	0 0 0 0 0
Average of the 5 subplots				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

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

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

Plot Disturbance	Severity code	Age code	Observational evidence:
Clearing (inc. logging)	2	R	Slashing.
Cultivation (inc. pasture)			
Soil erosion			
Firewood / CWD removal			
Grazing (identify native/stock)			
Fire damage			
Storm damage			
Weediness			
Other			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

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400 m² plot: Sheet _ of _	Survey Name	Plot Identifier	Recorders
Date 17/06/24		~~BMT~~ Q7	Sara

GF Code	Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable	N, E or HTE	Cover	Abund	stratum	voucher
	1 Kunzea ambigua		40			
	2 Stringy bark. → Eucalyptus eugeniolides.		20			
	3 Lepidosperma laterale.		0.5			
	4 Echinopogon caespitosus		0.5			
	5 Eragrostis curvula.		5			
	6 Setaria parviflora.		0.2			
	7 Themeda triandra.		2.5			
	8 Entolasia stricta.		0.5			
	9 Eragrostis brownii		0.1			
	10 Pomax umbellata.		0.1			
	11 Cymbopogon refractus.		0.2			
	12 Bursaria spinosa.		0.5			
	13 Gonocarpos tetragynus.		0.2			
	14 Aristida vagans.		0.5			
	15 Dianella caerulea.		0.2			
	16 Grevillea mucronata.		0.2			
	17 Lobelia purpurascens.		0.1			
	18 Gahnia aspera. Melaleuca thymifolia		0.1			
	19 Shrub #1 → Sample. ~~Lepidosperma laterale~~.		0.1			
	20 Lomandra longifolia.		0.5			
	21 Hypochaeris radicata		0.1			
	22 Cheilanthes sieberiana.		0.1			
	23 Drosera peltata.		0.1			
	24 Dillwynia retorta.		0.2			
	25 ~~Shrub #2~~. Leucopogon ericoides.		0.2			
	26 Daisy thing → Lagenophora stipitata.		0.1			
	27 Aristida ramosa.		0.5			
	28 ~~Epacridaceae~~ → Cryptandra spinescens.		0.2			
	29 Senecio madagascariensis.		0.2			
	30 ~~Leucopogon virgatus~~. Lissanthe strigosa.		0.2			
	31 Pimelea ~~linifolia~~. ~~Melaleuca~~ linifolia.		0.1			
	32 Species #3 → Persoonia linearis.		0.1			
	33 Cuchitor sphaculata.		0.1			
	34 ~~Cryptandra~~ Stipa sp.		0.2			
	35					
	36					
	37					
	38					
	39					
	40					

GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code** if 'top 3'.

Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

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BAM Site – Field Survey Form

Site Sheet no: 1 of

		Survey Name	Zone ID	Recorders			
Date	18/06/24			Sara			
Zone	Datum	Plot ID	MP6 Q8	Plot dimensions	10×40/ 40×100	Photo #	
Easting 288969	Northing 6213188	IBRA region		Midline bearing from 0 m			
Vegetation Class						Confidence: H M L	
Plant Community Type				EEC:		Confidence: H M L	

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m² plot)		Sum values
Count of Native Richness	Trees	
	Shrubs	
	Grasses etc.	
	Forbs	
	Ferns	
	Other	
Sum of Cover of native vascular plants by growth form group	Trees	
	Shrubs	
	Grasses etc.	
	Forbs	
	Ferns	
	Other	
High Threat Weed cover		

BAM Attribute (1000 m² plot)		
DBH	# Tree Stems Count	# Stems with Hollows
80 + cm		
50 – 79 cm		
30 – 49 cm	HH III	II BS
20 – 29 cm	HH II	
10 – 19 cm	HH II	
5 – 9 cm	—	
< 5 cm	20 +	n/a
Length of logs (m) (≥10 cm diameter, >50 cm in length)	No logs	

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

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

BAM Attribute (1 x 1 m plots)	Litter cover (%)	Bare ground cover (%)	Cryptogam cover (%)	Rock cover (%)
Subplot score (% in each)	10 20 40 10 15	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0
Average of the 5 subplots				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

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

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

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

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

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400 m² plot: Sheet _ of _	Survey Name	Plot identifier	Recorders
Date 18.06.24		[illegible] Q8	Sara.

GF Code	Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable	N, E or HTE	Cover	Abund	stratum	voucher
	1 Euc tereticornis		20			
	2 Euc ~~[illegible]~~ Moluccana.		~~Over~~ 10			
	3 Bursaria spinosa		20			
	4 Sida rhombifolia		0.2			
	5 Senecio madagascariensis.		0.2			
	6 Setaria parviflora.		05			
	7 Echinopogon ovatus.		0.2			
	8 Sporobolous africanus.		0.5			
	9 Lobelia purpurescens.		0.1			
	10 Plantago lanceolata.		0.1			
	11 ~~Eragrostis spp~~ panicum simile		0.2			
	12 Cynodon dactylon.		0.5			
	13 Verbena bonariensis.		0.2			
	14 Bothriochloa macra.		0.1			
	15 Glycine tabac.		0.1			
	16 Oxaperdium acanthium		0.2			
	17 Glycine clandestina.		0.1			
	18 Paspalum ~~dist~~ dilatatum.		0.5			
	19 Echinopogon caespitosus.		0.5			
	20 Themeda triandra.		0.5			
	21 Dichondra repens.		0.2			
	22 Desmodium vagrans → Grona varians		0.1			
	23 Sonchus oleaceus.		0.2			
	24 Einidia hastata.		0.2			
	25 ~~Sida trinervifolia~~ Senecio linearifolius		0.1			
	26 Mentha satureioides		6.5			
	27 Oxalis sp → Wood sorrel.		0.1			
	28 ~~Forb #1~~ → ~~[illegible]~~		0.1			
	29 Aristida vagans.		0.5			
	30 Solivia sessilis.		0.1			
	31 Eragrostis brownii		0.1			
	32 Cassytha glabella.		0.1			
	33 Chloris gayana.		0.2			
	34 Asperula conferta.		0.2			
	35 Ligustrum sinense.		0.2			
	36 Asparagus (→bridal creeper ord) Asparagoides		0.5			
	37 Chenchrus clandestinus.		0.5			
	38 Lantana camara.		0.2			
	39 Gahnia aspera.		0.2			
	40 Acacia ~~[illegible]~~ parramattensis		0.5			

GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code** if 'top 3'.

Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

400m² plot: Sheet 2 of 2	Survey Name	Plot Identifier	Recorders
Date		Mark QB	Sara.

GF	Top 3 natives in each GF: Full species name mandatory. All others where practicable	N	E	HTE	Cover %	Abund	voucher
	1 Olea europea subsp. cuspidata.				0.5		
	2 Conyza sumatrensis.				0.1		
	3 Allocasuarina ~~torulosa~~ littoralis				0.2		
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
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GF Code: see growth form definitions in Appendix 1 N: native, E: exotic, HTE: high threat exotic GF – circle code of 'top 3'
Cover: 0.1, 0.2, 0.3..... 1, 2, 3 ..... 10, 15, 20, 25 .....100% (foliage cover): ***Note:*** *0.1% cover = 63 x 63 cm or a circle 71 cm across, 0.5% cover = 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10m.* **Abundance:** 1, 2, 3...10, 20, 30....100, 200...1000...

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BAM Site – Field Survey Form

Site Sheet no: 1 of ____

		Survey Name	Zone ID	Recorders			
Date	18/06/24		S1	Sara			
Zone	Datum	Plot ID	DDT Q9	Plot dimensions	20 x 20	Photo #	
Easting	Northing	IBRA region	In m	Midline bearing from 0 m		Magnetic °	
Vegetation Class						Confidence: H M L	
Plant Community Type				EEC: : :		Confidence: H M L	

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m² plot)		Sum values
Count of Native Richness	Trees	
	Shrubs	
	Grasses etc.	
	Forbs	
	Ferns	
	Other	
Sum of Cover of native vascular plants by growth form group	Trees	
	Shrubs	
	Grasses etc.	
	Forbs	
	Ferns	
	Other	
High Threat Weed cover		

BAM Attribute (1000 m² plot)		
DBH	# Tree Stems Count	# Stems with Hollows
80 + cm	—	
50 – 79 cm	11	No Hollows
30 – 49 cm	—	
20 – 29 cm	—	
10 – 19 cm	—	
5 – 9 cm	—	
< 5 cm	—	n/a
Length of logs (m) (≥10 cm diameter, >50 cm in length)	1 m Tally space	

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

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

BAM Attribute (1 x 1 m plots)	Litter cover (%)	Bare ground cover (%)	Cryptogam cover (%)	Rock cover (%)
Subplot score (% in each)	10 5 2 2 1	2 0 0 2 0	0 0 0 0 0	0 0 0 0 0
Average of the 5 subplots				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

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

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

Plot Disturbance	Severity code	Age code	Observational evidence.
Clearing (inc. logging)	3	3NR	paddock with Goats etc.
Cultivation (inc. pasture)			
Soil erosion			
Firewood / CWD removal			
Grazing (identify native/stock)			
Fire damage			
Storm damage			
Weediness			
Other			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

400m² plot: Sheet of	Survey Name	Plot Identifier	Recorders
Date 18/06/24		HTB Q9	Jara.

GF	Top 3 natives in each GF: Full species name mandatory. All others where practicable	N	E	HTE	Cover %	Abund	voucher
	1 Eragrostis curvula.				10		
	2 Juncus usitatus.				0.5		
	3 Cynodon dactylon				50		
	4 Chenchrus clandestinus.				25		
	5 Onopordium acanthium.				0.1		
	6 Hypochaeris radicata.				0.1		
	7 Oxalis sp.				0.1		
	8 Hairy weed #1 → Cerastium glomeratum.				0.1		
	9 Senecio madagascariensis				0.2		
	10 Soliva sessilis.				0.1		
	11 Setaria parviflora.				05		
	12 Cyperus gracilis.				0.1		
	13 Plantago lanceolata.				0.1		
	14 Lysimachia arvensis.				0.5		
T216.	15 Eucalyptus. fibrosa.				25		
	16 Kunzea ambigua.				0.5		
	17 Paspalum dilatatium.				0.5		
	18 Stenotaphrum secundatum.				20		
	19 Sporobolos africanus.				5		
	20 Modiola caroliana.				0.1		
	21						
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GF Code: see growth form definitions in Appendix 1 N: native, E: exotic, HTE: high threat exotic GF – circle code of 'top 3'
Cover: 0.1, 0.2, 0.3..... 1, 2, 3 ..... 10, 15, 20, 25 .....100% (foliage cover): ***Note:*** *0.1% cover = 63 x 63 cm or a circle 71 cm across, 0.5% cover = 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10m.* **Abundance:** 1, 2, 3...10, 20, 30....100, 200...1000...

