APPENDICES

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OVEN MOUNTAIN PUMPED HYDRO ENERGY STORAGE EIS

Biodiversity development assessment report

OVEN MOUNTAIN PUMPED HYDRO STORAGE

EMM creating opportunities

Oven Mountain Pumped Hydro Energy Storage Project

Biodiversity Development Assessment Report

Prepared for OMPS Pty Ltd

September 2023

Oven Mountain Pumped Hydro Energy Storage Project

Biodiversity Development Assessment Report

OMPS Pty Ltd

J210465 OMPS EIS - BDAR

September 2023

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Approved by



Nathan Garvey
Associate Director
8 September 2023

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Newcastle NSW 2300

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Executive Summary

ES1 Project description

OMPS Pty Ltd (OMPS) is proposing to develop the Oven Mountain Pumped Hydro Energy Storage Project (the Project), an off-river pumped hydro energy storage system (referred to as the pumped hydro system) located approximately half-way between Kempsey and Armidale adjacent to the Macleay River in northern NSW. The Project is located within the New England Renewable Energy Zone (REZ) and the Armidale Regional Local Government Area (LGA), proximate to its border with Kempsey Shire LGA.

The Project has been declared by the NSW Government to be critical State significant infrastructure (CSSI) under the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). Infrastructure projects are declared to be CSSI if, in the opinion of the NSW Minister for Planning, they are essential to the State for economic, environmental, or social reasons.

This Biodiversity Development Assessment Report (BDAR) is an appendix to the Project's Environmental Impact Statement (EIS) and should be read in conjunction with the main EIS. It documents the terrestrial biodiversity assessment methods and results, the initiatives built into the Project design to avoid and minimise associated impacts to terrestrial biodiversity, and the mitigation, and management measures, including offset requirements, proposed to address any unavoidable residual impacts.

ES2 Landscape feature

The Project occurs within the NSW North Coast interim biogeographic regionalisation of Australia (IBRA) bioregion and Macleay Gorges, Carrai Plateau and Macleay Hastings IBRA subregions on the Macleay Escarpment Foothills BioNet NSW Landscapes (formerly Mitchell Landscapes). The percentage of native vegetation within a 1,500 m buffer of the footprint of the reservoirs construction and operation areas combined and a 500 m buffer on either side of the centreline of the transmission line and access footprints is estimated at approximately 96.7% based on aerial imagery. The patch size is calculated to be greater than 101 hectares (ha) due to the contiguity of vegetation in the construction envelope with nearby vegetation within the region.

ES3 Native vegetation

The vegetation within the Project area reflects past land uses and disturbances, including historical timber felling, current uses such as grazing, the 2019/2020 bushfires and floodplain along the Macleay River, as well as the landscape in which the Project is situated, noting there is an elevation change of approximately 1,000 metres (m) from the Macleay River to the Carrai Plateau.

On the banks of the Macleay River, the vegetation is primarily dominated by River Oak (Casuarina cunninghamiana). Dry sclerophyll forests occur along the floodplain of the Macleay River and lower slopes, with much of the vegetation within the construction envelope occurring as open grassy Eucalypt forests with smaller wet sclerophyll areas influenced by surface water flows located on headwater tributaries. Vegetation on upper slopes includes tall grassy forests, with shrubby understorey in wetter and cooler microclimates.

In the floodplains and foothills of the Project area, past disturbance has led to clearing of native vegetation and native and exotic grasslands occur; these grasslands lack a mid-storey and canopy stratum and vary in species density and diversity. These lower elevation areas support a higher density of exotic species, due to both the alluvial influences of the Macleay River as well as past and current disturbance.

Ten plant community types (PCTs) are mapped within the construction envelope:

- PCT 762 – Cabbage Gum open forest or woodland on flats of the North Coast
- PCT 780 v Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions
- PCT 842 – Forest Redgum – Broad leaved Apple dry open forest of the gorges of NSW North Coast Bioregion
- PCT 868 – Grey gum – Stringybark open forest of the gorges of the NSW North Coast Bioregion and New England Tableland Bioregion
- PCT 822 – Eurabbie tall open forest of the escarpment ranges of the NSW North Coast Bioregion
- PCT 1106 – River Oak riparian woodland of the NSW North Coast Bioregion and northern Sydney Basin Bioregion
- PCT 1142 – Shatterwood v Giant Stinging Tree v Yellow Tulipwood dry rainforest of the NSW North Coast Bioregion and northern Sydney Basin Bioregion
- PCT 1215 – Spotted Gum – Grey Ironbark open forest of the Macleay Valley lowlands of the NSW North Coast Bioregion
- PCT 1268 – Tallowwood open forest of the coastal ranges of the NSW North Coast Bioregion
- PCT 1287 – Upland heath swamps of the New England Tableland Bioregion.

Vegetation zones were delineated by the presence/absence of canopy and condition of derived grasslands, with 25 vegetation zones delineated across the ten PCTs.

Five threatened ecological communities (TECs) occur within the Project area. The disturbance footprint contains:

- 0.1 ha of Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions
- 1.9 ha of Subtropical Coastal Floodplain Forest of the New South Wales North Coast Bioregion
- 0.4 ha of Lowland Rainforest on Floodplain in the New South Wales North Coast Bioregion
- 5 ha of Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions
- 0.03 ha of Montane Peatlands and Swamps of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands and Australian Alps bioregions.

These TECs are listed as endangered ecological communities (EECs) under the BC Act.

ES4 Threatened species

The Project area has an elevation change of nearly 1,000 m. The escarpment of the Carrai Plateau is dominated by a series of scarp slopes, rocky areas with deep gullies. The construction envelope is, in parts, densely vegetated with disturbance limited to areas where there has been historical use for logging and areas of lower elevation along the Macleay River which have been subject to low level clearing associated with grazing activities. The Project area was also impacted by the 2019/2020 bushfires which along with historical land use, reduced habitat values for threatened species.

A habitat assessment within the construction envelope was used the guide the candidate species assessment. This assessment concluded that target surveys were required for 30 flora species and 33 fauna species. Safe access to certain areas of the construction envelope were also restricted due to the steep terrain, with survey effort using traditional methodologies either limited or impossible to undertake for forest owls and Glossy Black-Cockatoos. Alternative survey methodology was applied, where feasible; however, where survey gaps existed, assumed presence for some species was required.

The following species credit species were recorded within the construction envelope:

- Guthrie's Grevillea (*Grevillea guthrieana*)
- Tall Velvet Sea-berry (*Haloragis exalata* subsp*. velutina*)
- Wandering Pepper Cress (*Lepidium peregrinum*)
- *Pultenaea rubescens*
- Cryptic Forest Twiner (*Tylophora woollsii*)[1]
- Southern Myotis (*Myotis macropus*)
- Greater Glider (*Petauroides volans*)
- Squirrel Glider (*Petaurus norfolcensis*)
- Brush-tailed Rock-wallaby (*Petrogale penicillata*)
- Koala (*Phascolarctos cinereus*) (old scat found in one location indicating species presence)
- Long-nosed Potoroo (*Potorous tridactylus*)
- Eastern Cave Bat (*Vespadelus troughtoni*).

Five species were assumed to be present within some parts of the disturbance footprint which are considered either inaccessible or having a high degree of health and safety risk to survey as per the standard survey guidelines:

- Glossy Black-Cockatoo (*Calyptorhynchus lathami*)
- Barking Owl (*Ninox connivens*)

[1] Unconfirmed by the herbarium.

- Powerful Owl (*Ninox strenua*)
- Common Planigale (*Planigale maculata*)
- Masked Owl (*Tyto novaehollandiae*).

These species total approximately 1% of total species credits and were not recorded elsewhere within the construction envelope. Thus, this approach is considered precautionary.

ES5 Groundwater dependent ecosystems

No obligate Groundwater dependent ecosystems are predicted to be impacted within the Project area. No ongoing drawdown is predicted within 40 m of facultative/opportunistic GDEs between the lower reservoir and Macleay River. A separate report covering GDE assessment can be found in Appendix I of the EIS.

ES6 Impact avoidance, minimisation and mitigation

A key focus of the Project has been to avoid and minimise impacts to biodiversity values identified during the field surveys. The Project has undergone significant steps to avoid, minimise and mitigate impacts to ensure impacts are avoided and minimised to the greatest extent possible, within the design and other limitations of the Project.

Avoidance consideration of options and development of the Project was informed by iterative environmental constraint assessment comprising both desktop and field survey. The Project was designed to avoid, where practical direct impacts to threatened flora species and critical habitat known to support threatened fauna species.

Minimisation and mitigation of impacts was also incorporated into the final design where components were moved away from more sensitive areas such as the Macleay River flood plain that was associated with EECs and habitat to support threatened species. All works will be undertaken in accordance with general mitigation measures to be identified in the construction environment management plan (CEMP).

A summary of measures undertaken to avoid, minimise and mitigate impacts is provided in Section 8.3.

ES7 Impact assessment

The Project will result in the following direct impacts:

- loss of 328 ha of native vegetation and threatened species habitat of varying condition
- loss of 7.43 ha of threatened ecological communities.

Seven serious and irreversible impacts (SAII) candidate species were recorded within the Project area. Of these, the Project is considered likely to have impacts on approximately 0.002 ha of critical habitat for the Brush-tailed Rock Wallaby. The Project will also impact on 0.74 ha of potential habitat for *Pultenaea Rubescens.* This equates to an impact on 5% of the known geographic range of this species. Two individuals of Wandering Pepper Cress will also be impacted, impacting 0.1% of the percentage of the NSW population. The other species will not be directly impacted by the Project.

Four prescribed impacts are expected to occur as a result of the Project. These are:

- impacts on cliffs and rocks
- movement corridors
- water quality, water bodies and hydrological processes

- vehicle strikes.

These prescribed impacts may impact threatened species. Mitigation measures to minimise these impacts have been included in this assessment.

ES8 Biodiversity offsets

The Project requires a total of 7,807 ecosystem credits to compensate for impact on native vegetation and species habitat. An additional 41, 575 species credit are required to offset the residual impacts of the Project on threatened species that were recorded or assumed present within the disturbance footprint. Species credits that required assumed presence comprises approximately 1% of the total species credit.

Offsets are not required for five vegetation zones (762_DNG Moderate, 762_Exotic Grassland, 780_Moderate, 842_DNG Moderate and 842_Exotic Grassland) as the vegetation integrity score of these zones falls below the offset threshold under the BAM. Additional areas which do not require offsetting include existing cleared access tracks and watercourses, both of which occur within the disturbance footprint.

ES9 Assessment of impacts under other relevant biodiversity legislation

ES9.1 Environment Protection and Biodiversity Conservation Act 1999

One EEC listed under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act), Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions, occurs within the disturbance footprint associated with PCT 762. Impacts will occur to 1.9 ha of this community. The EEC within the disturbance footprint is of moderate condition and as such the Project is unlikely to have a significant impact to the EEC.

Six flora species and eight fauna species listed under the EPBC Act were recorded within the Project area. Of these, the Project will have an adverse impact on critical habitat for Brush-tailed Rock-wallaby; however, it is unlikely to significantly impact the local population of species. The other species are unlikely to be significantly impact by the Project.

Four migratory species were also recorded within the construction envelope. The Project is unlikely to significantly impact these species.

ES9.2 Biosecurity Act 2015

Seven priority weeds of the North Coast region were recorded in the construction envelope. One species, Tropical Soda Apple (*Solanum viarum*), is listed as having a control order, where landowners are required to notify the local control authority.

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1 Introduction

1.1 The Project

OMPS Pty Ltd (OMPS) is proposing to develop the Oven Mountain Pumped Hydro Energy Storage Project (the Project), an off-river pumped hydro energy storage system (referred to as the 'pumped hydro system') located approximately half-way between Kempsey and Armidale, adjacent to the Macleay River in northern NSW. The Project is located within the New England Renewable Energy Zone (REZ) and the Armidale Regional Local Government Area (LGA), proximate to its border with Kempsey Shire LGA.

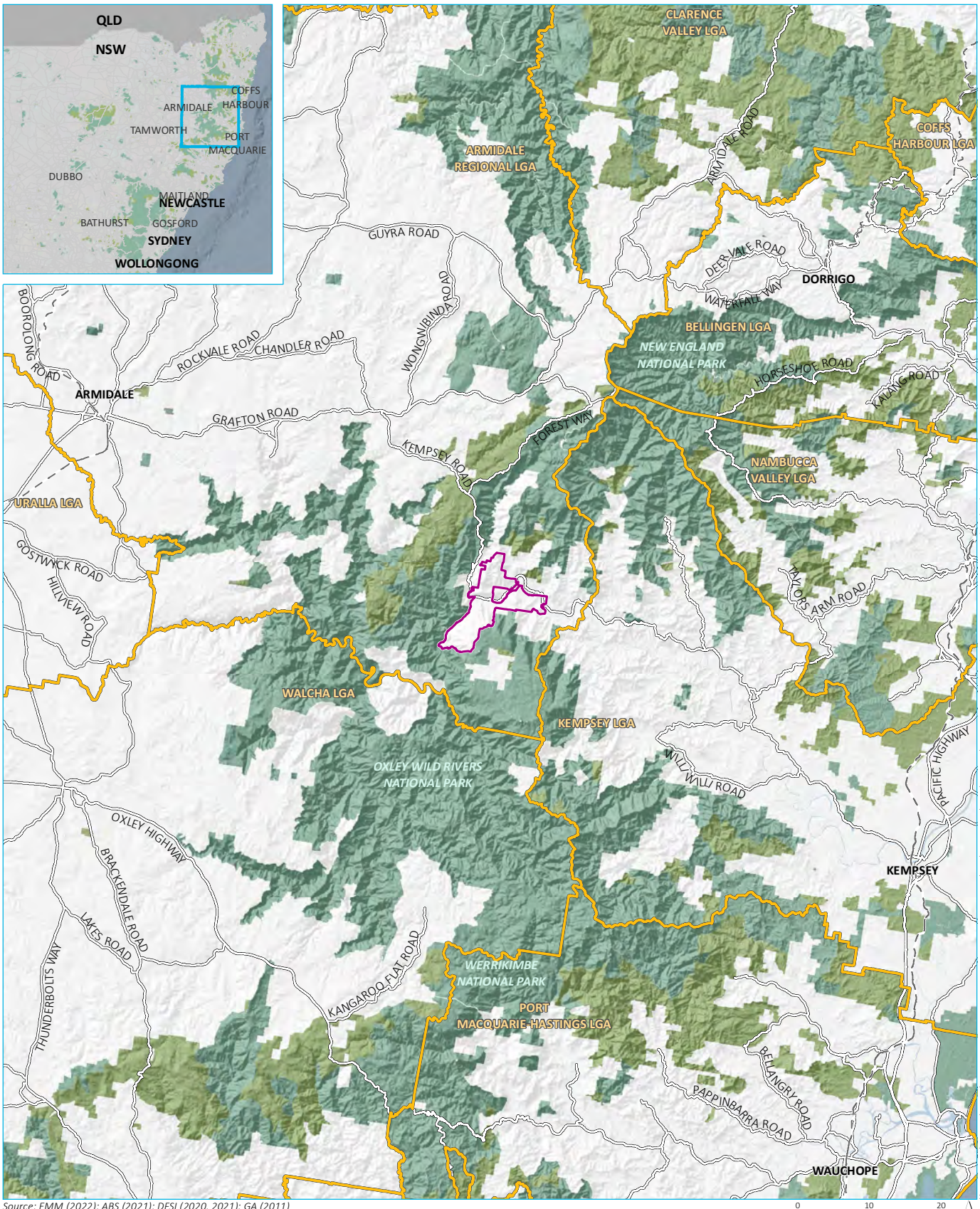
Figure 1.1 and Figure 1.2 provide the regional and local context of the Project respectively.

At a basic level, the Project will consist of upper and lower water reservoirs and an underground waterway connecting them via a hydro-electric power station. The Project will utilise the highly favourable natural terrain of the site to allow electrical energy from the main grid to be stored by pumping water from the lower reservoir to the upper reservoir. Energy can then be generated when needed by allowing water to flow back down to the lower dam and reservoir via the hydro-electric power station, effectively enabling the Project to act as a large battery.

The Project has been declared by the New South Wales (NSW) Government to be critical State significant infrastructure (CSSI) under the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). Infrastructure projects are declared to be CSSI if, in the opinion of the NSW Minister for Planning, they are essential to the State for economic, environmental, or social reasons. By providing up to 900 megawatts (MW) of electricity generating capacity, the Project will aid in the transition of the National Electricity Market (NEM) towards cleaner, more reliable and affordable electricity. It will also provide between 8 and 12 hours of dispatchable energy at full generation to be stored and made available to the NEM through the New England REZ. The expected operational lifespan of the Project is in excess of 100 years.

1.2 Proponent

OMPS Pty Ltd (ABN 22 160 259 174) is developing the Project and is located at 2/28 Clyde Street, Kempsey NSW 2440.



Source: EMM (2022); ABS (2021); DFSI (2020, 2021); GA (2011)

0 10 20 km

GDA 1994 MGA Zone 56

N

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KEY

- Project area
- Rail line
- Major road
- Named waterbody
- Local government area
- NPWS reserve
- State forest

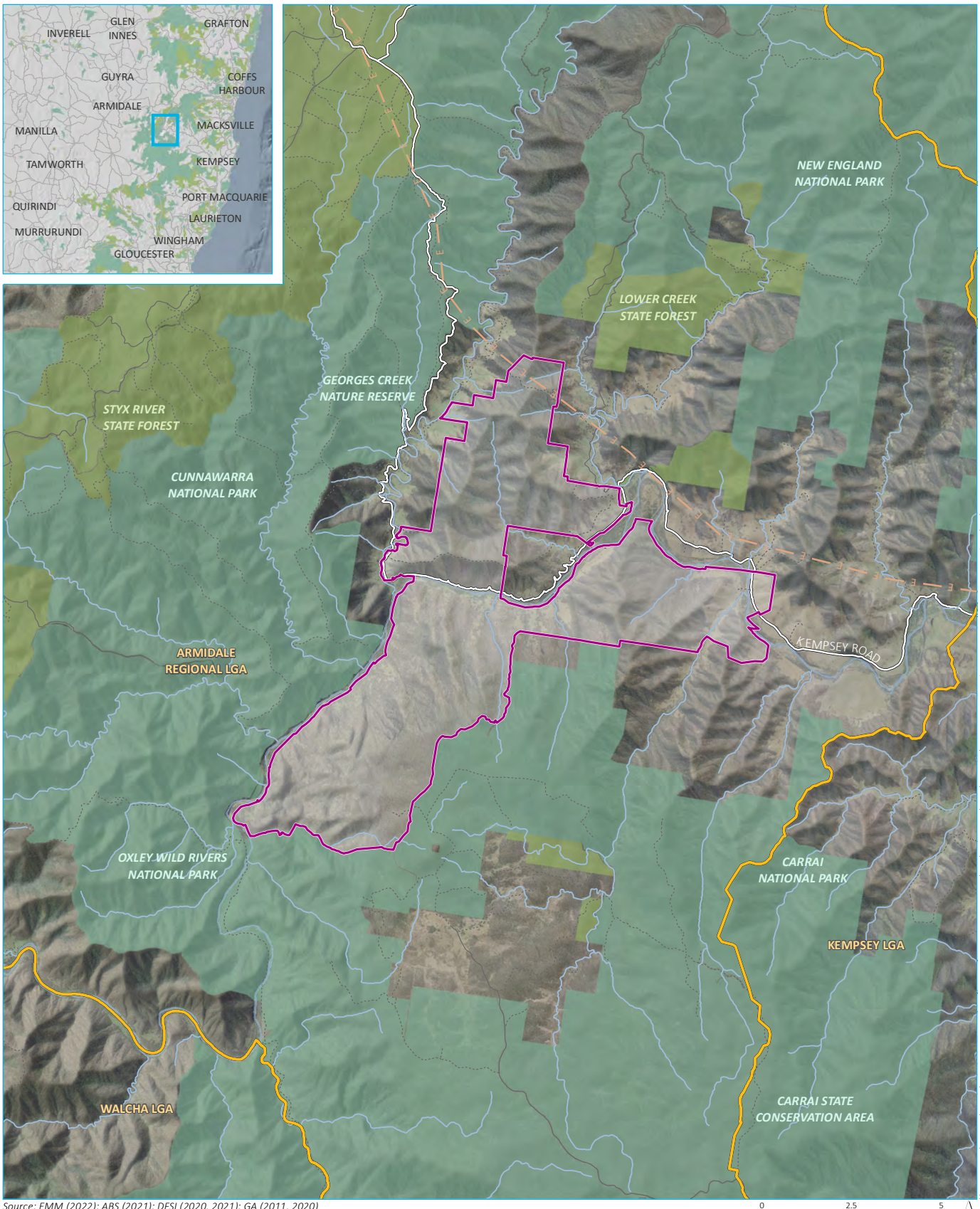
INSET KEY

- Major road
- NPWS reserve
- State forest

Regional setting

Oven Mountain Pumped Hydro Energy Storage Project
Biodiversity development assessment report
OMPS Pty Ltd
Figure 1.1

EMM creating opportunities



Source: EMM (2022); ABS (2021); DFSI (2020, 2021); GA (2011, 2020)

0 2.5 5 km

GDA 1994 MGA Zone 56

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KEY

- Project area
- Existing transmission line
- Major road
- Minor road
- Vehicular track
- Named watercourse
- Named waterbody
- Local government area
- NPWS reserve
- State forest

INSET KEY

- Major road
- NPWS reserve
- State forest

The Project area – local context

Oven Mountain Pumped Hydro Energy Storage Project
Biodiversity development assessment report
OMPS Pty Ltd
Figure 1.2

EMM creating opportunities

1.3 Purpose of this report

This Biodiversity Development Assessment Report (BDAR) is an appendix to the Project's environmental impact statement (EIS) and should be read in conjunction with it. The BDAR documents the terrestrial biodiversity assessment methods and results, the initiatives built into the project design to avoid and minimise associated impacts to terrestrial biodiversity, and the mitigation, and management measures, including offset requirements, proposed to address any unavoidable residual impacts.

The specific objectives of this assessment are to:

- describe biodiversity values of the Project area
- assess the likelihood that threatened species and communities (threatened biodiversity) listed under the NSW *Biodiversity Conservation Act 2016* (BC Act) and the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) could occur in the disturbance footprint
- document the strategies implemented to avoid and/or minimise impacts of the Project on threatened biodiversity
- assess residual threatened biodiversity impacts, after avoidance and minimisation strategies have been implemented
- provide environmental safeguards to mitigate threatened biodiversity impacts during construction and operation
- describe the offsets and other compensatory measures that are appropriate for the Project.

This BDAR has been prepared in accordance with the Biodiversity Assessment Method (BAM) (DPIE 2020a).

1.4 Assessment guidelines and requirements

This BDAR has also been prepared to address the Secretary's Environmental Assessment Requirements (SEARs) issued by the former Department of Planning, Industry and Environment (DPIE) (now the NSW Department of Planning and Environment (DPE)) on 10 June 2022. To inform preparation of the SEARs, the Department invited relevant government agencies to advise on matters to be addressed in the EIS. These matters were taken into account by the Secretary for the Department when preparing the SEARs. Table 1.1 lists the matters relevant to this assessment and where they are addressed in the report.

Table 1.1 Relevant matters raised in SEARs

Terrestrial Biodiversity and Ecology Requirements	Sections where addressed
Key Matter – Biodiversity: • An assessment of the biodiversity impacts of the Project on terrestrial, aquatic and groundwater-dependent ecosystems, including listed Commonwealth and State threatened species and communities and listed Commonwealth migratory species, and impacts on National Parks and Reserves and World Heritage Areas), and Appendix A of the SEARs. • A strategy to offset the residual impacts of the Project on these ecosystems.	Assessment of biodiversity impacts is addressed in Chapter 8 with residual impacts outlined in Chapter 11. Assessment of aquatic biodiversity impacts is addressed in Appendix J in the EIS. Assessment of ground water dependent ecosystems is addressed in Appendix I in the EIS and summarised in Chapter 7. Assessment of impacts on National Parks and Reserves and World Heritage Areas is addressed in Appendix V of the EIS. A strategy to offset the residual impacts of the project is outlined in Chapter 12.
Impacts 10. The EIS must include an assessment of the relevant impacts of the action on the matters protected by the controlling provisions, including: i. a description and detailed assessment of the nature and extent of the likely direct, indirect and consequential impacts, including short term and long term relevant impacts ii. a statement whether any relevant impacts are likely to be unknown, unpredictable or irreversible iii. analysis of the significance of the relevant impacts iv. any technical data and other information used or needed to make a detailed assessment of the relevant impacts.	Assessment of biodiversity impacts is addressed in Sections 8.1 and 8.2.
Avoidance, mitigation and offsetting 11. For each of the relevant matters protected that are likely to be significantly impacted by the action, the EIS must provide information on proposed avoidance and mitigation measures to manage the relevant impacts of the action including: i. a description, and an assessment of the expected or predicted effectiveness of the mitigation measures ii. any statutory policy basis for the mitigation measures iii. the cost of the mitigation measures iv. an outline of an environmental management plan that sets out the framework for continuing management, mitigation and monitoring programs for the relevant impacts of the action, including any provisions for independent environmental auditing v. the name of the agency responsible for endorsing or approving each mitigation measure or monitoring program.	General avoidance and mitigation is detailed in Section 8.3. A strategy to offset the residual impacts of the project is outlined in Chapter 12.
12. Where a significant residual adverse impact to a relevant protected matter is considered likely, the EIS must provide information on the proposed offset strategy, including discussion of the conservation benefit associated with the proposed offset strategy.	Residual impacts are outlined in Chapter 11. The significance of these impacts are assessed in Section 13.1. A strategy to offset the residual impacts of the project, including significant residual adverse impacts to Matters of National Environmental Significance (MNES) listed under the EPBC Act, is outlined in Chapter 12.

Table 1.1 Relevant matters raised in SEARs

Terrestrial Biodiversity and Ecology Requirements	Sections where addressed
13. For each of the relevant matters likely to be impacted by the action the EIS must provide reference to, and consideration of, relevant Commonwealth guidelines and policy statements including any: i. conservation advice or recovery plan for the species or community ii. relevant threat abatement plan for the species or community iii. wildlife conservation plan for the species iv. any strategic assessment.	Addressed in Section 13.1
Assessment Requirements 14. The EIS must identify each EPBC Act listed threatened species and community and migratory species likely to be impacted by the action. For any species and communities that are likely to be impacted, the proponent must provide a description of the nature, quantum and consequences of the impacts. For species and communities potentially located in the Project area or in the vicinity that are not likely to be impacted, provide evidence why they are not likely to be impacted.	Addressed in Section 13.1
15. Further analysis of the impacts of the 2019–2020 bushfires on EPBC Act listed threatened species and communities should be undertaken during the assessment. Further assessment will determine whether the remaining habitat within the proposed action area is of substantially greater importance to the survival of the listed threatened species following the fires and/or whether the population of the species in the area is considered an important population. This information, once obtained, can be considered when determining avoidance, mitigation and offset measures for these species.	Addressed in Section 6.3.5 and Section 13.1.2
16. For each of the EPBC Act listed threatened species and ecological communities and migratory species likely to be impacted by the proposed action the EIS must provide a separate: i. Description of the habitat (including identification and mapping of suitable breeding habitat, suitable foraging habitat, important populations and habitat critical for survival), with consideration of, and reference to, any relevant Commonwealth guidelines and policy statements including listing advice, conservation advice and recovery plans. ii. Details of the scope, timing and methodology for studies or surveys used and how they are consistent with (or justification for divergence from) published Australian Government guidelines and policy statements. iii. Description of the relevant impacts of the action having regard to the full national extent of the species or community's range. iv. Description of the specific proposed avoidance and mitigation measures to deal with relevant impacts of the action. v. Identification of significant residual adverse impacts likely to occur after the proposed activities to avoid and mitigate all impacts are taken into account. vi. A description of any offsets proposed to address residual adverse significant impacts and how these offsets will be established. vii. Details of how the current published NSW Biodiversity Assessment Method (BAM) has been applied in accordance with the objects of the EPBC Act to offset significant residual adverse impacts. viii. Details of the offset package to compensate for significant residual impacts including details of the credit profiles required to offset the action in accordance with the BAM and/or mapping and descriptions of the extent and condition of the relevant habitat and/or threatened communities occurring on proposed offset sites.	i Is addressed in Section 13.1. ii Is addressed in Section 6.3.3. iii Is addressed in Chapter 8. iv Is addressed in Section 8.3. v Is addressed in Chapter 12. vi Is addressed in Chapter 12. vii Is addressed in Chapter 12. viii Is addressed in Chapter 12.

Table 1.1 Relevant matters raised in SEARs

Terrestrial Biodiversity and Ecology Requirements	Sections where addressed
17. Any significant residual impacts not addressed by the BAM may need to be addressed in accordance with the EPBC Act 1999 Environmental Offset Policy. http://www.environment.gov.au/epbc/publications/epbc-act-environmental-offsets-policy	Addressed in Section 13.1

This assessment also considers relevant governmental assessment requirements, guidelines and policies, and was prepared in consultation with the relevant government agencies.

1.5 Other relevant reports

This BDAR has been prepared with reference to other technical reports that were compiled as part of the EIS. The other relevant reports referenced in this BDAR are listed below:

- Aquatic Ecology Assessment (EMM 2022a) – appended to the EIS
- Groundwater Assessment (EMM 2022b) – appended to the EIS
- Noise and Vibration Impact Assessment (EMM 2022c) – appended to the EIS
- Soils and Land Capability Assessment (EMM, 2022d) – appended to the EIS
- Traffic Impact Assessment (EMM 2022e) – appended to the EIS
- Surface Water Assessment (EMM 2022f) – appended to the EIS
- Groundwater Dependent Ecosystems (EMM 2023) – appended to the EIS.

1.5.1 Other information sources

The main sources of pre-existing data used to inform this assessment, including databases, spatial datasets and previous reports are listed below.

i Publications and databases

In order to provide context for the Project, data about flora and fauna species, populations, communities and habitats from the locality were obtained from the following databases:

- NSW BioNet (Department of Planning, and Environment; DPE):
  - BioNet Atlas – threatened species records
  - BioNet Threatened Biodiversity Data Collection
  - BioNet Vegetation Classification database – Plant Community Types (PCTs)
- NSW Threatened biodiversity profile search (DPE)
- Protected Matters Search Tool (PMST) (Department of Climate Change, Energy, the Environment and Water; DCCEEW)

- Commonwealth Species Profile and Threats Database (DCCEEW)
- Directory of Important Wetlands: Nationally Important Wetlands (DCCEEW 2005)
- NSW Wetlands (DPIE 2018)
- Groundwater Dependent Ecosystems Atlas (Bureau of Meteorology (BoM))
- PlantNET (The NSW Plant Information Network System) (Royal Botanic Gardens and Domain Trust)
- Atlas of Living Australia (National Collaborative Research Infrastructure Strategy (NCRIS) and CSIRO)
- Google Earth aerial images for the Project area and locality.

ii Spatial data

Spatial data defining the disturbance footprint was obtained from OMPS. Base map data was obtained from the Department of Finance, Services and Innovation (DFSI) NSW databases, with cadastral data obtained from DFSI digital cadastral database. Mapping for stream orders was obtained from DPI.

The following spatial datasets were utilised during the development of this report:

- NSW State Vegetation Type Map (DPE, 2022a)
- Vegetation Map for the Northern Rivers CMA VIS_ID 524 (NRCMA, 2010)
- Mitchell Landscapes Version V3.1 (OEH 2016)
- Interim Biogeographic Regionalisation of Australia (IBRA) Version 7 (DCCEEW, 2017).

Mapping was undertaken using a hand-held GPS unit, Collector for ArcGIS™ and Survey123 for ArcGIS™ installed on mobile tablet computers and mobile phones, and aerial photo interpretation. Accuracy of GPS devices is generally ±5 m. Mapping has been produced using a Geographic Information System (ArcGIS 10.5).

1.6 Declarations

1.6.1 BAM contributors

The following key people contributed to this BDAR and the associated biodiversity assessment.

Table 1.2 Key personnel involved in preparing this BDAR

Name	Qualifications	Experience	Role
Nathan Garvey	BSc, GradDip (BioSci) BAM Accredited Assessor (BAAS17037)	22 years	Technical guidance and review
Jason Brown	BSc, Science (Env mgn/GeoSci) BAM Accredited Assessor (BAAS21017)	18 years	Lead author Field surveys
Ross Davey	BSc.	3 years	Field surveys Report preparation

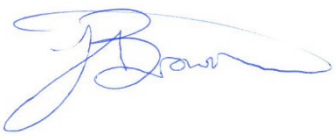
Table 1.2 Key personnel involved in preparing this BDAR

Name	Qualifications	Experience	Role
Paul Rossington	BSc, (Biology) BAM Accredited Assessor (BAAS18065)	18 years	Field surveys Technical guidance
Amy Rowles	Bachelor of Science Degree (Honours)(Ecology)	26 years	Ultrasonic bat call analysis
Nicole McVicar	Bachelor of Science Bush Regeneration Certificate II BAM Accredited Assessor (BAAS18077)	15 years	BAM Plot surveys Targeted flora surveys
Brendan Ryan	Bachelor of Science Degree (Ecology) Master of Science (Ecology) BAM Accredited Assessor	25 years	Bird surveys Mammal surveys Targeted flora surveys
Simone Popp	Bachelor of Science Degree 12 years handling dogs and caring for koalas 5 years Koala feed tree collection	12 years	Koala detection dog handler
Claire Chiotti	Bachelor of Animal Science Degree 18 years animal training and handling experience 5 years training and handling Koala detection dogs	18 years	Koala detection dog handler
Mark Phillips	Licence: ARN/REPL/AROC-835759	Flight hours: 800+ hours 200+ night hours for thermal Koala and fauna survey	Drone pilot for Koala, forest owls and Glossy Black-Cockatoos

1.6.2 Certification under clause 6.15 Biodiversity Conservation Act 2016

I certify that this report has been prepared based on the requirements of, and information provided under, the Biodiversity Assessment Method (DPIE 2020a) and Clause 6.15 of the BC Act.

Name: Jason Brown



Date: 8 September 2023

BAM Assessor Accreditation no: BAAS21017

1.6.3 Conflict of interest

As per the Accredited BAM Assessor Code of Conduct, BAM Accredited Assessors must not act in circumstances where there is actual, perceived, or potential conflict of interest. I declare that I have considered the circumstances and there is no actual, perceived, or potential conflict of interest. This declaration has been made in the interests of full disclosure to the decision-maker. Full disclosure has also been provided to the client.

2 The Project description

2.1 Project overview

The Project involves building two 'off river' water containment structures to create an upper and a lower reservoir (referred to as 'the upper dam and reservoir' and 'the lower dam and reservoir'), on an ephemeral tributary of the Macleay River. An underground hydro-electric power station complex will be connected to the reservoirs by infrastructure including a power waterway and tunnels. During operation, the water will enable the generation of electricity as it passes through the underground power station while moving from the upper to the lower reservoir, from where it is pumped back up via the same waterway in a 'closed-loop circuit'. The pumped hydro system will be connected to the existing transmission network via new overhead high voltage transmission lines.

A detailed description of the Project and its strategic context is provided in the Project's EIS which should be read in conjunction with this report.

An overview of the key components and elements are provided below.

2.2 Key Project design elements

Broadly, the Project has been categorised into three key components, which are further broken down into the Project's key elements in Table 2.1 and shown in Figure 2.1:

- pumped hydro-electric and generation works (PHGW) – including:
  - new upper and lower water storage dams and reservoirs
  - a new underground pumped hydro-electric power station and transformer hall
  - water tunnels, access tunnels, portals and adits
  - tailrace
  - intake and outlet structures
  - associated gates, shafts and screens
- transmission connection works – including:
  - new electricity transmission lines to connect the PHGW to the existing electricity transmission network (Line 965)
  - new electricity transmission infrastructure
  - a new substation
- ancillary development – including but not limited to:
  - access roads, tracks and bridge
  - on-site quarries and related infrastructure
  - utilities and communications infrastructure
  - construction pads containing assets such as workshops, concrete batching plants (CBPs), and offices

- laydown and storage areas
- construction accommodation
- pumping infrastructure
- operational facilities such as offices, and camps for staff
- construction and operational power supply.

Table 2.1 Key Project elements

Project element	Description
PHGW	
Underground power station complex	An underground pumped hydro-electric power station located below the upstream end of the pumped hydro system to optimise the hydraulic arrangement of the Project. The power station complex consists of: • two main caverns comprising: – the machine hall – the transformer hall • interconnecting tunnels, the transformer hall tunnel and isolated phase busbar (IPB) tunnels.
Dams and reservoirs	Two concrete faced rockfill dams (CFRD) and reservoirs, referred to as the upper dam and reservoir and lower dam and reservoir, with the following specifications:
	Upper dam and reservoir: • CFRD approximately 70 metres (m) high and 780 m long • reservoir covering a total area of approximately 20 hectares (ha) and an inundation extent of approximately 16.7 ha • reservoir height of 881 m Australian Height Datum (AHD) at full supply level (FSL) and 830 m AHD at minimum operating level (MOL) • total reservoir storage capacity of around 5.1 gigalitres (GL) at FSL.
	Lower dam and reservoir: • CFRD approximately 70 m high and 280 m long • reservoir covering a total area of approximately 24.7 ha and an inundation extent of approximately 21.6 ha • reservoir height of 250 m AHD at FSL, 215 m at MOL and 205 m AHD at lowest operating level (LOL) • total reservoir storage capacity of around 6.5 GL at FSL.
Water intake structures	Two intake structures, one at each reservoir, including: • a morning glory, vertical-type intake structure situated at the upper dam and reservoir • a lateral intake structure, with head gates and stoplog slots, and an intake channel, at the lower dam and reservoir.
Spillway	Two concrete lined spillway chutes, one for each of the upper and lower dams and reservoirs. Both spillway crests will comprise ungated ogee-shaped overflow weirs on the upstream ends of the spillway chutes.
Macleay River pump facility	A pump facility on the Macleay River, which will include duty and standby pumps for the initial fill and for periodic reservoir top ups.

Table 2.1 Key Project elements

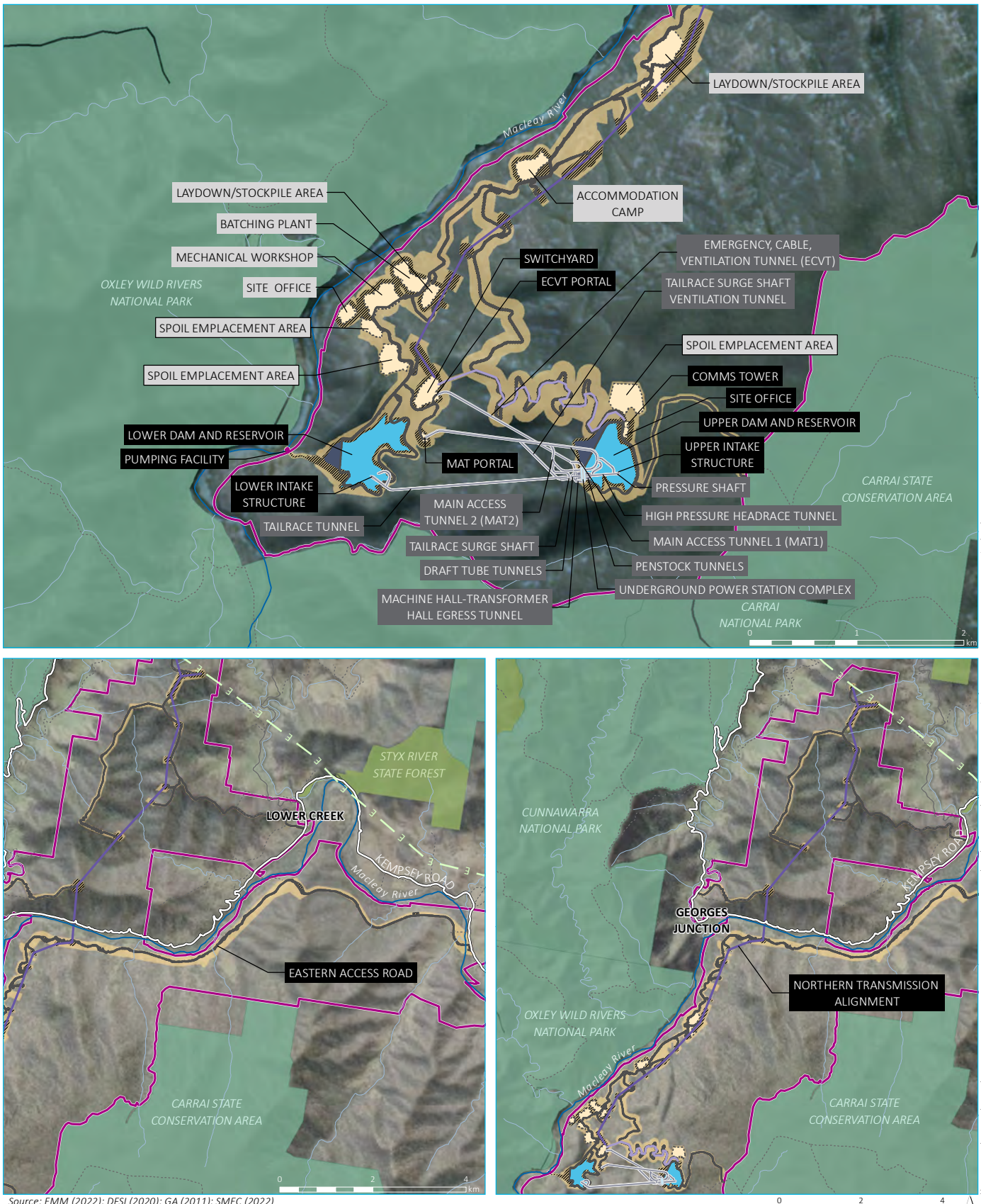
Project element	Description
Tunnels	Three main tunnels comprising: • two main access tunnels (MAT1 and MAT2) • the emergency, cable, ventilation tunnel (ECVT). The MAT1 and MAT2 will provide loop access to the power station complex from the MAT portal. The ECVT will provide services access and egress between the switchyard portal and the transformer hall. The ECVT portal will contain the station switchyard, control rooms, ventilation and firefighting equipment, with blast walls separating important equipment.
Power waterway	The power waterway will consist of: • a 660 m deep, 5.1 m diameter vertical pressure shaft • 250 m concrete and steel lined high-pressure headrace tunnel • three or more 80 m long penstock tunnels • three or more 120 m long draft tube tunnels • an approximately 1,825 m long concrete lined tailrace tunnel.
Transmission connection works	
Connection works	The connection works will consist of: • An approximately 15km long transmission alignment comprising, at a maximum, double circuit single tower 330 kV overhead infrastructure and single circuit single pole 132 kV overhead infrastructure connecting to TransGrid Line 965. • Up to 25 transmission tower sites (approximately 50 m x 50 m) containing the 132 kV and 330 kV infrastructure. • A transmission easement width of a maximum of approximately 105 m. Note: The upgrade of existing Line 965 will be the subject of a separate application.
Sub-station	Construction of a substation and associated connection infrastructure of up to 330 kV rating.
Switchyard	A high voltage connection linking the connection transmission lines to the cables exiting the underground power station complex. The outdoor air insulated switchyard will likely include: • switchgear and control room • cable potheads • disconnector/earth switches • capacitive voltage transformer (VT) • lightning protection • security fencing, lighting and surveillance • surge arrestor.
Ancillary development (construction and operation)	
Access roads, access tracks and bridge	A variety of road works to improve existing access, and construction of new permanent roads to enable construction access, temporary establishment and use of construction sites, and general access to the Project area including transmission line infrastructure.
	The proposed main access will be via the construction of a new unsealed two-lane access road located to the east of the site. The main access road will interface with the existing Kempsey-Armidale Road and will require the construction of one new single or two lane low-level bridge crossing over the Macleay River. A temporary bridge may be utilised prior to the construction of the permanent bridge.

Table 2.1 Key Project elements

Project element	Description
	There will be approximately 40 km of permanent roads connecting the dams, surface works, portals, transmission assets and spoil sites. Some of these roads are existing roads, however approximately 25 km will be newly constructed roads. The key road components include: • Main Access Road (approximately 4.7 km) • Eastern Access Road (up to approximately 11. 4 km) • Lower Dam Access Road (approximately 3.6 km) • Upper Dam Access Road (approximately 7.1 km) • access to portals and underground works • Upper Dam Emergency Egress Road (approximately 2.2 km). Access to the transmission infrastructure north of the Macleay River will be via two roads accessed from the Kempsey-Armidale Road. These two roads include the: • Northern Transmission Access Road (approximately 15 km) • Southern Transmission Access Road (approximately 2.3 km). To support access along the transmission line easement south of the Macleay River and to each of the tower sites, a network of interconnecting access and maintenance tracks will be constructed, to a large extent utilising existing access tracks.
Surface works pads and facilities	There are four main construction pads in addition to surface portals which will be used temporarily during construction for different services (workers camp, construction site offices, workshop area, and laydown storage).
	Construction works will require the establishment of the following ancillary support infrastructure and areas: • main accommodation camp(s), which will temporarily accommodate the majority of workers as required workers as required throughout the construction period • temporary or fly camps, which will temporarily accommodate the majority of workers as required throughout the construction period • two works areas including Works Area 1 and Works Area 2, which will contain ancillary facilities such as CBPs, mechanical and electrical workshops, a laboratory and various water treatment and wash areas • spoil emplacement areas • staging area • stockpiling areas • temporary site offices to be used during construction.
Communications	Communication infrastructure such as fibre optic cables are required for the operation of the Project and will be located in a mix of: • on an overhead line linking the upper and lower dams and reservoirs (in conjunction with the electrical line) • buried in road corridors. The communication network will also include a communications tower near the upper dam and reservoir.
Utilities during construction	• Construction water will be supplied either via groundwater bores, or via pumping of water from the Macleay River to support camp operations, the CBP, dust suppressions and other activities across the site. • Construction power will be supplied primarily by use of portable diesel generators and supported where possible by leveraging off existing electricity distribution infrastructure running through the generation site.
Utilities for operation	Alignment and length of utilities (electricity, water, etc) will be combined into a single corridor (total length of about 5.4 km).

Table 2.1 Key Project elements

Project element	Description
Water diversion and water treatment facilities	• Site drainage will include a combination of cross drainage culverts, drainage pits and pipe, open channels/open drains (vegetated, rock-lined or concrete), levees/bunds, and detention basins. • Various water treatment plants will be used for construction drainage and water treatment facilities – for the main accommodation camp, temporary or fly camps, CBP, tunnel, etc. • Specific discharge locations are planned for stormwater and surface water runoff.
Laydown/stockpile areas	Temporary laydown/stockpile areas will be utilised across the Project area, with a total allocated stockpile area of around 114,000 m^2.
Spoil emplacement areas	To accommodate spoil generated through excavation of the underground caverns and tunnels, three permanent spoil placement locations have been identified with a capacity to store around 2 million cubic metres (Mm^3) of material. Dead storage space within the reservoirs will also be used for spoil placement, with a capacity to store approximately 300,000–400,000 m^3.
Ancillary operational facilities	Primary operation of the Project can be undertaken remotely and will require minimal onsite operational staff, other than for maintenance activities. Operational facilities include maintenance housing, work area, car parking, workshop and storage, control room and switchgear, water treatment plant, office area, heating, ventilation and air conditioning (HVAC), backup generators and Macleay River pump facility.
Other	
Construction	• Construction duration of around four to five years. • Construction workforce of over 600 workers at construction peak.
Rehabilitation	Rehabilitation of areas disturbed during pre-construction and construction will be undertaken progressively during all stages and phases of the Project. Progressive rehabilitation will occur over about 60 ha including spoil emplacement areas and areas used for construction ancillary facilities no longer needed during operation. At the end of the Project's life, 192 ha in total will be rehabilitated to native ecosystem (including native vegetation and rock landscape). Approximately 138 ha will be retained permanently for the water storages and access roads, subject to agreement with relevant landowners/land managers.
Operation	• The Project will provide up to 900 MW of electricity generating capacity and up to between eight and twelve hours of energy storage at full generating capacity. • Maintenance and operational activities will include power station operations, infrastructure inspections, maintenance to assets, vegetation management, auditing and compliance and other activities. • It is expected that the operation of the new power station will require around 30–50 full-time workers, as well as additional contractors for regular and ad hoc maintenance and repairs.
Hours of operation	• Construction of the Project will be 24/7 and 365 days per year. • Operation of the Project will be 24/7 and 365 days per year.
Project timeline	The Project will involve the construction and operational stages, and numerous phases which are outlined in the Project's EIS.
CIV	Estimated to be about $1.97 billion.



Source: EMM (2022); DFSI (2020); GA (2011); SMEC (2022)

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KEY

- Project area
- Disturbance footprint
- Construction envelope
- Surface works

Project operational elements

- Underground power station complex
- Power and communications lines
- Transmission overhead lines
- Tunnels, portals, intakes, shafts
- Permanent road
- Reservoir
- Dam wall

Existing environment

- Macleay River
- Watercourse/drainage line
- Kempsey-Armidale Road
- Vehicular track
- Existing transmission line
- NPWS reserve

Label format

- SURFACE PERMANENT INFRASTRUCTURE
- UNDERGROUND PERMANENT INFRASTRUCTURE
- TEMPORARY INFRASTRUCTURE
- PERMANENT SPOIL EMPLACEMENT

Key Project Elements

Oven Mountain Pumped Hydro Energy Storage Project
Biodiversity development assessment report
OMPS Pty Ltd
Figure 2.1

EMM creating opportunities

2.3 Project area terminology

Approval for the Project is being sought based on feasibility and concept designs, as is common for projects of this size and scale. To accommodate minor changes and amendments to the design as it progresses, a 'Project area', 'construction envelope', 'disturbance footprint' and 'operational footprint' approach is being adopted for the Project. This approach is aimed at ensuring environmental impacts are assessed as accurately as possible, whilst accounting for the current level of design and the likelihood of design refinements occurring as the Project progresses towards construction. The terms are explained below with the BDAR equivalent terms outlined in Table 2.2.

The *Project area* is the broader area within which the Project will be built and operated, and the extent within which direct impacts from the Project are anticipated. Importantly the Project area does not represent a footprint for the construction works, but rather indicates an area that was investigated during environmental assessments. The Project area has been further divided into different areas to facilitate the assessment of direct impacts from the Project.

The *construction envelope* represents the maximum extent of where disturbance may occur during the construction of the Project. To derive the construction envelope, buffers have been applied to the key Project elements and infrastructure. The buffers used to derive the final construction envelope area reflect the confidence around the current siting of the asset or infrastructure and the likelihood that some minor amendments may be required prior to commencing the construction works as a result of the detailed design. The construction envelope for the Project covers an area of around 780 ha.

Located entirely within the bounds of the construction envelope sits the *disturbance footprint*, a smaller area that has been derived directly from the current level of design. The disturbance footprint represents the physical disturbance that is expected as part of the construction works. As the design is refined, the final siting of the disturbance footprint can move within the construction envelope, subject to the recommended environmental management measures, and provided it does not exceed any limits in this BDAR or any conditions of approval. The disturbance footprint for the Project covers an area of around 330 ha.