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BAM Site – Field Survey Form

Site Sheet no: 1 of ____

		Survey Name	Zone ID	Recorders			
Date	18/06/24			Sara			
Zone	Datum	Plot ID	BPB Q10	Plot dimensions	20 x 20	Photo #	
Easting 289188	Northing 6413060	IBRA region	In m	Midline bearing from 0 m		Magnetic °	
Vegetation Class						Confidence: H M L	
Plant Community Type				EEC:		Confidence: H M L	

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m² plot)		Sum values
Count of Native Richness	Trees	
	Shrubs	
	Grasses etc.	
	Forbs	
	Ferns	
	Other	
Sum of Cover of native vascular plants by growth form group	Trees	
	Shrubs	
	Grasses etc.	
	Forbs	
	Ferns	
	Other	
High Threat Weed cover		

BAM Attribute (1000 m² plot)		
DBH	# Tree Stems Count	# Stems with Hollows
80 + cm		
50 – 79 cm		
30 – 49 cm		
20 – 29 cm		
10 – 19 cm		
5 – 9 cm		
< 5 cm	111	n/a
Length of logs (m) (≥10 cm diameter, >50 cm in length)	2m.	Tally space

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

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

BAM Attribute (1 x 1 m plots)	Litter cover (%)	Bare ground cover (%)	Cryptogam cover (%)	Rock cover (%)
Subplot score (% in each)	60 70 10 5 5	100 2 0 0	0 0 0 0 0	0 0 0 0 0
Average of the 5 subplots				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

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

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

Plot Disturbance	Severity code	Age code	Observational evidence:
Clearing (inc. logging)	3	R	Slashed/cleared.
Cultivation (inc. pasture)			
Soil erosion			
Firewood / CWD removal			
Grazing (identify native/stock)			
Fire damage			
Storm damage			
Weediness			
Other			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

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BAM Site – Field Survey Form

Site Sheet no: 1 of ____

		Survey Name	Zone ID	Recorders			
Date	18/06/24			Sara			
Zone	Datum	Plot ID	BPB Q10	Plot dimensions	20 x 20	Photo #	
Easting	Northing	IBRA region	In m	Midline bearing from 0 m		Magnetic °	
Vegetation Class						Confidence: H M L	
Plant Community Type				EEC:		Confidence: H M L	

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m² plot)		Sum values
Count of Native Richness	Trees	
	Shrubs	
	Grasses etc.	
	Forbs	
	Ferns	
	Other	
Sum of Cover of native vascular plants by growth form group	Trees	
	Shrubs	
	Grasses etc.	
	Forbs	
	Ferns	
	Other	
High Threat Weed cover		

BAM Attribute (1000 m² plot)		
DBH	# Tree Stems Count	# Stems with Hollows
80 + cm		
50 – 79 cm		
30 – 49 cm		
20 – 29 cm		
10 – 19 cm		
5 – 9 cm		
< 5 cm	111	n/a
Length of logs (m) (≥10 cm diameter, >50 cm in length)	2m.	Tally space

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

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

BAM Attribute (1 x 1 m plots)	Litter cover (%)	Bare ground cover (%)	Cryptogam cover (%)	Rock cover (%)
Subplot score (% in each)	60 70 10 5 5	100 2 0 0	0 0 0 0 0	0 0 0 0 0
Average of the 5 subplots				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

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

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

Plot Disturbance	Severity code	Age code	Observational evidence:
Clearing (inc. logging)	3	R	Slashed/cleared.
Cultivation (inc. pasture)			
Soil erosion			
Firewood / CWD removal			
Grazing (identify native/stock)			
Fire damage			
Storm damage			
Weediness			
Other			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

400m² plot: Sheet of	Survey Name	Plot Identifier	Recorders
Date		SPS8 @10	

GF	Top 3 natives in each GF: Full species name mandatory. All others where practicable	N	E	HTE	Cover %	Abund	voucher
	1 Kunzea ambigua.				50		
	2 Gahnia aspera.				0.5		
	3 Allocasuarina ~~[illegible]~~ littoralis				0.2		
	4 Themeda triandra.				50		
	5 Eragrostis curvula.				50		
	6 Setaria sp. parviflora.				0.2		
	7 Cheilanthes ~~[illegible]~~ sieberi				0.1		
	8 Lobelia purpurescens				0.1		
	9 Cassytha glabella.				0.1		
	10 Cymbopogon refractus.				0.5		
	11 Lagenophora stipitata.				0.2		
	12 Bursaria spinosa.				0.5		
	13 ~~[illegible]~~						
	14 Glycine clandestina.				0.1		
	15 Acacia ~~[illegible]~~ parramattensis.				0.2		
	16 Sida sp (not rhomb) Sida spinosa.				0.2		
	17 Grevillea mucronata.				0.5		
	18 Aristida ramosa.				0.5		
	19 Lomandra multiflora.				5		
	20 Gonocarpos tetragynoides.				0.2		
	21 Aristida vagans				0.5		
	22 Lepidosperma laterale.				0.5		
	23 Senecio madagascariensis				0.2		
	24 Eucalyptus tereticornis				0.5		
	25 Epacridaceae → Leucopogon ericoides.				0.2		
	26 ~~Epacrid → Acrotriche~~ → Cryptandra spinescens				0.2		
	27 Lomandra longifolia.				0.5		
	28 Hypochaeris radicata.				0.1		
	29 Parsonia linearis.				0.1		
	30 Entolasia stricta				0.5		
	31 Glycine tab.				0.5		
	32 Asparagus asparagoides.				0.2		
	33 Echinopogon caespitosus				0.2		
	34 Sida rhombifolia.				0.2		
	35 Phyllanthus hirtellus				0.2		
	36						
	37						
	38						
	39						
	40						
	41						
	42						
	43						
	44						
	45						
	46						
	47						

GF Code: see growth form definitions in Appendix 1 N: native, E: exotic, HTE: high threat exotic GF – circle code of 'top 3'
Cover: 0.1, 0.2, 0.3..... 1, 2, 3 ..... 10, 15, 20, 25 .....100% (foliage cover): ***Note:*** *0.1% cover = 63 x 63 cm or a circle 71 cm across, 0.5% cover = 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10m.* **Abundance:** 1, 2, 3...10, 20, 30....100, 200...1000...

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BAM Site – Field Survey Form

Site Sheet no: 1 of ____

		Survey Name	Zone ID	Recorders			
Date	23/07/24			MSR			
Zone	Datum	Plot ID	Q11	Plot dimensions	20x20	Photo #	
Easting 288942	Northing 6213322	IBRA region	In m	Midline bearing from 0 m		Magnetic °	
Vegetation Class						Confidence: H M L	
Plant Community Type				EEC: tick		Confidence: H M L	

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m² plot)		Sum values
Count of Native Richness	Trees	1
	Shrubs	3
	Grasses etc.	8
	Forbs	1
	Ferns	0
	Other	0
Sum of Cover of native vascular plants by growth form group	Trees	5
	Shrubs	2.6
	Grasses etc.	37.1
	Forbs	0.5
	Ferns	0
	Other	0
High Threat Weed cover		10

BAM Attribute (1000 m² plot)		
DBH.	# Tree Stems Count	# Stems with Hollows
80 + cm		
50 – 79 cm		
30 – 49 cm		
20 – 29 cm		
10 – 19 cm		
5 – 9 cm	11	NIL
< 5 cm		n/a
Length of logs (m) (≥10 cm diameter, >50 cm in length)	NIL	Tally space

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

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

BAM Attribute (1 x 1 m plots)	Litter cover (%)	Bare ground cover (%)	Cryptogam cover (%)	Rock cover (%)
Subplot score (% in each)	5, 0, 0, 5, 5	5, 0, 0, 0, 0	0, 0, 0, 0, 0	0, 0, 0, 0, 0
Average of the 5 subplots	3			

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

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

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

Plot Disturbance	Severity code	Age code	Observational evidence:
Clearing (inc. logging)	3	R	Open paddock grazed by goats
Cultivation (inc. pasture)			
Soil erosion	1	O	Track area
Firewood / CWD removal			
Grazing (identify native/stock)	3	R	Active goat + cattle grazing
Fire damage			
Storm damage			
Weediness	0	R	open paddock.
Other			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

400m² plot: Sheet of	Survey Name	Plot Identifier	Recorders
Date		Q11	MSR

GF		Top 3 natives in each GF: Full species name mandatory. All others where practicable	N	E	HTE	Cover %	Abund	voucher
S	1	Bursaria spinosa				0.5	7	
G	2	Microlaena stipoides				~~10~~ 60		
T	3	Eucalyptus ~~botryoides~~ tereticornis				5		
G	4	Entolasia stricta				~~5~~ 2		
	5	Eragrostis curvula			✓	~~10~~		
G	6	Eragrostis brownii				5		
S	7	Kunzea ambigua				~~5~~ 2		
G	8	Rubia. aspera				0.5		
	9	~~Lomandra longifolia~~						
G	10	Cynodon dactylon				~~5~~ 4		
	11	plantago				0.5		
	12	Hypocharis radicata				0.1		
G	13	Alisma lagan.				~~10~~ 5		
F	14	Oxalis species. O. perennans				5		
S	15	Epacridaceae — ~~Leucopogon juniperinus~~ Lissanthe strigosa				0.1		
G	16	Cyperus gracilis				~~5~~ 0.5		
	17							
G	18	Juncus usitatus				0.1		
	19							
	20							
	21							
	22							
	23							
	24							
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	46							
	47							

GF Code: see growth form definitions in Appendix 1 N: native, E: exotic, HTE: high threat exotic GF – circle code of 'top 3'
Cover: 0.1, 0.2, 0.3..... 1, 2, 3 ..... 10, 15, 20, 25 .....100% (foliage cover): ***Note:*** *0.1% cover = 63 x 63 cm or a circle 71 cm across, 0.5% cover = 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10m.* **Abundance:** 1, 2, 3...10, 20, 30....100, 200...1000...

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BAM Site – Field Survey Form

Site Sheet no: 1 of

Survey Name	Zone ID	Recorders
HTB03 DOWN ROCKS		LH

Date: 4 / 6 / 25	Zone:	Datum:	Plot ID: L1	Plot dimensions: 20 x 20 50 x 20m	Photo #:
Easting:	Northing:		IBRA region:	Midline bearing from 0 m:	Magnetic °

Vegetation Class		Confidence: H M L
Plant Community Type	EEC:	Confidence: H M L

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m² plot)		Sum values
Count of Native Richness	Trees	1
	Shrubs	2
	Grasses etc.	8
	Forbs	2
	Ferns	1
	Other	0
Sum of Cover of native vascular plants by growth form group	Trees	1.5
	Shrubs	7
	Grasses etc.	41.1
	Forbs	8.5
	Ferns	0.1
	Other	0
High Threat Weed cover		49

BAM Attribute (1000 m² plot)		
DBH	# Tree Stems Count	# Stems with Hollows
80 + cm	x	x
50 – 79 cm	x	x
30 – 49 cm	x	x
20 – 29 cm	x	x
10 – 19 cm	x	x
5 – 9 cm	✓	x
< 5 cm	✓	n/a
Length of logs (m) (≥10 cm diameter, >50 cm in length)	Tally space	

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

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

BAM Attribute (1 x 1 m plots)	Litter cover (%)	Bare ground cover (%)	Cryptogam cover (%)	Rock cover (%)
Subplot score (% in each)	25 65 20 10 25	a b c d e	a b c d e	a b c d e
Average of the 5 subplots	29			

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

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

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

Plot Disturbance	Severity code	Age code	Observational evidence:
Clearing (inc. logging)			
Cultivation (inc. pasture)			
Soil erosion			
Firewood / CWD removal			
Grazing (stock/rabbits)			
Fire damage			
Storm damage			
Weediness			
Other			

Severity: 0=no evidence, 1=slight, 2=moderate, 3=severe

Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

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400 m² plot: Sheet _ of _	Survey Name	Plot Identifier	Recorders
Date 4 / 6 / 25	HTB03 Douglas Park Dr	L1	LH

GF Code	Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable		N, E or HTE	Cover	Abund	strata	voucher
	1	Axonopus fissifolius	HTE	30	5000		
	2	Senecio madagascariensis	HTE	4	200		
	3	Setaria parviflora		0.2	50		
	4	Hypochaeris radicata		0.3	100		
G	5	Juncus usitatus	N	1.5	80		
	6	Eragrostis curvula	HTE	5	500		
G	7	Cynodon dactylon	N	30	5000		
	8	Conyza sumatrensis		0.3	100		
G	9	Cyperus gracilis	N	0.1	10		
S	10	Kunzea ambigua		4	100		
G	11	Aristida vagans	N	2	500		
G	12	Microlaena stipoides	N	7	1500		
S	13	Bursaria spinosa	N	3	4		
T	14	Eucalyptus fibrosa	N	1.5	8		
	15	Taraxacum officinale		0.2	30		
	16	Solanum sp (exotic) 2m tall		2	20		
	17	Plantago lanceolata		0.2	30		
	18	Soliva sessilis		0.1	10		
	19	Lysimachia arvensis		0.2	50		
	20	Oxalis corniculata		0.2	50		
G	21	Eragrostis brownii	N	0.1	10		
	22	Stellaria media		0.2	40		
G	23	Themeda triandra	N	0.3	50		
Fe	24	Cheilanthes sieberi	N	0.1	1		
F	25	Dichondra repens	N	7	2000		
	26	Cenchrus clandestinus	HTE	10	1500		
	27	Physalis sp		0.1	1		
G	28	Lomandra longifolia	N	0.1	1		
F	29	Lobelia purpurascens	N	1.5	400		
	30	Cirsium vulgare		0.1	5		
	31	Nasturtium officinale		0.1	1		
	32	Modiola caroliniana		0.3	70		
	33	Sonchus oleraceus		0.1	3		
	34	Sida rhombifolia		0.3	70		
	35						
	36						
	37						
	38						
	39						
	40						

GF Code: see Growth Form definitions in Appendix 1 N: native, E: exotic, HTE: high threat exotic GF = circle code if 'top 3'.

Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); *Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m.*

Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

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BAM Site – Field Survey Form

Site Sheet no: 1 of ____

Date	4 / 6 / 25	Survey Name: HTB03 Dooglas Park Drive	Zone ID	Recorders: LH
Zone	Datum	Plot ID: L2	Plot dimensions: 20x20 50x20m	Photo #
Easting	Northing	IBRA region	In m	Midline bearing from 0 m: Magnetic °
Vegetation Class				Confidence: H M L
Plant Community Type			EEC: tick	Confidence: H M L

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m² plot)		Sum values
Count of Native Richness	Trees	1
	Shrubs	2
	Grasses etc.	11
	Forbs	3
	Ferns	0
	Other	1
Sum of Cover of native vascular plants by growth form group	Trees	0.1
	Shrubs	0.4
	Grasses etc.	47.2
	Forbs	0.6
	Ferns	0
	Other	0.1
High Threat Weed cover		42.3

BAM Attribute (1000 m² plot)		
DBH	# Tree Stems Count	# Stems with Hollows
80 + cm	x	x
50 – 79 cm	x	x
30 – 49 cm	x	x
20 – 29 cm	x	x
10 – 19 cm	x	x
5 – 9 cm	x	✓
< 5 cm	✓	n/a
Length of logs (m) (≥10 cm diameter, >50 cm in length)	6	Tally space

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

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

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each)	35	30	30	25	30	a	b	c	d	e	a	b	c	d	e	a	b	c	d	e
Average of the 5 subplots	34																			

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

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

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

Plot Disturbance	Severity code	Age code	Observational evidence:
Clearing (inc. logging)			
Cultivation (inc. pasture)			
Soil erosion			
Firewood / CWD removal			
Grazing (density kg/ha/stock)			
Fire damage			
Storm damage			
Weediness			
Other			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

This document has not been endorsed or approved by Office of Environment and Heritage or Muddy Boots Environmental Training

400 m² plot: Sheet _ of _	Survey Name	Plot Identifier	Recorders
Date 4/6/25	HTB03 Dougrit Park Dave	L2	LH

GF Code		Top 3 native species in each growth form group: Full species name mandatory. All other native and exotic species: Full species name where practicable	N, E or HTE	Cover	Abund	stratum	voucher
	1	Axonopus fissifolius	HTE	15	3000		
	2	Senecio madagascariensis	HTE	0.3	100		
G	3	Cynodon dactylon	N	35	5000		
	4	Hypochaeris radicata		0.3	100		
	5	Plantago lanceolata		0.3	100		
D	6	Glycine clandestina	N	0.1	2		
	7	Cirsium vulgare		0.1	10		
G	8	Microlaena stipoides		3	600		
G	9	Austrostipa sp.	N	5	1000		
F	10	Dichondra repens	N	0.3	100		
S	11	Bursaria spinosa	N	0.3	3		
	12	Eragrostis curvula	HTE	7	1000		
G	13	Gahnia aspera	N	0.1	2		
	14	Conyza sumatrensis		0.2	50		
F	15	Oxalis perennans	N	0.2	50		
	16	Setaria parviflora		0.1	20		
G	17	Eragrostis brownii	N	3	600		
T	18	Eucalyptus	N	0.1	3		
	19	Lysimachia arvensis		0.1	20		
G	20	Lomandra filiformis	N	0.1	1		
	21	Taraxacum officinale		0.1	10		
S	22	Kunzea ambigua	N	0.1	2		
G	23	Lomandra longifolia	N	0.1	1		
G	24	Aristida ramosa	N	0.1	10		
	25	Lotus sp.		0.2	40		
F	26	Geranium homeanum	N	0.1	10		
G	27	Aristida vagans	N	0.5	100		
	28	Cenchrus clandestinus	HTE	8	1000		
G	29	Cyperus gracilis	N	0.1	10		
G	30	Juncus usitatus	N	0.2	40		
	31	Stenotaphrum secundatum	HTE	12	2000		
	32						
	33						
	34						
	35						
	36						
	37						
	38						
	39						
	40						

GF Code: see Growth Form definitions in Appendix 1 N: native, E: exotic, HTE: high threat exotic GF = circle code if 'top 3'.

Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); *Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m.*

Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Appendix 5. EPBC impact 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 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.

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.

Such habitat may be, but is not limited to: habitat identified in a recovery plan for the species or ecological community as habitat critical for that species or ecological community; and/or habitat listed on the Register of Critical Habitat maintained by the Minister under the *EPBC Act.*

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.

CRITICALLY ENDANGERED AND ENDANGERED ECOLOGICAL 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) 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) b) Habitat that is of critical importance to the species at particular life-cycle stages; and/or

(c) c) Habitat utilised by a migratory species which is at the limit of the species range; and/or

(d) d) Habitat within an area where the species is declining.

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.

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).

Appendix 6. EPBC IMPACT ASSESSMENT FOR RECORDED EPBC LISTED ENTITIES

Grevillea parviflora subsp. parviflora

Background

Grevillea parviflora subsp. parviflora is listed as Vulnerable under the *Commonwealth EPBC Act (1999)* from 26 March 2008.

Grevillea parviflora subsp. parviflora, Family *Proteaceae*, also known as Small-flower Grevillea, is a low open to erect shrub usually 0.3−1 m high (Benson & McDougall, 2000). The species has narrow leaves and white flowers with rusty brown hairs (Benson & McDougall, 2000; Fairley & Moore, 2000). Flowering occurs between July and December and between April and May (Benson & McDougall, 2000; NSW NPWS, 2002). It exhibits a degree of vegetative spread with stems capable of suckering from underground rhizomes (NSW NPWS, 2002). (DCCEW 2008).