Progressively and at the end of construction, temporary components that are required to support the construction of the Project will be rehabilitated and returned to a state representing their previous use. The exceptions to this are the areas required for the permanent operation of the Project, which would be retained (referred to as the *operational footprint*). The operational footprint of the Project covers an area of around 270 ha. Approximately 60 ha would be progressively rehabilitated during and following the completion of construction.

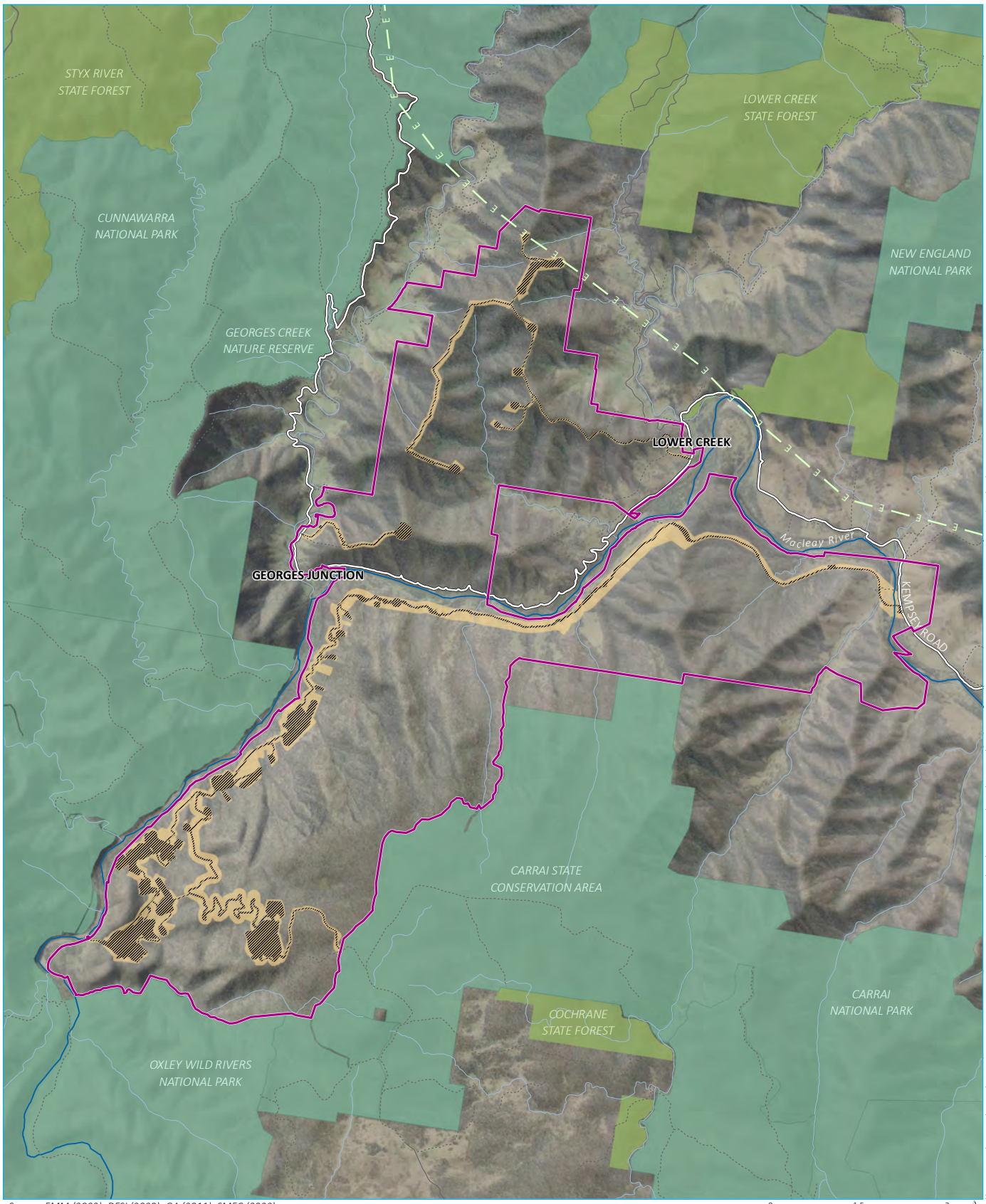
The Project area, construction envelope and disturbance footprint are shown in Figure 2.2. How these elements were used to inform this BDAR are summarised in Table 2.2.

Table 2.2 Project elements referred in this BDAR

Project elements	Definition
Buffer area (equivalent to the assessment area in the BAM)	1,500 m buffer from the footprint of the reservoirs construction and operation areas combined with a 500 m buffer on either side of the centreline of the transmission line and access footprints. Used to assess identify landscape features in accordance with Section 3 of the BAM (DPIE 2020a).
Project area	The broader area within which the Project will be built and operated. It also includes a larger area of investigation that was required for certain species outside of that described for the construction envelope, such as habitat supporting serious and irreversible impacts (SAII) candidate species.

Table 2.2 Project elements referred in this BDAR

Project elements	Definition
Construction envelope	The maximum extent of where disturbance may occur during the construction of the Project. It is also the area that was surveyed for ecological values. This included the disturbance footprint and additional adjacent lands to provide context for impacts. These additional lands included at least 10 m either side of the disturbance footprint in areas of restricted access (difficult terrain/access routes for the transmission line), to a minimum of 40 m either side of the disturbance footprint related to the generation and access road components. Investigations increased to up 100 m from the disturbance footprint if features were observed to contain important habitat such as the nests for birds of prey. All flora species which are candidates for serious and irreversible impacts (SAII) which fall within the construction envelope, and, where practical, threatened flora credit species, have exclusion areas within the construction envelope that ensure no additional direct impacts above what is assessed within the disturbance footprint.
Disturbance footprint (equivalent to subject land in the BAM)	Equivalent to the Project footprint described in the EIS, consisting of a combination of the construction and operational footprints. This is the area which will be directly impacted and which vegetation clearing will occur. The area (ha) of the disturbance footprint will not increase on final design. This is the area that was used to determine direct impacts to biodiversity values.
Generation site	The generation site is in the southern section of the Project area and is comprised of the two reservoirs, the associated construction and operational footprint, not including the access road and transmission line, see top inset in Figure 2.1.
Access road	The main access road runs from the Kempsey Road, in the eastern section of the Project area, roughly parallel to the Macleay River, and joins the generation area to the south. Labelled as Eastern Access Road in the bottom left inset in Figure 2.1.
Transmission Line	The transmission line is located to the north of the generation site. Labelled as Northern Transmission Alignment in the bottom right inset in Figure 2.1.



\\emmsvr1\emm3\2021\210465 - OMPS EIS - Generation Component\GIS\02_Maps_EIS_ACHA\ACHA004_ProjectAreaOverview_20221108_01.mxd 19/12/2022

Source: EMM (2022); DFSI (2020); GA (2011); SMEC (2022)

0 1.5 3 km

GDA 1994 MGA Zone 56

N

KEY

- Project area
- Disturbance footprint
- Construction envelope

Existing environment

- Macleay River
- Watercourse/drainage line
- Kempsey-Armidale Road
- Minor road
- Vehicular track
- Existing transmission line

- NPWS reserve
- State forest

Project areas overview

Oven Mountain Pumped Hydro Energy Storage Project
Biodiversity development assessment report
OMPS Pty Ltd
Figure 2.2

EMM creating opportunities

3 Legislative context

This chapter provides a brief outline of the key biodiversity legislation and government policy considered in this assessment.

3.1 Commonwealth

3.1.1 Environmental Protection and Biodiversity Conservation Act 1999

The EPBC Act provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities, heritage places and water resources which are defined as MNES under the EPBC Act. These are:

- world heritage properties
- places listed on the National Heritage Register
- Ramsar wetlands of international significance
- threatened flora and fauna species and ecological communities
- migratory species
- Commonwealth marine areas
- the Great Barrier Reef Marine Park
- nuclear actions (including uranium mining)
- water resources, in relation to coal seam gas or large coal mining development.

Under the EPBC Act, an action that may have a significant impact on a MNES is referred to DCCEEW for determination as to whether or not it is a controlled action. If deemed a controlled action, the Project is assessed under the EPBC Act and a decision made as to whether or not to grant approval. A 'controlled action' can only proceed with the approval of the Commonwealth Minister for the Environment.

On 1 February 2021, the delegate for the Minister determined that OMPS was a controlled action under Section 75 of the EPBC Act (EPBC 2020/8850). The EPBC Act controlling provisions for the proposed actions are:

- listed threatened species and communities (Section 18 and Section 18A)
- World Heritage properties (Section 12 and Section 15A)
- National Heritage places (Sections 15B and 15C).

On 23 December 2022, the application to vary the proposal was agreed by the delegate for the Minister. This variation included the access road and transmission line into the Project.

The Project will be assessed in accordance with the bilateral assessment agreement between the Commonwealth and NSW.

3.2 State

3.2.1 Environmental Planning and Assessment Act 1979

The NSW EP&A Act was enacted to encourage the consideration and management of impacts of proposed development or land-use changes on the environment and the community. The EP&A Act is administered by DPE.

The EP&A Act provides the overarching structure for planning in NSW; however, is supported by other statutory environmental planning instruments (EPIs) including State Environmental Planning Policies (SEPPs) and local environmental plans (LEPs).

The Project is declared to be CSSI under the EP&A Act. The Minister is the determining authority for this Project.

i State Environmental Planning Policy (State and Regional Development) 2011

The Project has been recognised to be critical to the state for economic, environmental and social reasons. For this reason, it was declared to be critical State significant infrastructure (CSSI) under the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) on 4 September 2021.

ii State Environmental Planning Policy (Biodiversity and Conservation) 2021

The State Environmental Planning Policy (Biodiversity and Conservation) 2021 (Biodiversity and Conservation SEPP) was ratified on 1 March 2022 and consolidates, transfers and repeals provisions of numerous SEPPs, which includes the former State Environmental Planning Policy (Koala Habitat Protection) 2020 (Koala SEPP 2020) and State Environmental Planning Policy (Koala Habitat Protection) 2021 (Koala SEPP 2021). No policy changes have been made to the Koala SEPPs.

The former Koala SEPP 2020 (now Chapter 3 of the Biodiversity and Conservation SEPP) and 2021 (now Chapter 4 of the Biodiversity and Conservation SEPP) together aim to encourage the proper conservation and management of areas of natural vegetation that provide habitat for Koalas to ensure a permanent free-living population over their present range and reverse the current trend of Koala population decline.

The two Chapters apply as follows:

1. In nine metropolitan Sydney local government areas (Blue Mountains, Campbelltown, Hawkesbury, Ku-Ring-Gai, Liverpool, Northern Beaches, Hornsby, Wollondilly) and the Central Coast LGA Chapter 4 of the Biodiversity and Conservation SEPP applies to all land use zones.
2. Outside of the areas identified above, Chapter 3 applies to all land zoned RU1, RU2, and RU3 (in 74 local government areas).
3. In the regional LGA's (in 74 local government areas) where land is zoned other than RU1, RU2, and RU3, Chapter 4 applies to all other landuse zones.

The Project is not a development application and does not require approval from Council, and thus consideration of Chapter 3 of the Biodiversity and Conservation SEPP is not triggered. Nonetheless, consideration has been given to the potential occurrence and impacts upon the Koala within this report.

3.2.2 Biodiversity Conservation Act 2016

The BC Act is the legislation responsible for the conservation of biodiversity in NSW through the protection of threatened flora and fauna species, populations and ecological communities. The BC Act, together with the Biodiversity Conservation Regulation 2017 (BC Regulation), established the Biodiversity Offsets Scheme (BOS).

The BOS includes establishment of the BAM, (DPIE 2020a) for use by accredited persons in biodiversity assessment under the scheme. The purpose of the BAM is to assess the impact of actions on threatened species and threatened ecological communities, and their habitats and determine offset requirements. For major projects, use of the BAM is mandatory, unless a BDAR waiver is granted.

The BAM sets out the requirements for a repeatable and transparent assessment of terrestrial biodiversity values on land in order to:

- identify the biodiversity values on land subject to proposed development area
- determine the impacts of a proposed development, following all measures to avoid, minimise and mitigate impacts
- quantify and describe the biodiversity credits required to offset the residual impacts of proposed development on biodiversity values.

This biodiversity assessment has been undertaken in accordance with the requirements of the BAM.

3.2.3 Fisheries Management Act 1994

The *Fisheries Management Act 1994* (FM Act) contains provisions for the conservation of fish stocks, key fish habitat, biodiversity, threatened species, populations and ecological communities. It regulates the conservation of fish, vegetation and some aquatic macroinvertebrates and the development and sharing of the fishery resources of NSW for present and future generations. The FM Act lists threatened species, populations and ecological communities, key threatening processes (KTPs) and declared critical habitat. Assessment guidelines to determine whether a significant impact is expected are detailed in Section 220ZZ and 220ZZA of the FM Act.

Another objective of the FM Act is to conserve key fish habitat (KFH). These are defined as aquatic habitats that are important to the sustainability of recreational and commercial fishing industries, the maintenance of fish populations generally and the survival and recovery of threatened aquatic species. KFH is defined in Section 3.2.1 and 3.2.2 of the *Policy and Guidelines for Fish Conservation and Management* (DPI 2013).

The impact of the Project on threatened aquatic species, populations, communities, habitats and KFH has been assessed separately and is presented in the aquatic ecology assessment (Stantec 2022).

3.2.4 Biosecurity Act 2015

The primary objective of the NSW *Biosecurity Act 2015* is to provide a framework for the prevention, elimination and minimisation of biosecurity risks posed by biosecurity matters, dealing with biosecurity matters, carriers and potential carriers, and other activities that involve biosecurity matters, carriers or potential carriers.

The Biosecurity Act stipulates management arrangements for weed biosecurity risks in NSW, with the aim to prevent, eliminate and minimise risks. Management arrangements include:

- any land managers and users of land have a responsibility for managing weed biosecurity risks that they know about or could reasonably be expected to know about
- applies to all land within NSW and all waters within the limits of the State
- local strategic weed management plans will provide guidance on the outcomes expected to discharge duty for the weeds in that plan.

The Northern Tablelands Regional Strategic Weed Management Plan 2017–2022 (NTLLS 2017) outlines how government, industry, and the community will share responsibility and work together to identify, minimise, respond to and manage weeds within the Northern Tablelands Region, which includes the Project area. The plan also supports regional implementation of the Biosecurity Act.

The provisions of the Biosecurity Act are discussed further in Section 13.2.

Stage 1 – Biodiversity assessment

4 Landscape features

The identification of landscape features was undertaken in accordance with Chapter 3 of the BAM (DPIE 2020a) and results are summarised within this chapter. The landscape features described in the following sections are summarised in Table 4.1 and shown on Figure 4.1 and Figure 4.2.

Table 4.1 Landscape feature

Landscape feature	Subject site
Method applied for site context components	1,500 m buffer of footprint of the reservoirs and construction & operation areas, combined with a 500 m buffer on either side of the centreline of the transmission line and access footprints.
Interim Biogeographic regionalisation of Australia (IBRA) bioregion	NSW North Coast
IBRA subregion	Macleay Gorges, Carrai Plateau and Macleay Hastings.
BioNet NSW landscapes (formerly Mitchell landscapes)	Macleay Escarpment Foothills, Macleay Channels and Floodplains and Tinebank Granites.
Rivers, streams and estuaries	Within the 1,500 m buffer of the reservoirs and construction and operation areas the following mapped segments of Strahler streams include: • 289 (1st order streams) • 145 (2nd order streams including Fingerboard Crossing Creek) • 17 (3rd order streams including Fingerboard Crossing Creek) • 5 (4th order streams) • 5 (6th order streams) • 1 (9th order – Macleay River). Within the 500 m buffer of the transmission line and access footprints the following mapped segments of Strahler streams include: • 331 (1st order streams) • 181 (2nd order streams) • 29 (3rd order streams) • 7 (4th order streams) • 4 (5th order streams including Carrolls Creek) • 4 (6th order streams) • 1 (9th order including Macleay River).
Wetlands	There are no nationally important wetlands within the Project area or buffer area.
Connectivity of different areas of habitat	The subject site is entirely surrounded by extensive areas of native forest; however, in some areas, canopy cover is discontinuous due to a history of clearing for agriculture and forestry operations.
Areas of geological significance and soil hazard	The Project area is part of the Macleay Gorges. The Project area and adjacent areas contain large outcrops with vertical surfaces and deep crevices.
Areas of outstanding biodiversity value	No areas of outstanding biodiversity value within the Project area.
Percent native vegetation cover	96.7%

4.1 Landscape features

4.1.1 Bioregions and landscape

The Project occurs within the NSW North Coast IBRA region. The generation site occurs within the Macleay Gorges and Carrai Plateau IBRA sub-regions and the access road and transmission line occur in the Macleay Gorges and Macleay Hastings IBRA sub-regions (Figure 4.2).

The buffer area occurs across four BioNet NSW Landscapes (formerly Mitchell Landscapes) (Figure 4.2):

- Apsley Meta-sediments
- Macleay Escarpment Foothills
- Manning – Macleay Channels and Floodplains
- Tinebank Granites.

The Project area occurs within the Macleay Escarpment Foothills BioNet NSW Landscape; this was the landscape used in this assessment.

4.1.2 Rivers, streams, estuaries and wetlands

The Project area is located within the catchment of the Macleay River. This catchment covers 11,452 square kilometres (km^2) and is bounded to the west by the Great Dividing Range and the inland catchments of the Gwydir and Namoi Rivers. To the south lie the coastal Hastings and Manning River catchments and to the north, the coastal Clarence, Bellinger and Nambucca River catchments.

The buffer area contains the following Strahler stream sections (Figure 4.2):

- Within the 1,500 m buffer the following mapped segments of Strahler streams include:
  - 289 (1^{st} order streams)
  - 145 (2^{nd} order streams including Fingerboard Crossing Creek)
  - 17 (3^{rd} order streams including Fingerboard Crossing Creek)
  - 5 (4^{th} order streams)
  - 5 (6^{th} order streams)
  - 1 (9^{th} order – Macleay River).
- Within the 500 m buffer the following mapped segments of Strahler streams include:
  - 331 (1^{st} order streams)
  - 181 (2^{nd} order streams)
  - 29 (3^{rd} order streams)
  - 7 (4^{th} order streams)
  - 4 (5^{th} order streams including Carrolls Creek)

- 4 (6th order streams)
- 1 (9th order including Macleay River).

The Macleay River is the key waterway within the Project area, occurring along the western boundary of the generation site (Figure 4.2). This permanent waterway has a substratum containing a mixture of rocky, cobble, pebble and sandy sections, with some in-stream vegetation. The riparian zone of the Macleay is largely vegetated along the riverbanks and surrounding foot-slopes, with minor clearing in some areas for agriculture and forestry.

The smaller creeks (5th–3rd order) are largely situated on bedrock with some pooling areas. Riparian vegetation is extensive and intact along the creek banks. The second and first order creeks and drainage lines are minor and comprise vegetated banks with rocky sections.

The buffer area or locality does not contain any nationally important wetlands, local wetlands, or Ramsar wetlands.

4.1.3 Connectivity

The subject site is surrounded by extensive areas of intact native forest (Figure 4.2); however, in some small areas, canopy cover is discontinuous due to a history of minor clearing for agriculture and forestry operations. The generation site is bounded by National Parks Estate to the east, west and south and considered largely intact native vegetation. The access road and transmission line are largely surrounded by intact native vegetation within private landholdings, with some small areas of historical clearing for grazing cattle and forestry operations, particularly on valley floors and lower slopes.

4.1.4 Areas of geological significance

The Project area spans the area from the Carrai Plateau, with maximum elevation of approximately 1,000 metres Australian Height Datum (mAHD) to the Macleay River floodplain.

The escarpment of the Carrai Plateau is dominated by a series of steep scarp slopes ranging between 20 and 30 degrees. It is across this focus area where the majority of the power generation will occur, aided by an average grade of 25%. Incised valleys (generally orientated east-west) separate spurs, extending along the escarpment to the plain. Similar topography is mirrored by the Macleay River in the western catchment focus area, rising to approximately 760 mAHD, undulating over a series of north-south orientated ridgelines.

The Project area and adjacent areas contain large outcrops with vertical surfaces and deep crevices. Substantial cliff lines run to the north and south out of the Project area. No significant cave systems were found in or near the Project area; however, the terrain is difficult to access, and inaccessible in some areas, and may have large crevices and small caves along the cliff lines. There are no karst areas (i.e. limestone cave systems) or sandstone cliff areas known from the locality that would be likely to contain substantial caves.

4.1.5 Areas of outstanding biodiversity value

There are no areas of outstanding biodiversity value, as declared by the NSW Minister for Environment and Heritage, within the Project area.

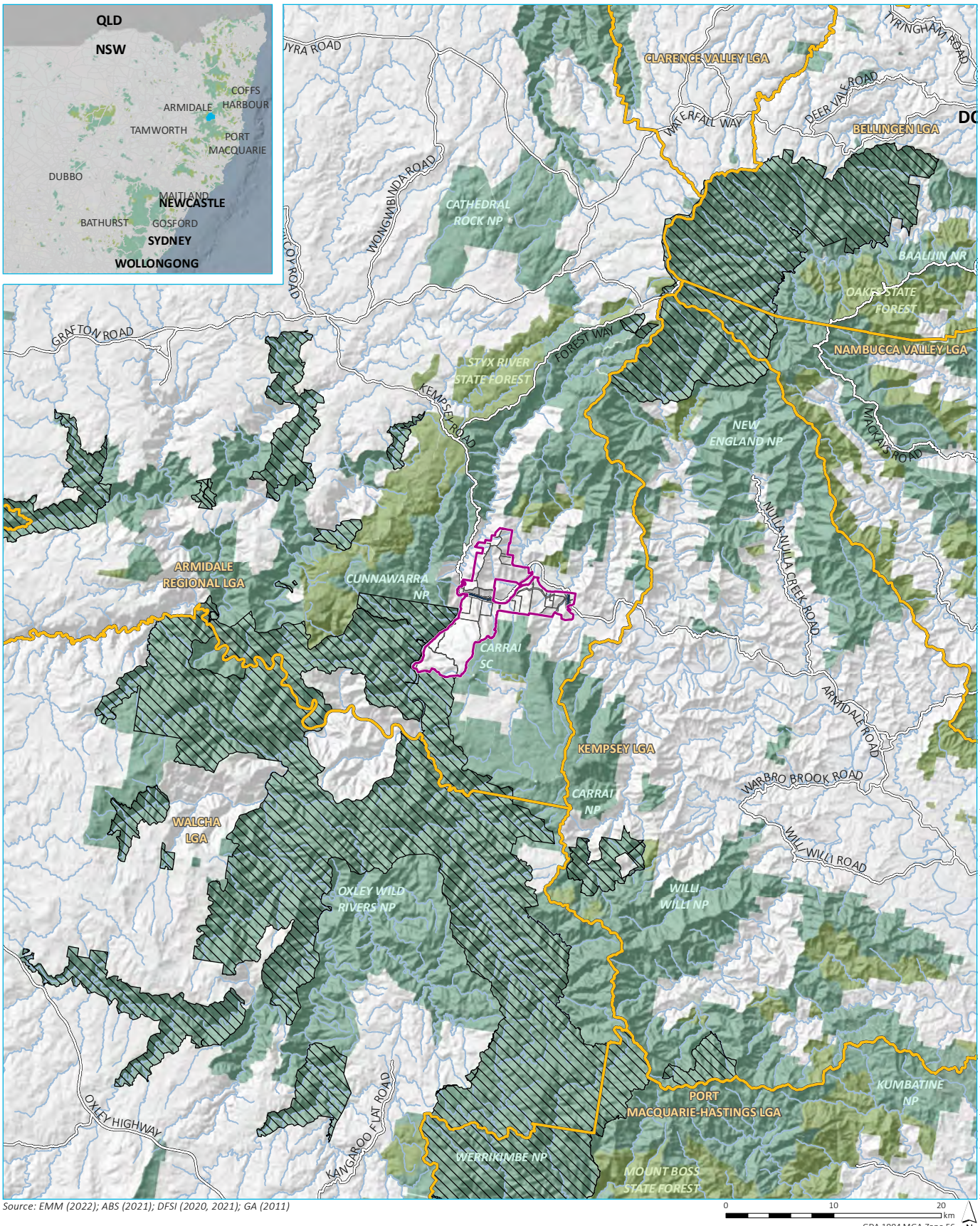
4.2 Assessment of site context

The Project area context has been assessed in accordance with the BAM (2020).

Mapping of native vegetation within buffer area was undertaken using vegetation mapping collected as a part of surveys, aerial photo interpretation and spatial data from State Vegetation Type Map: nth_rivers_CMA_VISmap_524. Mapping of native vegetation within the buffer areas is shown in Figure 4.2. The area of native vegetation by IBRA sub-regions is shown in Table 4.2.

Table 4.2 Percentage of native vegetation cover

IBRA subregion	Native vegetation in landscape assessment area (ha)	Landscape assessment area (ha)	Percentage of native vegetation in landscape assessment area
Macleay Gorges	4,176.26	4,176.26	100%
Carrai Plateau	961.78	964.65	99.7%
Macleay Hastings	2,403.38	2,654.19	90.6%
Total	7,541.42	7,795.10	96.7%



Source: EMM (2022); ABS (2021); DFSI (2020, 2021); GA (2011)

0 10 20 km

GDA 1994 MGA Zone 56

N

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KEY

- Project area
- Named watercourse
- Major road
- Cadastral boundary
- Wetland
- Named waterbody
- Local government area
- Gondwana Rainforest area
- NPWS reserve

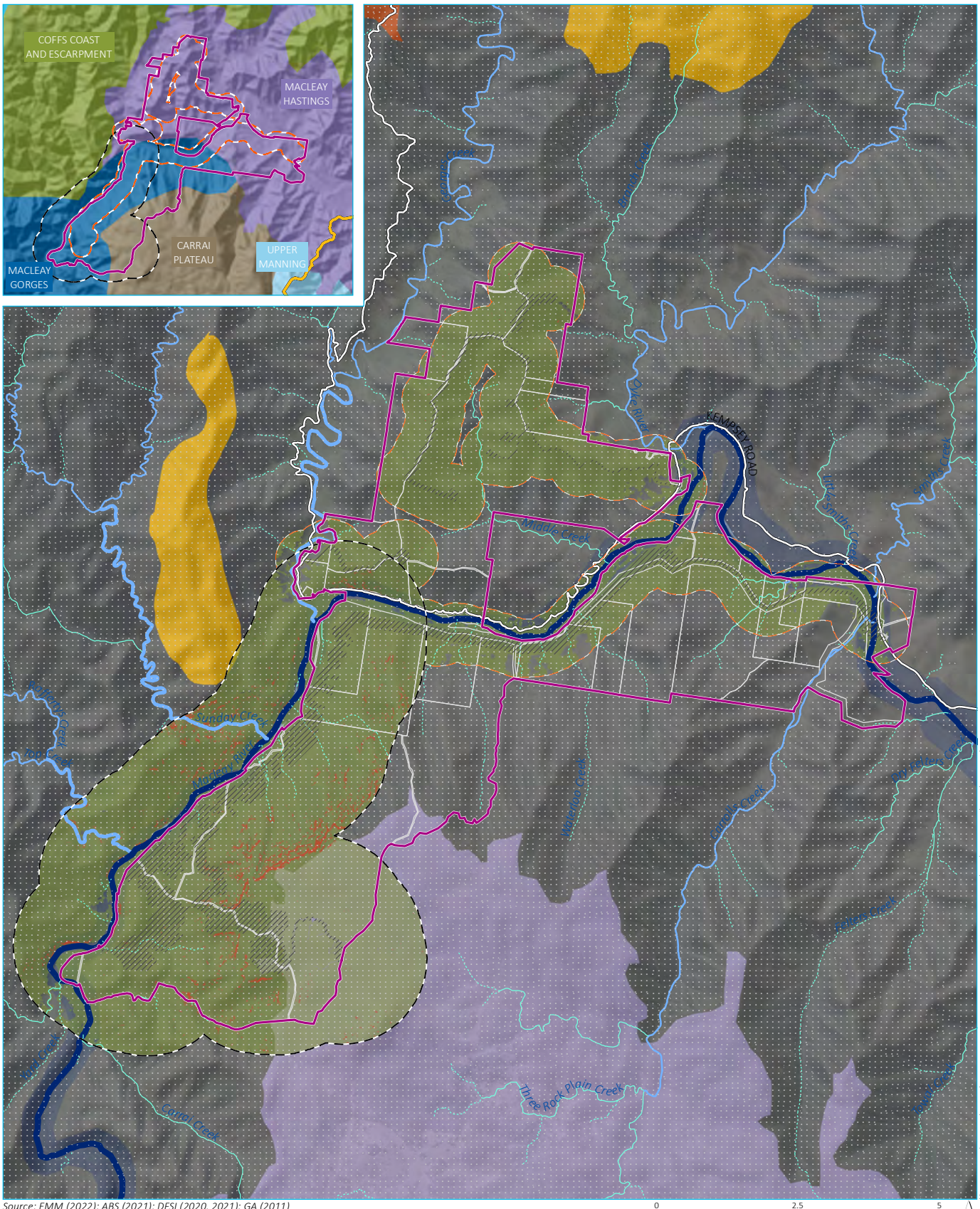
INSET KEY

- Major road
- NPWS reserve
- State forest

Site map

Oven Mountain Pumped Hydro Energy Storage Project
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Figure 4.1

EMM creating opportunities


COFFS COAST AND ESCARPMENT
MACLEAY HASTINGS
CARRAI PLATEAU
UPPER MANNING
MACLEAY GORGES
Oxley River
Dingo Creek
Civic River
KEMPSEY ROAD
Middle Creek
Hungry Creek
Spring Creek
Sundown Creek
Mullaway Creek
Jellore Creek
Dingo Creek
Mullaway Creek
Dingo Creek
Jellore Creek
Three Rock Plain Creek
Jellore Creek
Jellore Creek
Jellore

5 Native vegetation

5.1 Background review

A search was undertaken of the BioNet Vegetation Classification database and NSW SEED Data Sharing Portal to access existing vegetation mapping information within the Project area. Nine PCTs were mapped within the Project area by NRCMA (2010); these are listed in Table 5.1.

Table 5.1 Preliminary plant community types in the Project area

PCT ID	PCT name
761	Cabbage Gum – Broad-leaved Apple open forest of the eastern escarpment, NSW North Coast Bioregion and South Eastern Queensland Bioregion
868	Grey gum – stringybark open forest of the gorges of the NSW North Coast Bioregion and New England Tableland Bioregion
983	New England Blackbutt – stringybark grassy forest in the eastern New England Tableland Bioregion and NSW North Coast Bioregion
988	New England Blackbutt – Tallowwood moist shrubby forest of the escarpment ranges of the NSW North Coast Bioregion and New England Tableland Bioregion
993	New England Blackbutt grassy open forest of the eastern New England Tableland Bioregion
1106	River Oak riparian woodland of the NSW North Coast Bioregion and northern Sydney Basin Bioregion
1215	Spotted Gum – Grey Ironbark open forest of the Macleay Valley lowlands of the NSW North Coast Bioregion
1268	Tallowwood open forest of the coastal ranges of the NSW North Coast Bioregion
1287	Upland heath swamps of the New England Tableland Bioregion

5.2 Detailed vegetation mapping and habitat assessment

An assessment of the generation site was undertaken on 25 and 26 of February 2020 by NGH. Survey methods included a site walkover supported by drone and helicopter surveys. Rapid vegetation assessments (RVAs) were collected, identifying the dominant plant species at each site. The site inspection focused on dominant canopy species and mid-storey, where present; however, as the broader region had been subjected to impacts relating to bushfire of varying intensities, mid-storey and groundcover species were not readily identifiable.

Review of vegetation within the generation site was undertaken by EMM during the extensive surveys undertaken for the Project, including vegetation integrity surveys (see below). Assessment of the access road and transmission line was undertaken between 8 and 10 March and 6 and 9 April 2022 by EMM. Where there was some uncertainty about correct PCT alignment, or to justify PCT alignment, a series of RVAs were undertaken, with the three dominant species in the overstorey, mid-storey and groundcover recorded. Extrapolations were made based on the distribution of vegetation communities observed within accessible areas and from desktop assessment. Plant community distribution and condition data was collected in the field using GPS-enabled tablet computers using Collector for ArcGIS™.

PCTs were stratified into vegetation zones based on broad condition state using the definitions in Table 5.2. Vegetation zones are distinguished largely by presence or absence of woody native vegetation, tree canopy maturity and by native versus exotic species abundance and diversity.

Table 5.2 Definitions used in delineation of vegetation zones

Condition class	Description
High	Largely intact with all stratum present and minimal disturbance.
Moderate	Some elements or stratum missing, immature, or affected by the intrusion of exotic species.
Derived native grassland (DNG)	Tree stratum missing. Native vegetation restricted to groundcover. Some areas may have a sparse shrub layer.
Poor	Tree stratum present, but understorey vegetation is absent or degraded due to exotics species becoming established, vegetation being cleared, discarded building materials, rubbish and/or vehicles.
Dry	Drier species composition in PCTs associated with sclerophyll forests.
Rainforest (RF)	Rainforest remnants within the associated PCTs.
Exotic grassland (EG)	Dominated by non-native vegetation and/or pasture improvement. These areas were not assessed for ecosystem credits.
Unvegetated	Access tracks, stockpile areas, infrastructure. These areas were not assessed for ecosystem credits.

5.2.1 Vegetation integrity assessment

Following the stratification of vegetation zones within the Project area, native vegetation integrity was assessed using data obtained via a series of plots, as per the methodology outlined in Section 4.2.1, 4.3.3 and 4.3.4 of the BAM (DPIE 2020a). Plot data was collected from the construction envelope between 26–31 October and 16–20 November 2020 for the generation site by NGH. Additional plot data for the generation site was collected by EMM between 7–9 June 2022. Plot data for the access road and transmission line was collected between the 7–10 June and 21–25 June 2022. At each plot location the following was undertaken:

- one 20 x 20 m plot, for assessment of composition and structure
- one 20 x 50 m plot for assessment of function, including a series of five 1 x 1 m subplots to assess average leaf litter cover.

The assessment of composition and structure, based on a 20 x 20 m plot, recorded species name, stratum, growth form, cover and abundance rating for each species present within the plot. Cover (foliage cover) was estimated for all species rooted in or overhanging the plot, and recorded using decimals (if less than 1%, rounded to whole number (1–5%) or estimated to the nearest 5% (5–100%). Abundance was counted (up to 20) and estimated above 20, and recorded using the following intervals: 1, 2, 3, 4, 5, 10, 20, 50, 100, 500, 1,000, 1,500, 2,000 etc.

The assessment of function recorded the number of large trees, the presence of tree stem size class, tree regeneration, number of trees with hollows and length of fallen logs, as well as leaf litter cover within the 20 x 50 m plot and five 1 x 1 m subplots. The minimum number of plots and transects per vegetation zone was determined using Table 3 of the BAM (DPIE 2020a). Complied plot data and plot datasheets are in Appendix A.

The plot surveys were conducted prior to the final design of the Project. This was to inform the design and avoid and minimise impacts where possible (see Section 8.3). For this reason, some plots are located outside of, but within proximity to, the construction envelope. Despite falling outside of the final design of the construction envelope, these plots are representative and have been used to inform the stratification of management zones within the Project area and have been used to determine vegetation condition and offset requirements.

Surveys for flora and vegetation communities were completed under the authority of Scientific License (SL100409). A list of flora species was compiled for each plot and PCT. Records of all flora species will be submitted to BCS for incorporation into the Atlas of NSW Wildlife.

5.2.2 Application of Version 1.2 Benchmarks

On 6 September 2023, the BAM-C was updated to version 1.2 benchmarks. Prior to this, version 1.1. benchmarks were used. Version 1.1 benchmarks were used under a transitional arrangement for six months.

To be eligible to apply transitional arrangements to a BAM-C case, the case must:

- be commenced prior to the date the BAM-C is updated with Version 1.2 benchmarks
- modify all benchmarks in the entire proposal to Version 1.1 benchmarks
- finalise the BAM-C assessment prior to 2 August 2023
- submit the certified BDAR prior to 16 August 2023
- document the application of Version 1.1 benchmarks in the Biodiversity Assessment Report.

As the certified BDAR was not submitted prior to 16 August 2023, the BDAR was required to use version 1.2 benchmarks. This BDAR has been updated from Revision 3 to include updates to Version 1.2 benchmarks.

5.3 Results

5.3.1 Vegetation descriptions and environmental weeds

The vegetation within the Project area reflects past land uses and disturbances such as grazing, the 2019/2020 bushfires and floodplain inundation in areas adjacent to the Macleay River. Much of the vegetation within the construction envelope occurs as open, grassy Eucalypt forests with smaller wet sclerophyll forest areas influenced by surface water flows located on headwater tributaries. These are located throughout the Project area from higher to lower elevations and vegetation type varies according to landscape position. Some small rainforest remnants occur in protected areas such as gullies.

The vegetation in higher elevations consists of grassy open forests primarily dominated by New England Blackbutt (*Eucalyptus campanulata*) and Tallowwood (*Eucalyptus microcorys*) in the south and Spotted Gum (*Corymbia maculata*) and Thick-leaved Mahogany (*Eucalyptus carnea*) in the north. The understory vegetation structure changes from open grassy to shrubby in wetter and cooler microclimates within the higher forests. On the mid-slopes, the vegetation is comprised of grassy open forests where Small-fruited Grey Gum (*Eucalyptus propinqua*) and Broad-leaved Stringybark (*Eucalyptus caliginosa*) extend below the higher forests. Moving to the lower slopes and foothills, the Broad-leaved Stringybark (*Eucalyptus caliginosa*) continues to occur with the canopy species Forest Red Gum (*Eucalyptus tereticornis*), which is associated with the lower slopes of the Macleay River. The vegetation in the lower slopes and foothills is best described as dry open forest.

In the floodplains and foothills of the Project area, native and exotic grasslands also occur, and many are subject to current grazing practices. These grasslands primarily lack a mid- and canopy stratum and vary in species density and diversity. On the banks of the Macleay River, the vegetation is primarily dominated by River Oak (*Casuarina cunninghamiana*) and has been observed to be inundated by high river levels after rainfall events.

Much of the Project area remains intact with minimal weed disturbance; however, due to the alluvial influences of the Macleay River introducing exotic species from upstream and current disturbance practices, exotic species do occur, primarily in the lower elevations of the Project area. Exotic species occurrence is also associated with the existing access tracks for private and transmission line access. Of the exotic species recorded during surveys, 22 are high threat weeds and primarily include herbaceous groundcover and grasses.

5.3.2 Plant community types and vegetation zones

PCTs were identified through analysis of data collected during vegetation mapping surveys and were verified using floristic data collected during plot surveys. Ten PCTs were identified within the disturbance footprint. These PCTs are summarised in Table 5.3, shown in Figure 5.1.

Table 5.3 PCTs identified within the disturbance footprint

Plant community types	Vegetation formation	Vegetation Class	Percentage cleared (NSW)	Direct impacts (ha)
762 – Cabbage Gum open forest or woodland on flats of the North Coast	Grassy Woodlands	Coastal Valley Grassy Woodlands	70	1.5
780 – Coastal floodplain sedgelands, rushlands, and forblands of the North Coast	Forested Wetlands	Coastal Floodplain Wetlands	80	0.1
822 – Eurabbie tall open forest of the escarpment ranges of the NSW North Coast Bioregion	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Northern Escarpment Dry Sclerophyll Forests	0	11.1
842 – Forest Redgum – Broad-leaved Apple dry open forest of the gorges of NSW North Coast Bioregion	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Northern Gorge Dry Sclerophyll Forests	40	192.4
868 – Grey gum – stringybark open forest of the gorges of the NSW North Coast Bioregion and New England Tableland Bioregion	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Northern Gorge Dry Sclerophyll Forests	5	62.5
1106 – River Oak riparian woodland of the NSW North Coast Bioregion and northern Sydney Basin Bioregion	Forested Wetlands	Eastern Riverine Forests	90	1.3
1142 – Shatterwood – Giant Stinging Tree – Yellow Tulipwood dry rainforest of the NSW North Coast Bioregion and northern Sydney Basin Bioregion	Rainforests	Dry Rainforests	30	5.0
1215 – Spotted Gum – Grey Ironbark open forest of the Macleay Valley lowlands of the NSW North Coast Bioregion	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Hunter-Macleay Dry Sclerophyll Forests	35	52.9

Table 5.3 PCTs identified within the disturbance footprint

Plant community types	Vegetation formation	Vegetation Class	Percentage cleared (NSW)	Direct impacts (ha)
1268 – Tallowwood open forest of the coastal ranges of the NSW North Coast Bioregion	Wet Sclerophyll Forests (grassy sub-formation)	Northern Hinterland Wet Sclerophyll Forests	15	1.1
1287 – Upland heath swamps of the New England Tableland Bioregion	Freshwater Wetlands	Montane Bogs and Fens	30	0.03
Total				**327.9 ha**

Vegetation zones were delineated by the presence/absence of canopy and the condition of derived grasslands as discussed in Table 5.2. Most PCTs recorded within the disturbance footprint are represented by multiple vegetation zones. Details for each vegetation zone are summarised and shown in Table 5.4. Descriptions of the PCTs are presented in Table 5.4 to Table 5.13.

Table 5.4 Vegetation zones within the disturbance footprint

PCT ID	PCT name	Condition	Extent in direct impact area (ha)	Vegetation integrity score
762	Cabbage Gum open forest or woodland on flats of the North Coast	Moderate	0.5	63.1
762	Cabbage Gum open forest or woodland on flats of the North Coast	DNG Moderate	0.7	11.7
762	Cabbage Gum open forest or woodland on flats of the North Coast	Poor	0.3	23.3
762	Cabbage Gum open forest or woodland on flats of the North Coast	EG	0.4	1.9
780	Coastal floodplain sedgelands, rushlands, and forblands of the North Coast	Moderate	0.1	10.7
822	Eurabbie tall open forest of the escarpment ranges of the NSW North Coast Bioregion	High	11.1	75.1
842	Forest Redgum – Broad-leaved Apple dry open forest of the gorges of NSW North Coast Bioregion	High	149.0	73
842	Forest Redgum – Broad-leaved Apple dry open forest of the gorges of NSW North Coast Bioregion	DNG Moderate	35.2	12.1
842	Forest Redgum – Broad-leaved Apple dry open forest of the gorges of NSW North Coast Bioregion	Poor	1.5	48.8

Table 5.4 Vegetation zones within the disturbance footprint

PCT ID	PCT name	Condition	Extent in direct impact area (ha)	Vegetation integrity score
842	Forest Redgum – Broad-leaved Apple dry open forest of the gorges of NSW North Coast Bioregion	EG	6.7	0.6
868	Grey gum – stringybark open forest of the gorges of the NSW North Coast Bioregion and New England Tableland Bioregion	High	58.0	77.6
868	Grey gum – stringybark open forest of the gorges of the NSW North Coast Bioregion and New England Tableland Bioregion	Dry	4.4	72.2
1106	River Oak riparian woodland of the NSW North Coast Bioregion and northern Sydney Basin Bioregion	High	0.07	54.5
1106	River Oak riparian woodland of the NSW North Coast Bioregion and northern Sydney Basin Bioregion	Moderate	0.8	75.5
1106	River Oak riparian woodland of the NSW North Coast Bioregion and northern Sydney Basin Bioregion	Moderate RF	0.4	62.7
1142	Shatterwood – Giant Stinging Tree – Yellow Tulipwood dry rainforest of the NSW North Coast Bioregion and northern Sydney Basin Bioregion	Moderate	5.0	37.6
1215	Spotted Gum – Grey Ironbark open forest of the Macleay Valley lowlands of the NSW North Coast Bioregion	High	51.7	64.9
1215	Spotted Gum – Grey Ironbark open forest of the Macleay Valley lowlands of the NSW North Coast Bioregion	DNG Moderate	1.2	41
1268	Tallowwood open forest of the coastal ranges of the NSW North Coast Bioregion	High	1.1	72.7
1287	Upland heath swamps of the New England Tableland Bioregion	High	0.03	100

Table 5.5 PCT 762 – Cabbage Gum open forest or woodland on flats of the North Coast

Attribute	Description
PCT ID	762
Common name	Cabbage Gum open forest or woodland on flats of the North Coast
Vegetation class	Coastal Valley Grassy Woodlands
Extent within the disturbance footprint	1.5 hectares (ha), comprising: • Moderate: 0.5 ha • DNG Moderate: 0.2 ha • Poor: 0.3 ha • Exotic Grassland: 0.5 ha.
Survey effort	Additional plots are required within this PCT. These plots will be undertaken during Response to submissions (RtS) Plots: • DNG Moderate: NTL13 • Poor: NTL12 and EAR14 • Exotic Grassland: EAR05.
Description and condition	This PCT was identified within the lower elevations of the Project area associated with the floodplains and alluvial terraces of the Macleay River before a steeper break in slope to higher elevation areas. It occurs as intact forests and derived grasslands of varying condition. The majority of the PCT occurs in the north-east portion of the Project area along the eastern access road; however, small pockets also occur to the west and very southern tip of the Project area. Within the forested conditions of the PCT, mature Forest Red Gum (*Eucalyptus* tereticornis) is dominant with Grey Box (*Eucalyptus moluccana*) occurring at lower densities. Other canopy species which occur less often include Thin-leaved Stringybark (*Eucalyptus eugenioides*), Cabbage Gum (*Eucalyptus amplifolia*), Broad-leaved Apple (*Angophora subvelutina*) and Pink Bloodwood (*Corymbia intermedia*). A number of shrub species occur within this PCT and primarily include *Acacia* spp. in addition to Golden Rod (*Sida hackettiana*), Native Peach (*Trema tomentosa*), Cheese Tree (*Glochidion ferdinandi*) and Native Blackthorn (*Bursaria spinosa*). The groundcover shows low to high signs of disturbance due to current grazing and a moderate level of exotic species cover. Despite the weed encroachment in all vegetation zones, a number of native grasses persist. These include Purple Wiregrass (*Aristida ramosa*), Weeping Grass (*Microlaena stipoides*), Small-flowered Finger Grass (*Digitaria parviflora),* Kangaroo Grass (*Themeda triandra*), Lobed Bluegrass (*Bothriochloa biloba*), and Slender Rat's Tail Grass (*Sporobolus creber*). Native forbs and vines also occur within the PCT and include Spiny-headed Mat-rush (*Lomandra longifolia*), Kidney Weed (*Dichondra repens*), Bluebells (*Wahlenbergia* spp.), Dusky Coral Pea (*Kennedia rubicunda*), Scrambling Lily (*Geitonoplesium cymosum*) and Slender Tick-trefoil (*Desmodium varians*). Exotic species vary with condition, with the exotic grasses dominating the exotic grassland condition of the PCT and bordering the edges of the forested conditions. Bahia Grass (*Paspalum notatum*) dominates much of the groundcover whilst Lantana (*Lantana camara*) occurs within the mid-stratum. Other common exotic species include Fireweed (*Senecio madagascariensis*), White Passionflower (*Passiflora subpeltata*), Cat's Claw Creeper (*Dolichandra unguis-cati*) and Blackberry complex (*Rubus fruticosus* sp. agg).

Table 5.5 PCT 762 – Cabbage Gum open forest or woodland on flats of the North Coast

Attribute	Description
Condition description	The community has a moderate cover of exotic species throughout the PCT due to past and current disturbance associated with agricultural activities. **Moderate:** This vegetation zone has an intact canopy. However, the shrub and ground layer, while dominated by native species overall, contains substantial localised infestations of exotic shrubs and forbs interspersed with native species. **DNG Moderate:** This vegetation zone has had the canopy and mid layer removed, so that only a groundcover of predominantly native species remains. **Poor:** This vegetation zone has a sparse canopy, largely absent native shrub layer, and a ground cover dominated by exotics forbs and grasses. **Exotic Grassland:** This vegetation zone is dominated by exotic grasses and forbs. Native groundcover species may still be present albeit in small numbers.
Characteristic species for identification of PCT	The species described in the BioNet Vegetation Classification database for PCT 762 which also occur within the vegetation community in the construction envelope include: • Grey Box (*Eucalyptus moluccana*) • Forest Red Gum (*Eucalyptus tereticornis*) • Purple Wiregrass (*Aristida ramosa*) • Lobed Bluegrass (*Bothriochloa biloba*). The PCT description in the BioNet Vegetation Classification database has only six species associated with it.

Table 5.5 PCT 762 – Cabbage Gum open forest or woodland on flats of the North Coast

Attribute	Description
Justification of evidence used to identify the PCT	Plot data for this PCT was compared to data held in the VIS Classification with the three dominant species in the overstorey, midstratum and groundcover entered in to the PCT filter tool. The following PCTs were considered. • PCT 3427 was found to be inconsistent with the landscape position of the vegetation on site. The vegetation on site is located on a floodplain, while this PCT is located on hills fringing hinterland valleys. • PCT 3254 was found to be inconsistent with the landscape position of the vegetation on site. The vegetation on site is located on a floodplain, while this PCT is located on coastal, hinterland and escarpment ranges. These the vegetation on site was also found not to support species consistent with the PCT data. • PCT 3329 was found to be inconsistent with the landscape position of the vegetation on site. The vegetation on site is located on a floodplain, while this PCT is located on undulating hills in the hinterland valleys. • PCT 3240 was found to be inconsistent with the landscape position of the vegetation on site. The vegetation on site is located on a floodplain, while this PCT is located on escarpments. • PCT 3461 was found to be inconsistent with the landscape position of the vegetation on site. The vegetation on site is located on a floodplain, while this PCT is located on steep slopes. The vegetation on site was also found not to support species consistent with the PCT data. • PCT 3249 was found to be inconsistent with the landscape position of the vegetation on site. The vegetation on site is located on a floodplain, while this PCT is located on low hills. • PCT 3251 was found to be inconsistent with the landscape position of the vegetation on site. The vegetation on site is located on a floodplain, while this PCT is located on steep slopes and dissected valleys. The vegetation on site was also found not to support species consistent with the PCT data. • PCT 3170 was found to be inconsistent with the landscape position of the vegetation on site. The vegetation on site is located on a floodplain, while this PCT is located on escarpment ranges. The vegetation on site was also found not to support species consistent with the PCT data. • PCT 3241 was found to be inconsistent with the landscape position of the vegetation on site. The vegetation on site is located on a floodplain, while this PCT is located on slopes of the hinterland ranges. The vegetation on site was also found not to support species consistent with the PCT data. • PCT 3252 was found to be inconsistent with the landscape position of the vegetation on site. The vegetation on site is located on a floodplain, while this PCT is located on coastal hills and escarpment foothills and ranges. The vegetation on site was also found not to support species consistent with the PCT data. • PCT 4042 was found to support some species consistent with the vegetation on site. In particular, the vegetation description notes that *Eucalyptus amplifolia* and *Eucalyptus tereticornis* may be present in the tree canopy, which are two dominant species in the vegetation on site. The sub-canopy of the PCT (Melaleuca trees) is however, inconsistent with the plot the vegetation on site. The elevation of this PCT (typically below 50 metres ASL) is also inconsistent with the vegetation on site (~130 m ASL). This PCT is an offspring of PCT 762. • PCT 4046 was found not to support species consistent with the vegetation on site, in particular *Eucalyptus robusta* which is almost always present in this PCT. The landscape position is however suitable, occurring on floodplains and low rises. This PCT is an offspring of PCT 762. • PCT 761 was found to be mostly consistent with the species recorded in the vegetation on site, in particular Forest Red Gum (*Eucalyptus tereticornis)* and Grey Box (*Eucalyptus moluccana*). The mid-layer is however, inconsistent with the vegetation on site, with the only species detailed in the PCT being Broad-leaved Paperbark (Melaleuca quinquenervia). The PCT understory description comprised of Purple Wiregrass (*Aristida ramosa*) and Lobed Bluegrass (*Bothriochloa biloba*) is consistent with the vegetation on site. The landscape position of this PCT is also consistent with the vegetation on site, which is identified as poorly drained lower slopes, valley flats and creek banks. • PCT 762 was considered the best fit for the PCT recorded within the Project area. While no PCT from the new state vegetation type maps (DPE 2022) were exact matches for the PCT recorded within the Project area, PCT 4042 and 4046 were the closest match and contain the best match for the species composition as described for PCT 762.