Critically Endangered species assessment

Is there is a real chance or possibility that the proposal will:

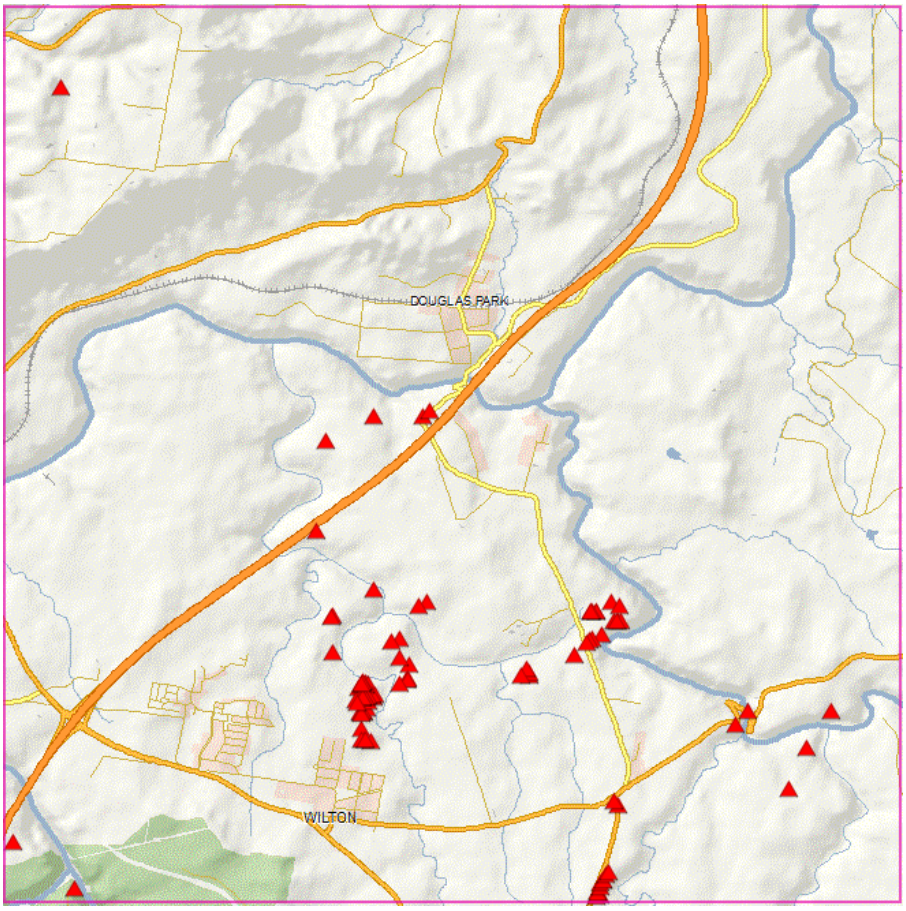
- **Lead to a long-term decrease in the size of a population;**

The local records show that the population is widespread within the locality, with a larger distribution to the south of the site towards the township of Wilton. As the habitat is being retained within the development footprint where the population resides, the proposal is unlikely to lead to a long-term decrease in the size of the population.

- **Reduce the area of occupancy of the species;**

There is still the availability for seed dispersal to occur within the retained vegetation onsite, as well as with the connected vegetation to the north of the site, where other known locations of this population occur.

However, 9.63 ha of native vegetation containing a combination of potential and known habitat for *Grevillea parviflora subsp. parviflora* has been impacted by the proposal which does reduce the area of occupancy of the species. From the BAM-C which incorporates a 30 m buffer around known specimens, the impact amounts to 0.32 ha of known impact.



Locations of *Grevillea parviflora subsp. parviflora* approximately 5km from the site (BioNet Atlas, July 2024)

- **Fragment an existing population into two or more populations;**

The proposal will not likely fragment existing populations in two or more populations based of the locations of existing records.

- **Adversely affect habitat critical to the survival of a species;**

Critical habitat is not defined for the species. The species grows in a range of vegetation from heath and shrubby woodland to open forest (DCCEW 2008).

- **Disrupt the breeding cycle of a population;**

The impacts caused by the removal of vegetation onsite will not likely disrupt the breeding cycle of the population of *Grevillea parviflora subsp. parviflora.*

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

The proposal will impact 9.63 ha of vegetation that may support this species or 0.32 ha of known habitat, thus modifying, destroying, removing, isolating and decreasing the availability or quality of habitat.

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

Clearing of vegetation will create edge effects due to light changes and soil impacts i.e. increased runoff amount, that regularly promotes the growth. With no specific management

plans in place for this species, weed infested areas can impact the retained vegetation within the site, as weed invasion is a threat to the species.

Without an appropriate management plan, there is possibility that weed invasion may reduce the likelihood of *Grevillea parviflora subsp*. *parviflora* lifecycle. It is recommended that the VMP (TBE 2019) be updated to include the management of this species.

- **Introduce disease that may cause the species to decline; or**

No. The proposal is not considered to introduce any relevant or known diseases to this species.

- **Interfere with the recovery of the species.**

Clearing of native vegetation interferes with the species likelihood of recovery. It is recommended that an appropriate Vegetation Management Plan is in place to protect the individuals located onsite.

Conclusions

As the proposal is located outside the known populations onsite, the actions are not likely to have a direct impact on the species within the site, but rather indirect impacts. It is recommended that an appropriate Vegetation Management Plan is in place to protect this species within the site.

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 any one of the above listed criteria. The action has reduced the area of occupancy of the species by a known 0.32 ha, potentially result in invasive species becoming established in the species habitat, and it will interfere with the recovery of the species.

Persoonia bargoensis

Background

Persoonia bargoensis is listed as Vulnerable under the *Commonwealth EPBC Act (1999)* from 07 September 2023.

Persoonia bargoensis (Family *Proteaceae*), also known as the Bargo Geebung, is described in PlantNET (2019) as an "erect shrub, young branchlets sparsely to moderately hairy. Leaves linear-lanceolate to lanceolate, 0.8–2.4 cm long, usually 1.0–2.0 mm wide, flat or convex, with recurved margins, sometimes recurved towards the tip, glabrous to sparsely hairy when immature, glabrescent when mature, smooth. Inflorescences growing on into a leafy shoot; flowers mostly subtended by leaves; pedicels 3–7 mm long, spreading to recurved, glabrous. Tepals 7–10 mm long, shortly caudate, glabrous. Ovary glabrous. (DCCEW 2023)

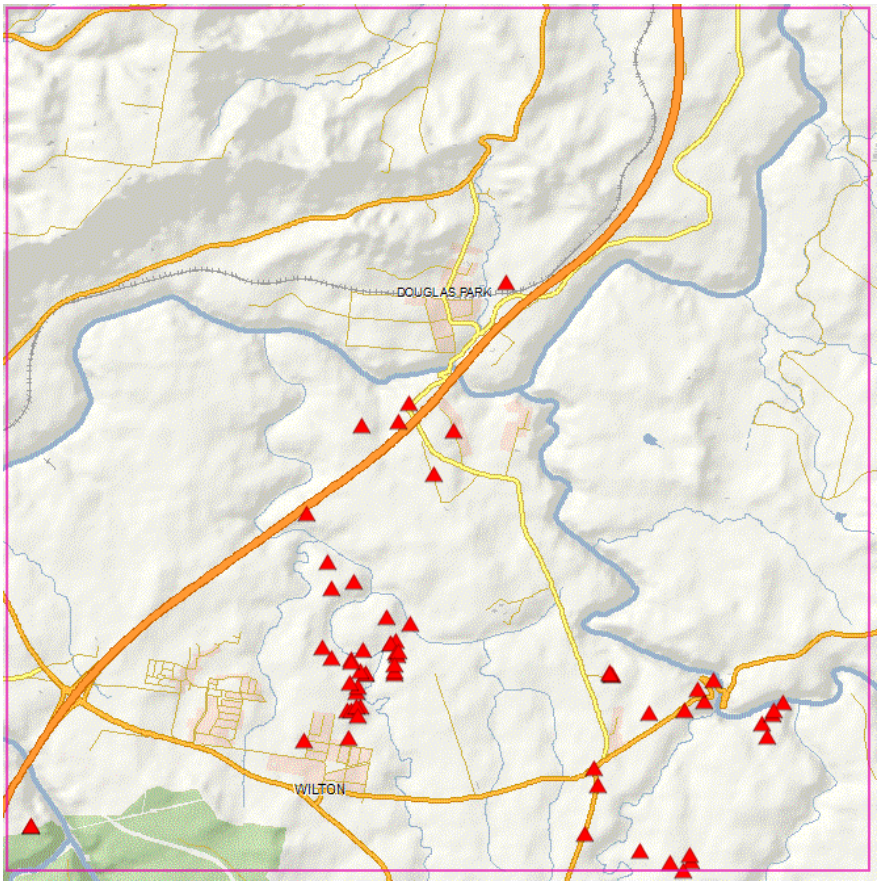
- **Lead to a long-term decrease in the size of a population;**

The local records shows that the species is widespread within the locality with one (1) of the records denoting a population count at the site. The population of this species is widespread to the south towards the township of Wilton. As the habitat is being retained within the development footprint where the population resides, the proposal is unlikely to lead to a long term-decrease in the size of the population.

- **Reduce the area of occupancy of the species;**

The impact area is located at the edge of a known area of occupation and as a result would reduce its overall geographic distribution.

9.63 ha of native vegetation containing a combination of potential and known habitat for *Persoonia bargoensis* has been impacted by the proposal which does reduce the area of occupancy of the species. Known specimens with a 30 m buffer account for only a 0.04 ha impact.



Locations of *Persoonia bargoensis* up to approximately 5km from the site (BioNet Atlas, July 2024)

- **Fragment an existing population into two or more populations;**

The proposal will not fragment two or more populations based on the location of existing records.

- **Adversely affect habitat critical to the survival of a species;**

Critical habitat is not defined for the species. The species grows in woodland to dry, sclerophyll forest, on sandstone and clayey laterite on heavier, well-drained, loamy, gravelly soils of the Hawkesbury Sandstone and Wianamatta Shale in the catchments of the Cataract, Cordeaux and Bargo Rivers (NSW Scientific Committee 2000).

- **Disrupt the breeding cycle of a population;**

The impacts caused by clearing vegetation onsite will not likely disrupt the breeding cycle of *Persoonia bargoenis*.

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

It is expected that 9.63 ha of native vegetation that may support this species will be removed as a result of the proposed development footprint, however only 0.04 ha of confirmed habitat will be impacted.

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

The proposal will likely create the clearing of vegetation which will in turn create edge effects due to soil disturbance and light changes, i.e. runoff amount, that regularly promotes the growth of annual and perennial weed species. With no species-specific management plan in place, these areas can turn into areas with high levels of weed infestation. Weed invasion is a threat to the species.

It is recommended that the VMP (TBE 2019) be updated to include the specific management of this species.

- **Introduce disease that may cause the species to decline; or**

No. The proposal is not considered to introduce any relevant or known diseases to this species.

- **Interfere with the recovery of the species.**

Clearing of native vegetation interferes with the species likelihood of recovery. It is recommended that an appropriate Vegetation Management Plan is in place to protect the individuals located onsite.

Conclusions

As the proposal is located outside the known populations onsite, the actions are not likely to have a direct impact on the species within the site, but rather indirect impacts. It is recommended that an appropriate Vegetation Management Plan is in place to protect this species within the site.

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 any one of the above listed criteria. The action has reduced the area of occupation of the species by known habitat of 0.04 ha, it could potentially result in invasive species becoming established in the species habitat, and it will interfere with the recovery of the species.

Shale Sandstone Transition Forest of the Sydney Basin Bioregion

This ecological community is listed as a Critically Endangered Ecological Community (CEEC) within the *Commonwealth EPBC Act (1999)* from 16 December 2014.