Table 5.5 PCT 762 – Cabbage Gum open forest or woodland on flats of the North Coast

Attribute	Description
Status	**BC Act** PCT 762 is associated with Subtropical Coastal Floodplain Forest of the New South Wales North Coast Bioregion Endangered Ecological Community (EEC) listed under the BC Act. Vegetation zones Moderate, Poor, and DNG Moderate are considered to be part of this EEC as: • the site is located north of Port Stephens • the PCT occurs on inundated alluvial flats, drainage lines and river terraces associated with a coastal floodplain of NSW • the tree layer is made up of mixed Eucalypts and includes Forest Red Gum (*Eucalyptus tereticornis*) and Pink Bloodwood (*Corymbia intermedia*). • rainforest shrubs are scattered throughout areas of the PCT • there are low to no *Casuarina* spp, *Melaleuca* spp. or Swamp Mahogany (*Eucalyptus robusta*) (DECC 2007). The Exotic Grassland zone is not considered to represent this EEC as there is little to no native vegetation in the exotic grassland. This vegetation zone is highly degraded, and the canopy and shrub layer is absent. **EPBC Act** Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions threatened ecological community (TEC) was listed under the EPBC Act during the preparation this BDAR (5 October 2022). While this listing roughly aligns with the BC Act listed community, the Conservation Listing Advice (DCCEEW 2022) specifies additional criteria for listing under the EPBC Act. Part of vegetation zones Moderate and Poor, with a patch ≥0.5 ha, are considered to represent this EEC as they meet the key diagnostic characteristics in Section 2.1 and the minimum condition thresholds in Table 2 (DCCEEW 2022). See Section 13.1.2i for detailed assessment. The Exotic Grassland and DNG Moderate zones are not considered to represent this EEC as they do not meet the required canopy cover of at least 20% (DCCEEW 2022).
Estimate of percent cleared value of PCT across its distribution	70%
Patch size	Moderate: >100 ha DNG Moderate: >100 ha Poor: >100 ha

Table 5.5 PCT 762 – Cabbage Gum open forest or woodland on flats of the North Coast

Attribute	Description
Example photo	

Plate 5.1 PCT 762 BAM plot photo

Table 5.6 PCT 780 – Coastal floodplain sedgelands, rushlands, and forblands of the North Coast

Attribute	Description
PCT ID	780
Common name	Coastal floodplain sedgelands, rushlands, and forblands of the North Coast
Vegetation class	Coastal Floodplain Wetlands
Extent within the disturbance footprint	0.1 hectares of Moderate condition vegetation zone.
Survey effort	Plots: • Moderate: EAR27.

Table 5.6 PCT 780 – Coastal floodplain sedgelands, rushlands, and forblands of the North Coast

Attribute	Description
Description and condition	This PCT is located on the Eastern Access Road, on a terrace at the base of a hill. It lies in a depression in the land where aquatic and semi-aquatic understory species dominate. It is unclear whether this PCT is natural or artificially created. Aerial imagery from the 1950s shows it as being present, so a conservative approach, assuming it is a naturally occurring feature, has been taken. This PCT has no species in the canopy or shrub layer. The groundcover shows moderate signs of disturbance due to grazing and exotic species cover. Despite this, native grass, forbs, and fern species persist. Native grass species include Common Couch (*Cynodon dactylon*) and Two-colour Panic (*Panicum simile*). Native forbs include Princes Feathers (*Persicaria orientalis*) which dominates the plot with a cover of 30% and Lesser Joyweed (*Alternanthera denticulata*). Nardoo (*Marsilea* spp.), a type of fern, is the next dominant species after Princes Feathers (*Persicaria orientalis*) making up 5% of the cover of the plot. Exotic species make up just over 5% of the plot cover, with Kikuyu Grass (*Cenchrus clandestinus*) the dominant species. Other exotic species include Fleabane (*Conyza* spp.), Paspalum (*Paspalum dilatatum*), and Paddy's Lucerne (*Sida rhombifolia*).
Condition description	**Moderate**: This community is in moderate condition. This vegetation zone is comprised of an understory of aquatic/semi-aquatic species. The canopy and shrub layer are absent. There is only once occurrence of this zone within the construction envelope. There is a low diversity of native species.
Characteristic species for identification of PCT	The species described in the BioNet Vegetation Classification database for PCT 780 do not occur within the vegetation community. It is worth noting that only four species are associated with this PCT in the BioNet Vegetation Classification database. Species described in the offspring PCT (PCT 3967) however, do occur within the vegetation community in the construction envelope. These are: • Lesser Joyweed (*Alternanthera denticulata*) • Common Couch (*Cynodon dactylon*) • *Cyperus polystachyos* • *Juncus usitatus* • *Juncus* spp. (several Juncus spp. specified in the BioNet Vegetation Classification database) • Nardoo (*Marsilea* spp.) (*Marsilea mutica* is the species specified in the BioNet Vegetation Classification database) • *Schoenoplectus mucronatus*.
Justification of evidence used to identify the PCT	Plot data for this PCT was compared to data held in the VIS Classification with the three dominant species in the overstorey, midstratum and groundcover entered in to the PCT filter tool. The following PCTs were considered. • PCT 1227 was found to be inconsistent with the vegetation type on site. The vegetation on site is either a derived wetland community (i.e. originally containing a canopy and shrub layer) or it is a wetland that is in its original state and did not possess a canopy or midstory. PCT 1227 cannot occur as a derived community, and it does not fit the description of a treeless, shrubless wetland, so it is not consistent with the vegetation on site. • PCT 3020 was found to be inconsistent with the vegetation type on site. The vegetation class of this PCT is Eastern Riverine Forests, while the vegetation on site better reflects a wetland. PCT 3020 was also found not to support the species composition consistent with the vegetation on site. PCT 3020 consists of a mixed ground layer of vines, grasses, ferns and graminoids, with no single species abundant in all areas. The PCT also occasionally has *Lomandra hystrix* growing in the creek bed or along the banks, sometimes forming dense stands. The vegetation on site is inconsistent with this, showing that it was dominated by one species Princes Feathers (*Persicaria orientalis*) making up 30% of the plot cover. The plot undertaken in this PCT also does not include *Lomandra hystrix* as one of the recorded species. • PCTs 3959, 3960 and 3961 were found to be inconsistent with the landscape position of the vegetation on site. The vegetation on site is located in a low lying depression on a floodplain, while PCTs 3959, 3960 and 3961 are located in closed depressions on or behind deep coastal Quaternary sands. • PCT 3962 was found not to support species consistent with the vegetation on site. Common Reed (*Phragmites australis*) almost always forms a mid-dense to dense upper layer in this PCT, however it was not recorded in the plot data. The landscape position is however suitable, occurring on alluvial backswamps on coastal floodplains.

Table 5.6 PCT 780 – Coastal floodplain sedgelands, rushlands, and forblands of the North Coast

Attribute	Description
	• PCT 3963 was found to be inconsistent with the landscape position of the vegetation on site. The plot is located in a low lying depression on a floodplain, while PCT 3963 is located in estuarine environments. PCT 3963 is also within the Coastal Freshwater Lagoons vegetation class, which is not a suitable class for the vegetation and landscape position of the vegetation on site. • PCT 3966 was found to be inconsistent with the landscape position of the vegetation on site. The vegetation on site is located in a low lying depression on a floodplain, while PCT 3966 is located in shallow depressions or soaks on coastal Holocene foredunes. • PCT 3967 was found to have some consistency with the landscape position of the vegetation on site. The PCT description notes that this community is located on muddy backswamp deposits on wide river floodplains of the North Coast that are not dominated by Common Reed (*Phragmites australis*). It also notes that this community is usually found below 5m asl. The vegetation on site is located on a river floodplain and is not dominated by Common Reed (*Phragmites australis*). However, the vegetation on site is located at 145m asl. PCT 3967 was also found not to support the dominant species within the plot, the dominant species within the PCT being *Eleocharis equisetina*, Water Couch (*Paspalum distichum*), Water Primrose (*Ludwigia peploides* subsp. *montevidensis*), *Azolla pinnata*, and Slender Knotweed (*Persicaria decipiens*). However, three less dominant species were consistent with the plot data, these being *Cyperus polystachyos*, *Juncus usitatus*, and *Schoenoplectus mucronatus*. While this PCT is not a good fit for the plot data, it is the best available fit with the IBRA sub-region and has therefore been chosen as the PCT for the vegetation on site. • PCT 3968 was found to be inconsistent with the landscape position of the vegetation on site. The vegetation on site is located in a low lying depression on a floodplain, while the PCT is located in closed depressions on or behind deep coastal Quaternary sands. • PCT 3969 was found to be inconsistent with the landscape position of the vegetation on site. The vegetation on site is located in a low lying depression on a floodplain, while PCT 3969 is located in closed depressions with standing fresh water on or behind deep coastal Quaternary sands. • PCT 3998 was found to be inconsistent with the landscape position of the vegetation on site. The vegetation on site is located at an elevation of ~130 m ASL, while the elevation of this PCT rarely reaches higher than 20 m ASL. This PCT was also found not to support species consistent with the plot data. PCT 3998 consists of ground cover species such as Red-fruit Saw-sedge (*Gahnia sieberiana*) which is almost always present, *Empodisma minus* which is common and abundant, and Wiry Panic (*Entolasia stricta*), Kangaroo Grass (*Themeda triandra*), and Spiny-headed Mat-rush (*Lomandra longifolia*) which are very frequent. None of these species were recorded in the plot. • PCT 4001 was found to be inconsistent with the landscape position of the vegetation on site. The vegetation on site is located at an elevation of ~130 m ASL, while the elevation of this PCT is not recorded above 30 m ASL. This PCT was also found not to support species consistent with the plot data. PCT 4001 consists of ground cover species such as Tall Sedge (*Carex appressa*) which very frequently occurs and *Enydra woollsii*, *Persicaria strigosa* and Indian Pennywort (*Centella asiatica*) which commonly occur. None of these species were recorded in the plot. • PCT 4002 was found not to support the species consistent with the vegetation on site. PCT 4002 consists of ground cover species such as Wiry Panic (*Entolasia stricta*), Whiteroot (*Lobelia purpurascens*) and Blue Flax-lily (*Dianella caerulea*) which are almost always present, Kangaroo Grass (*Themeda triandra*) and Blady Grass (*Imperata cylindrica*), and a high cover of *Ptilothrix deusta*. None of these species were recorded in the plot. • PCT 4042 was found not to support the species consistent with the vegetation on site. PCT 4042 consists of ground cover species such as Kidney Weed (*Dichondra repens*), Whiteroot (*Lobelia purpurascens*), Blue Flax-lily (*Dianella caerulea*), Creeping Beard Grass (*Oplismenus imbecillis*) and Spiny-headed Mat-rush (*Lomandra longifolia*) that are very frequently present, and Bordered Panic (*Entolasia marginata*) and Blady Grass (*Imperata cylindrica*) which are common. None of these species were recorded in the plot. • PCT 4044 was found not to support the species consistent with the vegetation on site. PCT 4044 consists of ground cover species such as Tall Saw-sedge (*Gahnia clarkei*) with a sparse to mid-dense cover of Common Maidenhair (*Adiantum aethiopicum*) and Creeping Beard Grass (*Oplismenus imbecillis*). These species are very frequently present. Bordered Panic (*Entolasia marginata*), Scrambling Lily (*Geitonoplesium cymosum*), Sweet Morinda (*Gynochthodes jasminoides*) and Spiny-headed Mat-rush (*Lomandra longifolia*) are common. Rainbow Fern (*Calochlaena dubia*) and Bracken (*Pteridium esculentum*) are occasionally present. None of these species were recorded in the plot.

Table 5.6 PCT 780 – Coastal floodplain sedgelands, rushlands, and forblands of the North Coast

Attribute	Description
	• PCT 4077 was found to be inconsistent with the vegetation type within the vegetation on site. The vegetation class of this PCT is Eastern Riverine Forests, while the vegetation on site better reflects a wetland or wetland. PCT 4077 was also found not to support the species composition consistent with the vegetation on site. Common Maidenhair (*Adiantum aethiopicum*) is a common ground cover species in the PCT. This species was not recorded in the plot data. Furthermore, none of the PCT species listed in the fern, grass & grasslike, forb and other categories were recorded in the plot. • PCT 4079 was found to be inconsistent with the vegetation type on site. The vegetation class of this PCT is Eastern Riverine Forests, while the vegetation on site better reflects a wetland. PCT 4079 was also found not to support the species composition consistent with the vegetation on site. The ground layer of PCT 4079 is usually grassy, almost always including grasses Weeping Grass (*Microlaena stipoides*) and Australian Basket Grass (*Oplismenus aemulus*), forbs Stinging Nettle (*Urtica incisa*) and Swamp Dock (*Rumex brownii*), commonly with the sedge Tall Sedge (*Carex appressa*). None of these species were recorded in the plot. Based on the above, we believe PCT 3967 is the best fit for the vegetation within the Project area. As legacy PCTs were used in this assessment and PCT 3967 aligns with PCT 780, PCT 780 was used in this assessment. The other four legacy PCTs aligned with PCT 3967 were also considered and ruled out based on geographic constraints. PCTs 1737 and 1740 are not associated with any IBRA subregions within the project area, and PCTs 782 and 1738 are not associated with the IBRA region that the project is located in.
Status	**BC Act** PCT 780 is associated with Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions EEC listed under the BC Act. PCT 780 recorded during the assessment is considered to be part of the EEC as: • the PCT is located within the NSW North Coast bioregion • the PCT occurs on a coastal floodplain of NSW • it is consistent with the distribution description which notes that the TEC occurs on 'silts, muds or humic loams in depressions, flats, drainage lines, backswamps, lagoons and lakes associated with coastal floodplains' (OEH 2022a) • the PCT includes species from the species assemblage such as *Juncus usitatus* and *Schoenoplectus mucronatus.* PCT 780 is associated with Sydney Freshwater Wetlands in the Sydney Basin Bioregion EEC under the BC Act. PCT 780 recorded during the assessment was determined to be inconsistent with the EEC definitions under the BC Act due to its known and predicted distribution which is situated in the Sydney Basin bioregion, south of the Project area (OEH 2022b).
Estimate of percent cleared value of PCT across its distribution	80%
Patch size	Moderate: >100 ha.

Table 5.6 PCT 780 – Coastal floodplain sedgelands, rushlands, and forblands of the North Coast

Attribute	Description
Example photo	

Plate 5.2 PCT 780 BAM plot photo

Table 5.7 PCT 822 – Eurabbie tall open forest of the escarpment ranges of the NSW North Coast Bioregion

Attribute	Description
PCT ID	822
Common name	Eurabbie tall open forest of the escarpment ranges of the NSW North Coast Bioregion
Vegetation class	Northern Gorge Dry Sclerophyll Forests
Extent within the disturbance footprint	11.1 ha of High condition vegetation zone
Survey effort	Plots: • High: URAT 01, URAT 03, URAT 05, URAT 07, URAT02, URAT06, EE_OMPS_1, EE_OMPS_13, EE_OMPS_14, EE_OMPS_16, EE_OMPS_2.

Table 5.7 PCT 822 – Eurabbie tall open forest of the escarpment ranges of the NSW North Coast Bioregion

Attribute	Description
Description and condition	PCT 822 is found in the south-eastern corner of the construction envelope and comprises a relatively small portion of the vegetation on site. The PCT is associated with the Upper Reservoir, plateau and adjoined steep terrain. This PCT occurs as an open grassy forest with one vegetation condition (High) throughout the construction envelope. The dominant canopy species are Diehard Stringybark (*Eucalyptus cameronii*), Broad-leaved Stringybark (*Eucalyptus caliginosa*), New England Blackbutt (*Eucalyptus campanulata*) and Gum-topped Peppermint (*Eucalyptus andrewsii*). Forest Oak (*Allocasuarina torulosa*) and Tallowwood (*Eucalyptus microcorys*) are present in smaller numbers. Small patches of vegetation dominated by Mountain Blue Gum (*Eucalyptus deanei*) are also present within the PCT. Several shrub species occur within this PCT primarily including Prickly Shaggy Pea (*Podolobium ilicifolium*), Narrow-leaved Geebung (*Persoonia linearis*) and *Leucopogon lanceolatus.* The groundcover is largely free of exotics with native grasses and sedges dominating. Native grasses in high abundance within this PCT include Snowgrass (*Poa sieberiana*), Kangaroo Grass (*Themeda triandra*), and Tussock Grass (*Poa labillardierei var. labillardierei*). Dominant sedges include Spiny-headed Mat-rush (*Lomandra longifolia*), Blady Grass (*Imperata cylindrica*), and Blue Flax-lily (*Dianella caerulea*). Native vines also occur in high cover and abundance within this PCT. The two dominant vines are Dusky Coral Pea (*Kennedia rubicunda*) and False Sarsaparilla (*Hardenbergia violacea*).
Condition description	**High**: This community is in high condition with all layers intact. This vegetation zone has a high native species diversity in all vegetation layers. There is a low abundance and diversity of exotic forbs.
Characteristic species for identification of PCT	The species described in the BioNet Vegetation Classification database for PCT 822 which also occur within the vegetation community in the construction envelope include: • Diehard Stringybark (*Eucalyptus cameronii*) • Black She-Oak (*Allocasuarina littoralis*) • Coast Banksia (*Banksia integrifolia*) • *Juncus prismatocarpus* • Spiny-headed Mat-rush (*Lomandra longifolia*) • Snowgrass (*Poa sieberiana* var. *sieberiana*).

Table 5.7 PCT 822 – Eurabbie tall open forest of the escarpment ranges of the NSW North Coast Bioregion

Attribute	Description
Justification of evidence used to identify the PCT	Plot data for this PCT was compared to data held in the VIS Classification with the three dominant species in the overstorey, midstratum and groundcover entered into the PCT filter tool. Note that the term 'plot data' below is often interchangeable with 'vegetation on site'. The following PCTs were considered. • PCTs 3288 and 3254 were found not to support species consistent with the plot data and were rapidly discounted. • PCT 3240 has a canopy dominated by Stringybarks (commonly *Eucalyptus eugenioides)*, Apples (*Angophora floribunda, Angophora subvelutina*) and Red Gums (E*ucalyptus tereticornis, Eucalyptus blakelyi, Eucalyptus amplifo*lia). None of these species were observed in the plot data, with dominants species observed on site (Gum-topped Peppermint (*Eucalyptus andrewsii*) and Diehard Stringybark (*Eucalyptus cameronii*)) described as "occasionally present". The midstratum observed on site was consistent with the PCT description, including species such as Forest Oak (*Allocasuarina torulosa*) and Black She-Oak (*Allocasuarina littoralis*) but other species described as occurring in PCT 3240 were not present. PCT 3240 is described as having a mid-dense ground layer of graminoids, soft-leaved forbs and twiners; groundcover in plots consisted of a dense cover of grasses. Landscape position (mid to upper slopes up to an elevation of 790 metres ASL) was consistent; however, lithology of PCT 3240 (metasedimentary substrates) is not consistent with observations on site (granodiorite). Based on dominant overstorey species, midstratum and groundcover species being largely inconsistent and incorrect lithology, PCT 3240 was considered a poor fit. • PCT 3277 showed a strong match with a number of observations on site. The overstorey of PCT 3277 is described as being dominated by dominated by Diehard Stringybark (*Eucalyptus cameronii*). Plot data from site was consistent with this, as well as Gum-topped Peppermint (*Eucalyptus andrewsii*). PCT 3277 has a small tree layer of Black She-Oak (*Allocasuarina littoralis*) or scattered Coast Banksia (*Banksia integrifolia*) and a shrub layer of *Leucopogon lanceolatus* and Native Raspberry (*Rubus parvifolius*), with Narrow-leaved Geebung (*Persoonia linearis*); all these small tree and shrub species were observed within plots and found to be common. The ground layer of PCT 3277 is predominantly grassy and dense, and key diagnostic species from the PCT description that occur within the plots include Snowgrass (*Poa sieberiana*), Spiny-headed Mat-rush (*Lomandra longifolia*), Blady Grass (*Imperata cylindrica*) and Kangaroo Grass (*Themeda triandra*). The PCT is described as occurring on dry rises and north and west-facing slopes of the Carrai Plateau and surrounding tablelands; this is consistent with both landscape position and geographic location. Assessment of plot data against diagnostic species in VIS found that 47of the 284 descriptor species were observed within plots (16.5% match). • PCT 3501 has floristics and landscape position consistent with the plot data. However, it is not described as occurring in Macleay Gorges or any of the IBRA subregions within the Project area. Assessment of plot data against diagnostic species in VIS found that 52 of the 346 descriptor species were observed within plots (15%). PCT 3501 is a dry sclerophyll forest whereas vegetation was observed to be a wet sclerophyll forest. Based on the above, we believe PCT 3277 is the best fit for the vegetation within the Project area. As old PCTs were used and PCT 3277 aligns with PCT 822, PCT 822 was used in this assessment.
Status	Not listed
Estimate of percent cleared value of PCT across its distribution	0%
Patch size	High: >100 ha

Table 5.7 PCT 822 – Eurabbie tall open forest of the escarpment ranges of the NSW North Coast Bioregion

Attribute	Description
Example photo	

Plate 5.3 PCT 822 BAM plot photo

Table 5.8 PCT 842 – Forest Redgum – Broad-leaved Apple dry open forest of the gorges of NSW North Coast Bioregion

Attribute	Description
PCT ID	842
Common name	Forest Redgum – Broad-leaved Apple dry open forest of the gorges of NSW North Coast Bioregion
Vegetation class	Northern Gorge Dry Sclerophyll Forests
Extent within the disturbance footprint	192.4 ha, comprising: • High: 149.0 ha • DNG Moderate: 35.2 ha • Poor: 1.5 ha • Exotic Grassland: 6.7 ha.

Table 5.8 PCT 842 – Forest Redgum – Broad-leaved Apple dry open forest of the gorges of NSW North Coast Bioregion

Attribute	Description
Survey effort	**Plots:** • High: EAR03, EAR11, EAR18, EAR19, EAR23, EAR31, EAR32, EAR36, EAR39, EAR40, EAR46, EE_OMPS_10, EE_OMPS_11, EE_OMPS_9, LW_OMPS_1, LW_OMPS_11, LW_OMPS_16, LW_OMPS_21, LW_OMPS_3, LW_OMPS_37, LW_OMPS_38, LW_OMPS_39, LW_OMPS_7, LW_OMPS_8, MP_OMPS_100, MP_OMPS_12. • DNG Moderate: EAR08, EAR10, EAR17, EAR20, EAR24, EAR42, and EAR45, EAR47, LW_OMPS_19, LW_OMPS_5, LW_OMPS_6, LW_OMPS_9. • Poor: EAR02, EAR35, NTL02, NTL14. • Exotic Grassland: EAR01, EAR12, EAR13, EAR21, EAR33, EAR37, NTL01.
Description and condition	This PCT is one of the dominant PCTs within the construction envelope. This PCT occurs within the generation site and the eastern access road areas mid to lower slopes. The PCT is dominated by Forest Red Gum (*Eucalyptus tereticornis*) and Broad-leaved Stringybark (*Eucalyptus caliginosa*) within the forested vegetation condition. Grey Box (*Eucalyptus moluccana*) is also present, albeit in less abundance. There is a prevalent mid-stratum within this PCT, with a diverse range of Acacia species such as Coastal Wattle (*Acacia longifolia*), Long-leaf Wattle (*Acacia longifolia*) and Fringed Wattle (*Acacia fimbriata*). Other shrub species which occur include Dogwood (*Jacksonia scoparia*), Dwarf Cherry (*Exocarpos strictus*), Forest Oak (*Allocasuarina torulosa*), Coffee Bush (*Breynia oblongifolia*), *Phyllanthus* spp. And Cockspur Flower (*Plectranthus parviflorus*). The density and diversity of native groundcovers varies between vegetation zones, with an increasingly greater cover and abundance of native grasses and forbs within the High or DNG_moderate condition of the PCT. Exotic grasses dominate the remaining vegetation zones. Native grasses which occur in the High and DNG_moderate condition vegetation zones include Pitted Bluegrass (*Bothriochloa decipiens* var. *decipiens*), Bunch Speargrass (*Heteropogon contortus*), Wiry Panic (*Entolasia stricta*), Paddock Lovegrass (*Eragrostis leptostachya*), Barbed Wire Grass (*Cymbopogon refractus*), and Weeping Grass (*Microlaena stipoides*). Native herbaceous and forb species also occur in smaller densities and include Pink Tongues (*Rostellularia adscendens*), Kidney Weed (*Dichondra repens*), Wattle Matt-rush (*Lomandra filiformis*), Native Wandering Jew (*Commelina cyanea*); False Sarsaparilla (*Hardenbergia violacea*) and Rock Fern (*Cheilanthes sieberi*). Exotic species which occur within the ground stratum of Poor and EG condition classes include Bahia Grass (*Paspalum notatum*) and Kikuyu Grass (*Cenchrus clandestinus*), primarily in high densities within the Exotic grassland vegetation zone. Additional exotic species which occur in low densities within the PCT comprise Tropical Soda Apple (*Solanum viarum*), Parramatta Grass (*Sporobolus africanus*), Fireweed (*Senecio madagascariensis*), Lantana (*Lantana camara*) and Climbing Nightshade (*Solanum seaforthianum*).
Condition description	This community is mostly in High or DNG condition with a low diversity and abundance of exotic forbs and grasses. A powerline easement runs through almost the entirety of this PCT. **High:** This vegetation zone has a canopy, shrub and ground-layer that are largely intact and contain minimal exotic species, typically limited to the ground-layer. **DNG Moderate:** This vegetation zone is in moderate condition with a high diversity of native species dominant but exotic species quite abundant. However, overstorey species are lacking. **Poor:** This vegetation zone has a sparse canopy, and a shrub and ground layer containing substantial exotic shrubs and forbs interspersed with native species. **Exotic Grassland:** This vegetation zone has a high cover and abundance of exotic grass and forb species with minimal native species diversity.

Table 5.8 PCT 842 – Forest Redgum – Broad-leaved Apple dry open forest of the gorges of NSW North Coast Bioregion

Attribute	Description
Characteristic species for identification of PCT	The species described in the BioNet Vegetation Classification database for PCT 842 which also occur within the vegetation community in the construction envelope include: • Grey Box (*Eucalyptus moluccana*) • Forest Red Gum (*Eucalyptus* tereticornis) • Broad-leaved Stringybark (*Eucalyptus caliginosa*) • Dogwood (*Jacksonia scoparia*) • Rock Fern (*Cheilanthes sieberi*) • Barbed Wire Grass (*Cymbopogon refractus*) • Native Wandering Jew (*Commelina cyanea*) • Kidney Weed (*Dichondra repens*) • Pink Tongues (*Rostellularia adscendens*) • False Sarsaparilla (*Hardenbergia violacea*).
Justification of evidence used to identify the PCT	Plot data for this PCT was compared to data held in the VIS Classification with the three dominant species in the overstorey, midstratum and groundcover entered into the PCT filter tool. Note that the term 'plot data' below is often interchangeable with 'vegetation on site'. The following PCTs were considered. • PCT 3427 was found to be consistent with some species recorded in the plot data. The description for PCT 3427 notes that the canopy very frequently includes Ironbarks (*Eucalyptus crebra, Eucalyptus siderophloia*) with Pink Bloodwood (*Corymbia intermedia*), Forest Red Gum (*Eucalyptus tereticornis*) and Thick-leaved Mahogany (*Eucalyptus carnea*) commonly present. While the presence of Pink Bloodwood (*Corymbia intermedia*), Forest Red Gum (*Eucalyptus tereticornis*) and Thick-leaved Mahogany (*Eucalyptus carnea*) are consistent with the plot data, the presence of Ironbarks are not. • PCT 3329 was found to be consistent with species recorded in the plot data. In particular, the PCT description identifies Forest Red Gum (*Eucalyptus tereticornis*) as a dominant species and Thin-leaved Stringybark (*Eucalyptus eugenioides*) and Grey Box (*Eucalyptus moluccana*) as occasionally present in localised areas. The PCT occurs on undulating hills in hinterland valleys, one of which is the Macleay Valley, and is therefore consistent with the location of the plots. The geology associated with this PCT is typically fine-grained sediments, however it is known from acid volcanics or granite, which is consistent with the plot data (mostly granite substrate, with sedimentary substrate also present). • PCT 3240 was found to be inconsistent with the landscape position of the plots. This PCT is located on the escarpment of the Lower North Coast on mid to upper slopes, while the plots are located on foothills and mid to lower slopes. • PCT 3254 was found not to support species consistent with the plot data and was rapidly discounted. • PCT 3463 is located between the Mann and Maryland rivers which is not consistent with the location of the site. As this is outside of the Project area or vicinity it was rapidly discounted. This PCT is an offspring of PCT 842. • PCT 842 was found to be consistent with the species recorded in the plot data, in particular Forest Red Gum (*Eucalyptus tereticornis*), Grey Box (*Eucalyptus moluccana*), and Broad-leaved Stringybark (*Eucalyptus caliginosa*). The typical landscape position of the PCT is however, not consistent with the plot data. This PCT typically occurs on steep slopes in gorges while the plots are located on foothills and mid to lower slopes. • PCT 1227 was considered as it is a parent PCT of 3329. This PCT was found not to support species consistent with the plot data and was discounted. The canopy species and vegetation class of this PCT are not consistent with the plot data. This PCT is categorised as Coastal Swamp Forests vegetation class, while the plot data is representative of dry sclerophyll forest. • PCT 761 was considered as it is a parent PCT of 3329. This PCT was found to be consistent with some species recorded in the plot data, in particular Forest Red Gum (*Eucalyptus tereticornis*), Grey Box (*Eucalyptus moluccana*) and Pink Bloodwood (*Corymbia intermedia*). However, the geology detailed in the PCT description, sedimentary rocks, was found to be inconsistent with that of the plots. The geology of the area in which the plots where undertaken is mostly granite with some minor sedimentary influence. • PCT 842 was considered the best fit for the PCT recorded within the Project area. While PCT 3329 was also a good match from the new state vegetation type maps (DPE, 2022a), its parent PCTs were not. As such, PCT 842 was used in this assessment.

Table 5.8 **PCT 842 – Forest Redgum – Broad-leaved Apple dry open forest of the gorges of NSW North Coast Bioregion**

Attribute	Description
Status	Not listed
Estimate of percent cleared value of PCT across its distribution	40%
Patch size	• High: >100 ha • DNG Moderate: >100 ha • Poor: >100 ha.
Example photo	

Plate 5.4 **PCT 842 BAM plot photo**

Table 5.9 PCT 868 – Grey gum – stringybark open forest of the gorges of the NSW North Coast Bioregion and New England Tableland Bioregion

Attribute	Description
PCT ID	868
Common name	Grey gum – stringybark open forest of the gorges of the NSW North Coast Bioregion and New England Tableland Bioregion
Vegetation class	Northern Gorge Dry Sclerophyll Forests
Extent within the disturbance footprint	62.5 ha, comprising: • High: 58.1 ha • Dry: 4.4 ha.
Survey effort	**Plots:** • High: NTL03, NTL04, NTL05, NTL06, EE_OMPS_12, EE_OMPS_3, EE_OMPS_5, EE_OMPS_6, EE_OMPS_7, LW_OMPS_20, MP_OMPS_17, MP_OMPS_25. • Dry: EE_OMPS_15, EE_OMPS_4, and EE_OMPS_8.
Description and condition	This PCT is located along the high ridges and steep slopes within the construction envelope, primarily associated with the main generation area with some mapped along the transmission line. This PCT occurs as an open forest in two conditions (High and Dry) throughout the construction envelope. The canopy species which dominate this vegetation comprise Grey Gum (*Eucalyptus biturbinata*), Broad-leaved Stringybark (*Eucalyptus caliginosa*), Thick-leaved Mahogany (*Eucalyptus carnea*) and Tallowwood (*Eucalyptus microcorys*). Pink Bloodwood (*Corymbia intermedia*), Grey Box (*Eucalyptus moluccana*) and Forest Oak (*Allocasuarina torulosa*) also occur in lower densities. The shrub stratum can vary from dense to open and includes Fern-leaved Wattle (*Acacia filicifolia*), Hickory Wattle (*Acacia falcata*), *Cassinia compacta* and Australian Indigo (*Indigofera australis*). Within the understorey, a dense layer of natives generally occurs including species such as False Sarsaparilla (*Hardenbergia violacea*) and Blady Grass (*Imperata cylindrica*) that dominate, possibly as successional species following fire. Smaller occurrences of *Macrozamia montana*, Wattle Matt-rush (*Lomandra filiformis*), Blue Flax-lily (*Dianella caerulea*) and Ivy Goodenia (*Goodenia hederacea*) also occur within the understorey, whilst the native vine Wonga Wonga Vine (*Pandorea pandorana*) persists into the canopy. Common native grasses include Yadbila Grass (*Panicum queenslandicum*), Barbed Wire Grass (*Cymbopogon refractus*), Slender Rat's Tail Grass (*Sporobolus creber*) and Jericho Wiregrass (*Aristida jerichoensis*). These species co-occur with occasional high densities of the exotic *Digitaria ischaemum.* Other exotic species which occur within this PCT at low densities include White Passionflower (*Passiflora subpeltata*), Black-berry Nightshade (*Solanum nigrum*), Cobbler's Pegs (*Bidens pilosa*) and Fireweed (*Senecio madagascariensis*).
Condition description	This community is largely in High condition with all layers intact. **High**: This vegetation zone has a high native species diversity in all vegetation layers. Low number of exotic species are present, mostly as grasses and forbs. **Dry:** This vegetation zone has a high diversity of native species with all layers intact. The species are representative of a dry vegetation community, with a sparser vegetation cover than the High condition, and a north facing aspect. No exotic species were recorded in plots undertaken in this condition.

Table 5.9 PCT 868 – Grey gum – stringybark open forest of the gorges of the NSW North Coast Bioregion and New England Tableland Bioregion

Attribute	Description
Characteristic species for identification of PCT	The species described in the BioNet Vegetation Classification database for PCT 868 which also occur within the vegetation community in the construction envelope include: • Grey Gum (*Eucalyptus biturbinata*) • Broad-leaved Stringybark (*Eucalyptus caliginosa*) • Tallowwood (*Eucalyptus microcorys*) • Pink Bloodwood (*Corymbia intermedia*) • Forest Oak (*Allocasuarina torulosa*) • Blue Flax-lily (*Dianella caerulea*) • Blady Grass (*Imperata cylindrica*).
Justification of evidence used to identify the PCT	Plot data for this PCT was compared to data held in the VIS Classification with the three dominant species in the overstorey, midstratum and groundcover entered into the PCT filter tool. Note that the term 'plot data' below is often interchangeable with 'vegetation on site'. The following PCTs were considered. • PCTs 3427, 3170, 3277, 3461 and 3240 were found not to support species consistent with the plot data and were rapidly discounted. • PCT 3254 showed a strong match with the plot data, with the overstorey comprised of Tallowwood (*Eucalyptus microcorys*) and Thick-leaved Mahogany (*Eucalyptus carnea*) with midstratum containing Forest Oak (*Allocasuarina torulosa*) and Coffee Bush (*Breynia oblongifolia*). Ground cover was represented by Blady Grass (*Imperata cylindrica*) with high occurrences of Blue Flax-lily (*Dianella caerulea*) and *Poa* spp. This PCT aligns with conditions recorded within the Project area with the PCT occurring in mild, wet locations receiving 1,040–1,540 mm mean annual rainfall, at mid to high elevations of 250–830 m ASL. It occurs on clay-rich sedimentary or meta-sedimentary substrates, on ridges to lower slopes, and exposed to moderately sheltered sites. • PCT 3251 showed a strong match with the plot data, with a similar composition as PCT 3254 with midstratum also aligning by containing Hickory Wattle (*Acacia falcata*). PCT 3251 is widespread in the steep hinterland hills in the Macleay Valley in hot, wet environments with mean annual rainfall typically between 1,000–1,370 mm. This PCT commonly occurs on metasediments however is also known from volcanic or granitic substrates. Due to the altitude within the Project area, temperatures are considered milder which making PCT 3254 a closer fit. • PCT 3464 showed a good match to the plot data, with similar compositions to both PCT 3251 and 3254, however the PCT within the Project area lacked species such as Grey Gum (*Eucalyptus biturbinata*) and stringybark species that are associated with PCT 3464. Based on the above, we believe PCT 3254 is the best fit for the vegetation within the Project area. As legacy PCTs were used and PCT 3254 aligns with PCT 868, this PCT was used in this assessment.
Status	Not listed
Estimate of percent cleared value of PCT across its distribution	5%
Patch size	High: >100 ha Dry: >100 ha.

Table 5.9 PCT 868 – Grey gum – stringybark open forest of the gorges of the NSW North Coast Bioregion and New England Tableland Bioregion

Attribute	Description
Example photo	

Plate 5.5 PCT 868 BAM plot photo

Table 5.10 PCT 1106 – River Oak riparian woodland of the NSW North Coast Bioregion and northern Sydney Basin Bioregion

Attribute	Description
PCT ID	1106
Common name	River Oak riparian woodland of the NSW North Coast Bioregion and northern Sydney Basin Bioregion
Vegetation class	Eastern Riverine Forests
Extent within the disturbance footprint	1.3 ha comprising: • High: 0.1 ha • Moderate: 0.8 ha • Moderate RF: 0.4 ha.

Table 5.10 PCT 1106 – River Oak riparian woodland of the NSW North Coast Bioregion and northern Sydney Basin Bioregion

Attribute	Description
Survey effort	**Plots:** • High: LW_OMPS_10, MP_OMPS_38, and LW_OMPS_10 • Moderate: EAR07, EAR25, EAR43, EAR55 andLW_OMPS_2 • Moderate RF: EAR26, EAR38, EAR52and EAR53 • Poor RF: EAR22, EAR44, EAR04, EAR06 and EAR54. This vegetation zone is no longer within the disturbance footprint.
Description and condition	This PCT was identified on the banks of the Macleay River and occurs as intact forests with some conditions observed to have a rainforest microclimate which supports rainforest flora species. There is some level of weed infestation, largely due to upstream impacts and a history of grazing. Within this PCT, River Oak (*Casuarina cunninghamiana*) is the dominant canopy species, whilst Weeping Bottlebrush (*Callistemon viminalis*) occurs as the dominant tall shrub layer. Within the rainforest influenced conditions of the PCT, a number of other canopy species occur including Weeping Lilly Pilly (*Waterhousea floribunda),* Red Kamala (*Mallotus philippensis*), Creek Sandpaper Fig (*Ficus coronata*) and Ribbonwood (*Euroschinus falcatus* var. *falcatus*). Species which occur in wetter soils and are also present within the PCT include White Cedar (*Melia azedarach*), Silky Oak (*Grevillea robusta*) and Black Tea-tree (*Melaleuca bracteata*). The groundcover shows signs of frequent inundation from the adjacent river; however, in areas of High condition, has a high native species diversity and density. Weeping Grass (*Microlaena stipoides*) is a common and dense species in this PCT, in addition to Common Couch (*Cynodon dactylon*), Australian Basket Grass (*Oplismenus aemulus*) and Native Wandering Jew (*Commelina cyanea*). Within the rainforest vegetation condition classes, a number of native vines also occur and include Scrambling Lily (*Geitonoplesium cymosum*), Twining glycine (*Glycine clandestina*), Wombat Berry (*Eustrephus latifolius*) and Round-leaf Vine (*Legnephora moorei*). Due to frequent inundation of this PCT, exotic species are common within the vegetation within the construction envelope and include Cat's Claw Creeper (*Dolichandra unguis-cati*), Climbing Nightshade (*Solanum seaforthianum*) and Moth Vine (*Araujia sericifera*). Lantana (*Lantana camara*) also occurs within the mid stratum, varying from very low to very high densities.
Condition description	The condition of this community ranges from High condition with all layers intact, to Poor condition with some straum absent. **High:** This vegetation zone has a canopy, shrub and ground-layer that are intact and contain minimal exotic species. **Moderate:** This vegetation zone has an intact canopy, but a shrub and ground layer, while dominated by native species overall, that contains substantial localised infestations of exotic shrubs, forbs, and grasses interspersed with native species. **Moderate RF:** This vegetation zone has an intact canopy, but a shrub and ground layer, while dominated by native species overall, that contains substantial localised infestations of exotic shrubs and forbs interspersed with native species. This vegetation zone differs from the Moderate condition in that it contains rainforest species. **Poor RF:** This vegetation zone contains a sparse canopy, and native shrub and ground layer that has been highly modified, with some areas missing the shrub or ground-layer. Substantial infestations of exotic species are present in the mid and ground-layer. This vegetation zone differs from the Poor condition in that it contains rainforest species.
Characteristic species for identification of PCT	The species described in the BioNet Vegetation Classification database for PCT 1106 which also occur within the vegetation community in the construction envelope include: • River Oak (*Casuarina cunninghamiana*) • Weeping Bottlebrush (*Callistemon viminalis*) • Weeping Lilly Pilly (*Waterhousea floribunda)*.

Table 5.10 PCT 1106 – River Oak riparian woodland of the NSW North Coast Bioregion and northern Sydney Basin Bioregion

Attribute	Description
Justification of evidence used to identify the PCT	Plot data for this PCT was compared to data held in the VIS Classification with the three dominant species in the overstorey, midstratum and groundcover entered into the PCT filter tool. Note that the term 'plot data' below is often interchangeable with 'vegetation on site'. The following PCTs were considered. • PCTs 3329, 3427, 3254 and 3089 were found not to support species consistent with the plot data and were rapidly discounted. • PCT 4077, while containing some of the species structure like River Oak (*Casuarina cunninghamiana subsp. cunninghamiana*) and Creek Sandpaper Fig (*Ficus coronata*), lacked other indicator species that were recorded within the plot data. This PCT also only occurs on a small tributary of the Orara River near Nana Glen and one on the Wilson River near Rollands Plains, North Coast, over 100 km away from the Project area. • PCT 4079 is dominated by River Oak (*Casuarina cunninghamiana* subsp. *cunninghamiana*). In the PCT description it is noted that other trees are rarely present. As the plot data recorded other tree species such as Forest Red Gum (E*ucalyptus tereticornis*), Pink Bloodwood (*Corymbia intermedia*) and Broad-leaved Apple (*Angophora subvelutina*), this PCT was considered a poorer fit than other PCTs. • PCT 3020 has an overstorey dominated by River Oak (*Casuarina cunninghamiana* subsp. *cunninghamiana*) with Broad-leaved Apple (*Angophora subvelutina*). The description mentions other Eucalyptus species are rare. The plot data recorded other tree species such as Forest Red Gum (*Eucalyptus tereticornis*) and Pink Bloodwood (*Corymbia intermedia*). Therefore, based on the description that Eucalyptus species should be rare, this PCT was considered a poorer fit than other PCTs. • PCT 4078 had the strongest fit for the PCT recorded within the Project area, with the PCT description discussing a midstratum dominated by River Oak (*Casuarina cunninghamiana* subsp. *cunninghamiana*) with occurrences of Forest Red Gum (E*ucalyptus tereticornis*), Pink Bloodwood (*Corymbia intermedia*) and Broad-leaved Apple (*Angophora subvelutina*). The description of the midstratum matched with dominant species that were recorded in the plots such as Creek Sandpaper Fig (*Ficus coronata*), White Cedar (*Melia azedarach*) and Weeping Bottlebrush (*Callistemon viminalis*). The description of the groundcover was also consistent with species observed in plots, including Native Wandering Jew (*Commelina cyanea*), Wiry Panic (*Entolasia stricta*), Swamp Dock (*Rumex brownii*),Weeping Grass (*Microlaena stipoides*), Australian Basket Grass (*Oplismenus aemulus*) and Common Couch (*Cynodon dactylon*). This PCT occurs below 390 m ASL in a warm, moist climate on moist gravelly loam soils that are derived from a variety of substrates., which matches conditions within the Project area. Based on the data we believe that PCT 4078 is the best fit. As legacy PCTs were used and PCT 4078 aligns with PCT 1106, this PCT was used in this assessment.

Table 5.10 PCT 1106 – River Oak riparian woodland of the NSW North Coast Bioregion and northern Sydney Basin Bioregion

Attribute	Description
Status	**BC Act** PCT 1106 is associated with Hunter Floodplain Red Gum Woodland in the NSW North Coast and Sydney Basin Bioregions EEC listed under the BC Act. This PCT within the construction envelope was determined to be inconsistent with the EEC definitions under the BC Act due to its known and predicted distribution which is situated around the Hunter area, south of the Project area (OEH 2022c). PCT 1106 is associated with Subtropical Coastal Floodplain Forest of the New South Wales North Coast Bioregion EEC listed under the BC Act. Vegetation zones High and Moderate within the construction envelope are considered to be part of this EEC as: • the Project is located north of Port Stephens • the PCT occurs on inundated alluvial flats, drainage lines and river terraces associated with a coastal floodplain of NSW • the PCT includes species from the species assemblage such as Forest Red Gum, Cabbage Gum, River Oak, and Weeping Bottlebrush • rainforest shrubs and trees are scattered throughout areas of the PCT (DECC 2007). PCT 1106 is also associated with Lowland Rainforest on Floodplain in the New South Wales North Coast Bioregion EEC listed under the BC Act. Vegetation zones Moderate RF and Poor RF within the construction envelope are considered to be part of this EEC as they: • lie within or within the vicinity of the known distribution of this EEC • are consistent with the distribution description which identifies 'riverine corridor and alluvial flats' (OEH 2022d) • are consistent with several species from the NSW Scientific Committee – final determination including Whalebone Tree (*Streblus brunonianus*), Brush Cherry (*Syzygium australe*), and Creek Sandpaper Fig (NSW TSSC, 2011b). As per the NSW Scientific Committee – final determination (NSW TSSC 2011a), all remaining native vegetation on the coastal floodplains of NSW is covered by an EEC. While there are several EECs that cover the coastal floodplains of NSW, the best fit for PCT 1106 in Moderate_RF condition is Lowland Rainforest on Floodplain in the New South Wales North Coast Bioregion due to the presence of rainforest species which differentiate it from the same PCT in other condition states. **EPBC Act** PCT 1106 could be associated with Lowland Rainforest of Subtropical Australia Critically Endangered Ecological Community (CEEC) listed under the EPBC Act. All occurrences of this PCT within the construction envelope were determined to be inconsistent with the CEEC definitions under the EPBC Act as it does not meet the species richness required as per the key diagnostic characteristics of the listing advice (DSEWPC, 2011). The species richness required is at least 30 woody species from the listing advice in patches of this CEEC (DSEWPC 2011). Only 16 species were recorded within BAM plots undertaken in PCT 1106.
Estimate of percent cleared value of PCT across its distribution	90%
Patch size	• High: >100 ha • Moderate: >100 ha • Moderate RF: >100 ha • Poor RF: >100 ha

Table 5.10 **PCT 1106 – River Oak riparian woodland of the NSW North Coast Bioregion and northern Sydney Basin Bioregion**

Attribute	Description
Example photo	

Plate 5.6 **PCT 1106 BAM plot photo**

Table 5.11 PCT 1142 – Shatterwood - Giant Stinging Tree - Yellow Tulipwood dry rainforest of the NSW North Coast Bioregion and northern Sydney Basin Bioregion

Attribute	Description
PCT ID	1142
Common name	Shatterwood – Giant Stinging Tree – Yellow Tulipwood dry rainforest of the NSW North Coast Bioregion and northern Sydney Basin Bioregion
Vegetation class	Dry Rainforests
Extent within the disturbance footprint	5.0 hectares of Moderate condition vegetation zone
Survey effort	Plots: • Moderate: MP_OMPS_35 and LW_OMPS_23.
Description and condition	This PCT was identified in the southern part of the Project area within a creek that flows into the Macleay River. The PCT occurs as a dry rainforest with one vegetation condition within the construction envelope. The canopy species which dominate this vegetation comprise Port Jackson Fig (*Ficus rubiginosa*), Snow Wood (*Pararchidendron pruinosum* var. *pruinosum*), and Silver Croton (*Croton insularis*). Hard Quandong (*Elaeocarpus obovatus*) and Red Kamala (*Mallotus philippensis*) are also present in lower densities. The canopy is mostly open, however, dense and closed patches of this PCT are also present. Several shrub species occur with this PCT, primarily Tree Violet (*Melicytus dentatus*), Brush Cherry (*Syzygium australe*), and Black Tea-tree (*Melaleuca bracteata*). Black Plum (*Diospyros australis*) and Grey Myrtle (*Backhousia myrtifolia*) are also present albeit in much smaller densities. This PCT has a high diversity of species in the groundlayer, with ferns and grasses dominant. Prevalent species of ferns include Common Maidenhair (*Adiantum aethiopicum*) and Rough Maidenhair (*Adiantum hispidulum*). The two dominant grass species in this PCT are Weeping Grass (*Microlaena stipoides*) and Australian Basket Grass (*Oplismenus aemulus*). The understory also contains climber species and a diversity of orchids. Climber species include *Tetrastigma nitens*, *Jasminum simplicifolium*, and Native Grape (*Cayratia clematidea*). Orchid species include Tongue Orchid (*Dendrobium linguiforme*), Rat's Tail Orchid (*Dendrobium teretifolium*), and Tangle Orchid (*Plectorrhiza tridentata*). Exotic species are present in all layers of this PCT, albeit in low numbers. Lantana (*Lantana camara*), Large-leaved Privet (*Ligustrum lucidum*), and Common Centaury (*Centaurium erythraea*) are examples of this.
Condition description	**Moderate**: This community is in Moderate condition with all layers intact. This vegetation zone has a canopy, shrub and ground layer that are dominated by native species overall, however, contain substantial localised infestations of exotic species.
Characteristic species for identification of PCT	The species described in the BioNet Vegetation Classification database for PCT 762 which also occur within the vegetation community in the construction envelope include: • Barbwire Weed (*Nyssanthes diffusa*) • Black Plum (*Diospyros australis*) • Grey Myrtle (*Backhousia myrtifolia*) • Red Kamala (*Mallotus philippensis*) • Rough Maidenhair (*Adiantum hispidulum*).
Justification of evidence used to identify the PCT	Plot data for this PCT was compared to data held in the VIS Classification with the three dominant species in the overstorey, midstratum and groundcover entered in to the PCT filter tool. Note that the term 'plot data' below is often interchangeable with 'vegetation on site'. The following PCTs were considered. • PCT 972 was found to be somewhat consistent with the landscape position of the plots, with the PCT located in steep rocky sites in the gorges. The PCT is, however, largely inconsistent with the species from the plot data. PCT 972 includes the following species: *Alectryon forsythii*, *Alectryon subdentatus,* Whalebone Tree (*Streblus brunonianus*), Yellow Tulipwood (*Drypetes australasica*), *Notelaea microcarpa* var. *velutina, Brachychiton populneus* subsp. *Populneus*, and Red Ash (*Alphitonia excelsa*). Only Whalebone Tree (*Streblus brunonianus*) is consistent with the plot data. The vegetation class of the PCT is also not

Table 5.11 PCT 1142 – Shatterwood - Giant Stinging Tree - Yellow Tulipwood dry rainforest of the NSW North Coast Bioregion and northern Sydney Basin Bioregion

Attribute	Description
	consistent with the vegetation class of the plot data. The vegetation class of PCT 972 is Western Vine Thickets while the plot data better reflects a dry rainforest vegetation class. • PCT 2079 was found to be inconsistent with the landscape position of the plots. PCT 2079 is located in gorges of the Macleay Valley on sedimentary rocks, while the plots are located in the gorges on the Carrai Plateau's western slopes on rock which formed as a result of volcanic activity. The PCT was also found to be mostly inconsistent with the species identified in the plots, matching with 3 out of 67 species (4%). • PCT 3099 was found to be somewhat consistent with the landscape position of the plots. PCT 3099 is located on steep rocky slopes, mainly on clay-rich medasediments, occasionally on sediments. On site, the vegetation is located in a steep gully on rock which formed as a result of volcanic activity. PCT 3099 was found to be moderately consistent with the species identified in the plots, matching with 28 out of 67 species (42%). This PCT was deemed to be the best fit. • PCT 3254 was found to be consistent with the landscape position of the plots, with PCT 3254 located in escarpment ranges. PCT 3254 is, however, found not to support species consistent with the plot data. PCT 3254 consists of Tallowwood (*Eucalyptus microcorys*) as frequently present and sometimes dominating with the highest foliage cover, Brush Box (*Lophostemon confertus*), Sydney Blue Gum (*Eucalyptus saligna*), Thick-leaved Mahogany (*Eucalyptus carnea*), White Mahogany (*Eucalyptus acmenoides*), and rarely with the spotted gums *Corymbia maculata* (incorporating *Corymbia variegata*). Forest oak (*Allocasuarina torulosa*) is almost always present, forming a mid-dense to dense sub-canopy. None of these species are consistent within the plot data. • PCT 3460 was found to be somewhat consistent with the species in the plot data. PCT 3460 has a canopy consisting of Broad-leaved Apple (*Angophora subvelutina*) and Forest Red Gum (*Eucalyptus tereticornis*), and a small tree layer with Forest Oak (Allocasuarina torulosa), Red Kamala (*Mallotus philippensis*) and Sweet Pittosporum (*Pittosporum undulatum*). Broad-leaved Apple (*Angophora subvelutina*) and Red Kamala (*Mallotus philippensis*) was recorded in the plot data. PCT 3460 is, however, inconsistent with the vegetation class of the plot data. PCT 3460 is within the Northern Gorge Sclerophyll Forests vegetation class, while the plot data better reflects a dry rainforest vegetation class. • PCT 3469 was found to be largely inconsistent with species in the plot data. PCT 3469 consists of scattered Yellow Box (*Eucalyptus melliodora*) emergent, with small trees and shrubs including Kurrajong (*Brachychiton populneus*), Brush Wilga (*Geijera salicifolia*), Native Olive (*Notelaea macrocarpa*), Acacia blakei, *Alectryon forsythii* and Narrow-leaved Orangebark (*Denhamia silvestris*). None of these species are consistent with the plot data. • PCT 4078 was found to be inconsistent with species in the plot data. PCT 4078 consists of River Oak (*Casuarina cunninghamiana* subsp. *Cunninghamiana*), Silky Oak (*Grevillea robusta*), White Cedar (*Melia azedarach*), Weeping Bottlebrush (*Callistemon viminalis*) and scattered individuals of Wiry Spurge (*Phyllanthus virgatus*) or Creek Sandpaper Fig (*Ficus coronata*). None of these species are consistent with the plot data. • PCT 4079 was found to be largely inconsistent with species in the plot data. PCT 4079 consists of River Oak (*Casuarina cunninghamiana*) as the main canopy species and almost always present, rarely other trees are present with low cover, including Broad-leaved Apple (*Angophora subvelutina*), Forest Red Gum (*Eucalyptus tereticornis*) and Dorrigo White Gum (*Eucalyptus dorrigoensis*). Only Broad-leaved Apple (*Angophora subvelutina*) is consistent with the plot data. Based on the above, we believe PCT 3099 is the best fit for the vegetation within the Project area. As legacy PCTs were used and PCT 3099 aligns with PCT 1142, PCT 1142 was used in this assessment.
Status	**BC Act** PCT 1142 is associated with Lowland Rainforest on Floodplain in the New South Wales North Coast Bioregion EEC listed under the BC Act. This PCT was determined to be inconsistent with the EEC definitions under the BC Act, irrespective of its condition, based on the PCTs location on higher ground away from the floodplain. PCT 1142 was reviewed against the NSW Scientific Committee Final Determination for the Lowland Rainforest in NSW North Coast and Sydney Basin Bioregion EEC (NSW TSSC, 2011). • The EEC is associated with a range of high-nutrient geological substrates, notably basalts and fine-grained sedimentary rocks, on coastal plains and plateaux, footslopes and foothills. Geology and topographic location are consistent with vegetation on site.