Shale Sandstone Transition Forest (SSTF) is forest or woodland with an overstorey dominated by various Eucalypt species and an understorey comprising of sclerophyll shrubs, grasses and herbs. The structure and composition of vegetation are primarily determined by the transitional geology between Wianamatta shale and Hawkesbury sandstone and vary considerably depending on the degree and the source of shale influence (Wianamatta or Hawkesbury Group, or Mittagong Formation) (DCCEW 2014)

This vegetation community occupies a large proportion of the site excluding a small portion on the central west and western boundary. The impacts to SSTF is 8.17 ha to facilitate the proposed development footprint. Outside of the proposed boundary fence, the remaining SSTF is not impacted and will be retained as part of the proposed development. The majority of this impact is upon regrowth vegetation.

Canopy: *Angophora bakeri, Eucalyptus fibrosa, Eucalyptus eugenioides*

Mid-Storey: *Kunzea ambigua, Bursaria spinosa Allocasuarina littoralis, Callistemon linearis, Ozothamnus diosmifolius, Persoonia linearis*

Ground layer: *Imperata cylindrica, Lepidosperma laterale, Entolasia stricta, Microlaena stipoides, Gahnia aspera, Lomandra obliqua, Lomandra multiflora, Aristida vagans and Themeda triandra*

Critically Endangered Ecological Community assessment

Is there a real chance or possibility that it will:

- **Reduce the extent of an ecological community;**

The proposal will impact on 9.63 ha of the community through direct impacts. The outer perimeter of the boundary fence will retain this community. This area may be subject to edge effects and weed invasion, particularly the boundaries adjoining roads. It is recommended that the impacts are to be minimised through appropriate vegetation management plans.

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

The proposal will impact on SSTF, however removal will not result in any further fragmentation as the site is already bound by roads on the east and west boundary and already isolated in part due to existing development and cleared in part from prior agricultural practices. All non-impacted SSTF onsite will remain connected to existing contiguous patches of bushland, allowing for passage and transfer of seed material to continue.

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

Given the large extent of the SSTF across the site and adjoining property to the northwest, the reduction of size will not be critical to the survival of the ecological community as the patch size is still large

- **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;**

SSTF will remain onsite outside the proposal's boundary. This is not a groundwater dependant ecosystem like Swamp Sclerophyll Forest or a hanging swamp which are dependent upon ground water and sensitive to hydrological changes. The proposal is not expected to or modify or destroy abiotic factors such that the remain SSTF will be placed at risk of local extinction.

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

A portion of the SSTF will be retained insitu onsite, although there is no current plan of management for their conservation. Indirect impacts to retained vegetation may include, but are not limited to, over-clearing understorey maintenance such as for bushfire protection where this goes beyond the expected boundary, creation of access tracks, rubbish dumping, edge effects through changes in light conditions, and weed invasion.

The impacts can be variable and often only small, but without an approved plan of management for the conservation of non-impacted vegetation which is enacted to de-risk unintended, incidental and indirect impacts, there is very little guarantee that this will not occur,

and it should be assumed that there will be some degree of change in the species composition. Without a plan of management in place, that change in species composition could potentially be substantial.

- **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**

The Vegetation Management Plan (TBE 2019) intends to de-risk the impacts to the management for the conservation of the retained SSTF community onsite. It is recommended that a management plan be enacted in order to maintain the current integrity of the ecological community.

    - **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**

The proposed development involves the construction of a cemetery, internal roads and associated buildings, including earthworks, which assume the use of regular mobilisation of fertilisers, herbicides or other chemicals or pollutants.

The Vegetation Management Plan (TBE 2019) intends to de-risk the impacts to the SSTF community onsite. It is recommended that the management plan be updated to reflect current management practices in order to de-risk the unintended impacts to the SSTF community onsite. As the VMP currently stands, there will be some degree of death or inhibition of growth of species within the ecological community.

It is recommended that the management plan be updated to specify the activities that are prohibited or strictly controlled within the retained portion of the site.

    - **Interfere with the recovery of an ecological community**

A recommendation within the retained bushland for an updated Vegetation Management Plan to improve ongoing works within the site to form a net gain of better coverage and structure and as a result a corresponding increase in biodiversity within areas that are poorer than others within the site.

With out an updated Vegetation Management Plan in place, there is no guarantee that the proposal will not interfere with the recovery of SSTF ecological community.

Conclusions

There will be quite a substantial impact on this community in terms of its area (over 8 ha) and will reduce the local occurrence and thus triggering the requirement for a referral.

Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest

This ecological community is listed as Critically Endangered Ecological Community (CEEC) under the *Commonwealth EPBC Act (1999)* from 09 December 2009.

Cumberland Plain Shale Woodlands and Shale- Gravel Transition Forest (CPSWSGTF) represents certain occurrences of the coastal plain grassy eucalypt woodlands that are endemic to the shale hills and plains of the Sydney Basin Bioregion in NSW and which occur primarily in, but not limited to, the Cumberland Sub-region. The ecological community incorporates the grassy eucalypt shale hills and plains woodlands and the shale-gravel

transition forests of this region. The tree canopy is dominated by *Eucalyptus moluccana* (Grey Box), *Eucalyptus tereticornis* (Forest Red Gum) and/or *Eucalyptus fibrosa* (Red Ironbark) (DCCEW 2009).

This community occupies a small patch on the western boundary and two small, isolated patches within the site's boundary. As derived native grassland does not form part of the TEC as listed under the *EPBC Act*, there will be an impact of 0.34 ha on this community.

Canopy: *Eucalyptus tereticornis and Eucalyptus moluccana*

Mid storey: *Bursaria spinosa*

Groundcovers: *Microlaena stipoides, Entolasia stricta, Themeda triandra, Dichondra repens, Aristida vagans.*

PCT 3320 Cumberland Plain Woodland occurs onsite also as derived native grassland, however, is not considered under the *EPBC Act (1999).*

Critically Endangered Ecological Community assessment

Is there a real chance or possibility that it will:

- **Reduce the extent of an ecological community;**

The proposal will impact on 1.42 ha of this community (but only 0.34 ha as recognised under the *EPBC Act*) within the site through direct impacts. The proposal will have minor impacts on the extent of CPSWSGTF, however this community will largely be located outside the development proposal and as a result will be largely protected from direct impacts. The remaining community may be subject to edge effects and weed invasion, and it is recommended that a Vegetation Management Plan be prepared to include the management of this community.

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

The proposal will impact two small patches of CPSWSGTF, however will not result in any fragmentation as these two patches are already isolated from the larger patch of CPSWSGTF onsite. A larger patch of CPSWSGTF will be retained outside of the development footprint which will be largely protected from direct impacts and this community is already fragmented by Douglas Park Drive and no further changes to this community will incur.

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

The proposal will have minor impact on the extent of CPSWSGTF as two small patches are impacted within the development footprint. A larger patch will be retained outside of the development footprint and will largely be protected from direct impacts. Since the area of CPSWSGTF to be removed is small and isolated from larger contiguous patches and nearby native vegetation, the habitat is not considered critical to the survival of the 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;**

CPSWSGTF will be impacted within the proposed development, however, this community is not a groundwater dependant ecosystem like Swamp Sclerophyll Forest or a hanging swamp which are dependent upon ground water and sensitive to hydrological changes. The proposal

is not expected to or modify or destroy abiotic factors such that the remain CPSWSGTF will be placed at risk of local extinction.

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

A portion of the CPSWSGTF will be retained insitu onsite, although there is no current plan of management for their conservation. Indirect impacts to retained vegetation may include, but are not limited to, over-clearing understorey maintenance such as for bushfire protection where this goes beyond the expected boundary, creation of access tracks, rubbish dumping, edge effects through changes in light conditions, and weed invasion.

The impacts can be variable and often only small, but without an updated plan of management for the conservation of non-impacted vegetation which is enacted to de-risk unintended, incidental and indirect impacts, there is very little guarantee that this will not occur, and it should be assumed that there will be some degree of change in the species composition. Without a plan of management in place, that change in species composition could potentially be substantial.

- **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**

There is no current plan of management for the conservation of the retained CPSWSGTF community onsite. It is recommended that a management plan be enacted in order to maintain the current integrity of the ecological community.

    - **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**

The proposed development involves the construction of a cemetery, internal roads and associated buildings, including earthworks, which assume the use of regular mobilisation of fertilisers, herbicides or other chemicals or pollutants.

The Vegetation Management Plan (TBE 2019) intends to de-risk the impacts to the CPSWSGTF community onsite. It is recommended that the management plan be updated to reflect current management practices in order to de-risk the unintended impacts to the CPSWSGTF community onsite. As the VMP currently stands, there will be some degree of death or inhibition of growth of species within the ecological community.

It is recommended that the management plan be updated to specify the activities that are prohibited or strictly controlled within the retained portion of the site.

    - **Interfere with the recovery of an ecological community**

A recommendation within the retained bushland for an updated Vegetation Management Plan to improve ongoing works within the site to form a net gain of better coverage and structure and as a result a corresponding increase in biodiversity within areas that are poorer than others within the site.

As there is no updated Vegetation Management Plan in place with current management practices, there is no guarantee that the proposal will not interfere with the recovery of CPSWSGTF ecological community.

Conclusions

Patches of CPSWSGTF are very isolated on the eastern side of the Hume Highway in the vicinity of Douglas Park to Wilton and have been largely subject to small acerages, grazing and more recently, urban expansion, whereby the local occurrence is being made smaller and smaller, and the quality of the remaining vegetation is subject to more pressures of human influences. Impacts on this community will reduce the local occurrence and thus triggering the requirement for a referral.