Table 5.11 PCT 1142 – Shatterwood - Giant Stinging Tree - Yellow Tulipwood dry rainforest of the NSW North Coast Bioregion and northern Sydney Basin Bioregion

Attribute	Description
	• In the north of its range, Lowland Rainforest is found up to 600 m ASL. Within the construction envelope this PCT is recorded up to 270 m ASL, with the gully in which it is found extending to 380 m ASL. Elevational range of the EEC is consistent with vegetation within the construction envelope. • The Lowland Rainforest EEC has a closed canopy, characterised by a high diversity of trees whose leaves may be mesophyllous. Several layers occur including, emergents, canopy and sub-canopy, along with a range of plant growth forms, including palms, vines and vascular epiphytes. Scattered eucalypt emergents may occasionally be present. Vegetation within the construction envelope does not typically have a closed canopy, but does have a moderate diversity of mesophyllous trees, vines and epiphytes. • Characteristic species recorded in the plots include Port Jackson Fig (*Ficus rubiginosa*), Snow Wood (*Pararchidendron pruinosum* var. *pruinosum*), Hard Quandong (*Elaeocarpus obovatus*), Red Kamala (*Mallotus philippensis*), Brush Cherry (*Syzygium australe*), Black Plum (*Diospyros australis*), Grey Myrtle (*Backhousia myrtifolia*)and *Tetrastigma nitens*. • The final determination (NSW TSSC, 2011) notes that while the Lowland Rainforest EEC belongs to the Subtropical Rainforests vegetation class, some stands may be interpreted as structurally complex assemblages within the Dry Rainforests vegetation class. This is consistent with vegetation observed on site. While the vegetation on site does not typically support a closed canopy, other features are consistent and it is conservatively concluded that PCT 1142 within the construction envelope is considered consistent with the Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions EEC. **EPBC Act** PCT 1142 could be associated with Lowland Rainforest of Subtropical Australia CEEC listed under the EPBC Act. All occurrences of this PCT within the construction envelope were determined to be inconsistent with the CEEC definitions under the EPBC Act as it does not meet the species richness required as per the key diagnostic characteristics of the listing advice (DSEWPC, 2011). The species richness required is at least 30 woody species from the listing advice in patches of this CEEC (DSEWPC, 2011). Only 8 Species from the listing advice were recorded within BAM plots undertaken in PCT 1142.
Estimate of percent cleared value of PCT across its distribution	30%
Patch size	Moderate: >100 ha.

Table 5.11 **PCT 1142 – Shatterwood - Giant Stinging Tree - Yellow Tulipwood dry rainforest of the NSW North Coast Bioregion and northern Sydney Basin Bioregion**

Attribute	Description
Example photo	

Plate 5.7 **PCT 1142 BAM plot photo**

Table 5.12 PCT 1215 – Spotted Gum – Grey Ironbark open forest of the Macleay Valley lowlands of the NSW North Coast Bioregion

Attribute	Description
PCT ID	1215
Common name	Spotted Gum – Grey Ironbark open forest of the Macleay Valley lowlands of the NSW North Coast Bioregion
Vegetation class	Hunter-Macleay Dry Sclerophyll Forests
Extent within the disturbance footprint	52.9 ha, comprising: • High: 51.7 ha • DNG Moderate: 1.2 ha.
Survey effort	**Plots:** • High: EAR09, EAR15, EAR16, EAR28, EAR29, EAR30 and NTL10 • DNG Moderate: NTL09 and NTL11.
Description and condition	This PCT is located along the higher ridges and slopes within the construction envelope, associated with the access road to the east and the northern transmission line in the north. This PCT occurs as an open forest with a dense ground stratum of native vines and patches of *Acacia* spp. regeneration. This growth is likely due to the regeneration response post-fire with Fabaceae species responding to the changed nutrient load within the soil. The canopy is co-dominated by tall Spotted Gum (*Corymbia maculata*), Thick-leaved Mahogany (*Eucalyptus carnea*) and Grey Box (*Eucalyptus moluccana*). Many shrub species which occur within the mid stratum are from the Fabaceae family and comprise Hickory Wattle (*Acacia falcata*), Curracabah (*Acacia leiocalyx* subsp. *leiocalyx*), A Bush Pea (*Pultenaea spinosa*) and Australian Indigo (*Indigofera australis*). Coffee Bush (*Breynia oblongifolia*), Climbing Guinea Flower (*Hibbertia scandens*), *Cassinia* spp. and Forest Oak (*Allocasuarina torulosa*) also occur in moderate densities. The groundcover varies depending on the vegetation zone. The DNG Moderate zone is maintained as an easement and therefore is influenced by ongoing maintenance. Despite these differences, False Sarsaparilla (*Hardenbergia violacea*) still occurs in moderate to high densities, likely as successional following fire. Within the High vegetation zone, grasses co-dominate where False Sarsaparilla (*Hardenbergia violacea*) does not occur, with the natives Jericho Wiregrass (*Aristida jerichoensis*), Kangaroo Grass (*Themeda triandra*), Wiry Panic (*Entolasia stricta*), and Blady Grass (*Imperata cylindrica*) co-dominating with the exotic *Digitaria ischaemum.* Threeawn Speargrass (*Aristida vagans*) and Blue Flax-lily (*Dianella caerulea*) also occur in smaller density.
Condition description	This community is in good condition with all layers intact in forested areas and a high diversity of native species in the DNG condition. • **High:** This vegetation zone has a high native species diversity in all vegetation layers. Low numbers of exotic species are present. • **DNG Moderate:** This vegetation zone is in moderate condition with a high diversity of native species that clearly dominate.
Characteristic species for identification of PCT	The species described in the BioNet Vegetation Classification database for PCT 1215 which also occur within the vegetation community in the construction envelope include: • Spotted Gum (*Corymbia maculata*) • Thick-leaved Mahogany (*Eucalyptus carnea*) • Grey Box (*Eucalyptus moluccana*) • Forest Oak *(Allocasuarina torulosa*) • Wiry Panic (*Entolasia stricta*) • Threeawn Speargrass (*Aristida vagans*) • Blue Flax-lily (*Dianella caerulea*) • Kangaroo Grass (*Themeda triandra*).

Table 5.12 PCT 1215 – Spotted Gum – Grey Ironbark open forest of the Macleay Valley lowlands of the NSW North Coast Bioregion

Attribute	Description
Justification of evidence used to identify the PCT	Plot data for this PCT was compared to data held in the VIS Classification with the three dominant species in the overstorey, midstratum and groundcover entered into the PCT filter tool. Note that the term 'plot data' below is often interchangeable with 'vegetation on site'. The following PCTs were considered. • PCT 3427 was found to support some species consistent with the plot data. In particular, the vegetation description for PCT 3427 notes the presence of Thick-leaved Mahogany (*Eucalyptus carnea*) and Spotted Gums (*Corymbia maculata*) which have both been recorded in the plot data. The dominance of Spotted Gums in the PCT description is, however, inconsistent with the plot data with the PCT description noting that Spotted Gums are 'occasionally present in localised areas' while on site Spotted Gum (*Corymbia maculata*) was dominant. This PCT is an offspring of PCT 1215. • PCTs 3254, PCT 3252 and PCT 3329 were found not to support species consistent with the plot data and were rapidly discounted. • PCT 3433 is located in the Hunter Coast hinterland from Tuggerah to Stratford and Lower Hunter Valley around Cessnock. As this is outside of the Project area or vicinity it was rapidly discounted. • PCT 3244 was found to support some species consistent with the plot data. In particular, the description for PCT 3244 notes the presence of Thick-leaved Mahogany (*Eucalyptus carn*ea) and Spotted Gum (*Corymbia maculata*) which have both been recorded in the plot data. The dominance of Thick-leaved Mahogany (*Eucalyptus carnea*) in the PCT description is, however, inconsistent with the plot data. The plot data reflects Thick-leaved Mahogany (*Eucalyptus carnea*) as a co-dominant species; however the PCT description notes that Thick-leaved Mahogany (*Eucalyptus carnea*) is 'less regularly present' than species such as Grey Ironbark (E*ucalyptus siderophloia*), White Mahogany (*Eucalyptus acmenoides*), Broad-leaved White Mahogany (*Eucalyptus umbra*) and Grey Gum (*Eucalyptus punctata*), none of which were recorded in the plot data. • PCT 3249 was found to be mostly consistent with the species recorded in the plot data. The description for PCT 3249 notes that the canopy very frequently includes Mahogany species such as Thick-leaved Mahogany (*Eucalyptus carnea*), and that Spotted Gum (*Corymbia maculata*) may be locally prominent. In the shrub layer, the PCT description identifies Forest Oak (*Allocasuarina torulosa*), Hickory Wattle (*Acacia falcata*), Curracabah (*Acacia leiocalyx* subsp. *leiocalyx*) as common, which is also reflective of the plot data. This PCT is an offspring of PCT 1215. • PCT 3251 was found to be mostly consistent with the species recorded in the plot data. The description for PCT 3251 notes that the canopy very frequently includes Mahogany species such as Thick-leaved Mahogany (*Eucalyptus carnea*), and that Spotted Gum (*Corymbia maculata*) maybe locally prominent. In the shrub layer, the PCT description identifies Forest Oak (*Allocasuarina torulosa*) and Hickory Wattle (*Acacia implexa*) as common. For Forest Oak (*Allocasuarina torulosa*) this is reflective of the plot data but for Hickory Wattle (*Acacia implexa*) it is not, as this species occurs in low densities within the plots. This PCT is an offspring of PCT 1215. Based on the above data we believe that PCTs 3427, 3249 and 3251 are the best fit. As legacy PCTs were used and PCTs 3427, 3249 and 3251 align with PCT 1215, this PCT was used in this assessment.
Status	**BC Act** PCT 1215 is associated with Subtropical Coastal Floodplain Forest of the New South Wales North Coast Bioregion Endangered Ecological Community (EEC) listed under the BC Act. This PCT was determined to be inconsistent with the EEC definitions under the BC Act, irrespective of its condition, based on: • the PCTs location on higher ground, away from the alluvial flats, drainage lines and river terraces associated with a coastal floodplain • the canopy is dominated by Spotted Gum (*Corymbia maculata*) which is not listed as one of the dominant or locally common species in the TEC description (NSW TSSC 2010a).
Estimate of percent cleared value of PCT across its distribution	35%
Patch size	• High: >100 ha • DNG_Moderate: >100 ha.

Table 5.12 PCT 1215 – Spotted Gum – Grey Ironbark open forest of the Macleay Valley lowlands of the NSW North Coast Bioregion

Attribute	Description
Example photo	

Plate 5.8 PCT 1215 BAM plot photo

Table 5.13 PCT 1268 – Tallowwood open forest of the coastal ranges of the NSW North Coast Bioregion

Attribute	Description
PCT ID	1268
Common name	Tallowwood open forest of the coastal ranges of the NSW North Coast Bioregion
Vegetation class	Northern Hinterland Wet Sclerophyll Forests
Extent within the disturbance footprint	1.1 ha of High condition vegetation zone
Survey effort	**Plots:** High: Plots NTL07 and NTL08.

Table 5.13 PCT 1268 – Tallowwood open forest of the coastal ranges of the NSW North Coast Bioregion

Attribute	Description
Description and condition	This PCT is located along the high ridges and slopes within the Project area, associated with the northern transmission line in the north. This PCT occurs as an open forest dominated by Tallowwood (*Eucalyptus microcorys*). Grey Gum (*Eucalyptus biturbinata*), Forest Oak (*Allocasuarina torulosa*), and White Mahogany (*Eucalyptus acmenoides*) are also present in lower numbers. The shrub and vine layer species vary depending on the aspect. In cooler/moister conditions, ferns such as *Blechnum neohollandicum*, and Bracken (*Pteridium esculentum*) are present. In moister areas, vines such as Water Vine (*Cissus antarctica*), Lawyer Vine (*Smilax australis*), Scrambling Lily (*Geitonoplesium cymosum*), and Native Raspberry (*Rubus parvifolius*) are prevalent. In warmer/drier conditions there is a notable decrease in the variety of vine species. In these drier areas, shrubs such as Dogwood (*Jacksonia scoparia*), Prickly Shaggy Pea (*Podolobium ilicifolium*), and White Dogwood (*Ozothamnus diosmifolius*) are present. Common native grasses include Australian Basket Grass (*Oplismenus aemulus*), Snowgrass (*Poa sieberiana*) and Wiry Panic (*Entolasia stricta*). Two species of *Lomandra* are notable: Spiny-headed Mat-rush (*Lomandra longifolia*) and Wattle Matt-rush (*Lomandra filiformis*). Forbs include species such as Whiteroot (*Lobelia purpurascens*), *Vernonia cinerea,* and Slender Tick-trefoil (*Desmodium varians*). Other species present in smaller densities include Blue Flax-lily (*Dianella caerulea*) and Bracken (*Pteridium esculentum*). Due to the PCTs lack of disturbance, exotic species density is negligible.
Condition description	**High**: This community is in High condition with all layers intact. This vegetation zone has a high native species diversity in all vegetation layers. There is a low abundance and diversity of exotic forbs.
Characteristic species for identification of PCT	The species described in the BioNet Vegetation Classification database for PCT 1268 which also occur within the vegetation community in the construction envelope include: • Tallowwood (*Eucalyptus microcorys*) • Forest Oak (*Allocasuarina torulosa*) • Scrambling Lily (*Geitonoplesium cymosum*) • Native Raspberry (*Rubus parvifolius*) • Whiteroot (*Lobelia purpurascens*) • Bracken (*Pteridium esculentum*) • Blue Flax-lily (*Dianella caerulea*) • *Vernonia cinerea* • Spiny-headed Mat-rush (*Lomandra longifolia*) • Snowgrass (*Poa sieberiana*) • Slender Tick-trefoil (*Desmodium varians*).

Table 5.13 PCT 1268 – Tallowwood open forest of the coastal ranges of the NSW North Coast Bioregion

Attribute	Description
Justification of evidence used to identify the PCT	Plot data for this PCT was compared to data held in the VIS Classification with the three dominant species in the overstorey, midstratum and groundcover entered into the PCT filter tool. The following PCTs were considered. • PCT 3244 and 3252 were considered as Tallowwood (*Eucalyptus microcorys*) comprises of the canopy species. These PCTs were determined to be unsuitable due to their landscape position which is on the low foothills, and broader species assemblage. • PCT 3254 showed a strong match with the overstorey, with Tallowwood (*Eucalyptus microcorys*) as the dominating species with other known canopy species such as White Mahogany (*Eucalyptus acmenoides*). Forest Oak (*Allocasuarina torulosa*), an indicating species for this PCT, comprised largely of the mid-stratum, and floristic ground cover assemblages comprised a high cover of Snowgrass (*Poa sieberiana*) and other low abundance species, including Blue Flax-lily (*Dianella caerulea*), Climbing Guinea Flower (*Hibbertia scandens*), Spiny-headed Mat-rush (*Lomandra longifolia*) and Slender Tick-trefoil (*Desmodium varians*). PCT 3254 occurs mainly in mild, wet locations receiving 1,040–1,540 mm mean annual rainfall, at mid to high elevations of 250–830 m ASL. It occurs on meta-sedimentary substrates, on ridges which fits the location of this PCT within the Project area. Whilst this PCT fits vegetation recorded on site, other PCTs were considered a better fit. • PCT 3251 also showed a strong match comprising a similar floristic structure as per PCT 3254. This PCT occurs in the steep hinterland hills from the Macleay Valley. The environment is hot and wet with a mean annual rainfall typically between 1,000–1,370 mm. This PCT commonly occurs on metasediments; however, it is also known from volcanic or granitic substrates. This fits the location of this PCT within the Project area. • PCT 3253 is very similar to both PCT 3254 and 3251; however, with Tallowwood (*Eucalyptus microcorys*) not the dominant species in the overstory. This PCT was therefore discounted. Based on the data we believe that PCT 3251 is the best fit. PCT 3251 and PCT 3254 have a similar floristic composition; however, PCT 3251 can occur on granitic substrates which is where this PCT was recorded within the Project area. As legacy PCTs were used and PCT 3251 aligns with PCT 1268, this PCT was used in this assessment.
Status	Not listed
Estimate of percent cleared value of PCT across its distribution	15%
Patch size	High: >100 ha

Table 5.13 PCT 1268 – Tallowwood open forest of the coastal ranges of the NSW North Coast Bioregion

Attribute	Description
Example photo	

Plate 5.9 PCT 1268 BAM plot photo

Table 5.14 PCT 1287 – Upland heath swamps of the New England Tableland Bioregion

Attribute	Description
PCT ID	1287
Common name	Upland heath swamps of the New England Tableland Bioregion
Vegetation class	Montane Bogs and Fens
Extent within the disturbance footprint	0.03 ha of High condition vegetation zone
Survey effort	**Plots:** • High: URAT08. Note: as plots were undertaken in a partially cleared area and an area of low species diversity benchmark values were used. Additional data will be collected and updated as a part of the response to submissions.

Table 5.14 PCT 1287 – Upland heath swamps of the New England Tableland Bioregion

Attribute	Description
Description and condition	This PCT is the smallest within the construction envelope. It is located on the Carrai Plateau, on relatively flat topography with impeded drainage. Part of this PCT is located at the beginning of the proposed access road. The PCT has a distinct lack of a canopy layer, with a sparse and scattered cover of species such as Broad-leaved Stringybark (*Eucalyptus caliginosa*) and Diehard Stringybark (*Eucalyptus cameronii*), particularly on the margins. The shrub layer contains a high cover of native species, with the following species from the Leptospermum genus dominant: *Leptospermum gregarium*, Prickly Tea-tree (*Leptospermum juniperinum*) and Tantoon (*Leptospermum polygalifolium*). Other shrubs such as *Baeckea omissa* and Coral Heath (*Epacris microphylla*) are also present. Certain species of native sedges and rushes also have a high cover; notably *Juncus* spp., *Lepidosperma* spp. and Saw-sedge (*Gahnia* sp.). *Lepyrodia* sp. and *Schoenus* sp. are also present with albeit with low cover and abundance. Most of the species diversity within this PCT is found within the groundcover layer. Forb species present in low densities include *Gonocarpus micranthus*, Brown Beaks (*Lyperanthus suaveolens*), and Kidney Weed (*Dichondra repens*). Native grass species within this PCT are also present in low densities. The common native grasses are Snowgrass (*Poa sieberiana*) and Kangaroo Grass (*Themeda triandra*). *Sphagnum cristatum* was also present in trace amounts in one of plots. Exotic species were not recorded in either plot undertaken in this PCT. It is expected that exotic species numbers would be low to non-existent due to the minimal disturbance history within this PCT.
Condition description	This community is in high condition with all layers intact. It should be noted that one area of this PCT has been partially cleared within the last 1.5 years (where the PCT intersects with the beginning of the proposed access road). Despite this, that area is still considered to be in High condition due to the native species diversity present, evidence of regeneration, and lack of exotic species. **High**: This vegetation zone may have scattered trees at most, or none at all, an intact shrub layer, and a high native species diversity in the understory. No exotic species were recorded in plots undertaken in this condition.
Characteristic species for identification of PCT	The species described in the BioNet Vegetation Classification database (DPE 2022) for PCT 1287 which also occur within the vegetation community in the construction envelope include: • Coral Heath (*Epacris microphylla*) • *Leptospermum gregarium* • *Gonocarpus micranthus* • *Lepyrodia* sp. (*Lepyrodia anarthria* is the species specified in the BioNet Vegetation Classification database) • *Schoenus sp.* (*Schoenus apogon*) is the species specified in the BioNet Vegetation Classification database) • *Sphagnum cristatum*.

Table 5.14 PCT 1287 – Upland heath swamps of the New England Tableland Bioregion

Attribute	Description
Justification of evidence used to identify the PCT	Plot data for this PCT was compared to data held in the VIS Classification with the three dominant species in the overstorey, midstratum and groundcover entered into the PCT filter tool. Note that the term 'plot data' below is often interchangeable with 'vegetation on site'. The following PCTs were considered. • PCTs 3254, 3277, 3672, 3281, 3157, 3205, 3031, 3166, 3206, 3207, 3033, 2079 were found not to support species and vegetation formations consistent with the plot data and were rapidly discounted. • PCT 3944 is located within the Project area according to the state vegetation map type (DPE 2022); however, it was found not to support species consistent with the plot data. The vegetation description for PCT 3944 notes that this community tends to be replaced by PCT 3934 on wet habitats on coarse, sandy acidic alluvium. The plot is situated on sandy alluvium, likely explaining its greater affinity with PCT 3934. • PCT 3825 was found not to support species consistent with the plot data. It was also found to be inconsistent with the landscape position of the plot. The PCT is found on rocky outcrops which the plot is not located on, and the PCT occurs at elevations of 1,030-1,100 m ASL while the vegetation recorded on site is situated between 930–980 m ASL. • PCT 3934 is a strong match to the PCT recorded within the Project area. It is generally treeless; however, Wattle-leaved Peppermint (*Eucalyptus acaciiformis*), Mountain Gum (*Eucalyptus dalrympleana*) or White Sally (*Eucalyptus pauciflora*) may be present on swamp margins in small densities. None of these species were observed in the plot data, with most abundant canopy species in the plot data being Broad-leaved Stringybark (*Eucalyptus caliginosa*) and Gum-topped Peppermint (*Eucalyptus andrewsii*). The midstratum observed on site was somewhat consistent with the description for PCT 3934, with species such as Tantoon (*Leptospermum polygalifolium*), Bracken (*Pteridium esculentum*), and Lemon Bottlebrush (*Callistemon pallidus*) present. The species described as often dominant in the midstratum of PCT 3934 are Coral Heath (*Epacris microphylla*) and *Baeckea omissa*. Coral Heath (*Epacris microphylla*) was recorded within the plot but was not dominant. The ground layer of PCT 3934 is often dominated by sedge and rush species such as from the genera Lepyrodia, Baloskion, and Lepidosperma, and commonly includes sandy swamp-loving forbs such as *Gonocarpus micranthus*, and Swamp Iris (*Patersonia fragilis*). *Lepyrodia* sp. and *Gonocarpus micranthus* were both recorded in the plot, albeit in small quantities. Other widespread groundcover species listed in the description for PCT 3934 include Wiry Panic (*Entolasia stricta*), Kangaroo Grass (*Themeda triandra*), and Spiny-headed Mat-rush (*Lomandra longifolia*). These three species were also recorded in the plot. The landscape position of the PCT (sandy acid alluvium of gentle drainages and hanging swamps on granite and acid volcanic rocks) is consistent with the sandy soil in the plot and granodiorite present within the area surrounding the plot. This PCT elevation (850–1,400 m ASL) is also consistent with the plot elevation (930-940 m ASL). PCT 3934 is not predicted to occur in the NSW North Coast IBRA region. However, the New England Tablelands IBRA region in which PCT 3934 is predicted to occur is located adjacent to the NSW North Coast IBRA region. • PCT 3937 is another strong match to the PCT recorded within the Project area. It does not identify any canopy species in the vegetation description. This is understandable given the vegetation class of this PCT (Montane Bogs and Fens). PCT 3937 consists of a dense to sparse tall shrub layer with *Baeckea omissa* dominant, and Coral Heath (*Epacris microphylla*) and Lemon Bottlebrush (*Callistemon pallidus*) also present. These species were recorded in the plot. Groundcover species described in PCT 3937 include *Lepyrodia scariosa, Xyris operculata,* Christmas Bells (*Blandfordia grandiflora*), and occasionally with Wiry Panic (*Entolasia stricta*). *Leyrodia* sp. and Wiry Panic (*Entolasia stricta*) were both recorded in the plot. Damp loving herbs within PCT 3937 commonly include *Drosera spatulata* and *Goodenia bellidifolia*, occasionally with *Gonocarpus micranthus*. *Gonocarpus micranthus* was recorded in this plot. This PCT occurs in broad slow drainages and hanging swamps on infertile sandy alluvium, at elevations of 850–1,100 m ASL. This is consistent with the landscape position of this plot, which is located on sandy soils between 930–940 m ASL. This PCT is located in the Carrai Plateau IBRA sub-bioregion which is the same location as the plot. This PCT is described as a new vegetation type and does not align with any previous PCT under the old PCT system. While both PCT 3934 and 3937 were strong matches for this PCT, only PCT 3937 occurs within the Carrai Plateau IBRA subregion, while PCT 3934 occurs within the New England Tablelands IBRA region. PCT 3937 is considered best fit. However, this PCT had no offspring PCTs in the Vegetation Classification Database. As the assessment uses legacy PCTs, and PCT 3934 is the next best fit, the offspring PCT associations were reviewed for this PCT. PCT 1287 is the offspring of the new PCT 3934. As such, PCT 1287 was used for this assessment.

Table 5.14 PCT 1287 – Upland heath swamps of the New England Tableland Bioregion

Attribute	Description
Status	**BC Act** PCT 1287 is associated with Montane Peatlands and Swamps of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands and Australian Alps bioregions (Montane Peatlands and Swamps) EEC listed under the BC Act. PCT 1287 was review against the NSW Scientific Committee Final Determination for the EEC (NSW TSSC, 2011). • The EEC is associated with accumulated peaty or organic-mineral sediments on poorly drained flats in the headwaters of streams. It occurs on undulating tablelands and plateaus, above 400–500 m ASL, generally in catchments with basic volcanic or fine-grained sedimentary substrates or, occasionally, granite. This is consistent with the soils, geology and landscape position of vegetation observed on site and more broadly. • The EEC may have small trees present as scattered emergents or absent from the community. The PCT observed on site and more broadly has a distinct lack of a canopy layer, with a sparse and scattered cover of Eucalypt species recorded adjacent to the vegetation on site are not listed in the final determination. This is considered consistent with the EEC. • The EEC typically has an open to very sparse layer of shrubs, 1–5 m tall, including species of *Baeckea*, *Callistemon* and *Leptospermum*. This is consistent with the vegetation observed on site and more broadly across the Carrai plateau. • Species recorded within the PCT, which are consistent with the EEC, include Prickly Tea-tree (*Leptospermum juniperinum*) and Tantoon (*Leptospermum polygalifolium*), Coral Heath (*Epacris microphylla*), *Juncus* spp., Saw-sedge (*Gahnia* sp.). *Lepyrodia* sp. and *Schoenus* sp.*, Gonocarpus micranthus,* Snowgrass (*Poa sieberiana*) and *Sphagnum cristatum*. • The EEC is the only type of wetland that may contain more than trace amounts of *Sphagnum* spp. Sphagnum was recorded in the plot data, albeit in trace amounts. Based on the above, it is concluded that PCT 1287 is part of the Montane Peatlands and Swamps EEC.
Estimate of percent cleared value of PCT across its distribution	30%
Patch size	High: >100 ha

5.3.3 Vegetation integrity scores

Ten PCTs occur in the disturbance footprint, with vegetation zones mapped and/or entered into the credit calculator to determine vegetation integrity scores. A summary of the vegetation integrity score for each vegetation zone is provided in Table 5.14. The vegetation integrity score is based on the plot data which is compared with benchmark values for each vegetation type.

Table 5.15 Vegetation zone and impact summary

PCT ID	PCT name	Vegetation zones	Extents within disturbance footprint (ha)	Indirect impacts (ha)	Vegetation integrity score
762	Cabbage Gum open forest or woodland on flats of the North Coast	Moderate	0.5	0.6	63.1
		DNG Moderate	0.2	0.5	11.7
		Poor	0.3	0.3	23.3
		Exotic Grassland	0.5		1.9

Table 5.15 Vegetation zone and impact summary

PCT ID	PCT name	Vegetation zones	Extents within disturbance footprint (ha)	Indirect impacts (ha)	Vegetation integrity score
780	Coastal floodplain sedgelands, rushlands, and forblands of the North Coast	Moderate	0.1	0.1	10.7
822	Eurabbie tall open forest of the escarpment ranges of the NSW North Coast Bioregion	High	11.1	10.2	75.1
842	Forest Redgum – Broad-leaved Apple dry open forest of the gorges of NSW North Coast Bioregion	High	149.0	91.2	73
		DNG Moderate	35.2	13.2	12.1
		Poor	1.5	2.7	48.8
		Exotic Grassland	6.7	8.5	0.6
868	Grey gum – stringybark open forest of the gorges of the NSW North Coast Bioregion and New England Tableland Bioregion	High	58.1	23.8	77.6
		Dry	4.4	5.4	72.2
1106	River Oak riparian woodland of the NSW North Coast Bioregion and northern Sydney Basin Bioregion	High	0.1	0.4	54.5
		Moderate	0.8	1.5	75.5
		Moderate RF	0.4	0.4	62.7
1142	Shatterwood – Giant Stinging Tree – Yellow Tulipwood dry rainforest of the NSW North Coast Bioregion and northern Sydney Basin Bioregion	Moderate	5.0	0.5	37.6
1215	Spotted Gum – Grey Ironbark open forest of the Macleay Valley lowlands of the NSW North Coast Bioregion	High	51.7	60.1	64.9
		DNG Moderate	1.2	0.4	41
1268	Tallowwood open forest of the coastal ranges of the NSW North Coast Bioregion	High	1.1	1.0	72.7

Table 5.15 Vegetation zone and impact summary

PCT ID	PCT name	Vegetation zones	Extents within disturbance footprint (ha)	Indirect impacts (ha)	Vegetation integrity score
1287	Upland heath swamps of the New England Tableland Bioregion	High	0.03	0.2	19.7[2]

5.3.4 Threatened ecological communities

Candidate TECs were identified in Section 1.1.1 through review of the TEC associations in the BioNet Vegetation Classification database (DPE, 2022) for PCTs recorded in the disturbance footprint. A summary is provided in Table 5.15 for TECs listed under the BC Act and Table 5.16 for TECs listed under the EPBC Act.

Table 5.16 BC Act threatened ecological communities within the disturbance footprint by vegetation zone

PCT ID	PCT Name	TEC Name	Vegetation zones consistent with TEC	Extent in disturbance footprint (ha)
762	Cabbage Gum open forest or woodland on flats of the North Coast	Subtropical Coastal Floodplain Forest of the New South Wales North Coast Bioregion (BC Act)	Moderate, Poor, DNG Moderate	1 Please note this TEC was not associated with Carrai Plateau and Macleay Gorges IBRA sub-regions and therefore could not be included in the BAM-C. Therefore, credits have only been generated for the PCT only, not the TEC. For this assessment we have associated this TEC with these IBRA sub-regions.
780	Coastal floodplain sedgelands, rushlands, and forblands of the North Coast	Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions (BC Act)	Moderate	0.1
1106	River Oak riparian woodland of the NSW North Coast Bioregion and northern Sydney Basin Bioregion	Subtropical Coastal Floodplain Forest of the New South Wales North Coast Bioregion (BC Act)	Moderate, High	0.9 Please note this TEC was not associated with Carrai Plateau and Macleay Gorges IBRA sub-regions and therefore could not be included in the BAM-C. Therefore, credits have only been generated for the PCT only, not the TEC. For this assessment we have associated this TEC with these IBRA sub-regions.

[2] The lower than expected vegetation integrity score is due to the partial clearing of the area in which one plot was undertaken. It is also due to a low species diversity in the other plot undertaken. The plots were undertaken in these areas due to the constraints of the construction envelope. More representative areas of this PCT are likely found outside the construction envelope. The vegetation integrity score has been set to benchmark condition to account for this.

Table 5.16 BC Act threatened ecological communities within the disturbance footprint by vegetation zone

PCT ID	PCT Name	TEC Name	Vegetation zones consistent with TEC	Extent in disturbance footprint (ha)
		Lowland Rainforest on Floodplain in the New South Wales North Coast Bioregion (BC Act)	Moderate RF	0.4 Please note this TEC was not associated with Carrai Plateau and Macleay Gorges IBRA sub-regions and therefore could not be included in the BAM-C. Therefore, credits have only been generated for the PCT only, not the TEC. For this assessment we have associated this TEC with these IBRA sub-regions.
1142	Shatterwood – Giant Stinging Tree – Yellow Tulipwood dry rainforest of the NSW North Coast Bioregion and northern Sydney Basin Bioregion	Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions (BC Act)	Moderate	5.0 This TEC was not associated with PCT 1142, or the Carrai Plateau and Macleay Gorges IBRA sub-regions. For this assessment it has been associated with PCT 1142 and Macleay Gorges IBRA sub-region. This TEC association could not be entered into the BAM-C. Therefore, credits have only been generated for the PCT only, not the TEC.
1287	Upland heath swamps of the New England Tableland Bioregion	Montane Peatlands and Swamps of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands and Australian Alps bioregions	High	0.03

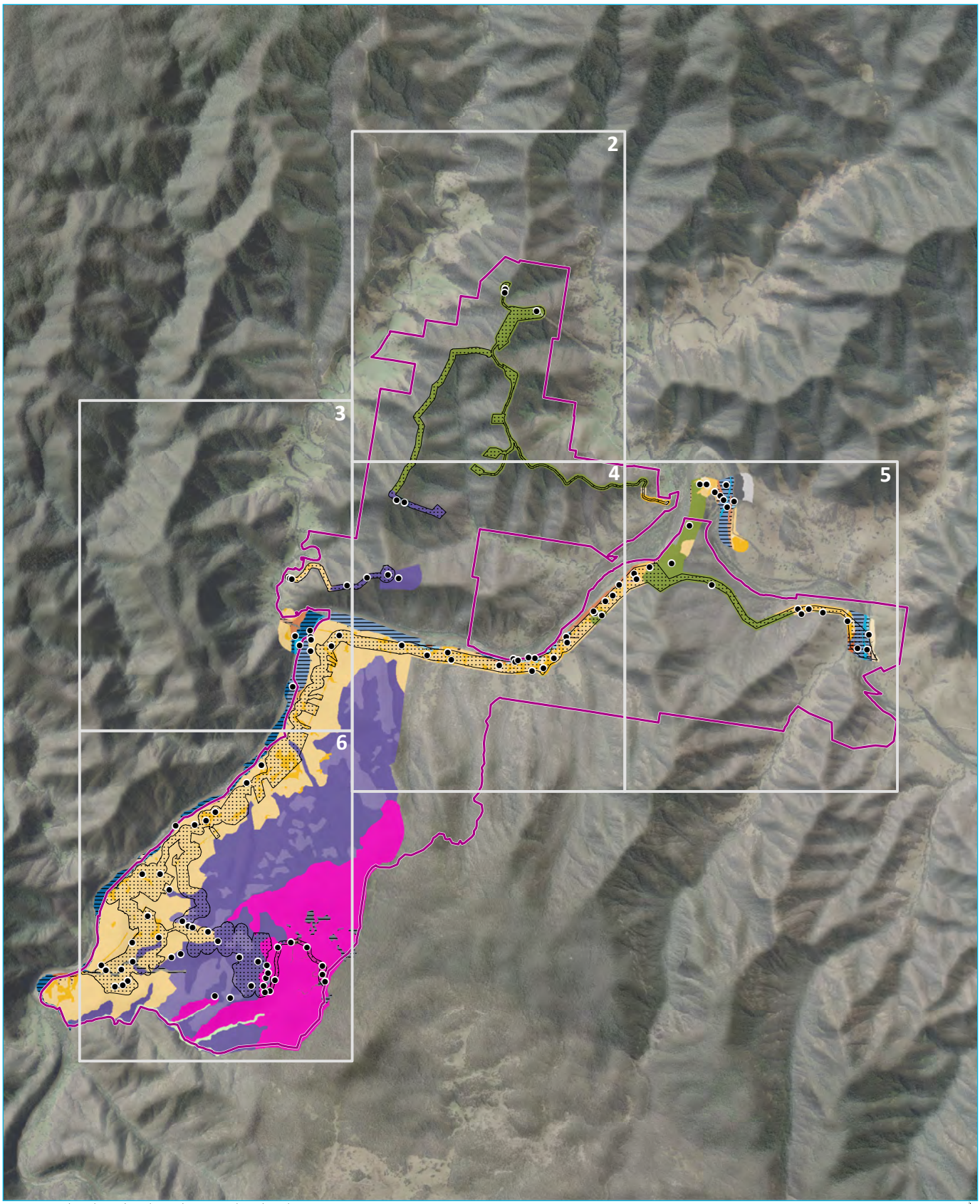
Table 5.17 EPBC Act threatened ecological communities within the disturbance footprint by vegetation zone

PCT ID	PCT Name	TEC Name	Vegetation zones consistent with TEC	Extent in disturbance footprint (ha)
762	Cabbage Gum open forest or woodland on flats of the North Coast	Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions (EPBC Act)	Moderate (part), Poor (part)	0.4

i Areas not considered to be part of a TEC

The EPBC Act listed TECs predicted to occur in the locality based on searches of the PMST were also considered:

- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland:
  - This CEEC was determined not to occur within the construction envelope. There is no PCT within the construction envelope that is dominated or co-dominated by the diagnostic species (i.e. White Box (*Eucalytpus albens*), Yellow Box (*Eucalyptus melliodora*), or Blakely's Red Gum (*Eucalyptus blakelyi*)) for this CEEC. Exceptions to this apply for ecological communities located in the Nandewar Bioregion. As the site is not located in the Nandewar Bioregion, this is not considered relevant (DEH, 2006).
- Lowland Rainforest of Subtropical Australia:
  - This CEEC was determined not to occur within the construction envelope as no PCTs within the construction envelope meet the species richness required. The justification for not including this CEEC is discussed in Table 5.9 as this CEEC was also identified in the BioNet Vegetation Classification database (DPE, 2022a), and Table 5.10 as PCT 1142 is floristically similar to the CEEC.
- Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland:
  - This EEC was determined not to occur within the construction envelope for two reasons. Firstly, this EEC occurs within 20 km of the coast while the Project area is located approximately 65 km from the coast. Secondly, the canopy species within this EEC are dominated by Melaleuca spp. and/or Swamp Mahogany (*Eucalyptus robusta*). This canopy composition is not reflective of any of the PCTs located on site (DAWE, 2021).
- New England Peppermint (*Eucalyptus nova-anglica*) Grassy Woodlands:
  - This CEEC was determined not to occur within the construction envelope as one of the key diagnostic requirements for this CEEC is an overstory dominated or co-dominated by New England Peppermint (*Eucalyptus nova-anglica*) (NSW TSSC 2011d). This does not correlate with any of the PCTs identified on site.



Source: EMM (2023); ABS (2021); DFSI (2020, 2021); GA (2011)

0 1 2 km

GDA 1994 MGA Zone 56

N

KEY

- Project area
- Construction envelope
- BAM plot location
- River/stream
- Track/road
- Threatened ecological community
- BC Act
- EPBC Act

PCTID | Condition

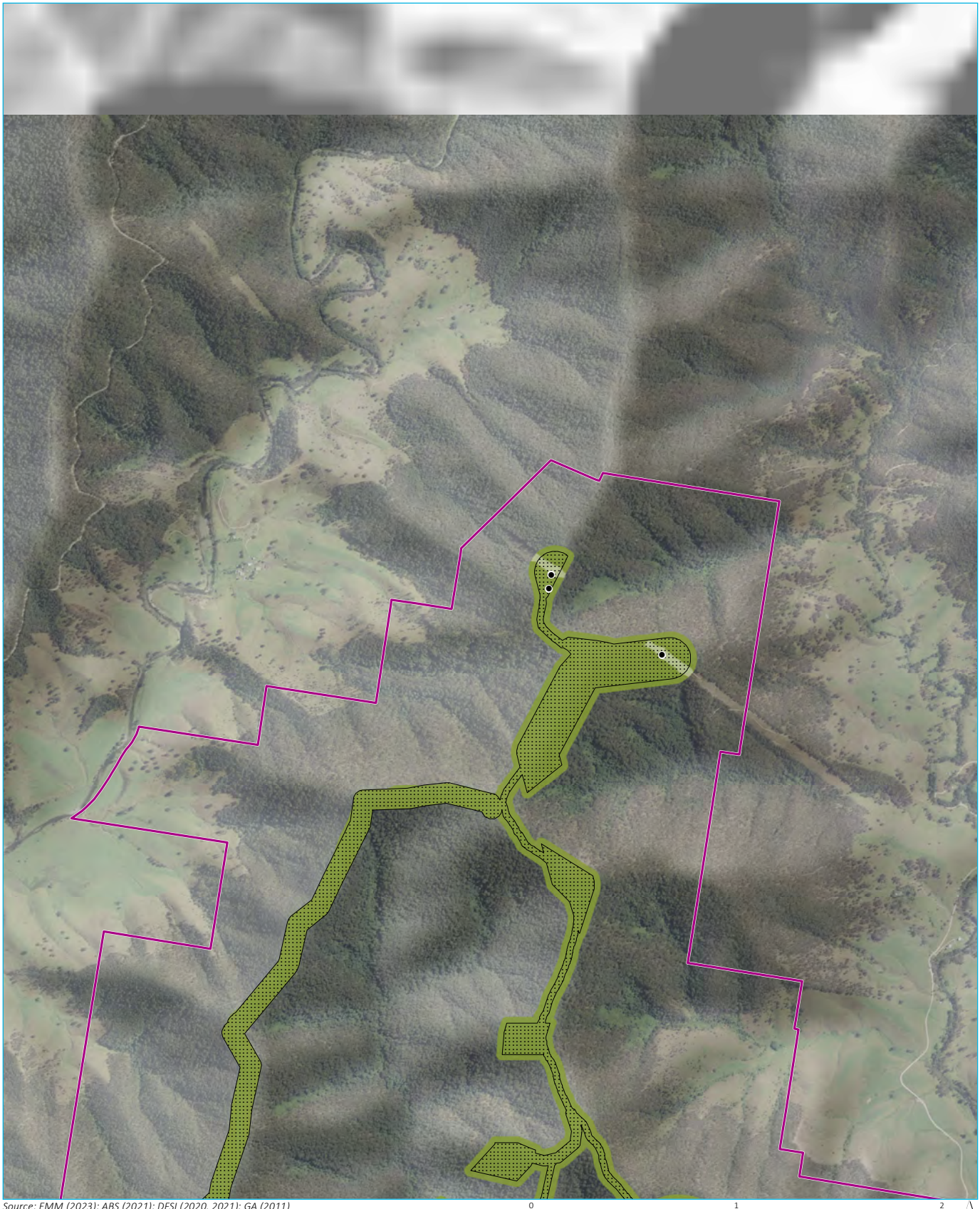
- 1106 | High
- 1106 | Moderate
- 1106 | Moderate RF
- 1106 | Poor RF
- 1142 | High
- 1215 | DNG Moderate
- 1215 | High
- 1268 | High
- 1287 | High
- 1549 | DNG Moderate
- 1549 | High
- 762 | DNG Moderate
- 762 | EG
- 762 | Moderate
- 762 | Poor
- 780 | Moderate
- 822 | High
- 842 | DNG Moderate
- 842 | EG
- 842 | High
- 842 | Poor
- 868 | Dry
- 868 | High

Native vegetation
Map 1 of 6

Oven Mountain Pumped Hydro Energy Storage Project
Biodiversity development assessment report
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Figure 5.1

EMM creating opportunities

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Source: EMM (2023); ABS (2021); DFSI (2020, 2021); GA (2011)

0 1 2 km

GDA 1994 MGA Zone 56

N

KEY

- Project area
- Construction envelope
- BAM plot location

PCTID | Condition

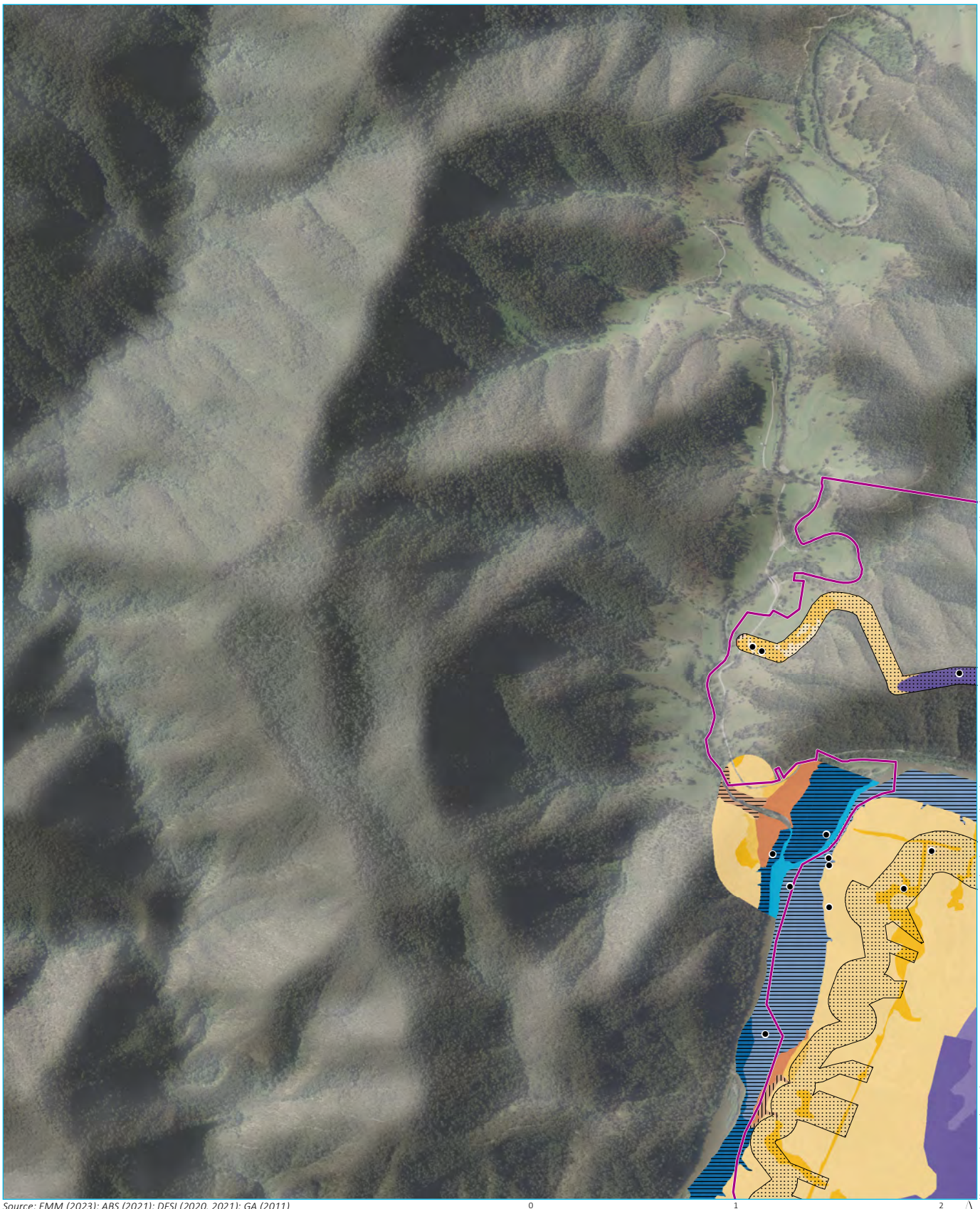
- 1215 | DNG Moderate
- 1215 | High

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Native vegetation
Map 2 of 6

Oven Mountain Pumped Hydro Energy Storage Project
Biodiversity development assessment report
OMPS Pty Ltd
Figure 5.1

EMM
creating opportunities



Source: EMM (2023); ABS (2021); DFSI (2020, 2021); GA (2011)

0 1 2 km

GDA 1994 MGA Zone 56

N

KEY

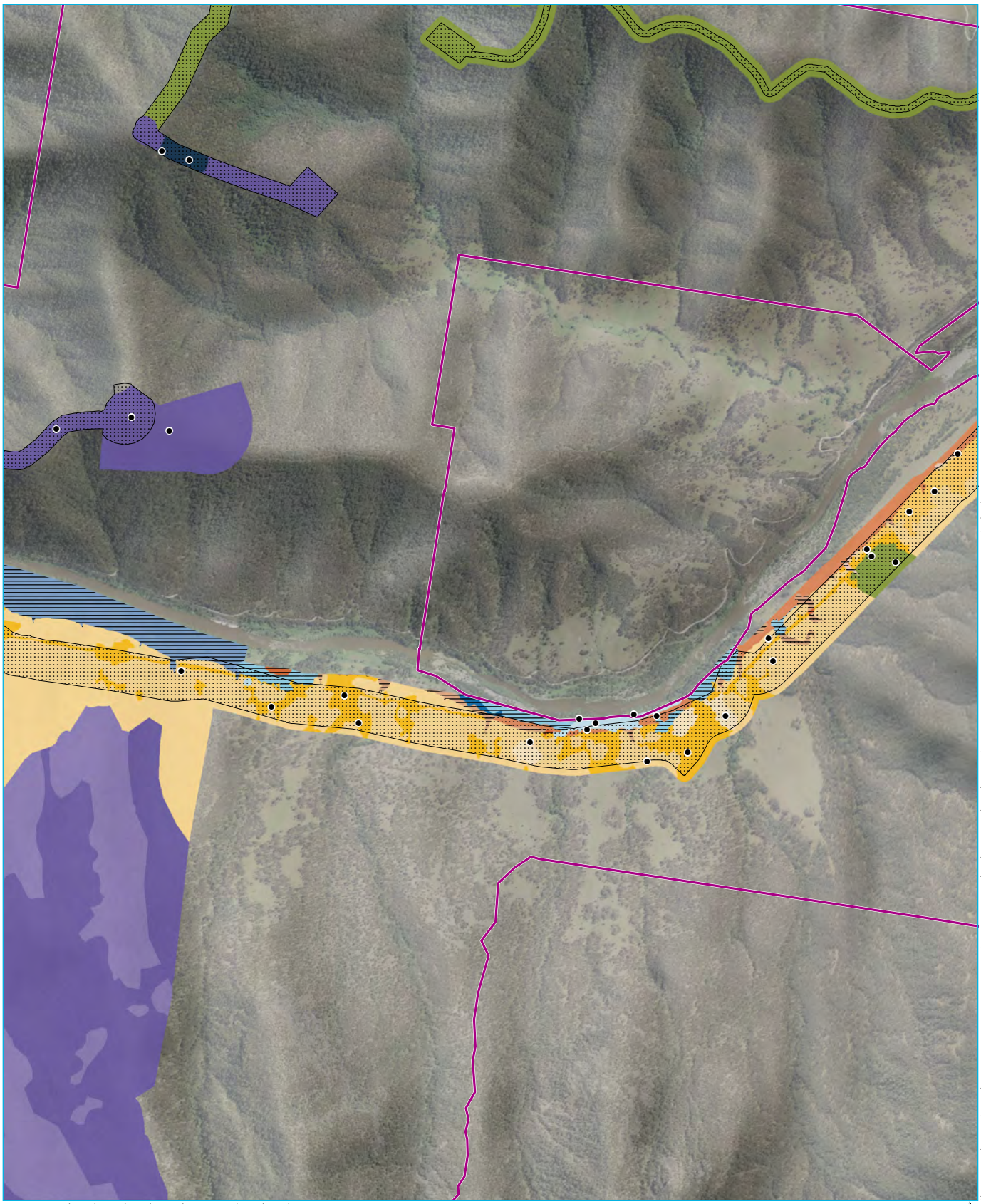
- Project area
- Construction envelope
- BAM plot location
- River/stream
- Threatened ecological community
- BC Act
- EPBC Act
- PCTID | Condition
- 1106 | High
- 1106 | Moderate
- 762 | EG
- 762 | Moderate
- 762 | Poor
- 842 | DNG Moderate
- 842 | EG
- 842 | High
- 842 | Poor
- 868 | Dry
- 868 | High

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Native vegetation
Map 3 of 6

Oven Mountain Pumped Hydro Energy Storage Project
Biodiversity development assessment report
OMPS Pty Ltd
Figure 5.1

EMM
creating opportunities



Source: EMM (2023); ABS (2021); DFSI (2020, 2021); GA (2011)

0 1 2 km

GDA 1994 MGA Zone 56

N

KEY

- Project area
- Construction envelope
- BAM plot location

Threatened ecological community

- BC Act

PCTID | Condition

- 1106 | High
- 1106 | Moderate
- 1106 | Moderate RF
- 1106 | Poor RF
- 1215 | High
- 1268 | High
- 762 | DNG Moderate
- 762 | EG
- 762 | Moderate
- 762 | Poor
- 842 | DNG Moderate
- 842 | EG
- 842 | High
- 842 | Poor
- 868 | Dry
- 868 | High

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Native vegetation
Map 4 of 6

Oven Mountain Pumped Hydro Energy Storage Project
Biodiversity development assessment report
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Figure 5.1

EMM
creating opportunities



Source: EMM (2023); ABS (2021); DFSI (2020, 2021); GA (2011)

0 1 2 km

GDA 1994 MGA Zone 56

N

KEY

- Project area
- Construction envelope
- BAM plot location
- River/stream
- Track/road
- Threatened ecological community
- BC Act
- EPBC Act

PCTID | Condition

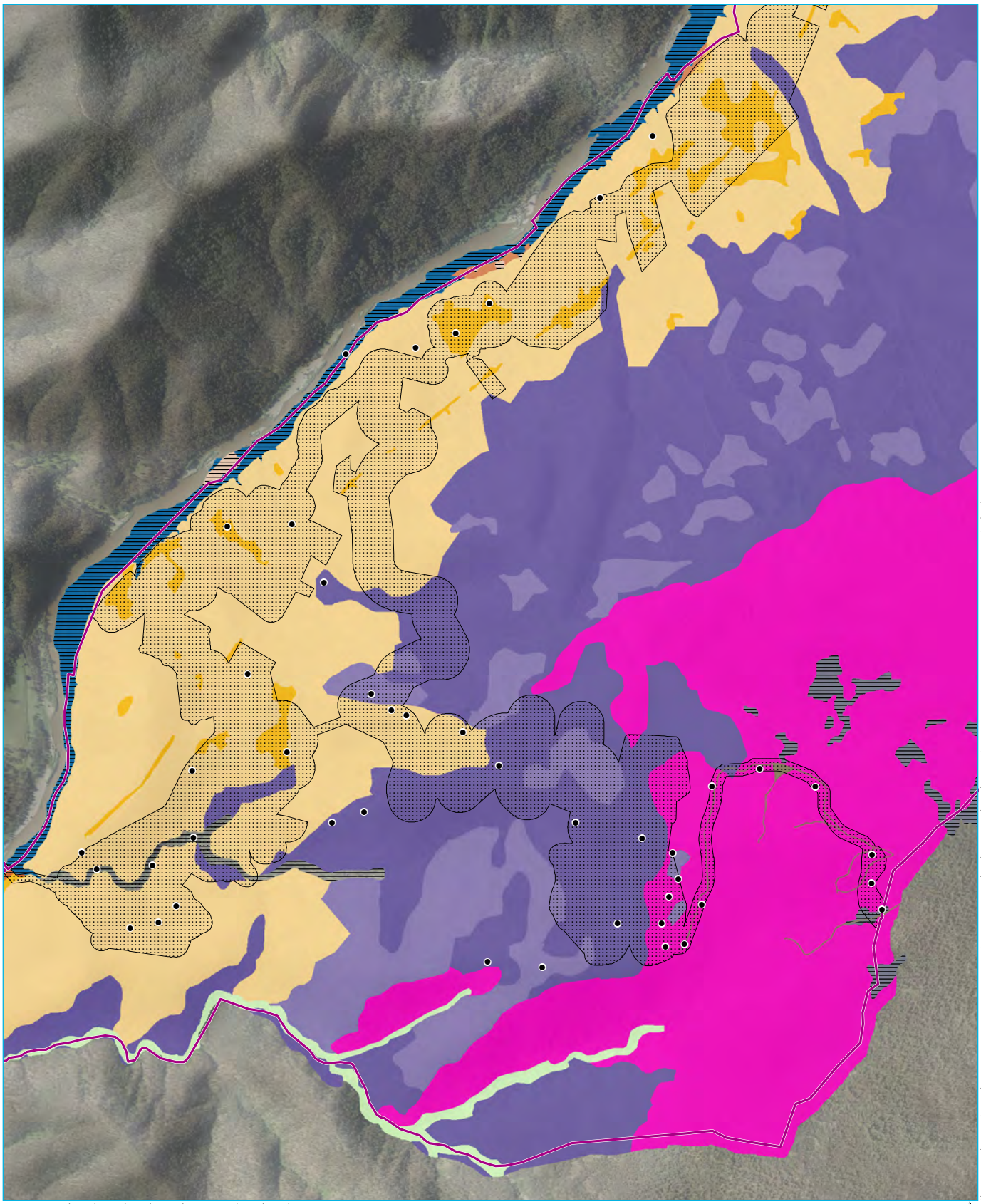
- 1106 | High
- 1106 | Moderate
- 1106 | Moderate RF
- 1215 | High
- 1549 | DNG Moderate
- 1549 | High
- 762 | DNG Moderate
- 762 | EG
- 762 | Moderate
- 762 | Poor
- 780 | Moderate
- 842 | DNG Moderate
- 842 | EG
- 842 | High
- 842 | Poor

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Native vegetation
Map 5 of 6

Oven Mountain Pumped Hydro Energy Storage Project
Biodiversity development assessment report
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Figure 5.1

EMM
creating opportunities



Source: EMM (2023); ABS (2021); DFSI (2020, 2021); GA (2011)

0 1 2 km

GDA 1994 MGA Zone 56

N

KEY

- Project area
- Construction envelope
- BAM plot location
- Track/road

Threatened ecological community

- BC Act

PCTID | Condition

- 1106 | High
- 1142 | High
- 1287 | High
- 762 | DNG Moderate
- 762 | EG
- 762 | Poor
- 822 | High
- 842 | DNG Moderate
- 842 | EG
- 842 | High
- 868 | Dry
- 868 | High

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Native vegetation
Map 6 of 6

Oven Mountain Pumped Hydro Energy Storage Project
Biodiversity development assessment report
OMPS Pty Ltd
Figure 5.1

EMM creating opportunities

6 Threatened species

6.1 Threatened species habitat description

Concurrent with the vegetation mapping, a habitat assessment was undertaken seeking to identify the following threatened species habitat features within the Project area:

- habitat trees including large hollow bearing trees
- availability of flowering shrubs and feed tree species
- waterway condition
- quantity of ground litter and logs
- searches for indirect evidence.

The majority of the Project area is vegetated with disturbance limited to areas where there has been historical use for logging and areas of lower elevation along the Macleay which have been subject to low level clearing associated with grazing activities.

The Project area contains an abundance of fauna habitat features such as cliffs, rocky areas and gorges, suitable to provide refuge habitat for a number of threatened species. Hollow bearing trees are mostly restricted to the steep hills and rocky areas, including along gorges and steeper creek lines, inaccessible for logging. Features, such as fallen timber, are still prevalent throughout the Project area after the 2019/2020 bushfires, with higher abundances associated with areas less impacted by the fires such as creek lines and gorges. The Project area has a very high level of connectivity with surrounding National Parks and forested private properties.

The two reservoirs and associated ancillary facilities are located on a western facing aspect of the Carrai Plateau. As a result, vegetation comprises dry sclerophyll forests with only small areas of remnant rainforest and wetter sclerophyll forests generally restricted to creek lines associated with the Macleay River. As such, associated rainforest species that would be found in the local area would be considered less frequent along the western facing aspects of the Plateau.

Areas of higher elevation, on upper slopes and on the Carrai Plateau, provide a cooler climate and support a mix of escarpments, rocky outcrops, cliffs and steep sections with exposed rock, along with flatter topography on the upper slopes and plateau. These areas support tall forests with a dense groundcover and moderate shrub density, providing suitable coverage for fauna species; these areas also contained the largest number of mature trees and hollows. Escarpments and rocky areas were less vegetated due to shallow soils. Wetter areas of flatter topography on the Carrai Plateau support bogs and fens. These upper slopes contained the least amount of disturbance and are considered suitable to support an array of threatened species.

The lower slopes in the southern section of the Project area had more evidence of impacts from human disturbance, such as grazing, and supported a higher amount of weed species. Minimal areas of clearance for grazing were observed, yet fewer mature trees that support hollows are located in this section, even in areas of higher ground and down steeper slopes. Shrub and ground cover varied in sections; steep aspects were drier and dominated by grass cover, lacking shrubs, while shaded, wetter areas, generally on an east or southern aspect, were observed to contain a higher cover of dense shrubs. The area contained large areas of rocky sections, steep gorges and ephemeral creeks that only flowed during high rainfall. Two creeks contained pooling that may hold water for longer periods after the creeks cease flowing.

The Macleay River flows from south to north along the western boundary of the Project area, turning to the east at Georges Junction. Habitat along the Macleay River includes small open grassland areas used for low intensity grazing. This area contained a limited amount of large hollow bearing trees with such trees limited to riparian zones and fields in the furthest eastern section of the Project area. The shrub layer was open with some small areas containing dense thickets of *Melaleuca* sp. Habitat along the floodplain contained areas of steep rocky slopes that lead to flatter areas of the flood plain that was largely covered by long grasses and weed species. A large number of 1st to 3rd order creeks flow from the higher elevations into the Macleay River. Some creek lines contained remnant rainforest patches, though mostly adjacent to the Macleay River; these creeks are impacted by weed species. Areas along the floodplain were also observed to be impacted by higher cover of weed species. Shrub species, excluding weed species, were observed to be less dominant in this area with groundcover largely comprising grasses, forbs and weeds.

North of the Macleay River the Project area rises from the Macleay River valley to a ridgeline with various aspects. Steep gullies and slopes with an easterly aspect contain wet sclerophyll forests habitat in gullies with rainforest habitat in lower elevation areas. For the other aspects, habitat was dry and in places contained areas of thick climbers and shrubs that have recolonised after the 2019/2020 bush fires. This area contains some mature trees with hollows, with the understorey largely intact with thick shrub and groundcover. This habitat was considered to provide suitable habitat to support various threatened species.

6.2 Ecosystem credit species

Ecosystem credits species are threatened species that can be reliably predicted to use an area of land based on habitat surrogates. For the purposes of the BAM (DPIE 2020a), ecosystem credit species are deemed to be offset through the habitat surrogates (PCTs) in which they occur.

A list of ecosystem credit species predicted to occur within the Project area, based on the PCTs present and generated by the calculator associated within the BAM is provided in Table 6.1. The potential for these species to occur within the Project area was assessed in accordance with Section 5.2.2 of the BAM (DPIE 2020a).

Table 6.1 Assessment of ecosystem credit species within the Project area

Scientific name	Common name	Associated PCTs	Habitat constraint	Geographic constraint	Justification for addition or exclusion
Amaurornis moluccana	Pale-vented Bush-hen	1106 and 1268	-	North of South West Rocks	Excluded, geographic limitation is north of South West Rocks.
Anthochaera phrygia	Regent Honeyeater (Foraging)	842, 868, 1106 and 1215	-	-	Included based on associated PCT(s) and IBRA subregion.
Artamus cyanopterus cyanopterus	Dusky Woodswallow	768, 842, 868, 822, 1106, 1268 and 1287	-	-	Included based on associated PCT(s) and IBRA subregion.
Botaurus poiciloptilus	Australasian Bittern	1106 and 1287	• Waterbodies. • Brackish or freshwater wetlands.	-	Excluded, no waterbodies with brackish or freshwater wetlands in the Project area suitable to support this species.
Chalinolobus nigrogriseus	Hoary Wattled Bat	762, 842, 868, 1106 and 1268	-	-	Included based on associated PCT(s) and IBRA subregion.

Table 6.1 Assessment of ecosystem credit species within the Project area

Scientific name	Common name	Associated PCTs	Habitat constraint	Geographic constraint	Justification for addition or exclusion
Chthonicola sagittata	Speckled Warbler	762, 842, 868 and 1215	-	-	Included based on associated PCT(s) and IBRA subregion.
Circus assimilis	Spotted Harrier	1106 and 1287	-	-	Included based on associated PCT(s) and IBRA subregion.
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	762, 842, 868, 1106, 1215 and 1268	-	-	Included based on associated PCT(s) and IBRA subregion.
Coracina lineata	Barred Cuckoo-shrike	762, 842, 868, 1106, 1215 and 1268	-	-	Included based on associated PCT(s) and IBRA subregion.
Daphoenositta chrysoptera	Varied Sittella	762, 842, 868, 822, 1106, 1215 and 1268	-	-	Included based on associated PCT(s) and IBRA subregion.
Dasyurus maculatus	Spotted-tailed Quoll	762, 842, 868, 822, 1106, 1215 and 1268	-	-	Included based on associated PCT(s) and IBRA subregion.
Ephippiorhynchus asiaticus	Black-necked Stork	1106 and 1287	• Swamps. • Shallow lakes, lake margins and estuaries within 300 m of these waterbodies.	-	Excluded, no swamps, shallow freshwater, shallow lakes or estuaries within the Project area suitable to support this species.
Falsistrellus tasmaniensis	Eastern False Pipistrelle	762, 842, 868, 822, 1106 and 1268	-	-	Included based on associated PCT(s) and IBRA subregion.
Glossopsitta pusilla	Little Lorikeet	762, 842, 868, 1106, 1215 and 1268	-	-	Included based on associated PCT(s) and IBRA subregion.
Hirundapus caudacutus	White-throated Needletail	762, 842, 868, 822, 1106, 1215, 1268 and 1287	-	-	Included based on associated PCT(s) and IBRA subregion.

Table 6.1 Assessment of ecosystem credit species within the Project area

Scientific name	Common name	Associated PCTs	Habitat constraint	Geographic constraint	Justification for addition or exclusion
Ixobrychus flavicollis	Black Bittern	1106	• Waterbodies. • Land within 40 m of freshwater and estuarine wetlands, in areas of permanent water and dense vegetation.	-	Excluded, Project area not within 40 m of freshwater and estuarine wetlands with dense vegetation suitable to support this species.
Lathamus discolor	Swift Parrot (Foraging)	762, 842, 868, 1106, 1215 and 1268	-	-	Included based on associated PCT(s) and IBRA subregion.
Lophoictinia isura	Square-tailed Kite (Foraging)	762, 842, 868, 822, 1106, 1215 and 1268	-	-	Included based on associated PCT(s) and IBRA subregion.
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	762, 842, and 868	-	-	Included based on associated PCT(s) and IBRA subregion.
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	762, 842, 868, 1106, 1215 and 1268	-	-	Included based on associated PCT(s) and IBRA subregion.
Neophema pulchella	Turquoise Parrot	842, 868, and 1106	-	-	Included based on associated PCT(s) and IBRA subregion.
Petaurus australis	Yellow-bellied Glider	762, 842, 868, 822, 1215 and 1268	• Hollow bearing trees. • Hollows >25 cm diameter.	-	Included based on associated PCT(s) and IBRA subregion and presence of habitat constraints.
Petroica boodang	Scarlet Robin	762, 842, 868, 822, 1106, 1215 and 1287	-	-	Included based on associated PCT(s) and IBRA subregion.
Petroica phoenicea	Flame Robin	762 and 1287	-	-	Included based on associated PCT(s) and IBRA subregion.
Phoniscus papuensis	Golden-tipped Bat	868, 1106 and 1268	-	-	Included based on associated PCT(s) and IBRA subregion.
Pseudomys gracilicaudatus	Eastern Chestnut Mouse	842, 868, 822, 1106 and 1268	-	-	Included based on associated PCT(s) and IBRA subregion.

Table 6.1 Assessment of ecosystem credit species within the Project area

Scientific name	Common name	Associated PCTs	Habitat constraint	Geographic constraint	Justification for addition or exclusion
Pseudomys oralis	Hastings River Mouse	None	-	-	Not predicted by BAM-C as no associated PCTs present, but species included as it was recorded within the construction envelope.
Ptilinopus magnificus	Wompoo Fruit-Dove	None	-	-	Not predicted by BAM-C as no associated PCTs present, but species included as it was recorded within the construction envelope.
Ptilinopus superbus	Superb Fruit-Dove	1106	-	-	Included based on associated PCT(s) and IBRA subregion.
Rostratula australis	Australian Painted Snipe	1106	-	-	Excluded, as this species is associated with wetland and marsh habitat which is absent within the Project area.
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	762, 842, 868, 822, 1106, 1215, 1268 and 1287	-	-	Included based on associated PCT(s) and IBRA subregion.
Scoteanax rueppellii	Greater Broad-nosed Bat	762, 842, 868, 822, 1106, 1215 and 1268	-	-	Included based on associated PCT(s) and IBRA subregion.
Stagonopleura guttata	Diamond Firetail	762, 842, 868, 1106 and 1215	-	North of Kempsey and west of Skillion Nature Reserve.	Included based on associated PCT(s) and IBRA subregion and within geographic constraint.
Stictonetta naevosa	Freckled Duck	1106	-	-	Included based on associated PCT(s) and IBRA subregion.
Syconycteris australis	Common Blossom-bat	1268	-	-	Included based on associated PCT(s) and IBRA subregion.

6.3 Species credit species

6.3.1 Candidate species assessment

In accordance with Step 3 (Section 5.2.3 of BAM (DPIE 2020a)), a field assessment of habitat constraints and microhabitats was undertaken in the field to determine the suitability of habitat within the Project area for:

- predicted species (ecosystem credit species associated with recorded PCTs, predicted by the BAM Calculator (BAMC))
- candidate species (species credit species associated with specific geographic and landscape feature constraints)
- species predicted to occur by the EPBC Act Protected Matters Search Tool.

Candidate species predicted by the BAMC are shown in Table 6.2. An assessment of the geographic and landscape constraints has been provided for each species, with a justification provided where species have been excluded, in accordance with Steps 1 to 3 (Section 5.2.1 to 5.2.3) of the BAM.

Table 6.2 Candidate threatened species assessment

Step 1 – Identify threatened species for assessment		Step 2 – Assessment of habitat constraints						Step 3 – Identify candidate species for further assessment
Scientific name	**Common name**	**Associated PCT**	**Habitat constraints**	**Habitat degraded**	**Geographic constraints**	**Vagrant species**	**Constraint present in Project area?**	**Candidate species (yes/no) and rationale**
Flora								
Acacia courtii	North Brother Wattle	1268	-	-	Queens Lake (Laurieton) to Johns River	-	No	Excluded. Project area is outside of its geographic restriction.
Asperula asthenes	Trailing Woodruff	762, 868 and 1106	-	-	-	-	-	Included. Microhabitat: Occurs in damp sites, often along riverbanks. This species is associated with PCTs located in the Macleay Hastings IBRA subregion. The stream and creek lines that run into the Maclear River are ephemeral, with rocky areas that can trap areas of water creating small areas of damp habitat that may be suitable for this species. Species excluded from exotic grasslands.
Banksia conferta	*Banksia conferta*	842	-	-	West of the Pacific Highway, south of Oxley Highway and south and east of the Wauchope to Wingham Road	-	No	Excluded. Project area is outside of its geographic restriction.
Bertya ingramii	*Narrow-leaved Bertya*		• Cliffs. • Or within 20 m/escarpments. • Or within 20 m/rocky areas. • Or within 20 m.	-	-	-	Yes	Included. Microhabitat: Grows among rocks or in thin soils close to cliff-edges in dry woodland with she-oaks, wattles and tea-trees.
Callistemon pungens	*Callistemon pungens*	No associated PCT	-	-	-	-	-	Included. Microhabitat: Grows along rivers and creeks. The Project area contains suitable habitat for this species.
Chiloglottis platyptera	Barrington Tops Ant Orchid	868	-	-	-	-	-	Included. Microhabitat: The species grows in moist areas in tall open eucalypt forest with a grassy understorey, and also around rainforest edges, generally on rich brown loam soils above 500 m. The Project area contains suitable habitat for this species.
Cryptostylis hunteriana	Leafless Tongue Orchid	842, 868, 1106, 1215 and 1268	-	-	-	-	-	Included. Does not appear to have well defined habitat preferences and is known from a range of communities, including swamp-heath and woodland. The Project area contains suitable habitat for this species.
Cynanchum elegans	White-flowered Wax Plant	842 and 1215	-	-	-	-	-	Included. Microhabitat: Usually occurs on the edge of dry rainforest vegetation. The Project area contains suitable habitat for this species.
Dendrobium melaleucaphilum	Spider orchid	1106	-	-	-	-	-	Included. Microhabitat: Grows frequently on *Melaleuca stypheliodes*, less commonly on rainforest trees or on rocks in coastal districts. The Project area contains marginal habitat for this species, with a general lack of suitable host trees or habitat. Areas of DNG and exotic grassland that lack any canopy species are considered unsuitable for this species. Species excluded from DNG and exotic grasslands.

Table 6.2 Candidate threatened species assessment

Step 1 – Identify threatened species for assessment		Step 2 – Assessment of habitat constraints						Step 3 – Identify candidate species for further assessment
Scientific name	**Common name**	**Associated PCT**	**Habitat constraints**	**Habitat degraded**	**Geographic constraints**	**Vagrant species**	**Constraint present in Project area?**	**Candidate species (yes/no) and rationale**
Diuris eborensis	*Diuris eborensis*	No associated PCT	-	-	-	-	-	Included. Microhabitat: Found mainly in damp grassland and woodland sites or in areas of sedge and swampy sites. Main locations are higher altitude. Project area contains some marginal habitat for this species.
Diuris disposita	Willawarrin Doubletail	1215 and 1268	-	-	-	-	-	Included. Species is only known from Willawarrin, not much is known about its habitat.
Diuris pedunculata	Small Snake Orchid	No associated PCT	-	-	-	-	-	Included. Microhabitat: Grows on grassy slopes or flats in peaty or mist areas. Also, can occur on shale and traps soils among boulders. Project contains habitat for this species.
Eucalyptus seeana - endangered population	*Eucalyptus seeana* population in the Greater Taree local government area	762, 842, 868, 1106, 1215, 1268 and 1287	-	-	Greater Taree LGA	-	No	Excluded. Project area is outside of its geographic restriction.
Eucalyptus magnificata	Northern Blue Box	842	-	-	-	-	-	Included. Microhabitat: Occurs in grassy open forests and woodlands on moderately hilly sites and at the edge of gorges, usually at altitudes from 900–1,050 m. Only a small area of the site occurs above 900 m on hilly terrain.
Euphrasia arguta	*Euphrasia arguta*	No associated PCT	-	-	-	-	-	Included. Microhabitat: Occurs in eucalypt forests with mixed grass and shrub understorey. Semi-parasitic species that attaches to roots of other plants. The Project area contains suitable habitat for this species.
Grevillea beadleana	Beadle's Grevillea	842	• Cliffs. • Or within 20 m of escapements or rocky areas. • Or within 200 m of these features.	-	-	-	Yes	Included. Microhabitat: Open eucalypt forest and woodland with a shrubby understorey on granite. The Project area contains suitable habitat for this species.
Grevillea guthrieana	Guthrie's Grevillea	842 and 868	-	-	-	-	-	Included. Microhabitat: Grows along creeks and cliff lines in eucalypt forest, on granitic or sedimentary soil. The Project area contains suitable habitat for this species.
Hakea archaeoides	Big Nellie Hakea	1268	-	-	2 disjunct populations (West of Pacific Highway and either (1) South of Macleay River and Dungay Creek and north of Oxley and Papinbarra rivers, or (2) South of Oxley Highway and south and east of Wauchope to Wingham Road)	-	No	Excluded. Project area is outside of its geographic restriction.

Table 6.2 Candidate threatened species assessment

Step 1 – Identify threatened species for assessment		Step 2 – Assessment of habitat constraints						Step 3 – Identify candidate species for further assessment
Scientific name	**Common name**	**Associated PCT**	**Habitat constraints**	**Habitat degraded**	**Geographic constraints**	**Vagrant species**	**Constraint present in Project area?**	**Candidate species (yes/no) and rationale**
Hakea fraseri	Gorge Hakea	842	• Rocky areas. • Rocky slopes of river gorges or gorge rims or within 50 m.	-	-	-	Yes	Included. Microhabitat: Mainly occurs on the dry and steep rocky slopes of river gorges. The Project area contains suitable habitat for this species.
Haloragis exalata subsp. *velutina*	Tall Velvet Sea-berry	842 and 868	-	-	-	-	-	Included. Microhabitat: Grows in damp places near watercourses and in woodland on the steep rocky slopes of gorges. Local occurrences of the species are from creek lines and the floor of a gully on rocky colluvial soil and alluvium. The project area contains suitable habitat for this species.
Hibbertia hexandra	Tree Guinea Flower	1268	-	-	-	-	-	Included. Microhabitat: Typically grows in heath, open forest or rainforest. The Project area contains suitable habitat for this species.
Lepidium peregrinum	Wandering Pepper Cress	No associated PCT	-	-	-	-	-	Included. Not associated with any PCTs on site. This species was recorded during targeted flora surveys. Restricted to the floodplain along the Macleay River, largely on the eastern bank.
Lindernia alsinoides	Noah's False Chickweed	762	• Damp areas or adjacent to riparian areas (including disturbed areas) or swamps). • Shallow, freshwater areas.	-	-	-	Yes	Included. Microhabitat: Grows in swamp forests and wetlands along coastal and hinterland creeks. Project area contains damp areas, but no swamp forests or wetlands along creek-lines.
Marsdenia longiloba	Slender Marsdenia	1268	-	-	-	-	-	Included. Microhabitat: Subtropical and warm temperate rainforest, lowland moist or open eucalypt forest adjoining rainforest and, sometimes, in areas with rock outcrops.
Maundia triglochinoides	*Maundia triglochinoides*		• Riparian areas/drainage lines, water ponding, man-made dams and drainage channels up to 1 m deep/Semi-permanent/ephemeral wet areas/Swamps • Shallow swamps up to 1 m deep/Waterbodies • Shallow waterbodies up to 1 m deep	-	-	-	Yes	Excluded. This species is restricted to coastal NSW and extending into southern Queensland. Microhabitats such as swamps, lagoons, dams, channels, creeks or shallow freshwater 30–60 cm deep on heavy clay, low nutrients are absent from the construction envelope.
Melaleuca biconvexa	Biconvex Paperbark	762, 1106, 1215 and 1268	-	-	South of Kempsey	-	No	Excluded. Project area is outside of its geographic restriction.
Melaleuca groveana	Grove's Paperbark	1215 and 1268	-	-	-	-	-	Included. Microhabitat: Grows in heath and shrubland, often in exposed sites, in low coastal hills, escarpment ranges and tablelands on outcropping granite, rhyolite and sandstone on rocky outcrops and cliffs. The Project area contains some suitable habitat to support this species.
Niemeyera whitei	Rusty Plum, Plum Boxwood	1268	-	-	-	-	-	Included. Microhabitat: Found in gully, warm temperate or littoral rainforests and the adjacent understorey of moist eucalypt forest. Occurs on poorer soils in areas below 600 m above sea level. The Project area contains some suitable habitat to support this species. Areas of DNG and exotic grassland are not considered suitable habitat for this species due to a lack of trees. Species excluded from DNG and exotic grasslands.

Table 6.2 Candidate threatened species assessment

Step 1 – Identify threatened species for assessment		Step 2 – Assessment of habitat constraints						Step 3 – Identify candidate species for further assessment
Scientific name	**Common name**	**Associated PCT**	**Habitat constraints**	**Habitat degraded**	**Geographic constraints**	**Vagrant species**	**Constraint present in Project area?**	**Candidate species (yes/no) and rationale**
Oberonia titania	Red-flowered King of the Fairies	1268	-	-	-	-	-	Included. Microhabitat: Occurs in littoral and subtropical rainforest and paperbark swamps, but it can also occur in eucalypt-forested gorges and in mangroves. The Project area contains some suitable habitat to support this species. Areas of DNG and exotic grassland do not support suitable host plants or rocky habitats for this species. Species excluded from DNG and exotic grasslands.
Parsonsia dorrigoensis	Milky Silkpod	1215 and 1268	-	-	-	-	-	Included. Microhabitat: Found in subtropical and warm-temperature rainforest, on rainforest margins, and in moist eucalypt forest up to 800 m, on brown clay soils. The Project area contains some suitable habitat to support this species.
Pomaderris queenslandica	Scant Pomaderris	1215 and 1268	-	-	-	-	-	Included. Microhabitat: Found in moist eucalypt forest or sheltered woodlands with a shrubby understorey, and occasionally along creeks. The Project area contains some suitable habitat to support this species. Areas of DNG and exotic grassland contain weed invasion and considered marginal habitat for this species. Species excluded from DNG and exotic grasslands.
Rhodamnia rubescens	Scrub Turpentine	Not associated with a PCT[1]	-	-	-	-	-	Included. Microhabitat: Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils. Not associated with any PCT; however, the Project area contains suitable habitat to support this species and specimens were recorded in the fringes of PCTs within the Project area. Areas of DNG and exotic grassland considered marginal habitat for this species. Species excluded from DNG and exotic grasslands.
Pultenaea rubescens	*Pultenaea* sp. Werrikimbe NP	Not associated with a PCT	• Swamps. • Swamp margins or creek edges/waterbodies. • Waterbody margins, drainage lines, creek edges or within 50 m.	-	-	-	Yes	Included. Microhabitat: The species grows in swampy drainage depressions in Eucalypt forest with a sparse canopy, with a ground layer of grasses, sedges and forbs, in sand over granite, at 900–1,030 m altitude (Barrett, In press). This species is not associated with any PCTs within the study area. Specimens of a *Pultenaea* sp. recorded on site during targeted surveys were been sent to herbarium for identification but could not be definitively identified at that time. At the time of survey, it was considered that the specimen could be Parris' Bush-pea (*Pultenaea parrisiae*) or an as yet undescribed *Pultenaea* spp. In July 2023 confirmation was received from the herbarium that the plants recorded on site were a new species for the genus. There is an existing phrase name for this taxon; *Pultenaea* sp. Werrikimbe NP. However, it is proposed to recognise this as a distinct species, *Pultenaea rubescens* (Barrett, In press).
Sarcochilus fitzgeraldii	Ravine Orchid		• Exposed rockfaces and vertical moist cliffs • Exposed rockfaces and boulders	-	-	-	Yes	Included. Microhabitat: Grows mainly on rocks, amongst organic matter, in cool, moist, shady ravines, gorges and on cliff faces in dense subtropical rainforest at altitudes between 500 and 700 m. The Project area contains some marginal habitat that may support this species.

Table 6.2 Candidate threatened species assessment

Step 1 – Identify threatened species for assessment		Step 2 – Assessment of habitat constraints						Step 3 – Identify candidate species for further assessment
Scientific name	**Common name**	**Associated PCT**	**Habitat constraints**	**Habitat degraded**	**Geographic constraints**	**Vagrant species**	**Constraint present in Project area?**	**Candidate species (yes/no) and rationale**
Senna acclinis	Rainforest Cassia	842, 868 and 1106	-	-	-	-	-	Included. Microhabitat: Grows on the margins of subtropical, littoral and dry rainforests. The project area contains suitable habitat to support this species. Areas of DNG and exotic grassland do not support shrubs likely to be *Senna* sp. and are considered marginal habitat for this species. Species excluded from DNG and exotic grasslands.
Tylophora woollsii	Cryptic Forest Twiner	Not associated with a PCT[1]	-	-	-	-	-	Included. Microhabitat: Grows in moist eucalypt forest, moist sites in dry eucalypt forest and rainforest margins. This species is not associated with any PCTs within the study area. A number of possible records of the species have been recorded during targeted surveys but could not be confirmed as Cryptic Forest Twiner on site. Specimens have been sent to herbarium for identification but could not be definitively identified due to a lack of fertile material. Response from the herbarium was "?*Tylophora woolsii* – your specimen is a good vegetative match for this species but in the absence of fertile material I can't confidently rule out all other *Apocyanaceae* taxa". Using the precautionary principle, the records on site will be assumed to be Cryptic Forest Twiner within the construction envelope.
Fauna								
Aepyprymnus rufescens	Rufous Bettong	762, 842, 868, 822, 1215 and 1268	-	-	-	-	-	Included. Microhabitat: Forest and woodland with a with a tussock grass understorey. A dense cover of tall native grasses is the preferred shelter. DNG and exotic grassland PCTs and fragment vegetation zones does not contain a dense cover of tall native grasses and these zones are considered unlikely to be potential habitat for this species. Other vegetation zones contain patches of dense ground layer vegetation and are considered potential habitat. Species excluded from DNG, exotic grasslands and fragmented zones.
Anthochaera phrygia	Regent Honeyeater (Breeding)	842, 868, 1106 and 1215	• As per mapped areas.	-	-	-	No	Excluded. Project area is not within mapped areas.
Argynnis hyperbius	Australian Fritillary		• Arrowhead Violet (*Viola betonicifolia*)	-	Within 15 km of coast	-	No	Excluded. Project area is outside of its geographic restriction and does not meet this species habitat constraints.
Burhinus grallarius	Bush Stone-curlew	762, 842, 868, 1106, 1215 and 1268	• Fallen/standing dead timber including logs.	-	-	-	Yes	Included. Microhabitat: Open forests and woodlands with a sparse grassy ground-layer and fallen timber. The majority of vegetation zones within project area support fallen/standing dead timber including logs. Areas of DNG and exotic grassland vegetation zones lack suitable habitat such as fallen timber and are unlikely suitable for this species. Species excluded from DNG and exotic grasslands.
Calidris canutus	Red Knot (Breeding)		• As per Important Habitat Map	-	-	-	No	Excluded Project area is not within mapped areas.

Table 6.2 Candidate threatened species assessment

Step 1 – Identify threatened species for assessment		Step 2 – Assessment of habitat constraints						Step 3 – Identify candidate species for further assessment
Scientific name	**Common name**	**Associated PCT**	**Habitat constraints**	**Habitat degraded**	**Geographic constraints**	**Vagrant species**	**Constraint present in Project area?**	**Candidate species (yes/no) and rationale**
Calyptorhynchus lathami	Glossy Black-Cockatoo (Breeding)	762, 842, 868, 822, 1215 and 1268	• Living or dead tree with hollows greater than 15 cm diameter and greater than 8 m above ground.	-	-	-	Yes	Included. Habitat constraint: Trees with hollows greater than 15 cm diameter and 8 m above ground level were sparse throughout the Project area, other than in unlogged old-growth forests, and absent from DNG and exotic grassland vegetation zones. Species excluded from DNG and exotic grasslands.
Carterornis leucotis	White-eared Monarch	1106	-	-	-	-	-	Included. Microhabitat: Occurs in rainforest, especially drier types, such as littoral rainforest, as well as wet and dry sclerophyll forests, swamp forest and regrowth forest. This species is associated with PCTs located in the Macleay Hastings IBRA subregion. The Project area contained dry sclerophyll forests that is considered suitable to support this species. Species excluded from DNG and exotic grasslands.
Cercartetus nanus	Eastern Pygmy-possum	762, 842, 868, 1106, 1215, 1268 and 1287	-	-	-	-	-	Included. Microhabitat: Woody vegetation with sheltering sites and a substantial component of food resources such as nectar and pollen from banksias, eucalypts and bottlebrushes or fleshy fruits. DNG, exotic grassland and fragmented vegetation zones provide very limited shelter or food resources due to a lack of hollow bearing trees or other potential shelter and/or the absence of a diverse suite of tree and shrub species and associated food resources. Species excluded from DNG and exotic grasslands.
Chalinolobus dwyeri	Large-eared Pied Bat	762, 842, 868, 1106, 1215 and 1268	• Cliffs. • Within two kilometres of rocky areas containing caves, overhangs, escarpments, outcrops, or crevices, or within two kilometres of old mines or tunnels.	-	-	-	Yes	Included. Microhabitat: Found in well-timbered areas containing gullies. Probably forages for small, flying insects below the forest canopy. The Project area contains and is within 2 km of features such as rocky areas containing overhangs, escapements and potentially small caves. Due to their lack of woody vegetation and associated habitat complexity and relatively low attractiveness to likely prey species (small flying insects), DNG and exotic grassland vegetation zones are likely to be of low value as foraging habitat for the species. Species excluded from DNG, exotic grasslands and fragmented zones.
Crinia tinnula	Wallum Froglet		-	-	Within 10 km of coast	-	No	Excluded. Project area is outside of its geographic restriction.
Dasyurus maculatus maculatus	Spotted-tailed Quoll	762, 822, 842, 868, 1106, 1215 and 1268,	-	-	-	-	-	Included. Microhabitat: Uses hollow-bearing trees, fallen logs other animal burrows, small caves and outcrops as den sites. Species excluded from DNG and exotic grasslands.
Haliaeetus leucogaster	White-bellied Sea-Eagle (Breeding)	762, 1106 and 1287	• Waterbodies. • Within 1 km of a rivers, lakes, large dams or creeks, wetlands and coastlines.	-	-	-	Yes	Included. Trees potentially suitable as nesting sites for these species are found in the Project area. Large trees were mostly absent within DNG and exotic grassland vegetation zones. Species excluded from DNG and exotic grasslands.
Hieraaetus morphnoides	Little Eagle (Breeding)	762, 842, 868, 1106, 1215 and 1287	• Nest trees – live (occasionally dead) large old trees within vegetation).	-	-	-	Yes	Excluded. Species was included in surveys but has since been excluded from further assessment for species credits as no nest trees or other signs of breeding activity found within the construction envelope or a 100m buffer surrounding the construction envelope.

Table 6.2 Candidate threatened species assessment

Step 1 – Identify threatened species for assessment		Step 2 – Assessment of habitat constraints						Step 3 – Identify candidate species for further assessment
Scientific name	**Common name**	**Associated PCT**	**Habitat constraints**	**Habitat degraded**	**Geographic constraints**	**Vagrant species**	**Constraint present in Project area?**	**Candidate species (yes/no) and rationale**
Hirundapus caudacutus	White-throated Needletail	762, 822, 842, 868, 1106, 1215 and 1268,	-	-	-	-	-	Included. Species excluded from DNG and exotic grasslands.
Hoplocephalus bitorquatus	Pale-headed Snake	762, 842, 868, 822, 1106, 1215 and 1268	-	-	-	-	-	Included. Microhabitat: Riparian areas with a high density of large, live hollow bearing trees. Due to historical logging, high density of hollow bearing trees is limited to the old growth forest areas along the clifflines that are located away from riparian areas. The Project area contains marginal habitat for this species. Large trees were mostly absent or considered fragmented in DNG and exotic grassland vegetation zones. Species excluded from DNG and exotic grasslands.
Hoplocephalus stephensii	Stephens' Banded Snake	1106 and 1268	• Fallen/standing dead timber including logs, or within 500 m of this habitat. • Hollow bearing trees, or within 500 m of this habitat. • Within 500 m of arboreal vine tangles.	-	-	-	Yes	Included. Microhabitat: Rainforest and eucalypt forests and rocky areas up to 950 m in altitude. Shelters between loose bark and tree trunks, amongst vines, or in hollow trunks limbs, rock crevices or under slabs during the day. The Project area contains suitable habitat for this species. Large trees were mostly absent or considered fragmented in DNG and exotic grassland vegetation zones. Species excluded from DNG and exotic grasslands.
Lathamus discolor	Swift Parrot (Breeding)	762, 842, 868, 1106, 1215 and 1268	• As per mapped areas.	-	-	-	No	Excluded. Project area is not within mapped areas.
Limosa lapponica baueri	Bar-tailed Godwit (baueri) (Breeding)		• As per Important Habitat Map	-	-	=	No	Excluded Project area is not within mapped areas.
Litoria aurea	Green and Golden Bell Frog	1106	• Semi-permanent/ephemeral wet areas. • Within 1 km of wet areas/swamps. • Within 1 km of swamp/waterbodies.	-	-	-	No	Excluded. Project area does not contain swamp semi-permanent/ephemeral wet areas considered suitable for support this species.
Litoria booroolongensis	Booroolong Frog	822 and 1106	-	-	-	-	-	Excluded. Microhabitat: Permanent, or near permanent river environment with rocky structures (bedrock or cobble). Occurs predominantly along the western-flowing streams of the Great Dividing Range. The Project area does not contain permanent or near permanent rivers considered suitable to support this species.
Litoria brevipalmata	Green-thighed Frog	762, 868, 822, 1106, 1215 and 1268	• Semi-permanent/ephemeral wet areas/swamps/waterbodies.	-	-	-	No	Excluded. Microhabitat: Suitable breeding habitat is any semi-permanent or ephemeral waterbody of >25 square metres within or adjacent to 10 m of native vegetation. The Project area is too steep and largely comprised of a thin soils with igneous parent rock that is not suitable to support areas of breeding habitat such as semi-permanent or ephemeral waterbodies.
Litoria subglandulosa	Glandular Frog	822 and 1287	-	-	-	-	-	Excluded. Microhabitat: Found along streams in rainforest, moist and dry eucalypt forest or in subalpine swamps. Occurs in habitat above 500 m. The Project area contains no subalpine swamps or suitable streams that occur above 500 m.

Table 6.2 Candidate threatened species assessment

Step 1 – Identify threatened species for assessment		Step 2 – Assessment of habitat constraints						Step 3 – Identify candidate species for further assessment
Scientific name	**Common name**	**Associated PCT**	**Habitat constraints**	**Habitat degraded**	**Geographic constraints**	**Vagrant species**	**Constraint present in Project area?**	**Candidate species (yes/no) and rationale**
Litoria daviesae	Davies' Tree Frog	868, 822, 1106 and 1215	• South of Hastings River.	-	South of Hastings River	-	No	Excluded. Disturbance footprint is outside of its geographic restriction.
Lophoictinia isura	Square-tailed Kite (Breeding)	762, 842, 868, 822, 1106, 1215 and 1268	• Nest trees.	-	-	-	No	Excluded. Species was included in surveys but has since been excluded from further assessment for species credits as no nest trees or other signs of breeding activity found within the construction envelope or a 100 m buffer surrounding the construction envelope.
Macropus parma	Parma Wallaby	1268	-	-	-	-	-	Included. Microhabitat: Preferred habitat is moist eucalypt forest with thick, shrubby understorey, often with nearby grassy areas, rainforest margins and occasionally drier eucalypt forest. The project area contains suitable habitat for this species, including moist forest with a dense ground layer. DNG and exotic grassland PCTs and fragment vegetation zones do not contain a dense cover of tall native grasses and these zones are considered unlikely to be potential habitat for this species. Species excluded from DNG and exotic grasslands.
Miniopterus australis	Little Bent-winged Bat (Breeding)	762, 868, 822, 1106, 1215 and 1268	• Caves. • 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	Excluded. The Project area contains and is within 2 km of features such as rocky areas containing overhangs, escapements and potentially small caves. Due to their lack of woody vegetation and associated habitat complexity and relatively low attractiveness to likely prey species (small flying insects), DNG and exotic grassland vegetation zones are likely to be of low value as foraging habitat for the species. Species was included in harp surveys but has since been excluded from further assessment for species credits as suitable caves or signs of breeding activity (lactating females recorded during harp trapping) found within the Project area or a 100 m buffer surrounding the Project area.
Miniopterus orianae oceanensis	Large Bent-winged Bat (Breeding)	762, 842, 868, 822, 1106, 1215, 1268 and 1287	• Caves. • 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	Excluded. The Project area contains and is within 2 km of features such as rocky areas containing overhangs, escapements and potentially small caves. Due to their lack of woody vegetation and associated habitat complexity and relatively low attractiveness to likely prey species (small flying insects), DNG and exotic grassland vegetation zones are likely to be of low value as foraging habitat for the species. Species was included in surveys harp but has since been excluded from further assessment for species credits as suitable caves or signs of breeding activity (lactating females recorded during harp trapping) found within the Project area or a 100 m buffer surrounding the Project area.
Mixophyes balbus	Stuttering Frog	1106 and 1268	-	-	-	-	-	Included. Microhabitat: Found in rainforest and wet, tall open forest. Requires deep leaf litter and thick understorey vegetation on the forest floor. The creeks running into the Macleay River are ephemeral. Only two creeks were observed to have areas of pooling that may retain water in drier years. Creeks had open canopies and lacked leaf litter. The Project area contains marginal habitat to support this species.