Appendix 7. Staff qualifications and experience

Team member (role)	Accreditations and qualifications	Experience	Employment history	Skills and expertise
Michael Sheather-Reid (Managing Director)	• Bachelor of Natural Resources (Hons), University of New England • BioBanking Assessor • Engineering Assistant – CAD Drafting • MUSIC Modelling – Stormwater quality and quantity modelling (RMIT) • Bush Regeneration II Certificate, Ryde TAFE • NSW WorkCover OHS Construction Induction • Chemical Handling Certificate, Ryde TAFE	Michael has a wealth of experience in environmental consulting and on ground management of bushland, wetland and riparian habitats having undertaken environmental assessment, ecological consultancy, and restoration in both the private and public sectors for over 22 years.	• 2007- Current: Senior Ecologist, Travers bushfire & ecology • 2004 -2007: Senior Ecologist, Conacher Travers Pty Ltd • 2002-2004: Project Manager, Urban Bushland Management Projects Pty Ltd • 1999-2002: Project Manager Sustainable Vegetation Management Pty Ltd • 1995-1999: Managing Director Sheather-Reid & Associates Pty Ltd • 1996-1997: NSW Landcare Liaison Officer, Australian Conservation Foundation • 1992-1995: Environmental Officer, Dept. Land & Water Conservation • 1990-1992: Scientific Officer Dept. of Water Resources	• Ecological assessment • Rezoning studies • Biodiversity offset planning. • Restoration management and coordination • Biotic and soil translocation • Watercourse assessment • Project ecologist services • *EPBC Act* referrals • Controlled Activity Approvals • Vegetation management plans
Lindsay Holmes (Principal Ecologist)	• Biodiversity Assessment Method (BAM) Assessor (BAAS17032) • Bachelor of Science – Biology, James Cook University, Qld • Bush Regeneration II Certificate, Ourimbah TAFE • NSW WorkCover OHS Construction Induction • Senior First Aid Certificate • BioBanking Assessor (No. 199)	Lindsay has 24 years of experience as a flora ecologist and bushland regeneration supervisor and has expertise in botanical survey, ecological analysis, maintain and improve analysis, biometric analysis and geo-plotting of ecological data.	• 2007- Current: Senior Botanist, Travers bushfire & ecology • 2006-2007: Ecologist, Conacher Travers Pty Ltd • 1999-2006: Field Operations Manager, Microclimate.	• Highly experienced in botanical survey and ecological analysis • Vegetation management planning • Flora and fauna assessment • Species impact statement • Threatened species, ecological communities and endangered population surveys and analysis. • Preparation of BioBanking and Biodiversity Development Assessment Reports • Riparian, bushland, and wetland restoration • Habitat tree analysis and assessment • Noxious weed identification and control • SULE assessment.
Sara Peters (Botanist) Flora Survey 2024, BDAR contributor	• Bachelor of Plant Science, University of New England • Horticulture Certificate II, OTEN NSW • First Aid Certificate	Sara is a botanist with 13 years worth of experience in horticulture and farming management, with key skills in plant identification and taxonomy and weed management.	• 2023-Current: Botanist, Travers bushfire & ecology • 2010-Current: Farm Manager, Self-employed • 2009-2023: Greenlife Team member	• Botanical Survey • Plant Identification and Taxonomy • Noxious Weed Identification and control • SULE Assessment

Team member (role)	Accreditations and qualifications	Experience	Employment history	Skills and expertise
				• Habitat tree analysis and assessment • Threatened species, ecological communities and endangered population surveys and analysis.
Sandy Cardow (GIS officer) Reproduction of GIS Figures	• Bachelor of Science (Biological Sciences) (Macquarie University)	Sandy has over twenty years of experience in Spatial Information (Geographic Information Systems (GIS)), which includes preparation of mapping in local government roles and has completed a Bachelor of Science (Biological Sciences).	• 2017 – Current: GIS Officer, Travers bushfire & ecology • 2014 – 2017: GIS Consultant, Forestry Corp. NSW • 2005 – 2011: GIS Analyst, Forests NSW • 2002 – 2005: GIS Data Librarian, Forests NSW • 2000 – 2002: GIS Operator, Forests NSW • 2000 – 2002: GIS Data Import / Export Officer, Forests NSW • 1999 2000: GIS Project Officer DECC • 1998 – 1999: GIS Support Officer DECC • 1998 – 1999: Wildlife Atlas Data Entry Officer DECC	• Geographic Information Systems • Data management and analysis • Spatial databases and database administration • GPS • Cartography • Natural resource management • Client liaison
Wayne Davis (GIS officer)	• Bachelor of Science (Marine Science) (University of Newcastle) • Master of Spatial Science Technology (Geographic Information Systems) (University of Southern Queensland) • FWPCOT2237 Maintain Chainsaws • FWPCOT2239 Trim and Cut Felled Trees • AHCPMG301A: Control Weeds • CPCCOHS1001A Work safely in the construction industry. • Open Water Diver • AQF3 Chemical Accreditation: AHCCHM307 - Prepare and apply chemicals to control pest, weeds and diseases, AHCCHM304 - Transport and store chemicals . • HLTAID009 Provide cardiopulmonary resuscitation, HLTAID010 Provide basic	Wayne has over eighteen years of experience in IT which included roles as a senior systems designer with the CBA and data scientist with Catholic Schools NSW. Mapping projects for ecology, bushfire planning, student enrolments and demographics reporting. He has completed a Bachelor of Science (marine science), Master of Spatial Science Technology (GIS) and is a member of the Geospatial Council of Australia. Wayne also has 2 years bush regeneration supervisory experience. His Master's thesis involved using a machine learning approach to develop habitat suitability models for Piping Plovers.	• 2022 – Current: GIS Officer, Travers bushfire & ecology • 2022 – 2022: Spatial Data Analyst, Lotsearch • 2021 – 2022: Data Analyst - Strategic Data Analysis Unit, ACCC • 2018 – 2020: Data Scientist, Catholic Schools NSW • 2016 – 2018: Green Army Conservation Project Supervisor Central Coast Council, Ku-ring-gai Council, NPWS. • 2014 – 2014: Website Administrator, The Telecom Shop • 1997 – 2004 Senior Information Specialist, EDS • 1996 – 1997 Senior Systems Designer, CBA • 1989 – 1996 Analyst Programmer, CBA	• Geographic Information Systems • Spatial Data Science • Habitat Suitability Modelling • Predictive Analytics • Machine Learning • ArcGIS • Alteryx • Python

Team member (role)	Accreditations and qualifications	Experience	Employment history	Skills and expertise
	emergency life support, HLTAID011 Provide first aid. • Microsoft Certified Azure Fundamentals			
Anna Giles (GIS Officer) Reproduction of GIS Figures	• Bachelor of Environmental Science (1st Class Hons) (Deakin University) • PhD- National Marine Science Centre- "the uses of drone mapping to reveal aquatic environmental change" • PEPL <25kg Remote Pilots License (Aeronautical Radio Operator Certificate) (CASA Ref: AK ARN: 1051010) • First AID and CPR • Open Water Diver Certificate	Anna has a deep passion for environmental conservation which led her to study Wildlife Conservation and Biology (Hons) and has a Doctor in Philosophy in Landscape Ecology.	• 2023- Current: GIS officer, Travers bushfire & ecology • 2022-2023: GIS consultant, Everick Geospatial NSW • 2022-2023: Aquarium Guide- Solitary Island Aquarium • 2020-2023: Research Assistant, Southern Cross University	• Geographic Information Systems Geographic Information Systems • Data management and analysis • Spatial databases and database administration • GPS • Cartography • Natural resource management • Client liaison
Corrine Edwards (Fauna Ecologist) Fauna Survey, Report contributor	• Bachelor of Environmental Science and Management. (Hons) (University of New South Wales) (2016-2020)	Corrine has over 10 years' experience in fauna survey techniques, researching ecological interactions and identification of vertebrate fauna within a magnitude of Australian habitats. She is experienced in leading research projects, experimental design, data collection, data analysis and report writing.	• 2021 – 2024: Fauna Ecologist, Travers Bushfire and Ecology • 2020 – Recipient of the Marilyn Fox Environmental Science Prize • 2019 – 2020: Research scholarship fellow at the Fowlers Gap Research Station • 2019 – Research assistant at University of NSW • 2015-2016 – Reptile Research Assistant, Adelaide Museum • 2014 – 2015 Amphibian Research Assistant, University of Western Australia • 2012 -14 – Reptile Zookeeper – Australian Reptile Park	• Survey techniques for all major vertebrate fauna groups (including threatened species target searches) • Fauna identification, morphology, and behaviour • Fauna field assessment • Microhabitat identification • Project ecology • Experimental design and statistical analysis • Scientific report writing
Alana Parziani (Fauna Ecologist / Assistant Project Manager) Fauna Survey, Report Contributor	• Master of Applied Science (Wildlife Health and Population Management) (University of Sydney, NSW) • Captive Animals Certificate III (Richmond TAFE, NSW) • NSW WorkCover OHS Construction Induction • Senior First Aid Certificate	Alana has over 10 years' experience working across various roles within the environmental sector specialising in fauna behaviour and ecology, sustainable land management and project management. She has experience working for government and fauna field experience ranging from Tasmania, New South Wales to Queensland.	• 2024 – Current: Fauna Ecologist / Assistant Project Manager, Travers Bushfire and Ecology, NSW • 2016-2024: Senior Project Officer / Wildlife Officer, Department of Environment and Science, QLD • 2015-2016: Ecological Consultant / Bush Regenerator / Project Assistant, Toolijooa Environmental and Narla Environmental, NSW	• Fauna survey, assessment identification, morphology, and behaviour • Sustainable land management • Scientific report writing • Legislative knowledge • Project Management • Stakeholder engagement

Team member (role)	Accreditations and qualifications	Experience	Employment history	Skills and expertise
			• 2014-2015: Wildlife (Koala) Keeper, Featherdale Wildlife Park, NSW • 2013-2014: Australian Wildlife Keeper, Dreamworld, QLD • 2012-2013: Wildlife Keeper (Mammals and Birds), Australian Reptile Park, NSW	

Appendix 8. BAM-C outputs

BAM Vegetation Zones Report

Proposal Details

Assessment Id
00049659/BAAS17032/24/00049660

Assessment name
Douglas Park Cemetery

BAM data last updated *
05/08/2025

Assessor Name
Lindsay Holmes

Report Created
27/10/2025

BAM Data version *
Current classification (live - default) (82)

Assessor Number
BAAS17032

Assessment Type
Part 4 Developments (General)

BAM Case Status
Finalised

Assessment Revision
5

BOS entry trigger
BOS Threshold: Biodiversity Values Map and area clearing threshold

Date Finalised
27/10/2025

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Vegetation Zones

#	Name	PCT	Condition	Area	Minimum number of plots	Management zones
1	3320_moderate_good	3320-Cumberland Shale Plains Woodland	moderate_good	0.34	1	

2	3320_derived_native_grass	3320-Cumberland Shale Plains Woodland	derived_native_grass	1.08	1	
3	3321_high_sandstone	3321-Cumberland Shale-Sandstone Ironbark Forest	high_sandstone	0.04	1	
4	3321_low_sandstone	3321-Cumberland Shale-Sandstone Ironbark Forest	low_sandstone	1.28	1	
5	3321_regrowth	3321-Cumberland Shale-Sandstone Ironbark Forest	regrowth	5.74	3	
6	3321_poor	3321-Cumberland Shale-Sandstone Ironbark Forest	poor	1.15	1	

BAM Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00049659/BAAS17032/24/00049660	Douglas Park Cemetery	05/08/2025
Assessor Name	Report Created	BAM Data version *
Lindsay Holmes	27/10/2025	Current classification (live - default) (82)
Assessor Number	Assessment Type	BAM Case Status
BAAS17032	Part 4 Developments (General)	Finalised
Assessment Revision	BOS entry trigger	Date Finalised
5	BOS Threshold: Biodiversity Values Map and area clearing threshold	27/10/2025

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Threatened species reliably predicted to utilise the site. No surveys are required for these species. Ecosystem credits apply to these species.