Table 6.2 Candidate threatened species assessment

Step 1 – Identify threatened species for assessment		Step 2 – Assessment of habitat constraints						Step 3 – Identify candidate species for further assessment
Scientific name	**Common name**	**Associated PCT**	**Habitat constraints**	**Habitat degraded**	**Geographic constraints**	**Vagrant species**	**Constraint present in Project area?**	**Candidate species (yes/no) and rationale**
Mixophyes iteratus	Giant Barred Frog	1106 and 1268	• Land within 50 m of semi-permanent and permanent drainages.	-	-	-	Yes	Excluded. Microhabitat: Found along freshwater streams with permanent or semi-permanent water, generally (but not always) at lower elevation. Moist riparian habitats such as rainforest or wet sclerophyll forest are favoured for the deep leaf litter that they provide for shelter and foraging, as well as open perching sites on the forest floor. No creeks within the Macleay Hastings IBRA sub-region contained suitable habitat such as rainforest with deep leaf litter that were permanent or semi-permanent (ephemeral creeks only). The Project area contains no habitat considered suitable to support this species.
Myotis macropus	Southern Myotis	762, 842, 868, 822, 1106, 1215 and 1268	• Hollow bearing trees. • Within 200 m of riparian zone. • Bridges, caves or artificial structures within 200 m of riparian zone/waterbodies. • This include rivers, creeks, billabongs, lagoons, dams and other waterbodies on or within 200 m of the site.	-	-	-	Yes	Included. Microhabitat: Forage over streams and pools catching insects and small fish by raking their feet across the water surface. Roost close to water in caves, mine shafts, hollow bearing trees, storm water channels, buildings, under bridges and in dense foliage. Habitat constraints are present and the Macleay River is considered suitable habitat to support this species.
Ninox connivens	Barking Owl (Breeding)	762, 842, 868, 822, 1106, 1215 and 1268	• Hollow bearing trees. • Living or dead trees with hollows greater than 20 cm diameter and greater than 4 m above the ground.	-	-	-	Yes	Included. Due to historical logging, high density of hollow bearing trees is limited to the old growth forest areas along the clifflines. Sections of the Project area contain suitable breeding habitat for this species. Large trees were mostly absent in DNG and exotic grassland vegetation zones. Species excluded from DNG and exotic grasslands.
Ninox strenua	Powerful Owl (Breeding)	762, 842, 868, 822, 1106, 1215 and 1268	• Hollow bearing trees. • Living or dead trees with hollow greater than 20 cm diameter.	-	-	-	Yes	Included. Due to historical logging, high density of hollow bearing trees is limited to the old growth forest areas along the clifflines. Sections of the project area contain suitable breeding habitat for this species. Large trees were mostly absent in DNG and exotic grassland vegetation zones. Species excluded from DNG and exotic grasslands.
Numenius madagascariensis	Eastern Curlew (Breeding)		• As per Important Habitat Map	-	-	-	No	Excluded. The Project area is not within mapped areas.
Ocybadistes knightorum	Black Grass-dart Butterfly		-	-	-	-	-	Excluded. The Black Grass-dart Butterfly occurs only on the NSW mid north coast from Coffs Harbour to Scotts Head. It is currently known from two disjunct areas: a northern population centred around Sawtell and a southern population along Warrell Creek. The Black Grass-dart Butterfly is considered to be monophageous, with Floyd's Grass (*Alexfloydia repens*) being the only larval food plant known. The butterfly is generally restricted to within about 50 m of suitable patches of Floyd's Grass (*Alexfloydia repens*). Floyd's Grass (*Alexfloydia repens*) which is absent from the construction envelope.
Pandion cristatus	Eastern Osprey (Breeding)	1106	• Presence of stick-nests in living and dead trees (>15 m) or artificial structures within 100 m of a floodplain for nesting.	-	-	-	No	Excluded. Species was included in surveys but has since been excluded from further assessment for species credits as no nest trees or other signs of breeding activity found within the construction envelope or a 100 m buffer surrounding the construction envelope.

Table 6.2 Candidate threatened species assessment

Step 1 – Identify threatened species for assessment		Step 2 – Assessment of habitat constraints						Step 3 – Identify candidate species for further assessment
Scientific name	**Common name**	**Associated PCT**	**Habitat constraints**	**Habitat degraded**	**Geographic constraints**	**Vagrant species**	**Constraint present in Project area?**	**Candidate species (yes/no) and rationale**
Petalura gigantea	Giant Dragonfly	1287	• Swamps. • Within 500 m of swamps.	-	-	-	No	Excluded. Microhabitat: permanent swamps and bogs with free water and open vegetation. Construction envelope contains no swamps with standing water, and none are located within 500 m of the disturbance footprint.
Petauroides volans	Greater Glider	822, 842,868, 1106, 1215 and 1268	-	-	-	-	-	Included. Microhabitat: Eucalypt forest with a high density of hollow bearing trees. Due to historical logging, high density of hollow bearing trees is limited to the old growth forest areas along the clifflines. The Project area contains habitat for this species. DNG and exotic grassland vegetation zones provide no to very limited shelter or food resources due to a lack of hollow bearing trees or other potential shelter and/or the absence of a diverse suite of tree and shrub species and associated food resources. 'Fragments' vegetation zones were also considered unsuitable due to their isolation from woodland or forest habitat. These vegetation zones are unlikely to be suitable for this species. Species excluded from DNG, exotic grasslands and fragmented zones.
Petaurus norfolcensis	Squirrel Glider	762, 842, 868, 822, 1106, 1215 and 1268	-	-	-	-	-	Included. Microhabitat: woodlands, often dominated or co-dominated by box-type eucalypts, either containing abundant tree hollows or well-connected areas with such areas and containing a shrubby (particularly Acacia species) midstorey. Due to historical logging, high density of hollow bearing trees is limited to the old growth forest areas along the clifflines. The Project area contains habitat for this species. DNG and exotic grassland vegetation zones provide no to very limited shelter or food resources due to a lack of hollow bearing trees or other potential shelter and/or the absence of a diverse suite of tree and shrub species and associated food resources. 'Fragments' vegetation zones were also considered unsuitable due to their isolation from woodland or forest habitat. These vegetation zones are unlikely to be suitable for this species. Species excluded from DNG, exotic grasslands and fragmented zones.
Petrogale penicillata	Brush-tailed Rock-wallaby	842, 868, 822 and 1268	• Land within 1 km of rocky escarpments, gorges, steep slopes, boulder piles, rock outcrops or clifflines.	-	-	-	Yes	Included. Microhabitat: foraging areas adjacent to rocky areas that have sufficient cover from predators. Suitable habitat such as denning sites, refuge areas for this species is present in the generation site area, south of the Macleay River. North of the Macleay River lacked features such as rocky escarpments and rock outcrops.
Phascogale tapoatafa	Brush-tailed Phascogale	762, 842, 868, 822, 1215 and 1268	-	-	-	-	-	Included. Microhabitat: Areas containing dry sclerophyll open forest with sparse groundcover, tree hollows and rough barked trees of 25 cm DBH or greater constitute highly suitable habitat. Other areas would be considered marginal as habitat. Suitable habitat is present within the Project area. DNG, exotic grassland and fragmented vegetation zones provide very limited shelter or food resources due to a lack of hollow bearing trees or other potential shelter and/or the absence of a diverse suite of tree and shrub species and associated food resources. 'Fragments' vegetation zones were also considered unsuitable due to their isolation from woodland or forest habitat. These vegetation zones are unlikely to be suitable for this species. Species excluded from DNG, exotic grasslands and fragmented zones.

Table 6.2 Candidate threatened species assessment

Step 1 – Identify threatened species for assessment		Step 2 – Assessment of habitat constraints						Step 3 – Identify candidate species for further assessment
Scientific name	**Common name**	**Associated PCT**	**Habitat constraints**	**Habitat degraded**	**Geographic constraints**	**Vagrant species**	**Constraint present in Project area?**	**Candidate species (yes/no) and rationale**
Phascolarctos cinereus	Koala	762, 842, 868, 822, 1215 and 1268	• Presence of koala use trees – refer to survey comments field in TBDC.	-	-	-	Yes	Included. Koala use trees were present in most vegetation zones of all PCTs. Areas of DNG and exotic grassland do not support suitable Koala use trees. Species excluded from DNG and exotic grasslands.
Planigale maculata	Common Planigale	762, 868, 1106, 1215 and 1268	-	-	-	-	-	Included. Microhabitat: Inhabit rainforest, eucalypt forest, heathland, marshland, grassland and rocky areas where there is surface cover, and usually close to water. Shelter in saucer-shaped nests built in crevices, hollow logs, beneath bark or under rocks. The Project area within the MacLeay's Hastings IBRA subregion contains some suitable habitat to support this species.
Potorous tridactylus	Long-nosed Potoroo	Not associated with a PCT[1]	• Dense shrub layer or alternatively high canopy cover exceeding 70% (i.e. to capture populations inhabiting wet sclerophyll and rainforest).	-	-	-	Yes	Included Microhabitat: Inhabits coastal heaths and dry and wet sclerophyll forests. Dense understorey with occasional open areas is an essential part of habitat, and may consist of grasstrees, sedges, ferns or heath, or of low shrubs of tea-trees or melaleucas. Not associated with any PCTs; however, suitable habitat is considered to occur in the upper areas of the generation site within areas of flatter topography that were observed to contain a dense understory. DNG and exotic grassland PCTs and fragment vegetation zones does not contain a dense cover of tall native grasses and these zones are considered unlikely to be potential habitat for this species. Species excluded from DNG, exotic grasslands and fragmented vegetation zones.
Pteropus poliocephalus	Grey-headed Flying-fox (Breeding)	762, 842, 868, 822, 1106, 1215 and 1268	• Breeding camps.	-	-	-	No	Excluded. Project area contains no breeding camps.
Pseudomys oralis	Hastings River Mouse	Not associated with a PCT[1]	-	-	-	-	-	Included. Microhabitat: Access to seepage zones, creeks and gullies is important, as is permanent shelter such as rocky outcrops and fallen logs. Species excluded from DNG and exotic grasslands.
Pseudomys novaehollandiae	New Holland Mouse	Not associated with a PCT[1]	-	-	-	-	-	Excluded. Microhabitat: Open heathlands, woodlands and forests with a heathland understorey. This species occurs on sandstone country (Wilson & Laidlaw 2003), this species requires deeper topsoils and softer substrates for digging burrows. Sandstone and heathland habitat is absence from site. Species excluded from DNG and exotic grasslands.
Pezoporus wallicus wallicus	Eastern Ground Parrot		-	-	-	-	-	Excluded. The Ground Parrot occurs in high rainfall coastal and near coastal low heathlands and sedgelands, generally below one metre in height and very dense (up to 90% projected foliage cover). This habitat is absent from the construction envelope.
Turnix maculosus	Red-backed Button-quail	762, 868, 1215 and 1268	-	-	-	-	-	Included. Microhabitat: Occurs in grasslands, heath and crops, prefer sites close to water. Typically, only in regions subject to annual summer rainfall greater than 400 mm. Breed in dense grass near water. Habitat is present within the DNG and exotic grassland for the Macleay Hastings sub-region close to the Macleay River flood plain. Excluded from non-DNG and exotic grassland PCTs.

Table 6.2 Candidate threatened species assessment

Step 1 – Identify threatened species for assessment		Step 2 – Assessment of habitat constraints						Step 3 – Identify candidate species for further assessment
Scientific name	**Common name**	**Associated PCT**	**Habitat constraints**	**Habitat degraded**	**Geographic constraints**	**Vagrant species**	**Constraint present in Project area?**	**Candidate species (yes/no) and rationale**
Tyto novaehollandia	Masked Owl (Breeding)	762, 842, 868, 822, 1106, 1215 and 1268	• Hollow bearing trees. • Living or dead trees with hollows greater than 20 cm diameter.	-	-	-	Yes	Included. Habitat constraint: Living or dead trees with hollows greater than 20 cm diameter. Due to historical logging, high density of hollow bearing trees is limited to the old growth forest areas along the clifflines. Sections of the Project area contain suitable breeding habitat for this species. Large trees were mostly absent in DNG and exotic grassland vegetation zones. Species excluded from DNG and exotic grasslands.
Tyto tenebricosa	Sooty Owl (Breeding)	1106	• Caves. • Caves or clifflines/ledges/hollow bearing trees. • Living or dead trees with hollows greater than 20 cm diameter.	-	-	-	Yes	Excluded. Microhabitat: Occurs in rainforest, including dry rainforest, subtropical and warm temperate rainforest, as well as moist eucalypt forests. Nests in very large tree-hollows. Rainforest and wet sclerophyll forest habitat is largely absent within the Project area south of the Macleay River. This species was only associated with PCT 1106 which was located along the Macleay River and only had small section of rainforest species associated with some creek lines that floweed into the Macleay River. Due to historical logging, high density of hollow bearing trees is limited to the old growth forest areas along the clifflines. Large trees were mostly absent or considered fragmented in DNG and exotic grassland vegetation zones. Given the lack of suitable hollows, particularly within the highly limited habitat, the microhabitats required by the species are considered not to occur.
Vespadelus troughtoni	Eastern Cave Bat	762, 868, 1215 and 1268	• Caves • 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.	-	-	-	Yes	Excluded. Microhabitat: Relatively fertile, vegetated areas that are likely to support high prey densities. The Project area contains and is within 2 km of features such as rocky areas containing overhangs, escapements and potentially small caves. Due to their lack of woody vegetation and associated habitat complexity and relatively low attractiveness to likely prey species (small flying insects), DNG and exotic grassland vegetation zones are likely to be of low value as foraging habitat for the species. Species was included in surveys but has since been excluded from further assessment for species credits as suitable caves or signs of breeding activity (lactating females recorded during harp trapping) found within the Project area or a 100m buffer surrounding the project area.
Xenus cinereus	Terek Sandpiper (Breeding)		• As per Important Habitat Map	-	-	-	No	Excluded The Project area does not contain this species habitat constraint.

Notes: 1. Species predicted to occur by PMST only.

6.3.2 Candidate species credit species requiring further assessment

Candidate species for further assessment were identified in accordance with Step 1 to 2 (Section 5.2.1 to 5.2.2) of BAM (DPIE 2020a) and includes species that require assessment as listed in Table 1.2 of the SEARs. A list of species requiring further assessment is provided in Table 6.3.

Table 6.3 Candidate species credit species requiring further assessment

Scientific name	Common name	EPBC Act	BC Act	Survey location
Flora				
Asperula asthenes	Trailing Woodruff	Vulnerable	Vulnerable	All associated PCTs Excluded from exotic grasslands.
Bertya ingramii	Narrow-leaved Bertya	Endangered	Endangered	All associated PCTs.
Callistemon pungens	*Callistemon pungens*	Vulnerable		Along river banks and creek lines.
Chiloglottis platyptera	Barrington Tops Ant Orchid		Vulnerable	All associated PCTs.
Cryptostylis hunteriana	Leafless Tongue Orchid	Vulnerable	Vulnerable	All associated PCTs
Cynanchum elegans	White-flowered Wax Plant	Endangered	Endangered	All associated PCTs.
Dendrobium melaleucaphilum	Spider orchid	-	Endangered	All associated PCTs Species excluded from DNG and exotic grasslands.
Diuris eborensis	*Diuris eborensis*	Endangered	Endangered	Within suitable habitat associated with wet PCTs in the Carrai Plateau.
Diuris disposita	Willawarrin Doubletail	-	Endangered	All associated PCTs
Diuris pedunculata	Small Snake Orchid	Endangered	Endangered	Within suitable habitat associated with grassy slopes and flats in peaty and moist areas and around boulders.
Eucalyptus magnificata	Northern Blue Box	-	Endangered	All associated PCTs.
Euphrasia arguta	*Euphrasia arguta*	Critically Endangered	Critically Endangered	All PCTs.
Grevillea beadleana	Beadle's Grevillea	Endangered	Endangered	All associated PCTs.
Grevillea guthrieana	Guthrie's Grevillea	Endangered	Endangered	All associated PCTs.
Hakea fraseri	Gorge Hakea	Vulnerable	Vulnerable	All associated PCTs.
Haloragis exalata subsp. Velutina	Tall Velvet Sea-berry	Vulnerable	Vulnerable	All associated PCTs.
Hibbertia hexandra	Tree Guinea Flower	-	Endangered	All associated PCTs

Table 6.3 Candidate species credit species requiring further assessment

Scientific name	Common name	EPBC Act	BC Act	Survey location
Lepidium peregrinum	Wandering Pepper Cress	Endangered	Endangered	Macleay River Floodplain recorded in PCT 1106.
Lindernia alsinoides	Noah's False Chickweed	-	Endangered	All associated PCTs
Marsdenia longiloba	Slender Marsdenia	Vulnerable	Endangered	All associated PCTs.
Melaleuca groveana	Grove's Paperbark	-	Vulnerable	All associated PCTs.
Niemeyera whitei	Rusty Plum, Plum Boxwood	-	Vulnerable	All associated PCTs Species excluded from DNG and exotic grasslands.
Oberonia titania	Red-flowered King of the Fairies	-	Vulnerable	All associated PCTs Species excluded from DNG and exotic grasslands
Parsonsia dorrigoensis	Milky Silkpod	Endangered	Vulnerable	All associated PCTs
Pomaderris queenslandica	Scant Pomaderris	-	Endangered	All associated PCTs. Species excluded from DNG and exotic grasslands.
Pultenaea rubescens			Endangered	Swampy drainage depressions in Eucalypt forest (Barrett, In press).
Rhodamnia rubescens	Scrub Turpentine	Critically Endangered	Critically Endangered	In suitable habitat considered to support this species, such as the PCTs adjoining wetter forests, species recorded in PCT 1215. Species excluded from DNG and exotic grasslands.
Sarcochilus fitzgeraldii	Ravine Orchid	Vulnerable	Vulnerable	Within suitable habitat, such as shady gorges between 500 and 700 m altitude.
Senna acclinis	Rainforest Cassia	-	Endangered	All associated PCTs. Species excluded from DNG and exotic grasslands.
Tylophora woollsii	Cryptic Forest Twiner	Endangered	Endangered	In suitable habitat considered to support this species, such as the PCTs adjoining wetter forests.

Table 6.3 Candidate species credit species requiring further assessment

Scientific name	Common name	EPBC Act	BC Act	Survey location
Fauna				
Aepyprymnus rufescens	Rufous Bettong	-	Vulnerable	All associated PCTs. Species excluded from DNG, exotic grasslands and fragmented zones.
Burhinus grallarius	Bush Stone-curlew	-	Vulnerable	All associated PCTs Species excluded from DNG and exotic grasslands.
Calyptorhynchus lathami	Glossy Black-Cockatoo (Breeding)	-	Vulnerable	All associated PCTs. Species excluded from DNG and exotic grasslands.
Carterornis leucotis	White-eared Monarch	-	Vulnerable	All associated PCTs Species excluded from DNG and exotic grasslands.
Cercartetus nanus	Eastern Pygmy-possum	-	Vulnerable	All associated PCTs. Species excluded from DNG and exotic grasslands.
Chalinolobus dwyeri	Large-eared Pied Bat	Vulnerable	Vulnerable	All associated PCTs. Species excluded from DNG and exotic grasslands.
Dasyurus maculatus maculatus	Spotted-tailed Quoll	Endangered	Vulnerable	All associated PCTs. Species excluded from DNG and exotic grasslands.
Haliaeetus leucogaster	White-bellied Sea-Eagle (Breeding)	-	Vulnerable	All associated PCTs. Species excluded from DNG and exotic grasslands.
Hieraaetus morphnoides	Little Eagle (Breeding)	-	Vulnerable	All associated PCTs. Species excluded from DNG and exotic grasslands.
Hirundapus caudacutus	White-throated Needletail	Vulnerable		All associated PCTs. Species excluded from DNG and exotic grasslands.
Hoplocephalus bitorquatus	Pale-headed Snake	-	Vulnerable	All associated PCTs. Species excluded from DNG and exotic grasslands.

Table 6.3 Candidate species credit species requiring further assessment

Scientific name	Common name	EPBC Act	BC Act	Survey location
Hoplocephalus stephensii	Stephens' Banded Snake	-	Vulnerable	All associated PCTs Species excluded from DNG and exotic grasslands.
Lophoictinia isura	Square-tailed Kite (breeding)	-	Vulnerable	All associated PCTs. Species excluded from DNG and exotic grasslands.
Macropus parma	Parma Wallaby	-	Vulnerable	All associated PCTs Species excluded from DNG and exotic grasslands.
Miniopterus australis	Little Bent-winged Bat (Breeding)	--	Vulnerable	All associated PCTs. Species excluded from DNG and exotic grasslands.
Miniopterus orianae oceanensis	Large Bent-winged Bat (Breeding)	-	Vulnerable	All associated PCTs. Species excluded from DNG and exotic grasslands.
Mixophyes balbus	Stuttering Frog	Vulnerable	Endangered	All associated PCTs.
Myotis macropus	Southern Myotis	-	Vulnerable	All associated PCTs. Species excluded from DNG and exotic grasslands.
Ninox connivens	Barking Owl (Breeding)	-	Vulnerable	All associated PCTs. Species excluded from DNG and exotic grasslands.
Ninox strenua	Powerful Owl (Breeding)	-	Vulnerable	All associated PCTs. Species excluded from DNG and exotic grasslands.
Pandion cristatus	Eastern Osprey (Breeding)	-	Vulnerable	All associated PCTs. Species excluded from DNG and exotic grasslands.
Petauroides volans	Greater Glider	Endangered		All associated PCTs. . Species excluded from DNG and exotic grasslands.

Table 6.3 Candidate species credit species requiring further assessment

Scientific name	Common name	EPBC Act	BC Act	Survey location
Petaurus norfolcensis	Squirrel Glider	-	Vulnerable	All associated PCTs. Species excluded from DNG, exotic grasslands and fragmented zones.
Petrogale penicillata	Brush-tailed Rock-wallaby	Vulnerable	Endangered	All associated PCTs.
Phascogale tapoatafa	Brush-tailed Phascogale	-	Vulnerable	All associated PCTs. Species excluded from DNG, exotic grasslands and fragmented zones.
Phascolarctos cinereus	Koala	Endangered	Endangered	All associated PCTs. Species excluded from DNG and exotic grasslands.
Planigale maculata	Common Planigale	-	Vulnerable	All associated PCTs
Potorous tridactylus	Long-nosed Potoroo	Vulnerable	Vulnerable	In PCTs with suitable understory on flatter grounds near the upper reservoir. Recorded in PCT 1215 and 822. Species excluded from DNG, exotic grasslands and fragmented vegetation zones.
Pseudomys oralis	Hastings River Mouse	Endangered	Endangered	Within suitable habitat that is near creeks, gullies with sheltering areas such as rocky outcrops and fallen logs. Species excluded from DNG, exotic grasslands
Turnix maculosus	Red-backed Button-quail	-	Vulnerable	All associated PCTs
Tyto novaehollandia	Masked Owl (Breeding)	-	Vulnerable	All associated PCTs. Excluded from non-DNG and exotic grassland PCTs.
Vespadelus troughtoni	Eastern Cave Bat	-	Vulnerable	All associated PCTs Excluded from non-DNG and exotic grassland PCTs

6.3.3 Targeted species survey methods and effort

Targeted candidate species surveys were undertaken to determine whether candidate species occupy the construction envelope and to define the condition and the extent of habitat for candidate species present (i.e. the species polygons).

i Targeted flora surveys

Table 6.4 provides a summary of the threatened flora species surveys, including survey period for each candidate species. Where feasible, surveyors visited known populations of threatened species nearby to check flowering and become familiar with the appearance of the target species and its habitat in order to maximise the likelihood of detection. Targeted threatened flora surveys were carried out during appropriate detection periods between 2021 and 2022 in January, April, May, July, August, September, October and November. Some species were targeted during multiple searches over several months.

Targeted threatened flora surveys were conducted in all vegetation zones identified as suitable habitat at Step 3. Some other vegetation zones were, however, surveyed opportunistically during these surveys.

The BAM guideline for surveying threatened plants and their habitats (DPIE 2020b) recognises that "the survey design described in this guide may be impractical for some large-scale projects where the time taken to search large areas of suitable habitat for small threatened species is high" and includes a two-phase grid-based systematic survey approach for large areas of suitable habitat (> 50 ha). The first phase of a two-phase grid-based survey involves searches of 40 m diameter areas at 100 m grid intersections. If a target species is located, a finer-scale grid survey is used (second phase). This is used to locate the population extent, which will help define the species polygon. The finer-scale grid was used as per Table 4 of DPIE (2020b) which is dependent on the habitat type, vegetation type and condition and landscape attributes surrounding the locations where the target species was detected.

The two-phase grid-based systematic survey was not used for species where their suitable habitat was < 50 ha. In these areas, targeted flora surveys were undertaken in accordance with DPIE (2020b) and DoE (2013a) guidelines and included transects using spacing as defined in Table 1 of DPIE (2020b), generally spaced at intervals of 5 m (closed vegetation) to 10 m (open vegetation). As much of the hillside habitat in the construction envelope is very steep and, in places, near-vertical, often with loose unstable soil, exposed rock cliffs and dense spiny shrub thickets, walking of closely spaced and parallel transects was not always safe or feasible. In such areas, transects were more meandering with their path dictated by safe access. The survey areas where meandering occurred were along small sections of a creek that runs through the proposed lower reservoir and at a small section of the northern transmission line. These areas represent less than 0.5 ha of the area surveyed. Small sections of the transects were briefly interrupted by areas of exposed steep rock and thick areas native and non-native shrubs and vines that prevented safe access. Areas that could not be physically walked were checked where vantage points allowed. These areas were very small along the transects; refer to Figure 6.1 that shows areas where transects were undertaken.

Targeted flora survey effort is indicated in Figure 6.1. The transects shown represent surveys undertaken; however, the actual area surveyed was greater than that shown as each transect was undertaken by two observers.

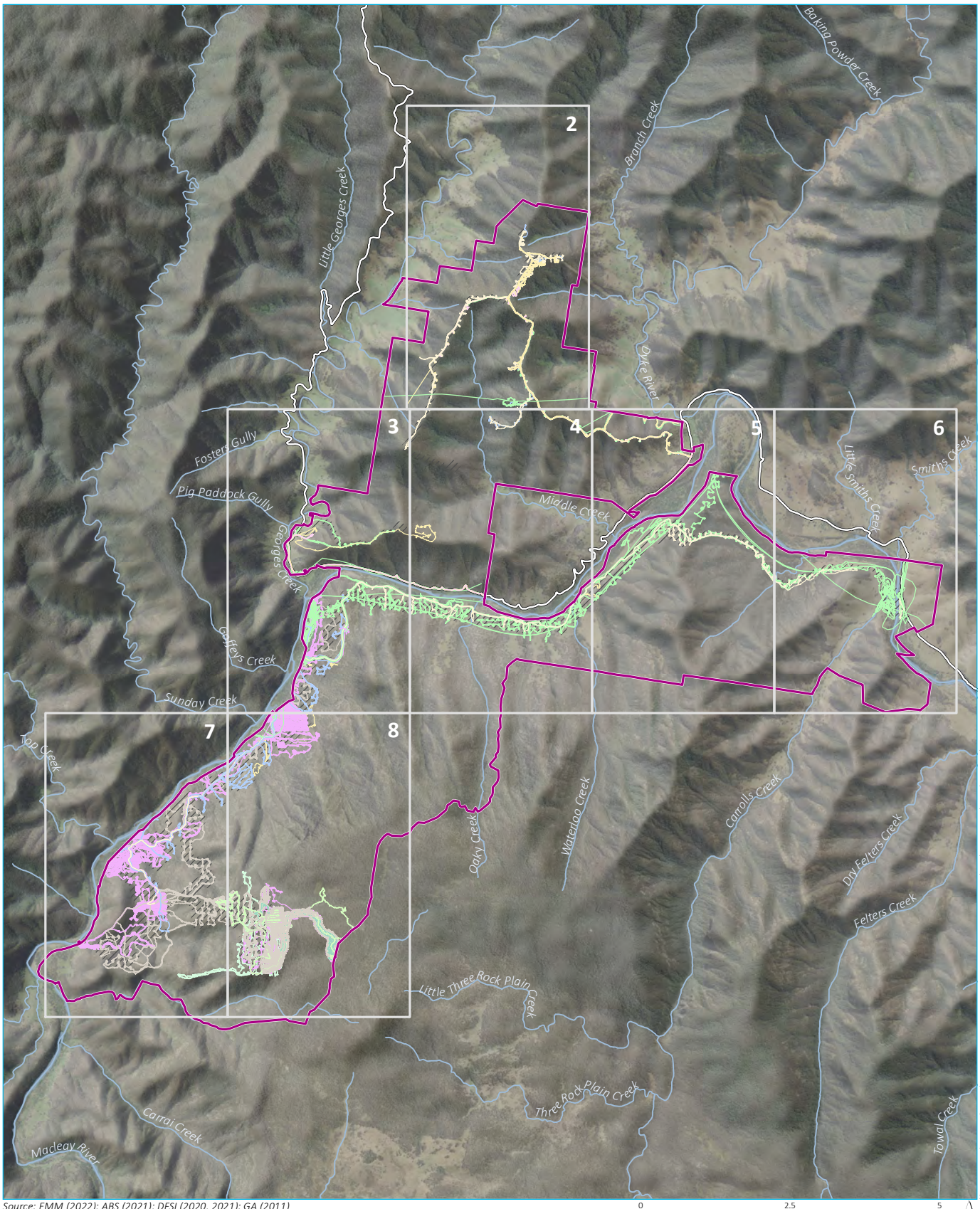
During the mapping of vegetation and the survey of BAM plots, most of the more heavily vegetated parts of the construction envelope, and much of the derived native grassland, was traversed on foot. In addition to targeted surveys, threatened species detectible year-round were searched for opportunistically during vegetation mapping, which included identification of plants, particularly trees and shrubs for the purposes of PCT identification. BAM plots also provided opportunities for detection of threatened species, particularly ground layer species.

Table 6.4 Targeted candidate flora species survey period

Scientific name	Common name	Recommended survey period	Survey dates onsite
Asperula asthenes	Trailing Woodruff	October, November, December	November
Bertya ingramii	Narrow-leaved Bertya	All year	January, April, May, July, August, November
Callistemon pungens	Callistemon pungens	September to February	November, January
Chiloglottis platyptera	Barrington Tops Ant Orchid	October	October
Cryptostylis hunteriana	Leafless Tongue Orchid	November to January	November
Cynanchum elegans	White-flowered Wax Plant	All year	January, April, May, July, August, November
Dendrobium melaleucaphilum	Spider orchid	August to September	September
Diuris eborensis	*Diuris eborensis*	November to December	November
Diuris disposita	Willawarrin Doubletail	September to October	October
Diuris pedunculata	Small Snake Orchid	September to October	October
Eucalyptus magnificata	Northern Blue Box	All year	January, April, May, July, August, November
Euphrasia arguta	*Euphrasia arguta*	November to March	November
Grevillea beadleana	Beadle's Grevillea	All year	January, April, May, July, August, November
Grevillea guthrieana	Guthrie's Grevillea	All year	January, April, May, July, August, November
Hakea fraseri	Gorge Hakea	All year	January, April, May, July, August, November
Haloragis exalata subsp. velutina	Tall Velvet Sea-berry	All year	January, April, May, July, August, November
Hibbertia hexandra	Tree Guinea Flower	All Year	April, May, July, August
Lepidium peregrinum	Wandering Pepper Cress	November to May	November, January, April, May
Lindernia alsinoides	Noah's False Chickweed	November to February	November
Marsdenia longiloba	Slender Marsdenia	November to February	November
Melaleuca groveana	Grove's Paperbark	All year	April, May, July, August
Niemeyera whitei	Rusty Plum, Plum Boxwood	All year	April, May, July, August
Oberonia titania	Red-flowered King of the Fairies	All year	April, May, July, August
Parsonsia dorrigoensis	Milky Silkpod	All year	April, May, July, August
Pomaderris queenslandica	Scant Pomaderris	All year	April, May, July, August
Rhodamnia rubescens	Scrub Turpentine	All year	April, May, July, August

Table 6.4 Targeted candidate flora species survey period

Scientific name	Common name	Recommended survey period	Survey dates onsite
Pultenaea rubescens		October – November	October, November
Sarcochilus fitzgeraldii	Ravine Orchid	October to November	October
Senna acclinis	Rainforest Cassia	All year	January, April, May, July, August, November
Tylophora woollsii	Cryptic Forest Twiner	January to April	January, April



Source: EMM (2022); ABS (2021); DFSI (2020, 2021); GA (2011)

0 2.5 5 km

GDA 1994 MGA Zone 56

N

KEY

- Project area
- Construction envelope
- Map reference
- Named watercourse
- Major road

Targeted flora surveys transect

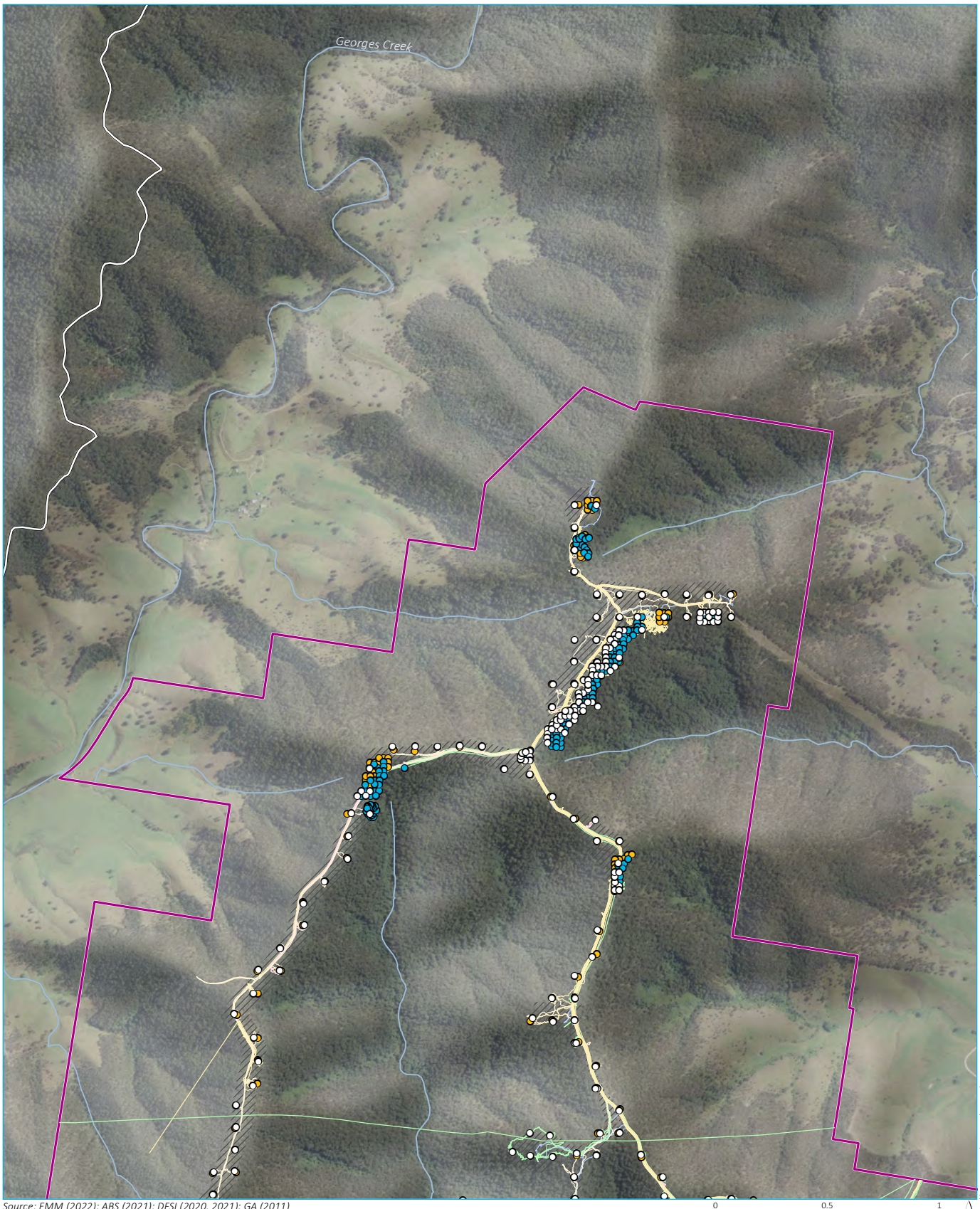
- October 2021
- November 2021
- January 2022
- April 2022
- May 2022
- July 2022
- August 2022
- September 2022
- October 2022
- November 2022

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Targeted flora surveys
Map 1 of 8

Oven Mountain Pumped Hydro Energy Storage Project
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OMPS Pty Ltd
Figure 6.1

EMM creating opportunities



Source: EMM (2022); ABS (2021); DFSI (2020, 2021); GA (2011)

0 0.5 1 km

GDA 1994 MGA Zone 56

N

KEY

- Project area
- Construction envelope
- Named watercourse
- Major road
- Two phase grid point - Complete
- Two phase gird point - Targeted species
- Two phase grid point - Summer/Spring 2022

Targeted flora surveys transect

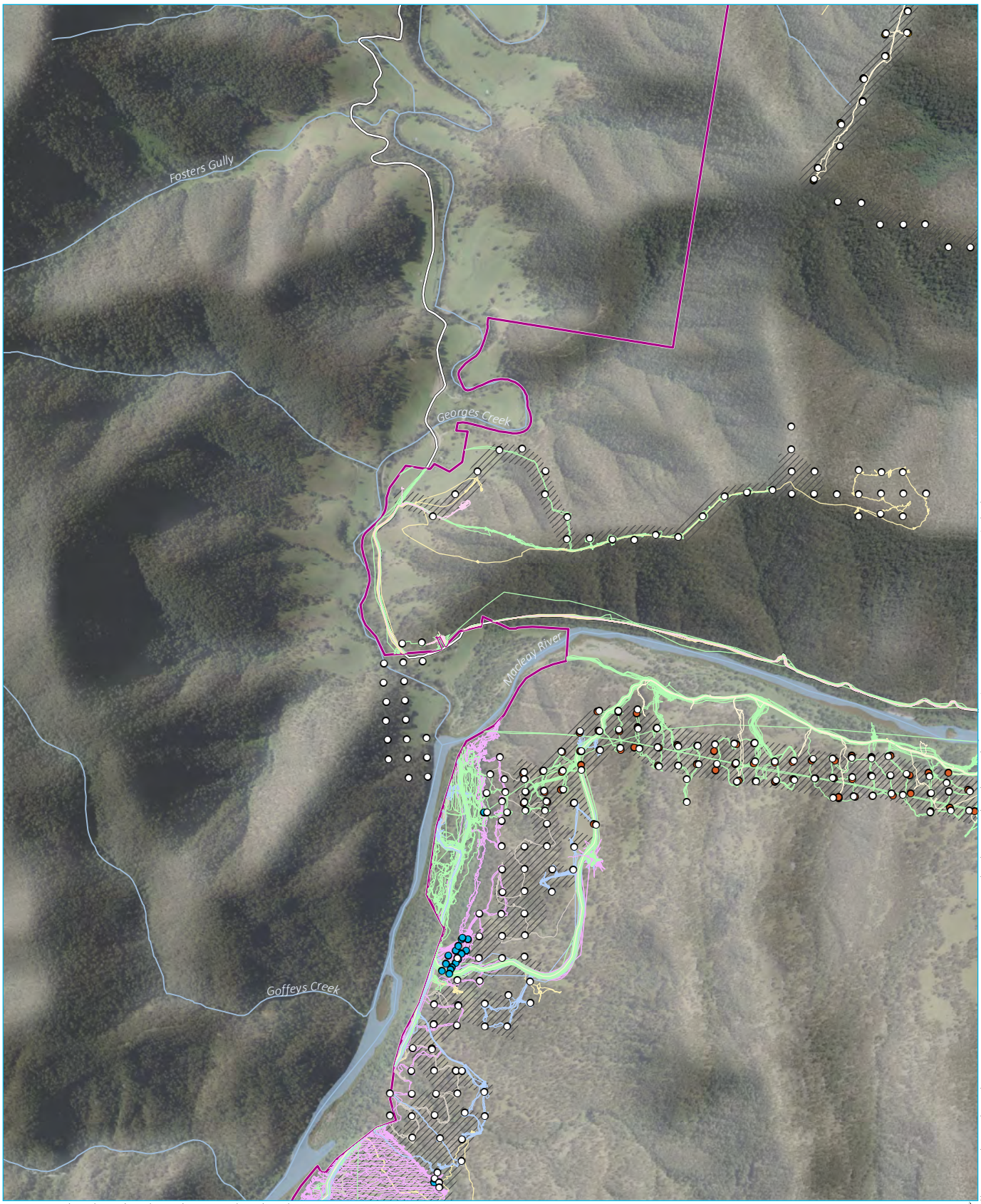
- April 2022
- May 2022
- July 2022
- August 2022
- October 2022

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Targeted flora surveys
Map 2 of 8

Oven Mountain Pumped Hydro Energy Storage Project
Biodiversity development assessment report
OMPS Pty Ltd
Figure 6.1

EMM creating opportunities



Source: EMM (2022); ABS (2021); DFSI (2020, 2021); GA (2011)

0 0.5 1 km

GDA 1994 MGA Zone 56

N

KEY

- Project area
- Construction envelope
- Named watercourse
- Major road
- Two phase grid point - Complete
- Two phase grid point - Nov/Dec 2022
- Two phase gird point - Targeted species
- Two phase grid point - Summer/Spring 2022

Targeted flora surveys transect

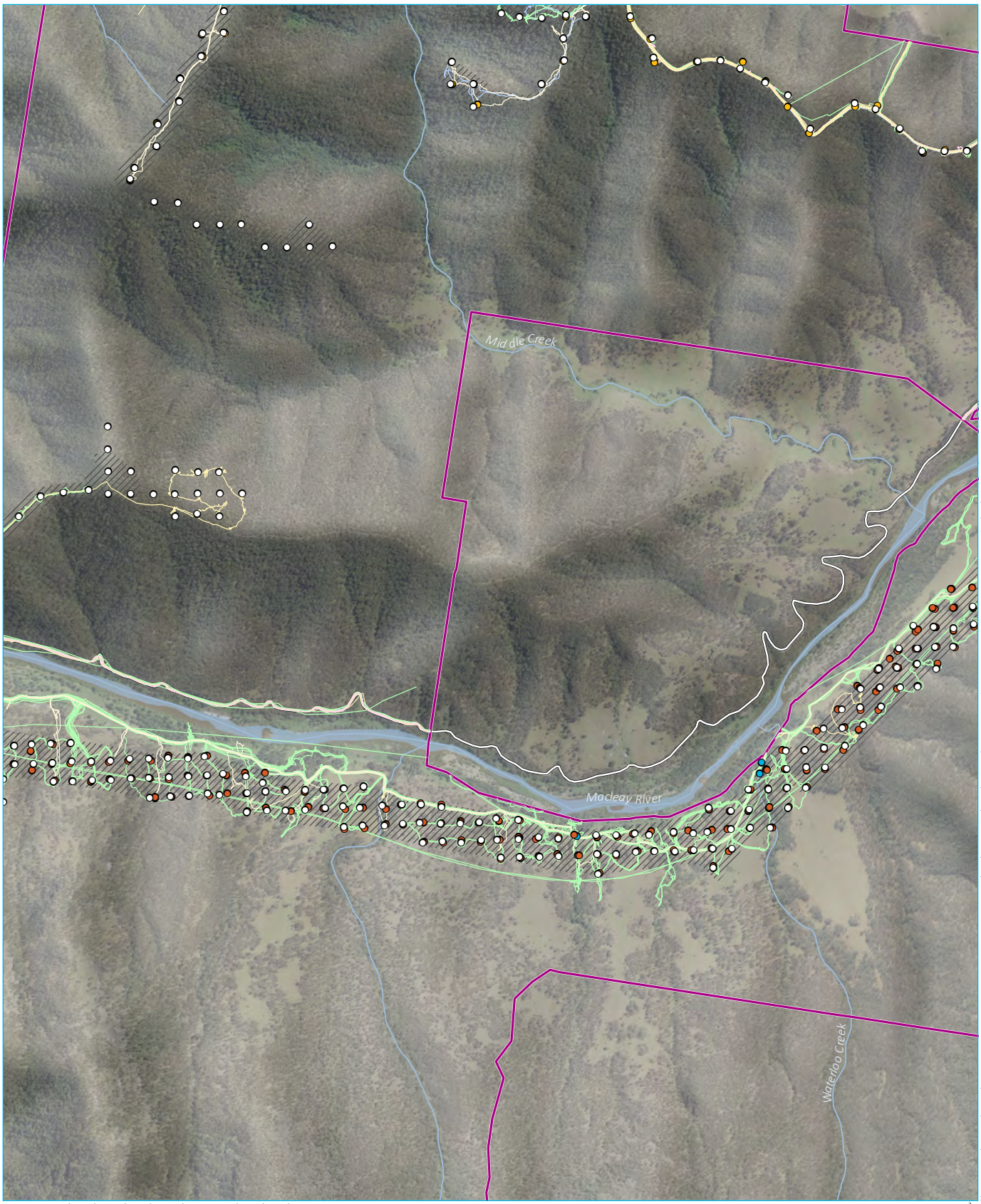
- November 2021
- January 2022
- April 2022
- May 2022
- July 2022
- August 2022
- October 2022

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Targeted flora surveys
Map 3 of 8

Oven Mountain Pumped Hydro Energy Storage Project
Biodiversity development assessment report
OMPS Pty Ltd
Figure 6.1

EMM creating opportunities



Source: EMM (2022); ABS (2021); DFSI (2020, 2021); GA (2011)

0 0.5 1 km

GDA 1994 MGA Zone 56

N

KEY

- Project area
- Construction envelope
- Named watercourse
- Major road
- Two phase grid point - Complete
- Two phase grid point - Nov/Dec 2022
- Two phase gird point - Targeted species
- Two phase grid point - Summer/Spring 2022

Targeted flora surveys transect

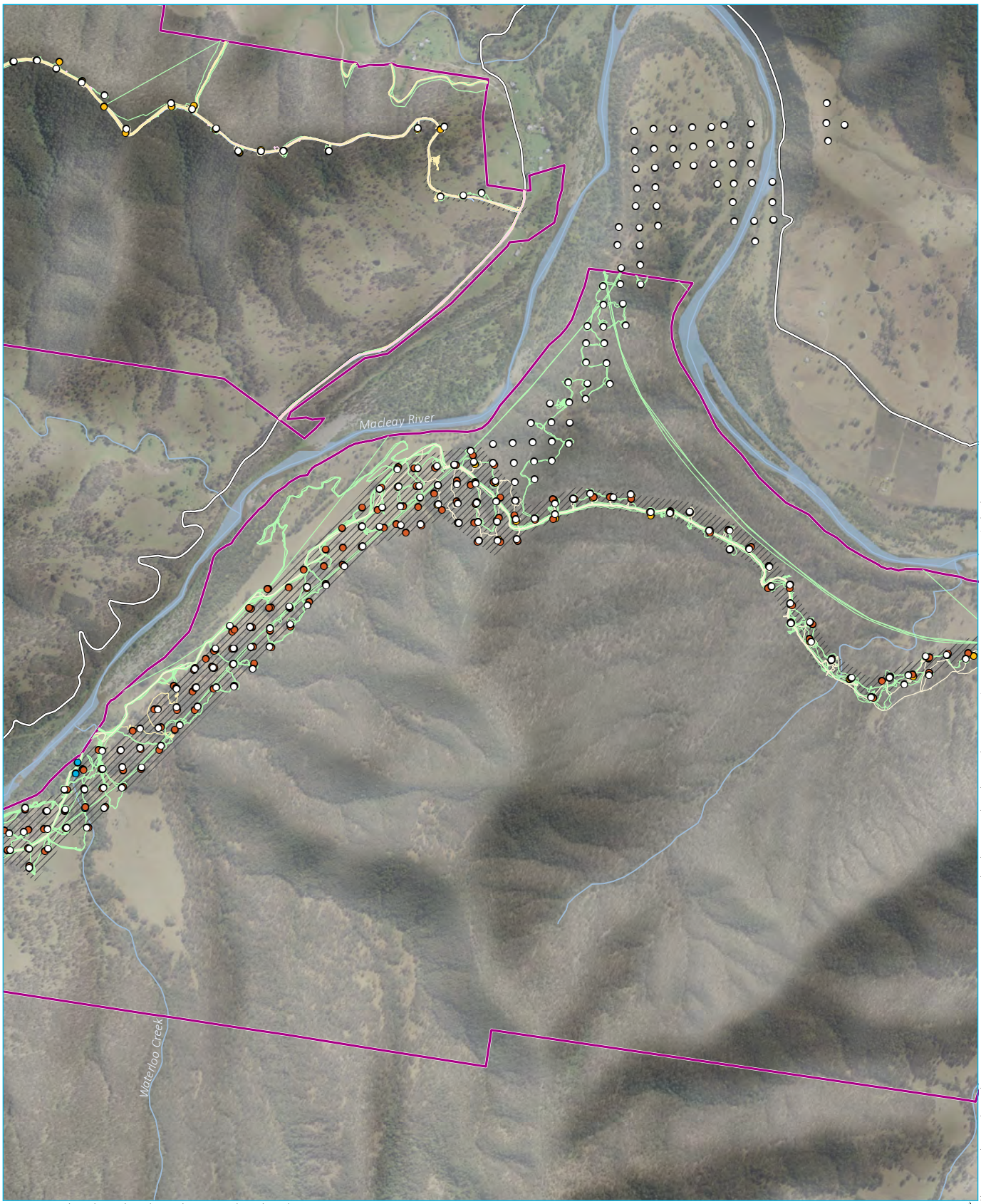
- November 2021
- January 2022
- April 2022
- May 2022
- July 2022
- August 2022
- October 2022

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Targeted flora surveys
Map 4 of 8

Oven Mountain Pumped Hydro Energy Storage Project
Biodiversity development assessment report
OMPS Pty Ltd
Figure 6.1

EMM creating opportunities



Source: EMM (2022); ABS (2021); DFSI (2020, 2021); GA (2011)

0 0.5 1 km

GDA 1994 MGA Zone 56

N

KEY

- Project area
- Construction envelope
- Named watercourse
- Major road
- Two phase grid point - Complete
- Two phase grid point - Nov/Dec 2022
- Two phase gird point - Targeted species
- Two phase grid point - Summer/Spring 2022

Targeted flora surveys transect

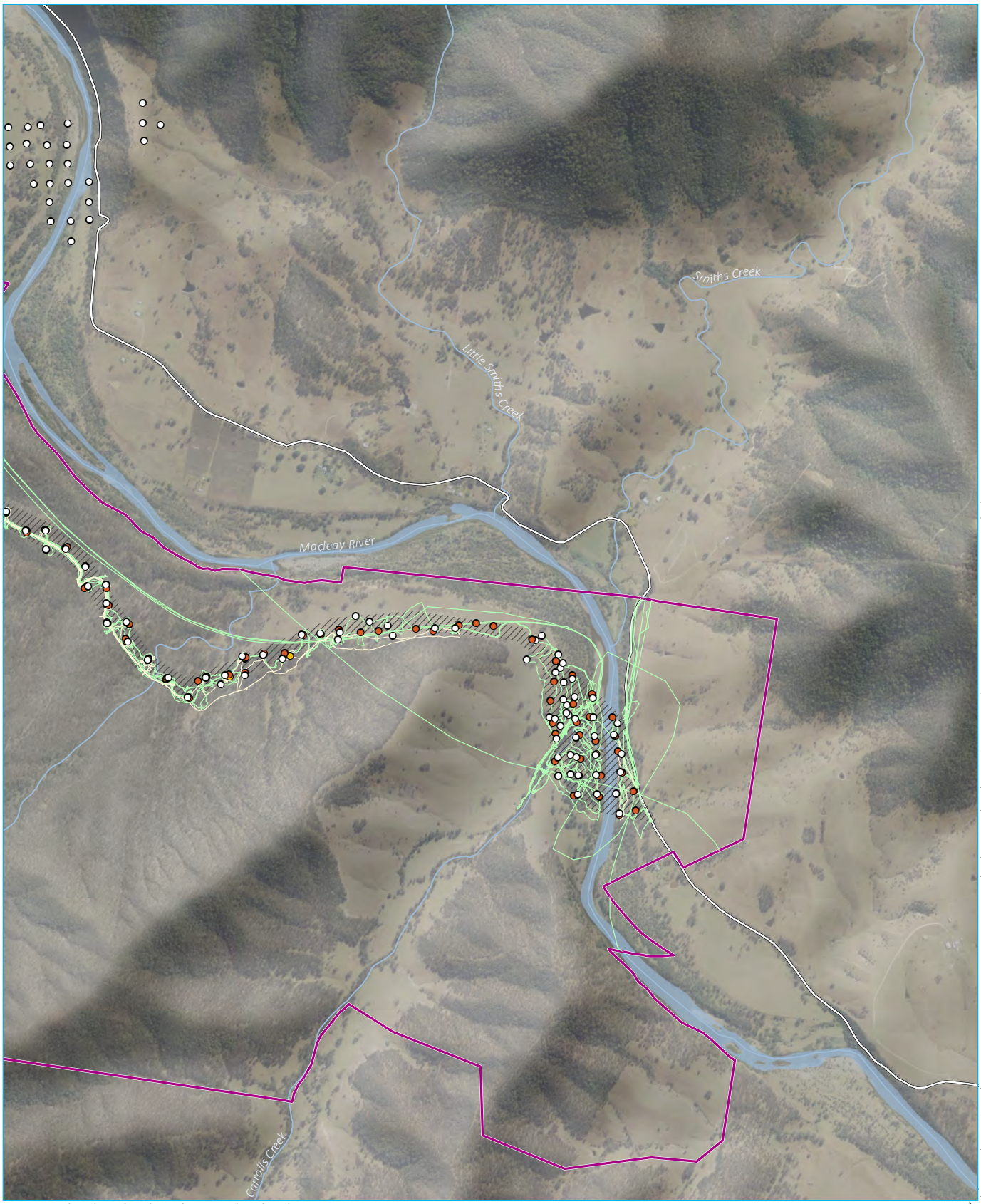
- November 2021
- January 2022
- April 2022
- May 2022
- July 2022
- August 2022
- October 2022