Common Name	Scientific Name	Vegetation Types(s)
Black Falcon	Falco subniger	3320-Cumberland Shale Plains Woodland
		3321-Cumberland Shale-Sandstone Ironbark Forest
Black-chinned Honeyeater (eastern subspecies)	Melithreptus gularis gularis	3320-Cumberland Shale Plains Woodland
		3321-Cumberland Shale-Sandstone Ironbark Forest
Brown Treecreeper (eastern subspecies)	Climacteris picumnus victoriae	3320-Cumberland Shale Plains Woodland
		3321-Cumberland Shale-Sandstone Ironbark Forest
Diamond Firetail	Stagonopleura guttata	3320-Cumberland Shale Plains Woodland
		3321-Cumberland Shale-Sandstone Ironbark Forest
Dusky Woodswallow	Artamus cyanopterus cyanopterus	3320-Cumberland Shale Plains Woodland
		3321-Cumberland Shale-Sandstone Ironbark Forest
Eastern Coastal Free-tailed Bat	Micronomus norfolkensis	3320-Cumberland Shale Plains Woodland
		3321-Cumberland Shale-Sandstone Ironbark Forest
Eastern False Pipistrelle	Falsistrellus tasmaniensis	3320-Cumberland Shale Plains Woodland
		3321-Cumberland Shale-Sandstone Ironbark Forest
Eastern Osprey	Pandion cristatus	3320-Cumberland Shale Plains Woodland

Eastern Osprey	Pandion cristatus	3321-Cumberland Shale-Sandstone Ironbark Forest
Flame Robin	Petroica phoenicea	3320-Cumberland Shale Plains Woodland
		3321-Cumberland Shale-Sandstone Ironbark Forest
Gang-gang Cockatoo	Callocephalon fimbriatum	3320-Cumberland Shale Plains Woodland
		3321-Cumberland Shale-Sandstone Ironbark Forest
Greater Broad-nosed Bat	Scoteanax rueppellii	3320-Cumberland Shale Plains Woodland
		3321-Cumberland Shale-Sandstone Ironbark Forest
Grey-headed Flying-fox	Pteropus poliocephalus	3320-Cumberland Shale Plains Woodland
		3321-Cumberland Shale-Sandstone Ironbark Forest
Large Bent-winged Bat	Miniopterus orianae oceanensis	3320-Cumberland Shale Plains Woodland
		3321-Cumberland Shale-Sandstone Ironbark Forest
Little Bent-winged Bat	Miniopterus australis	3320-Cumberland Shale Plains Woodland
		3321-Cumberland Shale-Sandstone Ironbark Forest
Little Eagle	Hieraaetus morphnoides	3320-Cumberland Shale Plains Woodland
		3321-Cumberland Shale-Sandstone Ironbark Forest
Little Lorikeet	Glossopsitta pusilla	3320-Cumberland Shale Plains Woodland
		3321-Cumberland Shale-Sandstone Ironbark Forest
Regent Honeyeater	Anthochaera phrygia	3320-Cumberland Shale Plains Woodland
		3321-Cumberland Shale-Sandstone Ironbark Forest
Rosenberg's Goanna	Varanus rosenbergi	3320-Cumberland Shale Plains Woodland
		3321-Cumberland Shale-Sandstone Ironbark Forest
Scarlet Robin	Petroica boodang	3320-Cumberland Shale Plains Woodland
		3321-Cumberland Shale-Sandstone Ironbark Forest
South-eastern Glossy Black-Cockatoo	Calyptorhynchus lathami lathami	3320-Cumberland Shale Plains Woodland
		3321-Cumberland Shale-Sandstone Ironbark Forest
Speckled Warbler	Chthonicola sagittata	3320-Cumberland Shale Plains Woodland
		3321-Cumberland Shale-Sandstone Ironbark Forest
Spotted Harrier	Circus assimilis	3320-Cumberland Shale Plains Woodland
		3321-Cumberland Shale-Sandstone Ironbark Forest
Spotted-tailed Quoll	Dasyurus maculatus	3320-Cumberland Shale Plains Woodland
		3321-Cumberland Shale-Sandstone Ironbark Forest
Square-tailed Kite	Lophoictinia isura	3320-Cumberland Shale Plains Woodland
		3321-Cumberland Shale-Sandstone Ironbark Forest
Swift Parrot	Lathamus discolor	3320-Cumberland Shale Plains Woodland

Swift Parrot	Lathamus discolor	3321-Cumberland Shale-Sandstone Ironbark Forest
Turquoise Parrot	Neophema pulchella	3320-Cumberland Shale Plains Woodland
		3321-Cumberland Shale-Sandstone Ironbark Forest
Varied Sittella	Daphoenositta chrysoptera	3320-Cumberland Shale Plains Woodland
		3321-Cumberland Shale-Sandstone Ironbark Forest
White-bellied Sea-Eagle	Haliaeetus leucogaster	3320-Cumberland Shale Plains Woodland
		3321-Cumberland Shale-Sandstone Ironbark Forest
White-throated Needletail	Hirundapus caudacutus	3320-Cumberland Shale Plains Woodland
		3321-Cumberland Shale-Sandstone Ironbark Forest
Yellow-bellied Glider	Petaurus australis	3321-Cumberland Shale-Sandstone Ironbark Forest
Yellow-bellied Sheathtail-bat	Saccolaimus flaviventris	3320-Cumberland Shale Plains Woodland
		3321-Cumberland Shale-Sandstone Ironbark Forest

Threatened species Manually Added

None added

Threatened species assessed as not within the vegetation zone(s) for the PCT(s)

Common Name	Scientific Name	Plant Community Type(s)
Black-necked Stork	Ephippiorhynchus asiaticus	3320-Cumberland Shale Plains Woodland
		3321-Cumberland Shale-Sandstone Ironbark Forest
Broad-headed Snake	Hoplocephalus bungaroides	3321-Cumberland Shale-Sandstone Ironbark Forest
Pilotbird	Pycnoptilus floccosus	3321-Cumberland Shale-Sandstone Ironbark Forest

Threatened species assessed as not within the vegetation zone(s) for the PCT(s)

Refer to BAR for detailed justification

Common Name	Scientific Name	Justification in the BAM-C
Black-necked Stork	Ephippiorhynchus asiaticus	Habitat constraints
Broad-headed Snake	Hoplocephalus bungaroides	Refer to BAR
Pilotbird	Pycnoptilus floccosus	Refer to BAR

BAM Candidate Species Report

Proposal Details

Assessment Id 00049659/BAAS17032/24/00049660	Proposal Name Douglas Park Cemetery	BAM data last updated * 05/08/2025
Assessor Name Lindsay Holmes	Report Created 27/10/2025	BAM Data version * Current classification (live - default) (82)
Assessor Number BAAS17032	Assessment Type Part 4 Developments (General)	BAM Case Status Finalised
Assessment Revision 5	BOS entry trigger BOS Threshold: Biodiversity Values Map and area clearing threshold	Date Finalised 27/10/2025

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

List of Species Requiring Survey

Name	Presence	Survey Months
Acacia bynoeana Bynoe's Wattle	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☑ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Acacia pubescens Downy Wattle	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☑ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Burhinus grallarius Bush Stone-curlew	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Callistemon linearifolius Netted Bottle Brush	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☐ Feb ☑ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Callocephalon fimbriatum Gang-gang Cockatoo	No (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Cercartetus nanus Eastern Pygmy-possum	No (surveyed)	☑ Jan ☑ Feb ☑ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Chalinolobus dwyeri Large-eared Pied Bat	Yes (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Darwinia biflora Darwinia biflora	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☑ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Epacris purpurascens var. purpurascens Epacris purpurascens var. purpurascens	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☐ Feb ☑ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Genoplesium baueri Bauer's Midge Orchid	No (surveyed)	☐ Jan ☐ Feb ☑ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Grammitis stenophylla Narrow-leaf Finger Fern	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☑ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Grevillea parviflora subsp. parviflora Small-flower Grevillea	Yes (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☐ Feb ☑ Mar ☐ Apr ☑ May ☑ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Haliaeetus leucogaster White-bellied Sea-Eagle	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Hibbertia puberula Hibbertia puberula	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Hibbertia superans Hibbertia superans	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☑ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Hieraaetus morphnoides Little Eagle	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Leucopogon exolasius Woronora Beard-heath	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☐ Feb ☑ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Leucopogon fletcheri subsp. fletcheri Leucopogon fletcheri subsp. fletcheri	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☐ Feb ☑ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Lophoictinia isura Square-tailed Kite	No (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Melaleuca deanei Deane's Paperbark	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Meridolum corneovirens Cumberland Plain Land Snail	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Micromyrtus minutiflora Micromyrtus minutiflora	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☑ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Myotis macropus Southern Myotis	Yes (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Pandion cristatus Eastern Osprey	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Persoonia bargoensis Bargo Geebung	Yes (surveyed)	☐ Jan ☐ Feb ☑ Mar ☐ Apr ☑ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Persoonia glaucescens Mittagong Geebung	No (surveyed)	☐ Jan ☐ Feb ☑ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Persoonia hirsuta Hairy Geebung	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☑ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Persoonia nutans Nodding Geebung	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☑ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Petauroides volans Southern Greater Glider	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Petaurus norfolcensis Squirrel Glider	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Phascolarctos cinereus Koala	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Pimelea curviflora var. curviflora Pimelea curviflora var. curviflora	No (surveyed)	☐ Jan ☐ Feb ☑ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Pimelea spicata Spiked Rice-flower	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☑ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Pterostylis saxicola Sydney Plains Greenhood	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Pultenaea pedunculata Matted Bush-pea	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Tetratheca glandulosa Tetratheca glandulosa	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Threatened species Manually Added