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Targeted flora surveys
Map 5 of 8

Oven Mountain Pumped Hydro Energy Storage Project
Biodiversity development assessment report
OMPS Pty Ltd
Figure 6.1

EMM
creating opportunities



Source: EMM (2022); ABS (2021); DFSI (2020, 2021); GA (2011)

0 0.5 1 km

GDA 1994 MGA Zone 56

N

KEY

- Project area
- Construction envelope
- Named watercourse
- Major road
- Two phase grid point - Complete
- Two phase grid point - Nov/Dec 2022
- Two phase grid point - Summer/Spring 2022

Targeted flora surveys transect

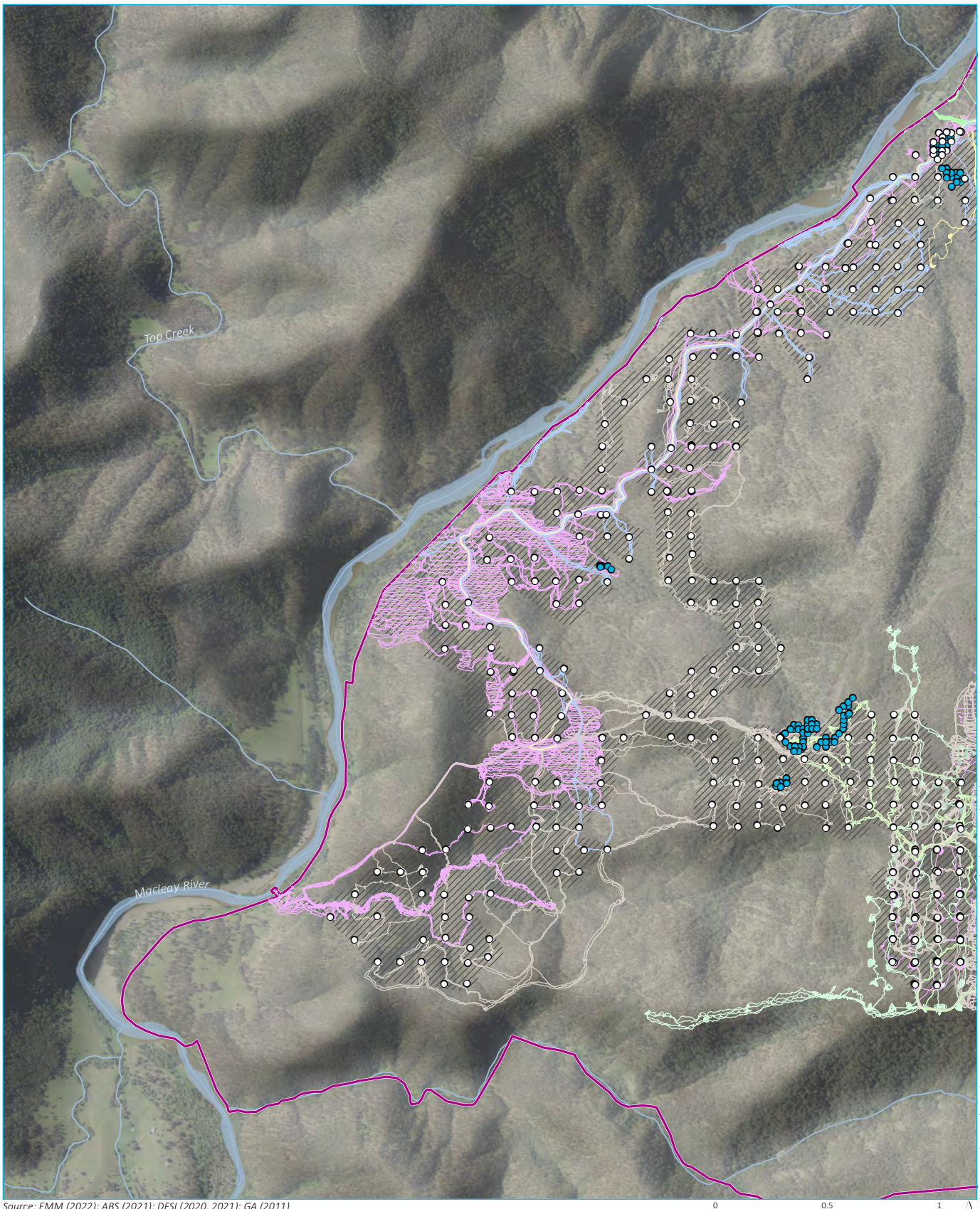
- November 2021
- January 2022
- May 2022
- July 2022
- August 2022
- October 2022

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Targeted flora surveys
Map 6 of 8

Oven Mountain Pumped Hydro Energy Storage Project
Biodiversity development assessment report
OMPS Pty Ltd
Figure 6.1

EMM
creating opportunities



Source: EMM (2022); ABS (2021); DFSI (2020, 2021); GA (2011)

0 0.5 1 km

GDA 1994 MGA Zone 56

N

KEY

- Project area
- Construction envelope
- Named watercourse
- Two phase grid point - Complete
- Two phase gird point - Targeted species

Targeted flora surveys transect

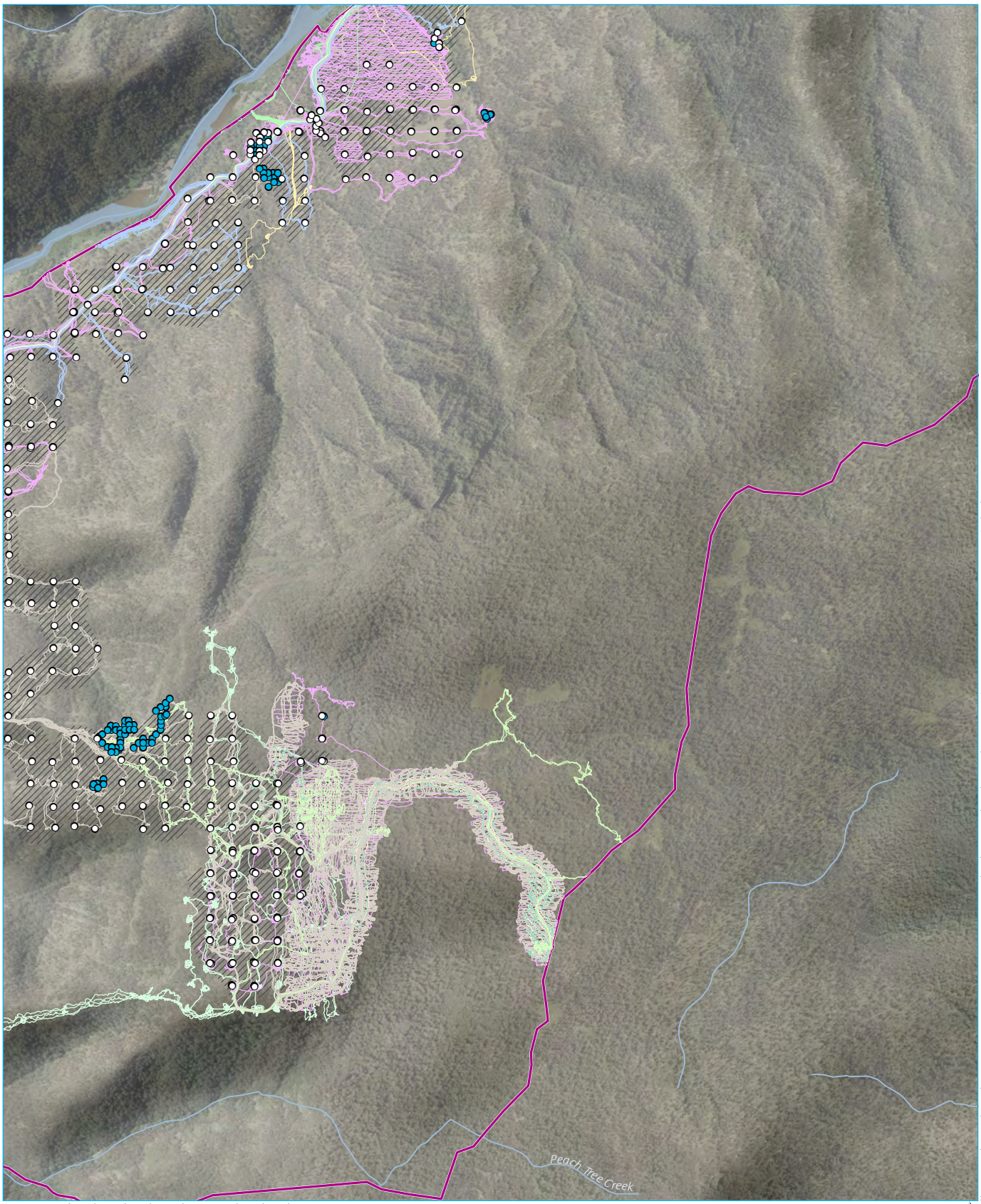
- October 2021
- November 2021
- January 2022
- April 2022
- May 2022
- July 2022
- August 2022
- September 2022
- October 2022
- November 2022

Targeted flora surveys
Map 7 of 8

Oven Mountain Pumped Hydro Energy Storage Project
Biodiversity development assessment report
OMPS Pty Ltd
Figure 6.1

EMM
creating opportunities

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Source: EMM (2022); ABS (2021); DFSI (2020, 2021); GA (2011)

0 0.5 1 km

GDA 1994 MGA Zone 56

N

KEY

- Project area
- Construction envelope
- Named watercourse
- Two phase grid point - Complete
- Two phase gird point - Targeted species

Targeted flora surveys transect

- October 2021
- November 2021
- January 2022
- April 2022
- May 2022
- July 2022
- August 2022
- September 2022
- October 2022
- November 2022

Targeted flora surveys
Map 8 of 8

Oven Mountain Pumped Hydro Energy Storage Project
Biodiversity development assessment report
OMPS Pty Ltd
Figure 6.1

EMM creating opportunities

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ii Targeted fauna surveys

Table 6.5 provides a summary of the threatened fauna species surveys, including survey period for each species. Targeted fauna surveys were conducted within the survey area in accordance with various NSW and Commonwealth guidelines for the corresponding species groups below.

Survey methods and effort are outlined for each fauna group in Sections 6.3.3.ii.a to 6.3.3.ii.g below. Fauna survey locations are illustrated in Figure 6.3. A summary of fauna survey effort is provided below, while weather data for the survey period is provided in Appendix B.

Table 6.5 Targeted fauna survey method

Target species group	Target species	Survey method	Recommended survey period	Survey timing
Birds	Bush Stone-curlew	Call playback and spotlighting surveys	All year	July, August
	Glossy Black-Cockatoo (Breeding)	Targeted nest and thermal drone surveys	January to September	May, June, July, August
	White-eared Monarch	Area searches	All year	August
	White-bellied Sea-Eagle (Breeding)	Nest tree searches, area and transect searches	July to December	July, August, October
	Little Eagle (Breeding)	Nest tree searches, area and transect searches	August to October	July, August, October
	Square-tailed Kite (breeding)	Nest tree searches, area and transect searches	September to January	July, August, October
	Barking Owl (Breeding)	Targeted nest tree searches, listening surveys and thermal drone surveys	May to December	July, August
	Powerful Owl (Breeding)	Targeted nest tree surveys, listening surveys and thermal drone surveys	May to August	July, August
	Eastern Osprey (Breeding)	Nest tree searches, area and transect searches	April to November	July, August, October
	Red-backed Button-quail	Transects and nocturnal listening and flushing surveys	All year	January
	Masked Owl (Breeding)	Targeted nest tree surveys, listening surveys and thermal drone surveys	May to August	July, August, October
	White-throated Needletail	Opportunistic	n/a	Opportunistic
Mammals	Rufous Bettong	Remote camera surveys	All year	January, February, June, July, August, November
	Eastern Pygmy-possum	Remote camera surveys	October to March	January, March, November, December, January

Table 6.5 Targeted fauna survey method

Target species group	Target species	Survey method	Recommended survey period	Survey timing
	Parma Wallaby	Remote camera surveys	All year	January, February, June, July, August, November
	Greater Glider	Remote camera, spotlighting surveys, hair and arboreal trapping	All year	March, April, May, June, November, January
	Yellow-bellied Glider	Remote camera, spotlighting surveys, hair and arboreal trapping	All year	March, April, May, June, November, January
	Squirrel Glider	Remote camera, arboreal trapping, hair and spotlighting surveys	All year	March, April, May, June, November, December, January
	Brush-tailed Rock-wallaby	Remote camera, scat searches (including genotype analysis) and aerial surveys	All year	January, February, June, July, August, October, November
	Brush-tailed Phascogale	Remote camera, arboreal trapping, hair and spotlighting surveys	December to June	March, April, May, June, December, January
	Koala	Detection dogs, thermal drone, and spotlighting surveys	All year	March, April, May, June, August, November
	Common Planigale	Funnel trapping. Remote cameras surveys	All year	January, February, June, July, August, November
	Long-nosed Potoroo	Remote camera surveys	All year	January, February, June, July, August, November
	Spotted-tailed Quoll	Remote camera surveys	All year	January, February, June, July, August, November
	Hastings River Mouse	Remote camera surveys	N/A	January, February, June, July, August, November
Microbats	Large-eared Pied Bat	Anabat detection, roost searches and harp trapping surveys	November to January	January, December
	Little Bent-winged Bat (Breeding)	Anabat detection, roost searches and harp trapping surveys	December to February	January, February, March, October, December
	Large Bent-winged Bat (Breeding)	Anabat detection, roost searches and harp trapping surveys	December to February	January, February, March, October, December
	Southern Myotis	Anabat detection, roost searches and harp trapping surveys	October to March	January, February, March, October, November

Table 6.5 Targeted fauna survey method

Target species group	Target species	Survey method	Recommended survey period	Survey timing
	Eastern Cave Bat	Anabat detection, roost searches and harp trapping surveys	November to January	January, February, March, October, November
Reptiles	Pale-headed Snake	Spotlighting surveys and funnel trapping	November to March	March, November, December, January
	Stephens' Banded Snake	Spotlighting surveys	October to March	January
Amphibians	Stuttering Frog	Aural-visual surveys	September to March	September, March, January

a Diurnal birds

Diurnal bird surveys were undertaken for the following species:

- Glossy Black-cockatoo
- White-eared Monarch
- Red-backed Button-quail
- White-throated Needletail
- White-bellied Sea-eagle
- Little Eagle
- Square-tailed Kite
- Eastern Osprey.

Bird survey methods and survey effort have been developed in accordance with DPE threatened biodiversity profile data collection (TBDC), DEC (2004), DSEWPaC (2010) guidelines. Methods include a mix of area and vantage point surveys to record species presences, targeted nest searches and use of thermal drones. Thermal drones have been successfully used for arboreal mammal species such as Koalas and have been used for more mobile species such as Greater Gliders (Vinson et al, 2020). It has also been used successfully for nesting birds to detect nest heat signatures for much smaller species such as nightjars in Wales (Sherwing M & Vafidis J, 2021) and marshbirds in Canada (McKellar et al, 2021). It was applied to Glossy Black-cockatoos to detect potential nesting trees. Methods and survey effort are outlined in Table 6.6.

Table 6.6 Methods and survey effort – diurnal birds

Method	Survey description	Survey effort
Area searches/vantage point surveys (All species)	Area searches and vantage point surveys include: • land based area and vantage point searches • surveyors conducted area and vantage point surveys within the construction envelope • all calls and habitat features were investigated • birds observed or heard were recorded.	DEC (2004) has not resolved bird survey requirements and does not provide guidance on survey effort, particularly for nesting birds. DSEWPaC (2010a) was reviewed, and sympatric species survey efforts indicated 8 hours over 4 days (2 hours per day) for sites less than 50 ha. No survey effort for larger sites is provided. Based on suitable habitat within the disturbance footprint (330 ha), area searches were carried out in locations that were identified as suitable nesting sites for raptors, or at locations where multiple habitat features, such as hollow bearing trees were located close together. Vantage point surveys took advantage of locations where large areas of the construction envelope could be viewed for larger species such as raptors and Glossy Back-Cockatoos. This survey methodology was undertaken for all components of the Project, provided a large coverage of the survey area. Twelve areas searches were undertaken, totalling 6.40 hours over 8 days. Nine bird transects/meandering were undertaken totalling 24 hours over 8 days.
Flushing surveys. (Red-backed Button-quail)	Flushing surveys included: • land based transect/flushing surveys • surveyors walked and/or used a buggy to undertake the surveys • all calls and habitat features were investigated • birds observed or heard were recorded.	DPE is currently developing survey guidance for threatened bird species. The TBDC for Red-backed Button-quail survey comments state that nocturnal surveys to flush birds from habitat should be used (see nocturnal birds surveys); however, identification is difficult. Flushing surveys were undertaken in areas containing suitable habitat for flushing such as areas of long grass. These were generally undertaken at dusk and dawn where identification of any flushed birds could be more accurately identified. Six flushing surveys were undertaken targeting Red-backed Button-Quail over four days, totalling approximately 3 hours.
Targeted nest searches/hollow bearing tree surveys (Glossy Black-Cockatoo and raptors)	Diurnal surveys included: • observers travelled across available habitat, seeking out habitat features including nest trees and hollows • suitable nest or breeding hollows were marked and observed for breeding activity.	DPE is currently developing survey guidance for nest searches. The TBDC outlines that active nest should be assessed for the presence of each target species. For Glossy Black-Cockatoo, the TBDC states that the surveyors should look for signs of breeding. Where signs of breeding are present, potential nest trees should be identified. Potential nest trees are to be monitored during the breeding season to confirm actual nest trees. This survey methodology was undertaken for the access road and transmission line. Thirty potential nest hollows were identified. Each was surveyed for 20 minutes with one repeat. The minimum survey effort was reached.

Table 6.6 Methods and survey effort – diurnal birds

Method	Survey description	Survey effort
Thermal drone surveys (Glossy Black-Cockatoo)	Flight altitude is maintained, where possible, at a consistent level from which objects may be identified using the above thermal detection methods combined. No one detection method alone allows a singular point of truth regarding confirmation of object. A combination of various thermal detection methods (outlined above) allows the pilot a confidence in the object detected during search but also confirms this detection through an inspection at lower altitude to understand the object for identification. During this Project, where physically possible, ground crew from EMM mobilised on foot to confirm object detected in flight by the pilot/operator. Understanding the correct time for flights to occur requires no daylight due to reflected radiation giving false positive returns from direct sunlight which shines from objects over the flight area such as tree trunks, rocks and other surfaces. Generally, flights occur during the normalised radiation ground emission under night conditions, where a suitable temperature contrast between object for detection and background features can occur. The project area in this instance was between -5–21 degrees (circa day to night temperature range) with an average of ±4 degrees Celsius observed during most flight conditions being during late winter conditions which allowed flights to occur soon after last light each day of operations. Day time ambient temperature conditions being low meant features not for inspection did not hold significant temperatures which would bias the inspection with false temperature positives.	Thermal drone surveys were used in areas on site (where access could be achieved for drone operation) as a substitute where safe access cannot be achieved and/or coverage was considered efficient using this methodology. Drone surveys were used to target nesting Glossy Black-Cockatoos. 643 ha of the project area was surveyed using the thermal drone. Coverage included the majority of the generation site, with some coverage of the access and transmission line.

b Nocturnal birds

Nocturnal bird surveys were undertaken for the following species:

- Bush Stone-curlew
- Red-backed Button-quail
- Barking Owl
- Powerful Owl
- Masked Owl.

Bird survey methods and survey effort were development in accordance with the TBDC, DEC (2004) and Howell et al (2021). Methods include call playback, spotlighting, nest hollow monitoring, listening surveys and thermal drones. Thermal drones have been successfully used for arboreal mammal species such as Koalas and have successfully been used for nesting birds to detect nest heat signatures for much smaller species such as nightjars in Wales (Sherwing M & Vafidis J, 2021) and marshbirds in Canada (McKellar et al, 2021). It was applied to forest owls to detect nesting trees. Listening point surveys for owls were substituted from the DEC (2004) call playback surveys guidelines due to concerns of modifying behavior of nesting owls during the breeding season, and the potential to call nesting owls off unhatched eggs or away from chicks. Previous discussions with Miranda Kerr, Senior Biodiversity Conservations Officer for the South West BCD in relation to the Snowy 2.0 Connection project indicated that call playback was not supported in the breeding season. Survey methods provided include the following (BCD pers. comm., 2 July 2021):

> Call playback is not supported in breeding season - rather than 'identify calling owls', call playback it encourages owls to call and modify behaviour.
>
> From BCD experience in finding nesting owls, by far the most successful technique was dusk/early evening listening periods (no playback) followed by diurnal searches in the locations of the calls looking for a combination of whitewash and a suitable tree, followed by a stag watch to confirm.
>
> With Powerful Owls at least, the male typically sits within close view of the nest entrance and will usually hold his position when a human approaches, at least the first few times it happens. The position alone often identifies the hollow.
>
> The refuge of the Masked Owl male is more problematic, with a recently substantiated instance of a male 250 m away. Whitewash in particular is a good indication of a feeding perch near the hollow.

EMM has received subsequent advice from BCD that "conducting call playback surveys for these species during nesting time is not ideal, it is unlikely to disrupt successful breeding for these species" (letter from BCD dated 26 June 2023). As outlined in Section 6.3.4, further surveys will be undertaken.

Methods and survey effort are outlined in Table 6.7.

Table 6.7 Methods and survey effort – nocturnal birds

Method	Survey description	Survey effort
Call playback and spotlighting (Bush Stone-curlew)	DEC (2004) recommends call playback and spotlighting are undertaken to target the Bush Stone-curlew: • Surveys were commenced with a 15 minute listening period. Calls were played for 30 seconds, followed by 5 minutes of listening. This 5 minute cycle was repeated three times. • This was followed by spotlighting on foot for one hour throughout the construction envelope. All observed fauna species were identified and recorded.	DEC (2004) recommends a number of survey methods for the Bush-stone Curlew, including: • call playback: 2–4 km apart and conducted during the breeding season • spotlighting: by foot or from a vehicle driven in first gear. Based on the above, and availability of suitable habitat, three call playback sites were surveyed over two nights per location. This survey methodology was undertaken for the access road and transmission. Three call playback locations with a repeat were undertaken with 2 hour and 12 minutes of total survey effort. Spotlighting on foot was undertaken when travelling from vehicles to call playback locations for each visit. The minimum survey effort was exceeded.
Spotlighting and listening surveys (All species)	Spotlight surveys were undertaken using handheld LED spotlights and included: • 1 km or 500 m transects were undertaken by two observers • observers moved at a speed of less than 1 km per hour (i.e. one hour for the 1 km transect) scanning vegetation and trees for animals using both spotlights • all animals observed were recorded • spotlighting for Red-backed Button-quail was done concurrently with nocturnal reptile and arboreal mammals surveys.	DPE is currently developing survey guidance for threatened bird species. The TBDC states that call playback for Powerful Owl and Songmeters for all Red-Backed Button-Quail are not known to be effective. Listening surveys for Red-backed Button-quail calls were undertaken as part of the spotlighting surveys. Nine transects within the generation site were completed, totalling 15 km in length, with two transect located in the generation site not being replicated due to impacts from weather preventing safe access to transects within the survey period. Overall survey effort was not impacted as a result of this. Fourteen area surveys with one repeat were undertaken along the transmission line and access road, incorporated with the breeding owl surveys. A total of 9 hours and 18 minutes were undertaken. Four transects with four repeats were undertaken along the transmission line and access road. Totalling 907 minutes of searching.
Targeted nest searches (Forest owls)	Nocturnal surveys included: • observers travelled across available habitat, seeking out habitat features like suitable hollows that were identified during the hollow bearing tree surveys targeting suitable owl breeding hollows • suitable nest or breeding hollows were marked and observed for breeding activity.	DPE is currently developing survey guidance for nest tree searches and do not currently provide guidance on survey effort. The TBDC outlines that active nest should be assessed for the presence of each target species. For forest owls, the TBDC states that the surveyors should look for signs of breeding. Where signs of breeding are present, potential nest trees should be identified. Potential nest trees are to be monitored during the breeding season to confirm actual nest trees. A minimal of two nights survey at each potential nest tree is required to detect the presence of any owl species using the tree. This survey methodology was undertaken for the access road and transmission line. Fourteen targeted nest surveys with one repeat visit were undertaken with a total of 9 hours and 18 minutes targeted breeding hollow surveys undertaken at the targeted nest locations.

Table 6.7 Methods and survey effort – nocturnal birds

Method	Survey description	Survey effort
Listening point surveys (Forest owls)	Nocturnal surveys included: • observers undertake listening surveys for forest owls to determine presence and indications of breeding activity • when forest owls are heard observers, searched for active nest tree.	DPE is currently developing survey guidance for forest owl survey and does not provide guidance on survey effort. Listening point surveys were undertaken in combination with the thermal drone surveys. Generally, these surveys were located less than 1 km apart from each other. Survey times continued for the duration of time as the drone was flown at each survey location. Thirteen listening survey locations were surveyed for 17 hours and 31 minutes.
Thermal drone surveys (Forest Owls)	As above for diurnal birds.	Thermal drone surveys were used in areas on site (where access could be achieved for drone operation) as a substitute where safe access could not be achieved and/or coverage was considered efficient using this methodology. Drone surveys used to target forest owls. 643 ha of the Project area was surveyed using the thermal drone. Coverage included the majority of the generation site, with some coverage of the access and transmission line.

c Terrestrial mammals

Targeted terrestrial mammal surveys were undertaken for the following species:

- Eastern Pygmy-possum
- Rufous Bettong
- Brush-tailed Rock-wallaby
- Spotted-tailed Quoll
- Parma Wallaby
- Long-nosed Potoroo
- Hastings River Mouse
- Common Planigale.

Methods and survey effort have been developed in accordance with DEC (2004) DSEWPC (2011) and included a mix of terrestrial trapping, remote camera surveys. Funnel trapping was used where conventional surveys couldn't be applied for Common Planigale. Survey effort was increased for Brush-tailed Rock-wallaby to greater understand any potential impacts for this species. Additional surveys included species distribution modelling, as per Thurtell et al (Thurtell, 2021) and Gowen (Gowen, 2015), to inform targeted aerial surveys and scat collection for genotype analysis. Methods and survey effort are outlined in Table 6.8.

Table 6.8 Methods and survey effort – terrestrial mammals

Method	Survey description	Survey effort
Remote cameras (all species)	Remote camera surveys were undertaken in accordance with the following method: • At each site two cameras were placed at least 100 m apart. • Cameras were attached to tree or stake and positioned approximately 25 cm above ground with bait stations placed 1.5 m away. • Bait stations were baited with a mixture of peanut butter, rolled oats and honey.	DSEWPaC (2011a) recommends cameras are placed out for at least one week. However, long term monitoring surveys undertaken by EMM have determined one week may not be sufficient to reliably detect the small, cryptic species (such as Long-nosed Potoroo) and surveys were extended to a minimum of 14 days. DEC (2004) does not include remote camera surveys. However, as cameras are used to replace hair tubes a similar survey effort was utilised. DEC (2004) recommends ten hair tubes left in place for at least four days and nights per 50 ha stratification unity, with replication for every additional 100 ha. DSEWPaC (2011a) recommends that ten cameras are deployed per hectare. To cover the disturbance footprint of suitable habitat 330 ha, you would require 3,300 cameras. This level of survey effort is considered unreasonable for large projects. Based on the survey effort for hair traps, 40 remote cameras and 560 survey nights are required for the disturbance footprint. Camera surveys were undertaken at 77 sites, with 154 cameras deployed, with cameras left in place for a minimum of 14 nights. A total of 7,527 camera nights were undertaken. This survey methodology was undertaken for all components of the Project. NGH also deployed nine cameras in (NGH 2021), however, didn't provide survey effort or camera placement (ground or tree) only results. The minimum survey effort required was exceeded.

Table 6.8 Methods and survey effort – terrestrial mammals

Method	Survey description	Survey effort
Funnel trapping and Elliot trapping (Common Planigale)	Funnel traps are used in combination with a 'drift fence'. Funnels were used instead of pitfall traps due to rocky conditions restricting the depth required to be dug for pitfall buckets. • Funnel traps and Elliot traps were used instead of pitfall traps due to the rocky/granite substrate that prevented digging in of pitfalls for trapping. • Drift fence constructed by erecting a vertical barrier composed of material that non-climbing mammals would find difficult to grip. • Fences were 50 cm high with the lower edge either buried in the soil or having any openings sealed by piling a little soil on each side of the fence line. • Funnel traps were set in suitable habitat for four nights. • Funnel traps were 75 cm x 18 cm x 18 cm. • Traps were spaced approximately 3 metres apart. • Traps were checked twice daily, in the morning and evenings.	The TBDC recommends that for the Common Planigale a minimum of three pitfall trap arrays must be used for an area of suitable habitat up to 1 ha. For suitable habitat >1 ha–10 ha, one additional pitfall trap array must be used for every additional hectare, with a maximum of 10 pitfall trap arrays for any one patch of suitable habitat. Where suitable habitat patches are separated by 200 m or greater, the same survey effort must be applied in each patch. Pitfall traps could not be used within the Project area due to the rocky nature of the suitable habitat where these surveys were to be targeted. As such, funnel traps, which function similarly to pitfall traps (animals are directed toward the trap along the drift fence into the funnel trap), were used. Based on the survey effort required for PCT 822 in the Carrai Plateau, four traps are required for a minimum of four consecutive nights. • Funnel trapping within the Macleay Hastings IBRA subregion included: Five trapline with 5 traps were undertaken along the transmission line with four survey nights. Totalling 100 trap nights. • Five trapline with 5 traps were undertaken along the access road with four survey nights. Totalling 100 trap nights. A total of 200 trap nights were undertaken. The minimum survey effort required was met.
Species distribution modelling (SDM) and targeted aerial surveys. (Brush-tailed Rock-wallaby)	SDM was run for the greater locality using existing records for the Brush-tailed Rock Wallaby and data collected by EMM. These records were input into the model as per the appendices Thurtell (2021). The resultant model was used to guide targeted aerial surveys. Using the SDM and records on site, transects were created to target suitable Brush-tailed Rock Wallaby habitat within the Project area and greater survey location. Transects were surveyed using three spotters in a helicopter flying along survey transects at 45 knots between 8:00 am–11:00 am.	Gowen (2015) requires four repeats of each transect. Three transects were identified as suitable target locations for the Brush-tailed Rock Wallaby surveys. The minimum survey effort required was met.
Scat collection and genotype analysis (Brush-tailed Rock-wallaby)	Brush-tailed Rock Wallaby scat collection involves collection of fresh scats, one scat each using papers to collect and minimise physical touching into a dry paper bag. Clean sampling protocols were employed to avoid cross-contamination. Scats were stored out of sunlight and frozen in individual packs until being transported to the laboratory for processing. DNA was extracted from scat samples using Qiagen soil kits (Qiagen). Extracted DNA was first screened to confirm the presence of Brush tailed rock wallaby DNA using specific primers in a qPCR assay. Genotype analysis was undertaken by Cesar Australia.	80 Brush tailed Rock-wallaby scats were collected during August 2022. Samples were collected at nine microsatellite locations that were identified in the field as possible colonies.

d Arboreal mammals

Targeted arboreal mammal surveys were undertaken for the following species:

- Squirrel Glider
- Greater Glider
- Yellow-bellied Glider
- Brush-tailed Phascogale
- Koala.

Methods and survey effort have been developed in accordance with OEH (2018b), DEC (2004), DSEWPaC (2011b) and DPE (2022) and survey effort is outlined in Figure 6.6. It should be noted that the majority of the surveys for Koala were undertaken prior to the release of DPE (2022). These guidelines require the employment of two survey methods to achieve coverage. Species surveys used within the project area included a mix of four survey methods for Koala that is considered to provide suitable coverage for this species. The field surveys for the Project were near completion when DPE (2022) was published.

Table 6.9 Methods and survey effort – arboreal mammals

Method	Survey description	Survey effort
Grey headed flying fox camps	Camp sites for flying foxes were searched for throughout the site on foot.	OEH (2018b) guidelines do not require targeted surveys. The entire construction envelope was covered on foot during other flora and fauna surveys. This survey methodology was undertaken for all components of the Project. The minimum survey effort required was met.
Arboreal trapping (Squirrel Glider, Greater Glider, Yellow-belled Glider, Brush-tailed Phascogale)	Transect lines containing ten Elliot B traps were placed at 2 m above the ground. Where possible, traps were placed 50 m apart on suitable trees within the construction envelope: • Traps were baited with a mixture of peanut butter, rolled oats and honey. • A mixture of water and honey was sprayed on each tree trunk. • Traps were checked early in the morning and closed for the day. • Traps were re-opened and rebaited in the late afternoon.	DEC (2004) requires 24 trap nights over 3–4 consecutive days per 50 ha of stratification unit, with replication for every additional 100 ha. Based on the stratification units within the disturbance footprint of suitable habitat of approximately 330 ha, this would equate to a minimum survey effort of 96 trap nights. Remote cameras targeting Brush-tailed Phascogales in the Lower Reservoir area of the generation site confirmed presences of Squirrel Glider. No targeted trapping for Squirrel Glider was therefore required in suitable habitat of the survey area. Ten survey transects were undertaken over 4 nights in the upper reservoir and transmission line, equating to 400 trap nights. The minimum survey effort was exceeded.

Table 6.9 Methods and survey effort – arboreal mammals

Method	Survey description	Survey effort
Spotlighting (All species)	Spotlight surveys were undertaken using handheld LED spotlights and included: • 1 km or 500 m transects were undertaken by two observers • observers moved at a speed of less than 1 km per hour (i.e. one hour for the 1 km transect) scanning vegetation and trees for animals using both spotlights • all animals observed were recorded. Spotlighting for arboreal mammals was done concurrently with nocturnal reptile and bird spotlighting surveys.	DSEWPaC (2011a) recommends two parallel transects per 5 ha site, while DEC (2004) recommends two transects per 200 ha of stratification unit, repeated across two nights. In line with DSEWPaC (2011a) and DEC (2004), a survey effort of 1 km transects per 200 ha stratification units was undertaken with each site replicated. These surveys were undertaken prior to the publication of the Koala survey guidance (DPE 2022). Based on the above stratification units, this would equate to two 1 km spotlighting surveys, repeated on two occasions. Requiring a total of 4 km in length. Nine transects within the generation site were completed, totalling 15 km in length, with two missing a repeat survey were undertaken in the generation site. Fourteen area surveys with one repeat were undertaken along the transmission line and access road, incorporated with the breeding owl surveys. A total of 558 minutes were undertaken. Four transects with four repeats were undertaken along the transmission line and access road. Totalling 907 minutes of searching. The minimum survey effort was exceeded.

Table 6.9 Methods and survey effort – arboreal mammals

Method	Survey description	Survey effort
Camera trapping (All species)	Remote camera surveys were undertaken in accordance with the following method: • At each site two cameras were placed at least 100 m apart. • Cameras were attached to tree or stake and positioned approximately 2 m or higher above ground with bait stations placed 1.5 m away. • Cameras were baited with a baited canister with small holes and capped at either end, to limit bait theft by other species, or honey-water sprayed very liberally in front of each camera.	DSEWPaC (2011a) recommends cameras are placed out for at least one week. However, long term monitoring surveys undertaken by EMM have determined one week may not be sufficient to reliably detect the small, cryptic species, and surveys were extended to a minimum of 14 days. DEC (2004) does not include remote camera surveys. However, as cameras are used to replace hair tubes a similar survey effort was utilised. DEC (2004) recommends ten hair tubes left in place for at least four days and nights per 50 ha stratification unity, with replication for every additional 100 ha. DSEWPaC (2011a) recommends that ten cameras are deployed per hectare. To cover the disturbance footprint of suitable habitat 330 ha, you would require 3,300 cameras. No survey effort for larger sites is described. The threatened biodiversity profile data collection (TBDC) states that for the Brush-tailed Phascogale survey effort must be undertaken using baited cameras. Cameras must remain in place for a minimum of 4 weeks with cameras checked and baits replaced after 2 weeks. A minimum of four cameras, independent of the size of the construction envelope, must be used for sites up to 1 ha, then an additional two cameras for every ha of potential habitat thereafter. To cover the disturbance footprint of suitable habitat 330 ha you will require 662 cameras. No survey effort is described for large sites and consultation was undertaken with BCD. Based on the survey effort for hair traps described in DEC (2004), 40 remote cameras and 1,120 survey nights are required for the construction envelope. Camera surveys were undertaken at 98 sites, with 195 cameras deployed, with cameras left in place for a minimum of 28 nights. 5,124 nights of active bait survey were undertaken, with bait replaced after 14 days. An extra 6,771 camera nights were undertaken after the 28 days. A total of 11,895 camera nights were undertaken. NGH also deployed nine cameras in (NGH 2021), however, didn't provide survey effort or camera placement (ground or tree) only results. The minimum survey effort required was exceeded.

Table 6.9 Methods and survey effort – arboreal mammals

Method	Survey description	Survey effort
Thermal drone surveys (Koala)	As above for diurnal birds.	Thermal drone surveys were used in areas on site (where access could be achieved for drone operation) as a substitute where safe access could not be achieved and/or coverage was considered efficient using this methodology. Thermal drone surveys were used to target Koala. DPE (2022) requires the full extent of suitable habitat to be surveyed with a 30% overlap between flight paths. DPE (2022) requires a second night of survey if no Koala presence is observed. Drone surveys were undertaken in winter 2021 prior to the publication of the survey guidance. No second survey night was undertaken in areas surveyed with no results. Due to the large area of the site, four nights of survey were undertaken to cover the accessible extent of the site. 643 ha of the Project area was surveyed using the thermal drone. Coverage included the majority of the generation site, with some coverage of the access and transmission line.
Koala Detection Dog Survey	Field detection dogs were used to detect Koala scats, comprising the following method: • Field quality assurance (FQA) procedures and field quality control (FQC) searches were conducted on site prior to daily surveys. • Two handheld GPS units were used to record scat locations. Tracking collars were also used to record tracks of the detection dogs. • Opportunistic observations were also carried out when dogs were not actively searching.	(DPE, 2022) requires three 200 m transects for every 5 ha of suitable habitat, spaced approximately 100 m apart. To cover suitable habitat within the disturbance footprint 330 ha requires 198 transects. No survey effort is described for large sites. Presence absence transects of 200 x 50 m were conducted every 500 m and/or at most suitable habitat areas. Sample surveys within suitable habitat were also undertaken between sites. 73 transects were undertaken along the access road, transmission line and in safe to access areas of the generation site.
Regularised Grid Based (RGB) Spot Assessment Technique (SAT) (Koala)	The RGB SAT method requires application of a uniform assessment method across a broad area. At each grid point, a SAT (Phillips and Callaghan 2011) survey is undertaken, as follows: • Centre tree (nearest tree irrespective of species) is located and marked with flagging tape. • The 29 nearest trees to the centre tree are also identified. • Koala faecal pellets are searched for beneath each of the 30 trees within a distance of 100 cm of tree trunks. Initial inspections of undisturbed ground surface are followed by a more thorough inspection involving disturbance of leaf litter and ground cover (if no faecal pellets are initially detected). • An average of approximately two person minutes per tree is dedicated to the faecal pellet search. Activity levels can be interpreted using Table 2 from Phillips and Callaghan (DSEWPaC 2011a).	A 250 m x 250 m grid was applied to the survey area to identify survey locations. Surveys were undertaken where the grid points intersected areas with >10% native tree canopy. A total of three SAT surveys were undertaken (NGH 2021).

Table 6.9 Methods and survey effort – arboreal mammals

Method	Survey description	Survey effort
Hair Trapping (Squirrel Glider, Greater Glider, Yellow-belled Glider, Brush-tailed Phascogale)	Transect lines containing ten hair traps were placed at 2 m above the ground. Where possible, traps were placed 50 m apart on suitable trees within the construction envelope: • Traps were baited with a mixture of peanut butter, rolled oats and honey. • A mixture of water and honey was sprayed on each tree trunk. • Traps were left for 26 nights. • Hair samples sent for analysis.	DEC (2004) recommends ten hair tubes left in place for at least four days and nights per 50 ha stratification unity, with replication for every additional 100 ha. Eleven hair trap lines-were undertaken by NGH (2021). The minimum survey effort required was exceeded.

e Microchiropteran bats

Microbat surveys were undertaken for the following species:

- Large-eared Pied Bat
- Little Bent-winged Bat
- Large Bent-winged Bat
- Southern Myotis.

Methods and survey effort have been developed in accordance with DEC (2004), OEH (2018b) and DSEWPaC (2010c). Methods and survey effort are outlined in Table 6.10.

Table 6.10 Methods and survey effort – Microchiropteran bats

Method	Survey description	Survey effort
Breeding habitat identification (all species)	Roost searches were undertaken in accordance with the following: • Potential roost sites across the disturbance footprint (caves, scarps, cliffs, rock overhangs, disused mines, tunnels, bridges, culverts, old buildings, sheds) were searched for signs of use by microbats. • Searches included searching for signs of microbats (urine stains, droppings, remains, and bat fly casings) during the daytime. • Searches were done using handheld torches shined into cracks and crevices. A handheld detector was used to alert the observers to any ultrasonic calls. • Where bats were recorded the species was identified by capture/through additional surveys (see below).	OEH (2018b) requires a 30 minute search per roost. Features such as cliffs, rock areas, overhangs were inspected where access could be achieved safely on foot. No potential roost sites were identified within 100 m from the disturbance footprint (where access could be safely achieved).

Table 6.10 Methods and survey effort – Microchiropteran bats

Method	Survey description	Survey effort
Acoustic detection (all species)	Acoustic surveys were undertaken as follows: • Detectors were set out over waterways and in flyways likely to be utilised by bats. • Detectors were placed a minimum of 50 m apart. • Detectors were placed out for a minimum of four nights, with devices set to record between dusk and dawn. • Calls were analysed by a person experienced in bat call analysis.	The OEH (2018b) guidelines specify a minimum survey effort of four sites surveyed for four night (16 detector nights) for sites with less than 50 ha of habitat/riparian stream lengths less than 2.5 km. Larger sites are required to be scaled up with the same effort required for 50 ha/2.5 km stream lengths. It is estimated that approximately 5 km of the disturbance footprint may fall within 200 m of the riparian area, requiring 80 detector nights (Southern Myotis) and 330 ha of suitable habitat requiring 112 detector nights (remaining candidate species). Surveys for riparian stream length were undertaken over five sites, across two nights, equating to 10 detector nights. These surveys had to be shortened due to rising river levels that would have washed away the detectors. The minimum survey effort was not met, but the candidate species was recorded. Surveys for suitable habitat with the survey area were undertaken by NGH in 2020. Surveys were undertaken over four sites across 21 nights, equating to 84 detector nights (NGH 2021). The minimum survey effort was not met, but candidate species were recorded.
Harp trapping (all species)	Harp trapping was undertaken as follows: • Two to three bank harp traps, with a minimum catch area of 4.2 m^2, strung with monofilament nylon line were placed out over waterways and in flyways likely to be utilised by bats. • Harp traps were placed a minimum of 20 m apart. • Each harp trap location was surveyed for a single night, in line with OEH (2018b), to minimise trap avoidance. • Harp traps surveys were undertaken across the Project area over four nights. • Harp traps were set prior to dusk and checked at dawn.	The OEH (2018b) guidelines specify a minimum survey effort of four sites surveyed for four night (16 trap nights) for sites with less than 50 ha of habitat/riparian stream lengths less than 2.5 km, for Southern Myotis. Due to La Nina events, harp trapping for Southern Myotis was undertaken during unfavourable conditions. Rapid river level rise reaching harp traps required surveyed to be discontinued due to animal welfare concerns. Main survey effort for Southern Myotis was therefore undertaken using acoustic detection and analysis. Cave dwelling bat maternity roost surveys were undertaken using harp trapping. It was identified during the roost searches that the construction envelope and habitat within 2 km contained over 5 km of features that could be considered habitat for cave dwelling bats. Due to the inaccessibility and safety of accessing these potential features within the construction envelope, harp trapping was used to determine if any lactating females were present. This would determine if a maternity roost was near the construction envelope. Four sites were surveyed for four night (16 trap nights) near suitable features to support maternity roosts were undertaken. Surveys guidelines were met.

f Amphibians

Amphibian (frog) surveys were undertaken for the Stuttering Frog.

Stratification units for frogs are based on lengths of suitable habitat for Stuttering Frog. Stratification units used to inform frog surveys are outlined in Table 6.11.

Table 6.11 Stream lengths for frogs

Target Species	Waterway/feature	Length (m)/area (ha)
Stuttering Frog	Macleay River – Strahler 9	22,804 m
Stuttering Frog	Lower Reservoir – Strahler 3	1,336 m
Stuttering Frog	Lower to Upper access – Strahler 2	826 m

Methods and survey effort has been developed in accordance with DPIE (2020) and is outlined in Table 6.12.

Table 6.12 Methods and survey effort - Amphibians

Method	Survey description	Survey effort
Aural-visual surveys	Aural-visual surveys comprise the following: • Each survey requires a minimum 120 minute period of listening for calling frogs and conducting a visual search along a 500 m transect in breeding habitat along, around or through a suitable waterbody. • Survey comprises of 5 minutes of listening every 50 m. • Spotlighting for eyeshine along each 50 m section. • Using call playback at the same location as the aural-visual survey. • Each transect requires four repeats with at least one transect separated by a two week period. • Each transect requires 450 survey minutes in total.	DPIE (2020c) survey guidelines for aural-visual surveys are to be undertaken along transects of 500 m in suitable breeding habitat for four surveys nights. Where habitat is greater than 5 km, a minimum of five 500 m are required. NGH conducted surveys in 2020 at one transect over four nights, 60 minutes each night equalling to 240 surveys minutes. Five transects with two repeats equalling 1,200 survey minutes were undertaken along the Macleay River.During these surveys it was identified that habitat along the Macleay was not considered suitable to support this species and no further surveys were undertaken along the Macleay. Three transects with four repeats equalling 1,440 survey minutes were undertaken along the Lower Reservoir – Strahler 3 creek and Strahler 2 creek. Both creeks are considered sub-optimal habitat. Survey effort meets the guideline requirements.

g Reptiles

Reptile surveys were undertaken for the following species:

- Pale-headed Snake
- Stephen's Banded Snake.

Methods and survey effort have been developed in accordance with DEC (2004), DPE (2022) and DSEWPaC (2011b) and are outlined in Table 6.13.

Table 6.13 Methods and survey effort - Reptiles

Method	Survey description	Survey effort
Spotlighting (all species)	Spotlight surveys (DPE, 2022) were undertaken using handheld LED spotlights and included: • Usually a 1 km transect, was undertaken in areas of suitable habitat, targeting microhabitats likely to support the species (e.g. under bark and hollow bearing trees and along riparian areas). • Observers scanned vegetation and trees for animals using spotlights, as well as targeted searching in suitable microhabitat. • All animals observed were recorded.	DEC (2004) requires one search per 100 ha of habitat, replicated over two nights, conducted between November and March. DPE released threatened reptiles survey guidance in November 2022 (DPE, 2022) after the survey effort for Pale-headed Snake was undertaken within the Generation site. DPE (2022) requires 120 people minutes per 50 ha of suitable habitat with four repeats for both species. The new guidance was only applied to the transmission line and access road as these surveys occurred after the release of the new survey guidance (DPE, 2022). Generation site: • Five transects were completed with one repeat on two transects only. Totalling 444 minutes of searching. The minimum survey effort was exceeded under the DEC 2004 guidelines, which would have required a maximum of four transects. Access road and transmission line: • Four transects with four repeats were undertaken along the transmission line and access road totalling 1,814 people minutes of searching. The minimum survey effort was exceeded for the transmission line and access road which would have required a maximum of 480 people minutes of searching under the DPE (2022) guidelines. • In addition, fourteen area surveys with one repeat were undertaken along the transmission line and access road, incorporated with the breeding owl surveys. A total of 1,116 people survey minutes were undertaken. • As part of the frog aural visual surveys, which targets habitat where both snake species would be hunting for prey, an additional 5,280 person minutes was undertaken with three transects having four repeats that meet DPE (2022) guidelines, totalling 2,880 person hours. Under the DPE (2022) guidance, a maximum of 2,880 person minutes would have been required with transects having four repeats. 3,254 person minutes were achieved under the DPE (2022) guidance. An additional 6,840 person minutes of spotlighting that did not have the four repeats were also undertaken for the Project. Survey effort exceeded the guideline requirements.

Table 6.13 Methods and survey effort - Reptiles

Method	Survey description	Survey effort
Funnel Traps (Pale-headed Snake)	• Funnel traps were set in suitable habitat such as near riparian habitat (where present) for 4 nights. • Funnel traps were 75 cm x 18 cm x 18 cm. • Traps were spaced approximately 3 m apart. • Drift fences were used to funnel snakes towards traps. • Traps were checked twice daily, in the morning and evenings. • Trapping occurred during high humid nights during afternoon storms that occurred most days.	Surveys within the generation site were undertaken prior to the new DPE (2022) guidance was issued. As such, no funnel traps were conducted in this section of the Project. DPE (2022) survey guidelines were only applied to the transmission line and access road that is within the Hasting Macleay sub-IBRA region. DPE (2022) requires 72 trap nights with 4 replicates per 50 ha within suitable habitat. The area of both the transmission lien and access road is less than 50 ha. • Five traplines with 5 traps were undertaken along the transmission line with four survey nights. Totalling 100 trap nights. • Five trapline with 5 traps were undertaken along the access road with four survey nights. Totalling 100 trap nights. A total of 200 trap nights were undertaken which exceeded the guideline requirements within the Hastings Macleay Sub-IBRA region.

6.3.4 Survey gaps, assumed presences and effort summary

A summary of survey gaps and assumed presence along with comment where the survey effort did not meet guideline requirements is in Table 6.14.