None added

Threatened species assessed as not on site

Refer to BAR for detailed justification

Common name	Scientific name	Justification in the BAM-C
Barking Owl	Ninox connivens	Habitat constraints
Broad-headed Snake	Hoplocephalus bungaroides	Habitat constraints
Brown Pomaderris	Pomaderris brunnea	Refer to BAR
Camden White Gum	Eucalyptus benthamii	Refer to BAR
Deyeuxia appressa	Deyeuxia appressa	Habitat degraded
Dillwynia tenuifolia	Dillwynia tenuifolia	Refer to BAR
Giant Burrowing Frog	Heleioporus australiacus	Refer to BAR
Green and Golden Bell Frog	Litoria aurea	Refer to BAR
Grevillea parviflora subsp. supplicans	Grevillea parviflora subsp. supplicans	Refer to BAR
Grey-headed Flying-fox	Pteropus poliocephalus	Habitat constraints
Juniper-leaved Grevillea	Grevillea juniperina subsp. juniperina	Refer to BAR
Large Bent-winged Bat	Miniopterus orianae oceanensis	Habitat constraints
Lasiopetalum joyceae	Lasiopetalum joyceae	Refer to BAR
Little Bent-winged Bat	Miniopterus australis	Habitat constraints
Marsdenia viridiflora R. Br. subsp. viridiflora population in the Bankstown, Blacktown, Camden, Campbelltown, Fairfield, Holroyd, Liverpool and Penrith local government areas	Marsdenia viridiflora subsp. viridiflora - endangered population	Refer to BAR
Masked Owl	Tyto novaehollandiae	Habitat constraints
P. prunifolia in the Parramatta, Auburn, Strathfield and Bankstown Local Government Areas	Pomaderris prunifolia - endangered population	Refer to BAR
Powerful Owl	Ninox strenua	Habitat constraints
Pultenaea parviflora	Pultenaea parviflora	Refer to BAR
Red-crowned Toadlet	Pseudophryne australis	Refer to BAR
Regent Honeyeater	Anthochaera phrygia	Habitat constraints
Slaty Red Gum	Eucalyptus glaucina	Species is vagrant

Swift Parrot	Lathamus discolor	Habitat constraints
Tadgell's Bluebell in the local government areas of Auburn, Bankstown, Baulkham Hills, Canterbury, Hornsby, Parramatta and Strathfield	Wahlenbergia multicaulis - endangered population	Refer to BAR
Zieria involucrata	Zieria involucrata	Refer to BAR

BAM Credit Summary Report

Proposal Details

Assessment Id
00049659/BAAS17032/24/00049660

Proposal Name
Douglas Park Cemetery

BAM data last updated *
05/08/2025

Assessor Name
Lindsay Holmes

Report Created
27/10/2025

BAM Data version *
Current classification (live - default) (82)

Assessor Number
BAAS17032

BAM Case Status
Finalised

Date Finalised
27/10/2025

Assessment Revision
5

BOS entry trigger
BOS Threshold: Biodiversity Values Map and area clearing threshold

Assessment Type
Part 4 Developments (General)

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Ecosystem credits for plant communities types (PCT), ecological communities & threatened species habitat

Zone	Vegetation zone name	TEC name	Current Vegetation integrity score	Change in Vegetation integrity (loss / gain)	Area (ha)	Sensitivity to loss (Justification)	Species sensitivity to gain class	BC Act Listing status	EPBC Act listing status	Biodiversity risk weighting	Potential SAII	Ecosystem credits
Cumberland Shale Plains Woodland												
1	3320_moderate_good	Cumberland Plain Woodland in the Sydney Basin Bioregion	41.7	32.7	0.34	Biodiversity Conservation Act listing status	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	7

2	3320_derived_native_grass	Cumberland Plain Woodland in the Sydney Basin Bioregion	11	11.0	1.1	Biodiversity Conservation Act listing status	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	0
											Subtotal	**7**
Cumberland Shale-Sandstone Ironbark Forest												
3	3321_high_sandstone	Shale Sandstone Transition Forest in the Sydney Basin Bioregion	38.8	29.2	0.04	Biodiversity Conservation Act listing status	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	1
4	3321_low_sandstone	Shale Sandstone Transition Forest in the Sydney Basin Bioregion	61.3	51.6	1.3	Biodiversity Conservation Act listing status	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	41
5	3321_regrowth	Shale Sandstone Transition Forest in the Sydney Basin Bioregion	35.4	35.4	5.7	Biodiversity Conservation Act listing status	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	127
6	3321_poor	Shale Sandstone Transition Forest in the Sydney Basin Bioregion	34.9	34.9	1.2	Biodiversity Conservation Act listing status	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	25
											Subtotal	**194**
											Total	**201**

Species credits for threatened species

Vegetation zone name	Habitat condition (Vegetation Integrity)	Change in habitat condition	Area (ha)/Count (no. individuals)	Sensitivity to loss (Justification)	Sensitivity to gain (Justification)	BC Act Listing status	EPBC Act listing status	Potential SAII	Species credits
Chalinolobus dwyeri / Large-eared Pied Bat (Fauna)									
3321_regrowth	35.4	35.4	5.7	Environment Protection and Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	True	152
3320_moderate_good	32.7	32.7	0.34	Environment Protection and Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	True	8
3321_high_sandstone	29.2	29.2	0.04	Environment Protection and Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	True	1
3321_low_sandstone	51.6	51.6	1.3	Environment Protection and Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	True	49

3320_derived_native_grass	11.0	11.0	1.1	Environment Protection and Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	True	9
3321_poor	34.9	34.9	1.2	Environment Protection and Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	True	30
								Subtotal	**249**
Grevillea parviflora subsp. parviflora / Small-flower Grevillea (Flora)									
3321_regrowth	35.4	35.4	0.08	Biodiversity Conservation Act listing status	Quantity class of viable seeds produced	Vulnerable	Vulnerable	False	1
3321_high_sandstone	29.2	29.2	0.02	Biodiversity Conservation Act listing status	Quantity class of viable seeds produced	Vulnerable	Vulnerable	False	1
3321_low_sandstone	51.6	51.6	0.21	Biodiversity Conservation Act listing status	Quantity class of viable seeds produced	Vulnerable	Vulnerable	False	5

3321_poor	34.9	34.9	0.01	Biodiversity Conservation Act listing status	Quantity class of viable seeds produced	Vulnerable	Vulnerable	False	1
								Subtotal	**8**
Myotis macropus / Southern Myotis (Fauna)									
3321_regrowth	35.4	35.4	3.6	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	64
3320_moderate_good	32.7	32.7	0.34	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	6
3321_low_sandstone	51.6	51.6	0.38	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	10
3320_derived_native_grass	11.0	11.0	1.1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	6
3321_poor	34.9	34.9	0.99	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	17
								Subtotal	**103**

Persoonia bargoensis / Bargo Geebung (Flora)									
3321_low_sandstone	51.6	51.6	0.03	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	1
3321_poor	34.9	34.9	0.01	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	1
								Subtotal	**2**

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id
00049659/BAAS17032/24/00049660

Proposal Name
Douglas Park Cemetery

BAM data last updated *
05/08/2025

Assessor Name
Lindsay Holmes

Assessor Number
BAAS17032

BAM Data version *
Current classification (live - default) (82)

Proponent Names

Report Created
27/10/2025

BAM Case Status
Finalised

Assessment Revision
5

BOS entry trigger
BOS Threshold: Biodiversity Values Map and area clearing threshold

Assessment Type
Part 4 Developments (General)

Date Finalised
27/10/2025

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Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
Cumberland Plain Woodland in the Sydney Basin Bioregion	Critically Endangered Ecological Community	3320-Cumberland Shale Plains Woodland
Shale Sandstone Transition Forest in the Sydney Basin Bioregion	Critically Endangered Ecological Community	3321-Cumberland Shale-Sandstone Ironbark Forest

Species
Chalinolobus dwyeri / Large-eared Pied Bat

Additional Information for Approval

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
Ephippiorhynchus asiaticus / Black-necked Stork
Hoplocephalus bungaroides / Broad-headed Snake
Pycnoptilus floccosus / Pilotbird

Ecosystem Credit Summary (Number and class of biodiversity credits to be retired)

BAM Biodiversity Credit Report (Like for like)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
3320-Cumberland Shale Plains Woodland	Cumberland Plain Woodland in the Sydney Basin Bioregion	1.4	7	0	7
3321-Cumberland Shale-Sandstone Ironbark Forest	Shale Sandstone Transition Forest in the Sydney Basin Bioregion	8.2	0	194	194

3320-Cumberland Shale Plains Woodland

Like-for-like credit retirement options

Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
Cumberland Plain Woodland in the Sydney Basin Bioregion This includes PCT's: 3319, 3320	-	3320_moderate_good	Yes	7	Cumberland, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Cumberland Plain Woodland in the Sydney Basin Bioregion This includes PCT's: 3319, 3320	-	3320_derived_native_grass	No	0	Cumberland, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

3321-Cumberland Shale-Sandstone Ironbark Forest

Like-for-like credit retirement options

Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region

	Shale Sandstone Transition Forest in the Sydney Basin Bioregion This includes PCT's: 3321	-	3321_high_sandstone	No	1	Cumberland, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Shale Sandstone Transition Forest in the Sydney Basin Bioregion This includes PCT's: 3321	-	3321_low_sandstone	No	41	Cumberland, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Shale Sandstone Transition Forest in the Sydney Basin Bioregion This includes PCT's: 3321	-	3321_regrowth	No	127	Cumberland, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Shale Sandstone Transition Forest in the Sydney Basin Bioregion This includes PCT's: 3321	-	3321_poor	No	25	Cumberland, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Species Credit Summary

BAM Biodiversity Credit Report (Like for like)

Species	Vegetation Zone/s	Area / Count	Credits
Chalinolobus dwyeri / Large-eared Pied Bat	**3321_regrowth, 3320_moderate_good, 3321_high_sandstone, 3321_low_sandstone, 3320_derived_native_grass, 3321_poor**	9.6	249.00
Grevillea parviflora subsp. parviflora / Small-flower Grevillea	**3321_regrowth, 3321_high_sandstone, 3321_low_sandstone, 3321_poor**	0.3	8.00
Myotis macropus / Southern Myotis	**3321_regrowth, 3320_moderate_good, 3321_low_sandstone, 3320_derived_native_grass, 3321_poor**	6.4	103.00
Persoonia bargoensis / Bargo Geebung	**3321_low_sandstone, 3321_poor**	0.0	2.00

Credit Retirement Options

Like-for-like credit retirement options

	Spp	IBRA subregion
Chalinolobus dwyeri / Large-eared Pied Bat	**Chalinolobus dwyeri /** Large-eared Pied Bat	Any in NSW

Grevillea parviflora subsp. parviflora / Small-flower Grevillea	Spp	IBRA subregion
	Grevillea parviflora subsp. parviflora / Small-flower Grevillea	Any in NSW
Myotis macropus / Southern Myotis	Spp	IBRA subregion
	Myotis macropus / Southern Myotis	Any in NSW
Persoonia bargoensis / Bargo Geebung	Spp	IBRA subregion
	Persoonia bargoensis / Bargo Geebung	Any in NSW