Table 6.14 Survey summary of gaps and effort

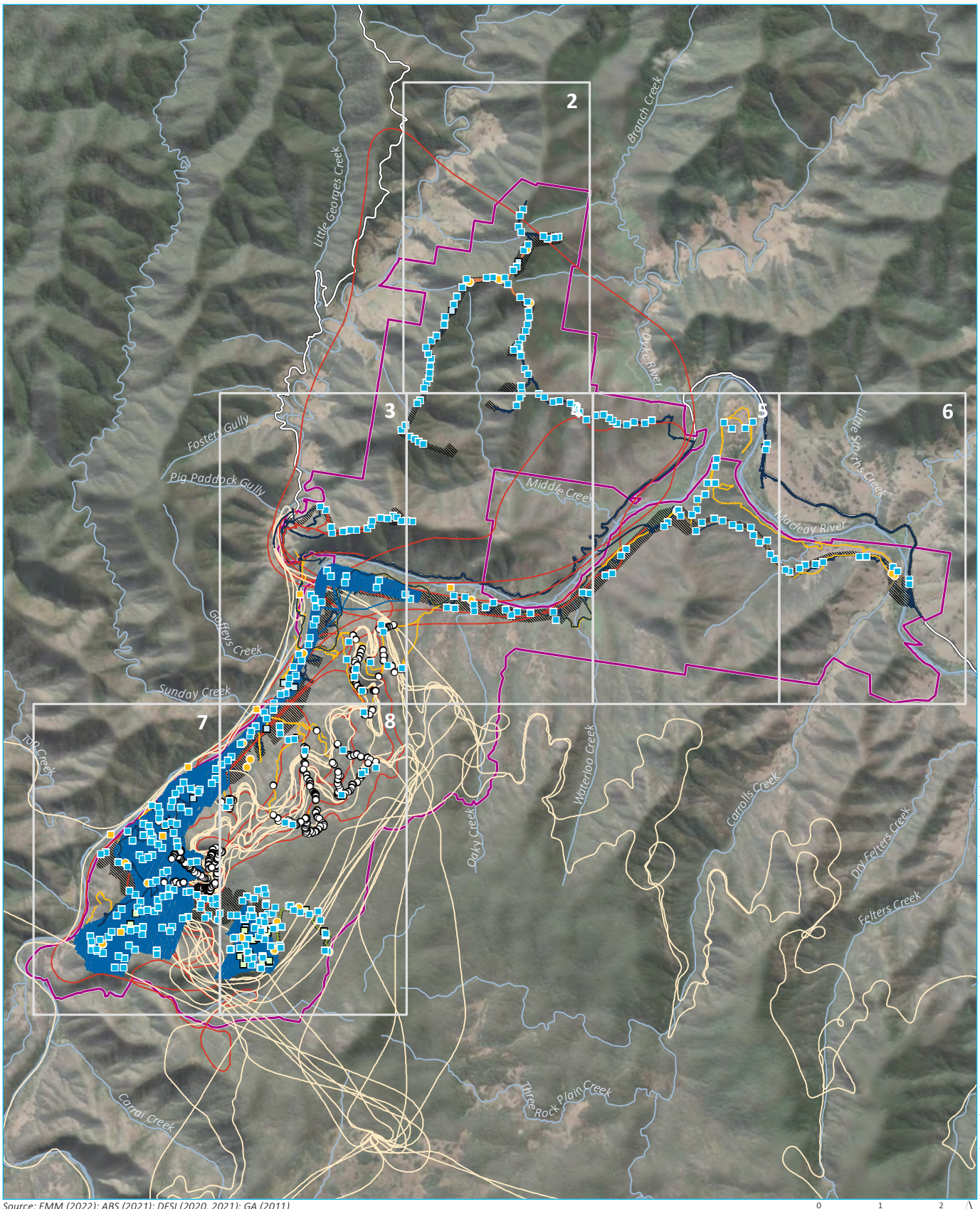
Scientific name	Common name	Survey gaps	Assumed presence	Comment on gaps
Calyptorhynchus lathami	Glossy Black-Cockatoo (Breeding)	Traditional surveys were undertaken along the access road and transmission line where safety risks were considered lower than other areas of the site. Drone surveys were undertaken in areas deemed less safe due to access constraints and risk to personnel. Gaps exist outside of drone coverage area within the generation site. Consultation with the North East Region of BCD indicates BCD does not support the use of thermal drones for nesting Glossy Black-Cockatoo surveys or Owls.	Yes – in unsurveyed areas.	Species was recorded foraging within the Project area. No breeding nests were identified in the survey area covered. Following consultation with BCD, additional surveys will be undertaken using traditional survey techniques during daylight. The BDAR will be updated once these surveys have been completed.

Table 6.14 Survey summary of gaps and effort

Scientific name	Common name	Survey gaps	Assumed presence	Comment on gaps
Ninox connivens	Barking Owl (Breeding)	As for Glossy Black-cockatoo	Yes – in unsurveyed areas.	Species not identified as part of the survey effort undertaken. Following consultation with BCD, additional surveys will be undertaken. The BDAR will be updated once these surveys have been completed.
Ninox strenua	Powerful Owl (Breeding)		Yes – in unsurveyed areas.	Species recorded outside of the construction envelope. Following consultation with BCD, additional surveys will be undertaken. The BDAR will be updated once these surveys have been completed.
Planigale maculata	Common Planigale	Due to rocky habitat, pitfall traps could not be dug in and funnel traps were used in place of pitfalls. Camera traps were also used. Consultation with the North East region of BCD indicates BCD does not support the use of funnel traps or remote cameras for survey effort for this species. An expert report could not be obtained due to the only recognised expert no longer being available.	Yes – for Macleay Hastings sub IBRA region.	It is recognised that the use of remote camera and funnel trapping have limitations for identification for this species. EMM is currently consulting with BCD on the use of a revised method for surveys for the Common Planigale. The BDAR will be updated once these surveys have been completed.
Tyto novaehollandia	Masked Owl (Breeding)	As for Glossy Black-cockatoo	Yes – in unsurveyed areas.	An active nest was recorded outside of the construction envelope as part of the survey effort undertaken. Following consultation with BCD, additional surveys will be undertaken. The BDAR will be updated once these surveys have been completed.

Table 6.14 Survey summary of gaps and effort

Scientific name	Common name	Survey gaps	Assumed presence	Comment on gaps
Myotis macropus	Large-eared Pied Bat	None.	No	As the survey effort undertaken for other candidate species detected their presence, it is considered that the combined survey effort (acoustic and harp trapping) is suitable due to other candidate species been recorded.
Miniopterus australis	Little Bent-winged Bat (Breeding)	None.	No	Recorded within the Project area, despite not meeting survey effort.
Miniopterus orianae oceanensis	Large Bent-winged Bat (Breeding)	None.	No	Recorded within the Project area, despite not meeting survey effort.
Myotis macropus	Southern Myotis	None.	No	Recorded within the Project area, despite not meeting survey effort.
Miniopterus australis	Eastern Cave Bat	None.	No	Recorded within the Project area, despite not meeting survey effort.



Source: EMM (2022); ABS (2021); DFSI (2020, 2021); GA (2011)

0 1 2 km

GDA 1994 MGA Zone 56

N

KEY

- Project area
- Construction envelope
- Named watercourse
- Major road

Targeted mammal survey point

- Camera
- Microbat acoustic
- Brush-tailed Rock-wallaby scat collection
- Arboreal mammal traps
- Hair trap
- Harp survey
- SAT survey

Survey transect

- Spotlighting

Targeted mammal survey transect

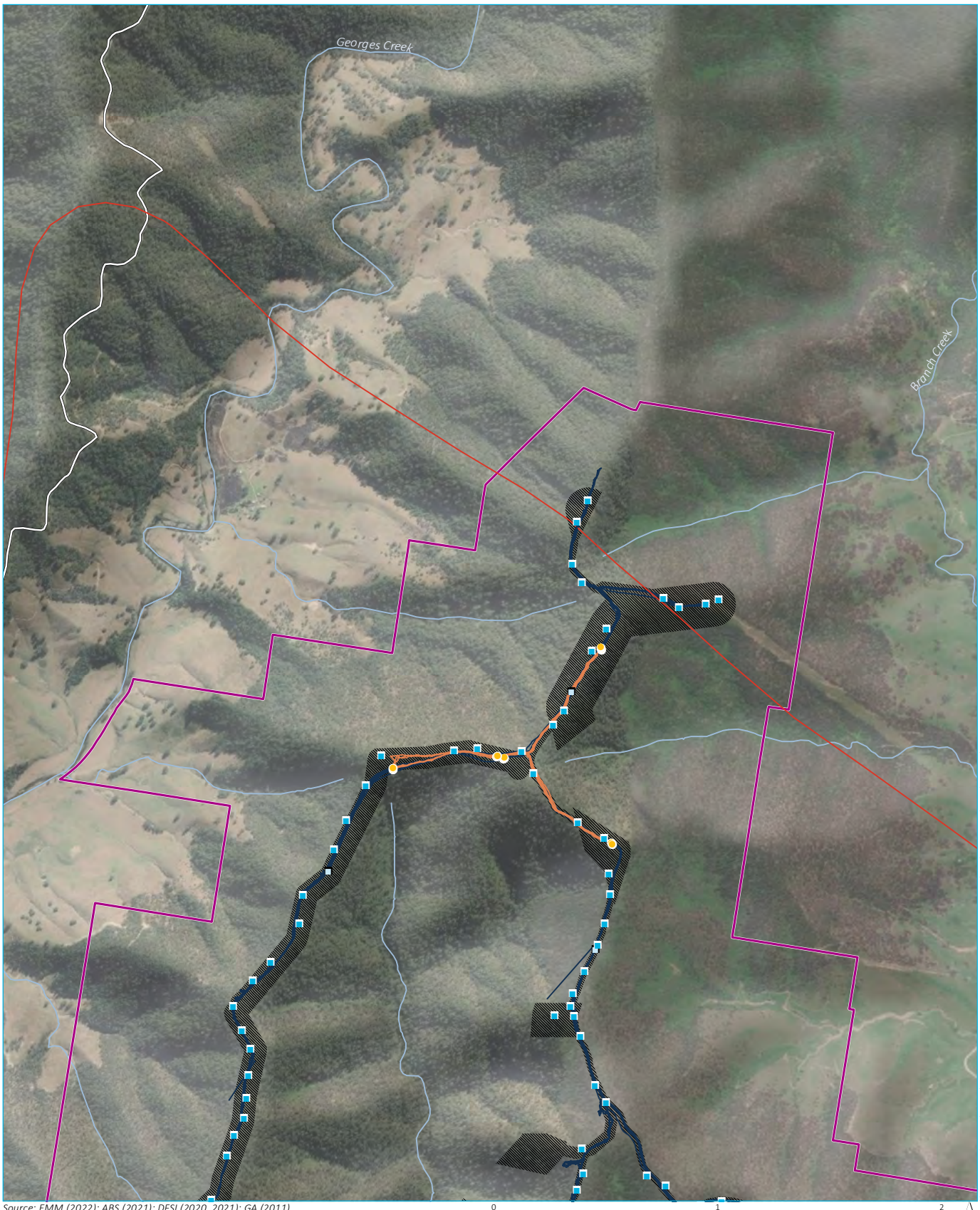
- Aerial survey - October - November 2022
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- Spotlighting - November 2021
- Spotlighting - March 2022
- Thermal drone transect - August 2021
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- Spotlighting - December 2022
- Spotlighting - January 2023

Targeted mammal surveys
Map 1 of 8

Oven Mountain Pumped Hydro Energy Storage Project
Biodiversity development assessment report
OMPS Pty Ltd
Figure 6.2a

EMM creating opportunities

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Source: EMM (2022); ABS (2021); DFSI (2020, 2021); GA (2011)

0 1 2 km

GDA 1994 MGA Zone 56

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Survey transect

- Spotlighting

Targeted mammal survey transect

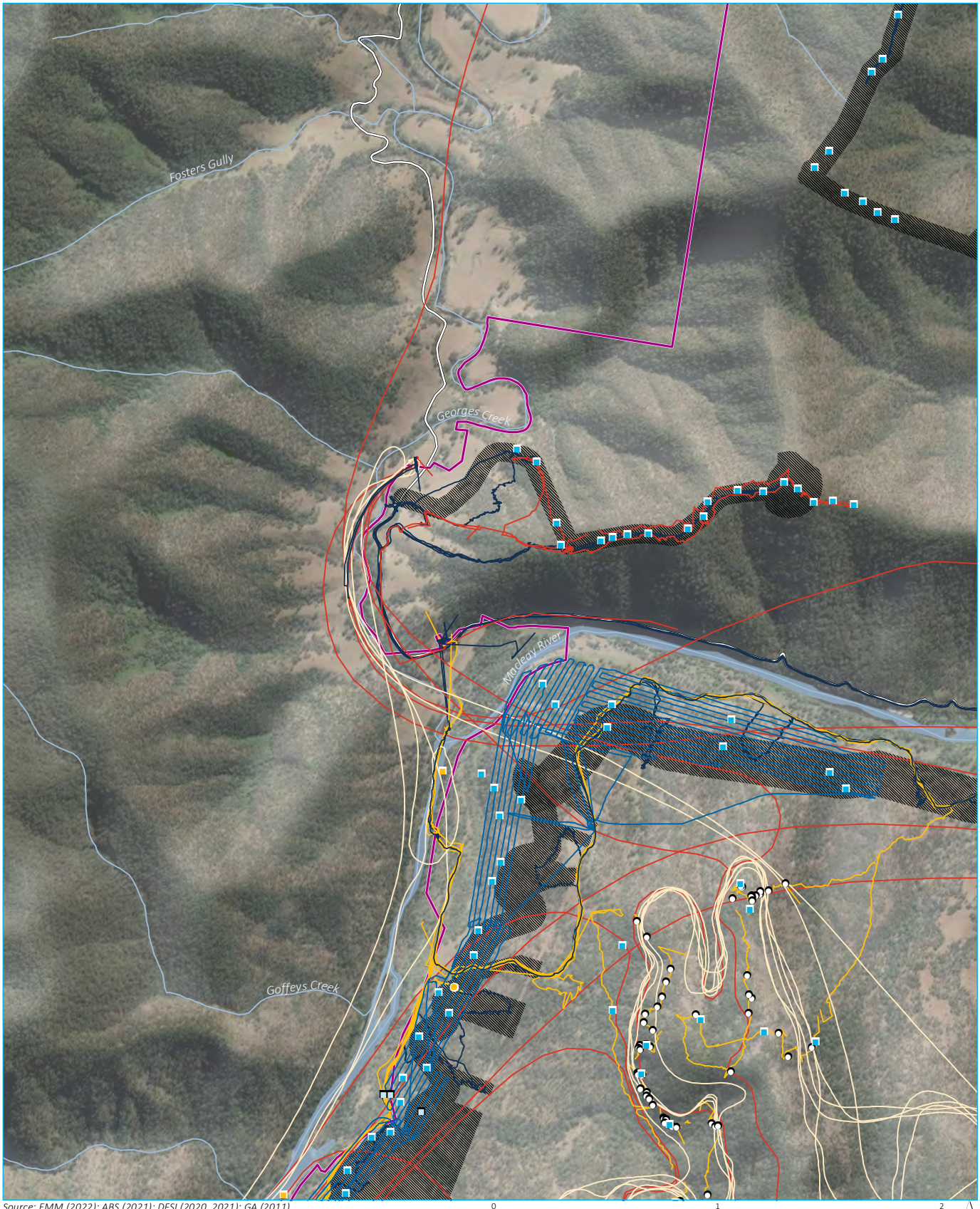
- Koala detection dog transect - August 2022
- Aerial survey - August 2022
- Spotlighting - December 2022

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Targeted mammal surveys
Map 2 of 8

Oven Mountain Pumped Hydro Energy Storage Project
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Figure 6.2a

EMM creating opportunities



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- Hair trap
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Survey transect

- Spotlighting

Targeted mammal survey transect

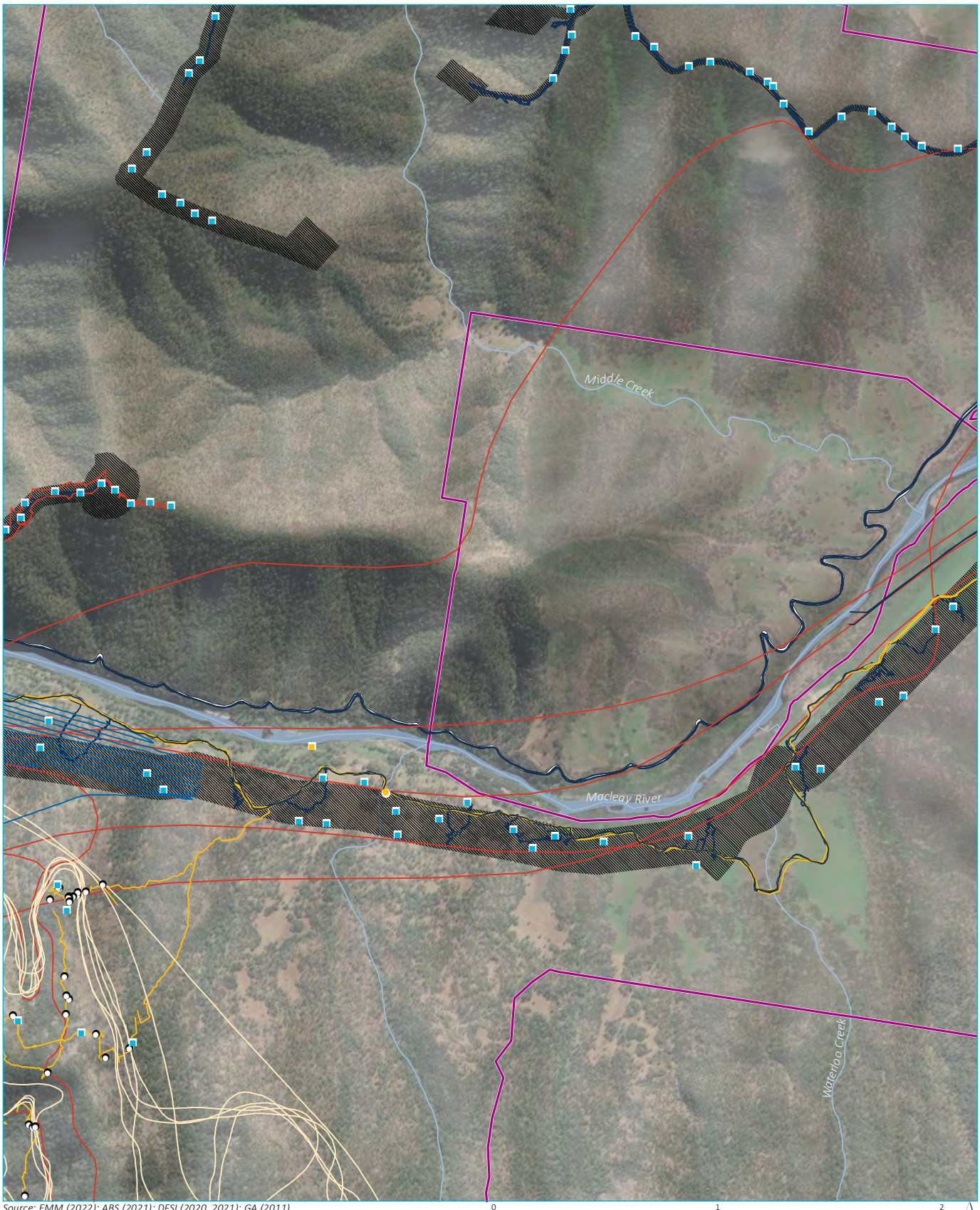
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- Koala detection dog transect - August 2022
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Targeted mammal surveys
Map 3 of 8

Oven Mountain Pumped Hydro Energy Storage Project
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Figure 6.2a

EMM
creating opportunities



Source: EMM (2022); ABS (2021); DFSI (2020, 2021); GA (2011)

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GDA 1994 MGA Zone 56

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- Hair trap
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- SAT survey

Survey transect

- Spotlighting

Targeted mammal survey transect

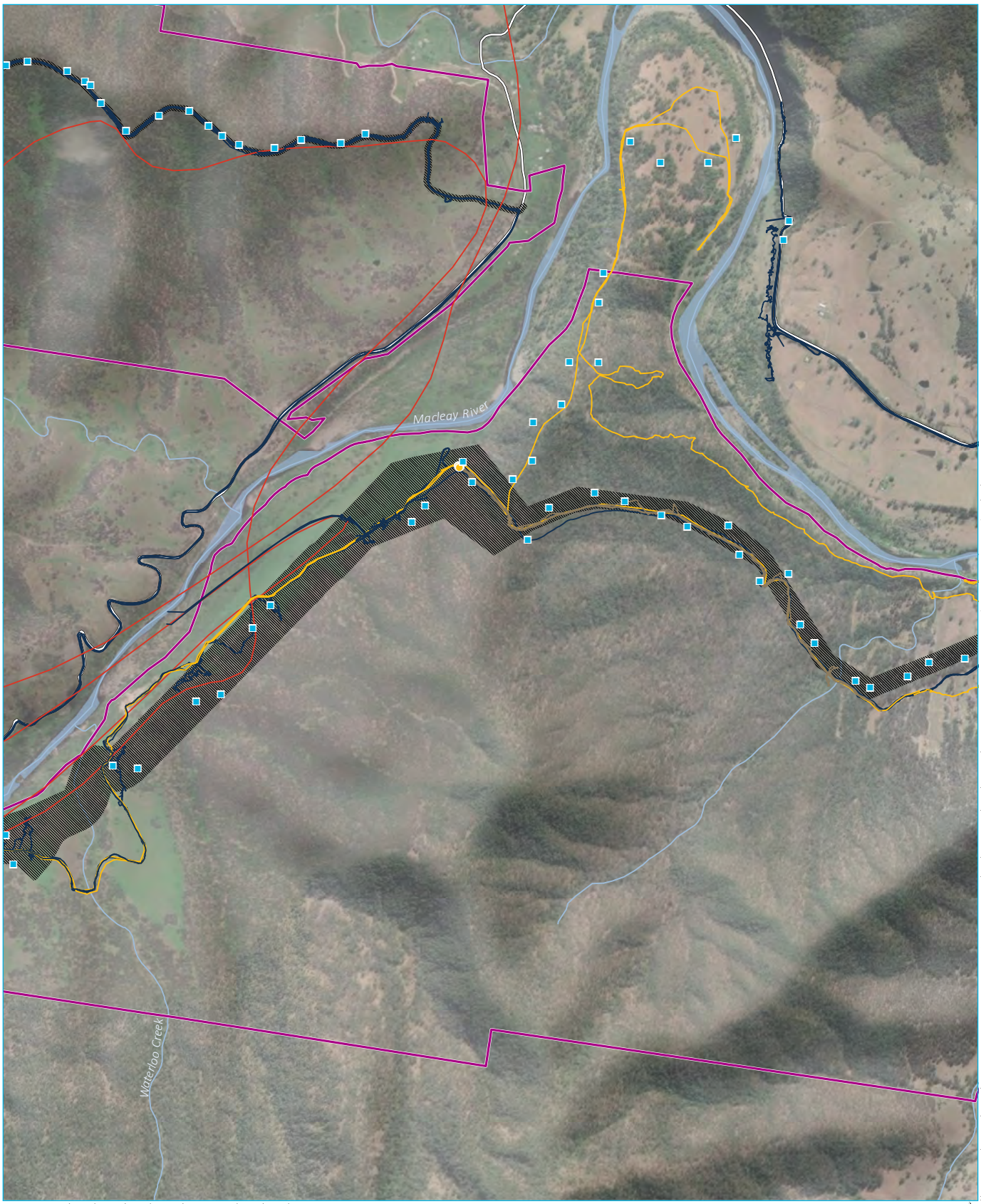
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- Thermal drone transect - August 2021
- Koala detection dog transect - August 2022
- Aerial survey - August 2022

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Targeted mammal surveys
Map 4 of 8

Oven Mountain Pumped Hydro Energy Storage Project
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Figure 6.2a

EMM creating opportunities



Source: EMM (2022); ABS (2021); DFSI (2020, 2021); GA (2011)

0 1 2 km

GDA 1994 MGA Zone 56

N

KEY

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Targeted mammal survey point

- Camera
- Microbat acoustic
- Arboreal mammal traps
- Hair trap
- Harp survey
- SAT survey

Survey transect

- Spotlighting

Targeted mammal survey transect

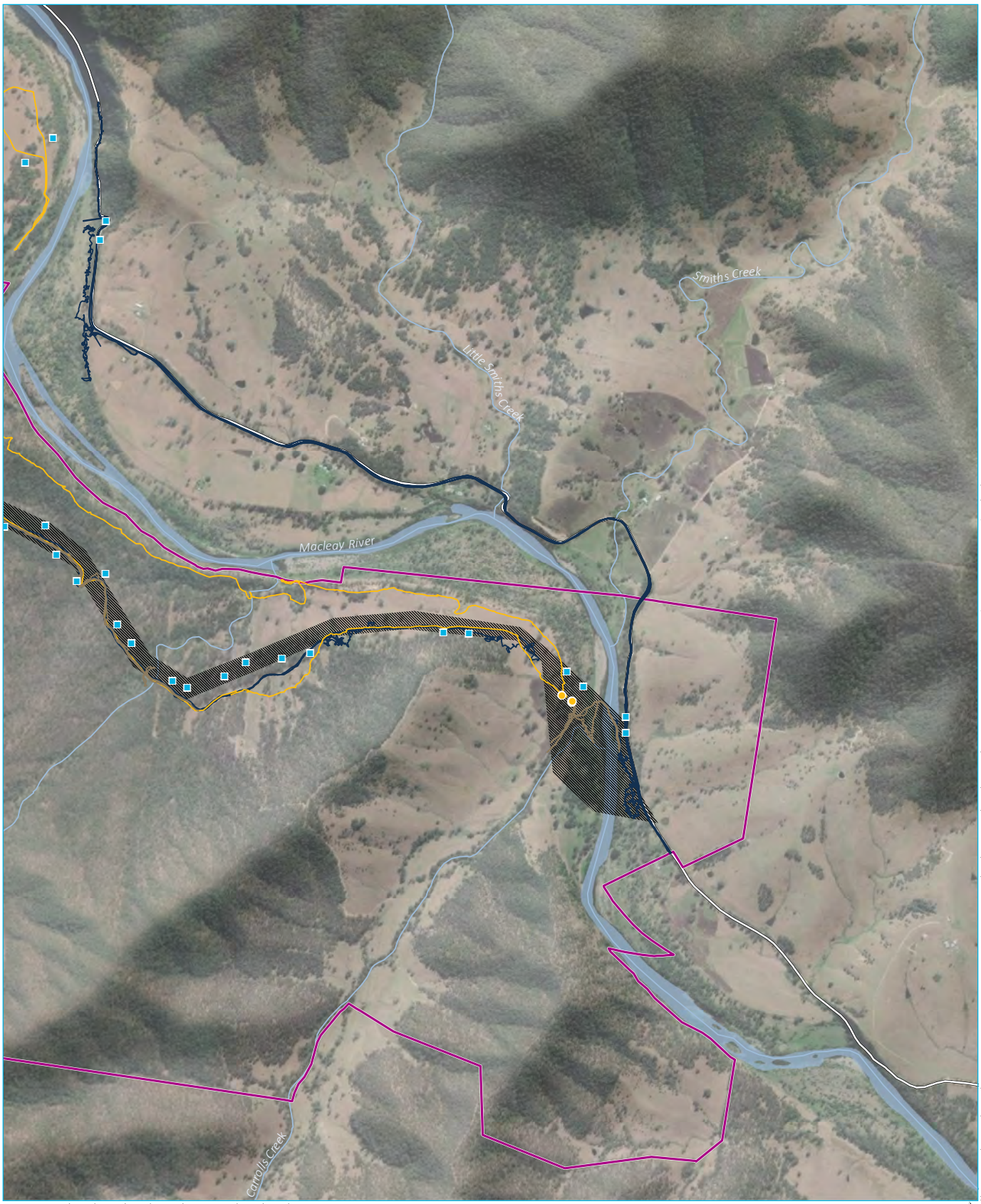
- Brush-tailed Rock-wallaby scat survey - August 2022
- Koala detection dog transect - August 2022
- Aerial survey - August 2022
- Spotlighting - January 2023

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Targeted mammal surveys
Map 5 of 8

Oven Mountain Pumped Hydro Energy Storage Project
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Figure 6.2a

EMM
creating opportunities



Source: EMM (2022); ABS (2021); DFSI (2020, 2021); GA (2011)

0 1 2 km

GDA 1994 MGA Zone 56

N

KEY

- Project area
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- Camera
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- Arboreal mammal traps
- Hair trap
- Harp survey
- SAT survey

Survey transect

- Spotlighting

Targeted mammal survey transect

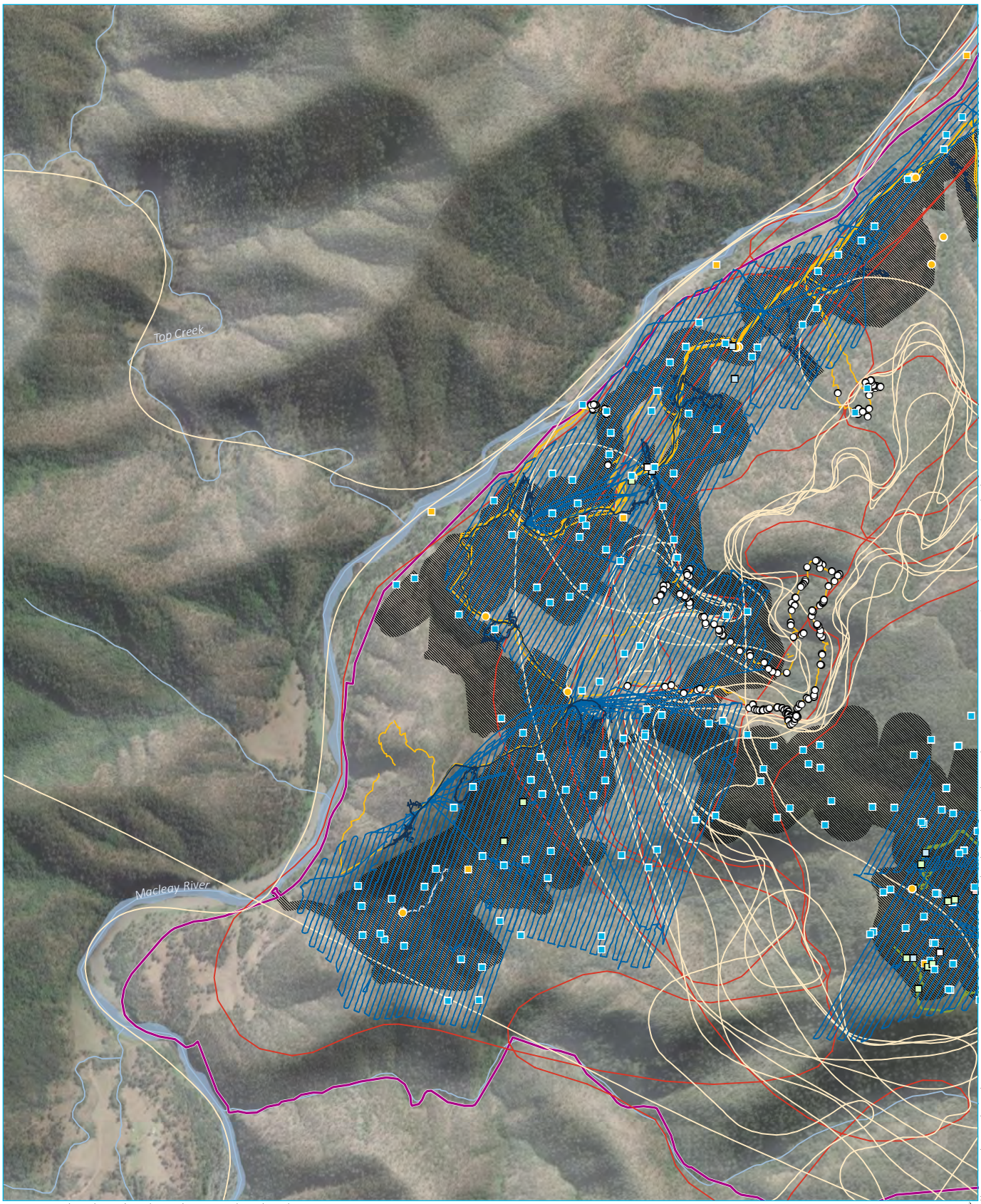
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- Spotlighting - January 2023

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Targeted mammal surveys
Map 6 of 8

Oven Mountain Pumped Hydro Energy Storage Project
Biodiversity development assessment report
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Figure 6.2a

EMM creating opportunities



Source: EMM (2022); ABS (2021); DFSI (2020, 2021); GA (2011)

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GDA 1994 MGA Zone 56

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Survey transect

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Targeted mammal survey transect

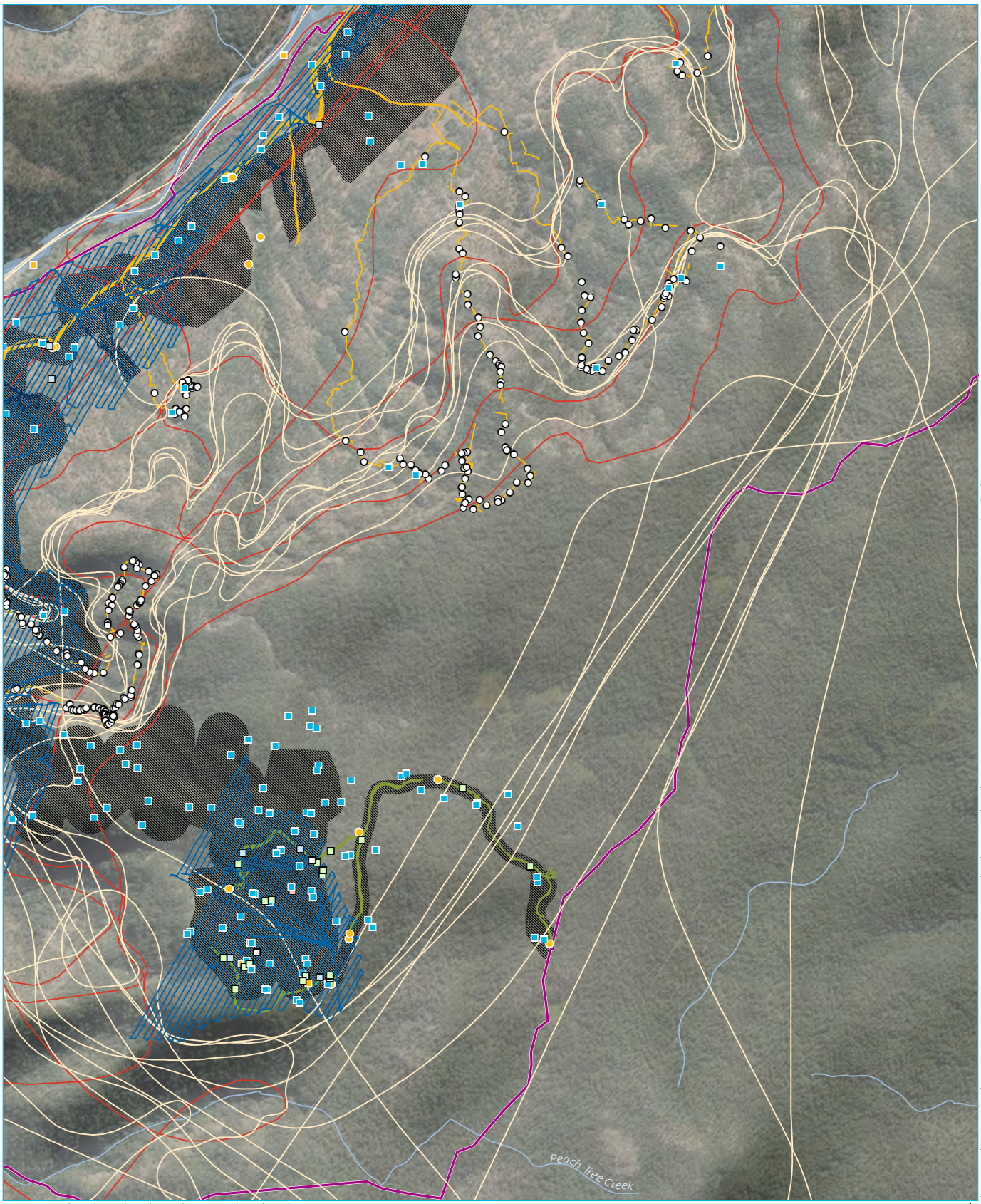
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- Spotlighting - March 2022
- Thermal drone transect - August 2021
- Koala detection dog transect - August 2022
- Aerial survey - August 2022

Targeted mammal surveys
Map 7 of 8

Oven Mountain Pumped Hydro Energy Storage Project
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Figure 6.2a

EMM creating opportunities

\\emmsvr1\emm3\2021\J210465 - OMPS EIS - Generation Component\GIS\02_Maps_EIS_BDAR\BDAR024_FaunaSurveyMamal_20230823_01.mxd 23/08/2023



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GDA 1994 MGA Zone 56

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- Harp survey
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Survey transect

- Spotlighting

Targeted mammal survey transect

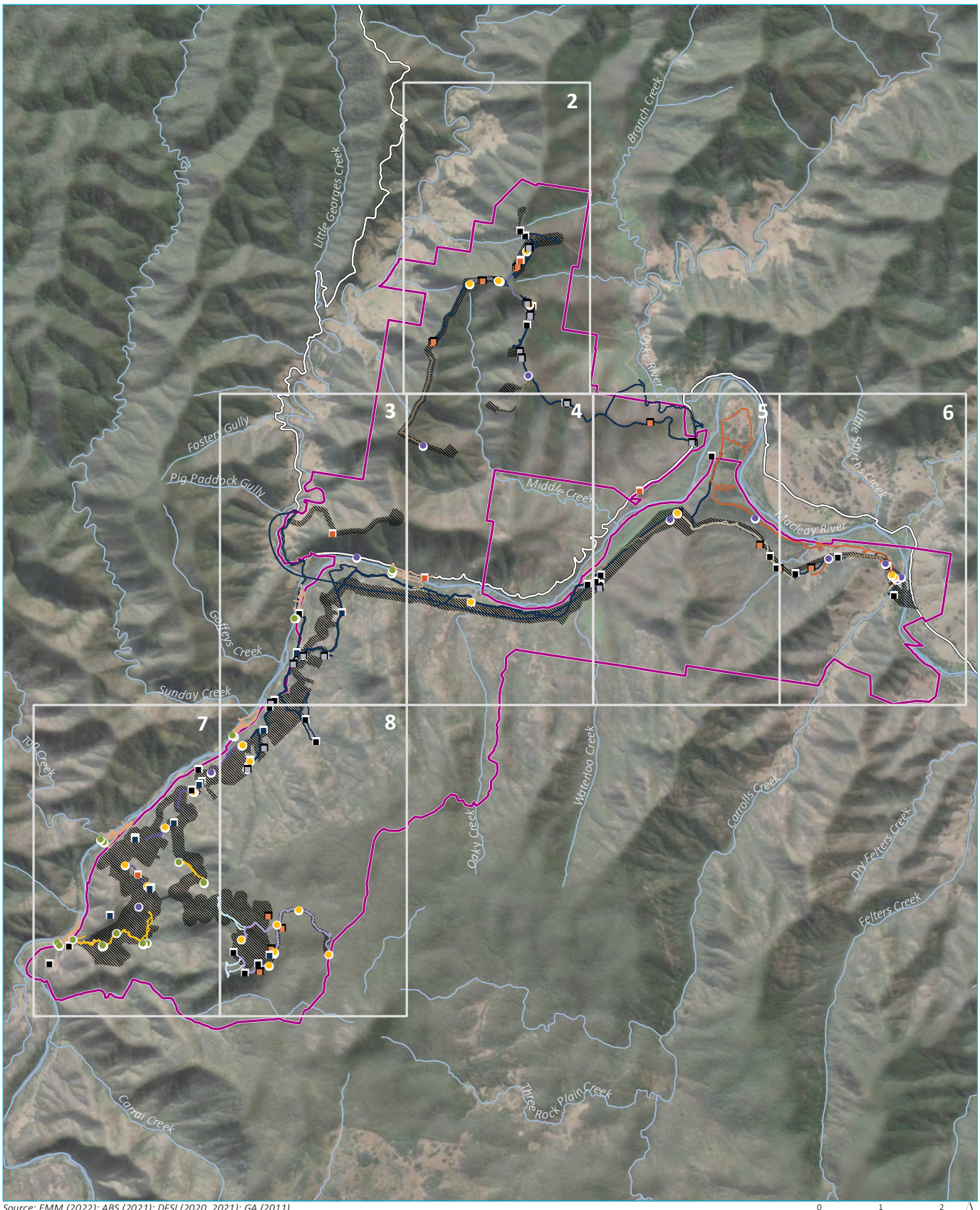
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- Aerial survey - August 2022

Targeted mammal surveys
Map 8 of 8

Oven Mountain Pumped Hydro Energy Storage Project
Biodiversity development assessment report
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Figure 6.2a

EMM creating opportunities

\\emmsvr1\emm3\2021\J210465 - OMPS EIS - Generation Component\GIS\02_Maps_EIS_BDAR\BDAR024_FaunaSurveyMamal_20230823_01.mxd 23/08/2023



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0 1 2 km

GDA 1994 MGA Zone 56

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KEY

- Project area
- Construction envelope
- Named watercourse
- Major road

Targeted fauna survey point

- Owl listening area
- Owl nest watch
- Bush Stone-curlew broadcast survey
- Bird area survey
- Funnel traps

Survey transect

- Bird transect
- Frog survey
- Spotlighting

Targeted fauna survey transect

- Bird survey - August 2022
- Frog survey - September 2021
- Frog survey - October 2021
- Frog survey - March 2022
- Frog survey - January 2023
- Spotlighting - March 2022
- Spotlighting - November 2021
- Bird transects - October 2021
- Bird survey - July 2022
- Spotlighting - December 2022
- Spotlighting - January 2023
- Bird flushing transects - January 2023

Other targeted fauna surveys
Map 1 of 8

Oven Mountain Pumped Hydro Energy Storage Project
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OMPS Pty Ltd
Figure 6.2b

EMM creating opportunities



Source: EMM (2022); ABS (2021); DFSI (2020, 2021); GA (2011)

0 1 2 km

GDA 1994 MGA Zone 56

N

KEY

- Project area
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- Named watercourse
- Major road

Targeted fauna survey point

- Owl listening area
- Owl nest watch
- Bush Stone-curlew broadcast survey
- Bird area survey
- Funnel traps

Survey transect

- Bird transect
- Frog survey
- Spotlighting

Targeted fauna survey transect

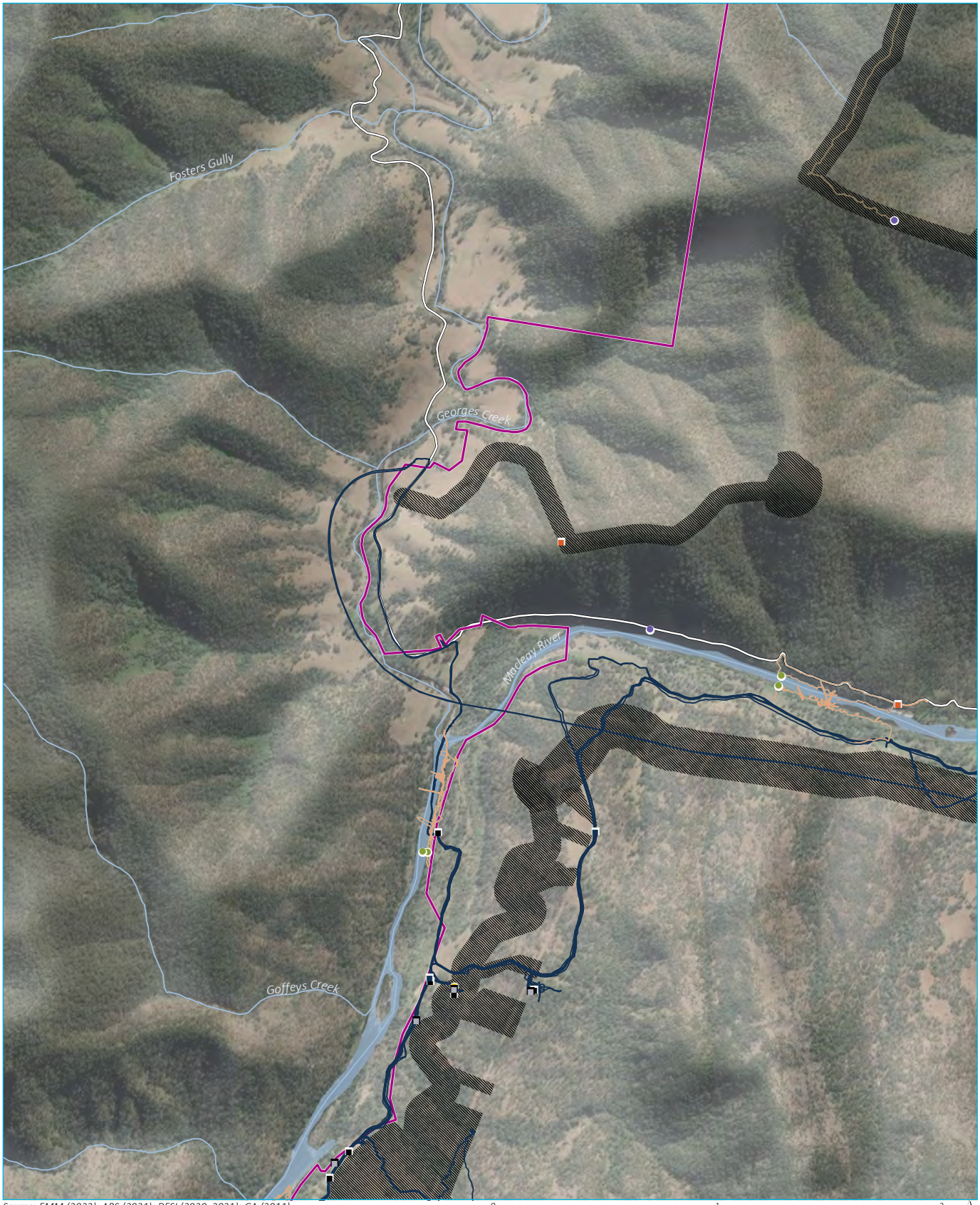
- Bird survey - July 2022
- Spotlighting - December 2022
- Bird flushing transects - January 2023

\\emmsvr1\emm3\2021\P210465 - OMPS EIS - Generation Component\GIS\02_Maps_EIS_BDAR\BDAR025_FaunaSurveyOther_20230823_01.mxd 23/08/2023

Other targeted fauna surveys
Map 2 of 8

Oven Mountain Pumped Hydro Energy Storage Project
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Figure 6.2b

EMM creating opportunities



Source: EMM (2022); ABS (2021); DFSI (2020, 2021); GA (2011)

0 1 2 km

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N

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Survey transect

- Bird transect
- Frog survey
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Targeted fauna survey transect

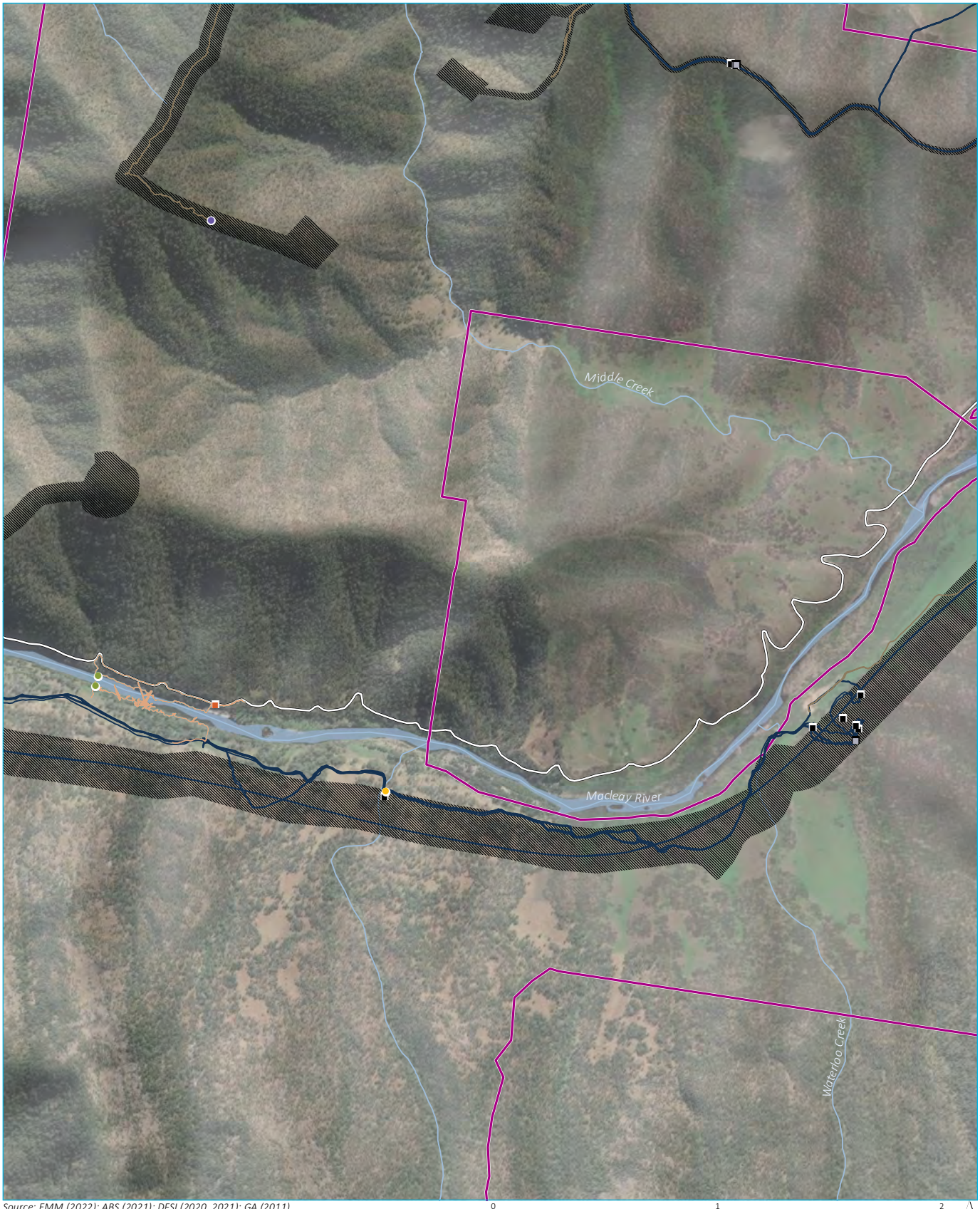
- Frog survey - September 2021
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Other targeted fauna surveys
Map 3 of 8

Oven Mountain Pumped Hydro Energy Storage Project
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OMPS Pty Ltd
Figure 6.2b

EMM creating opportunities



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0 1 2 km

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Survey transect

- Bird transect
- Frog survey
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Targeted fauna survey transect

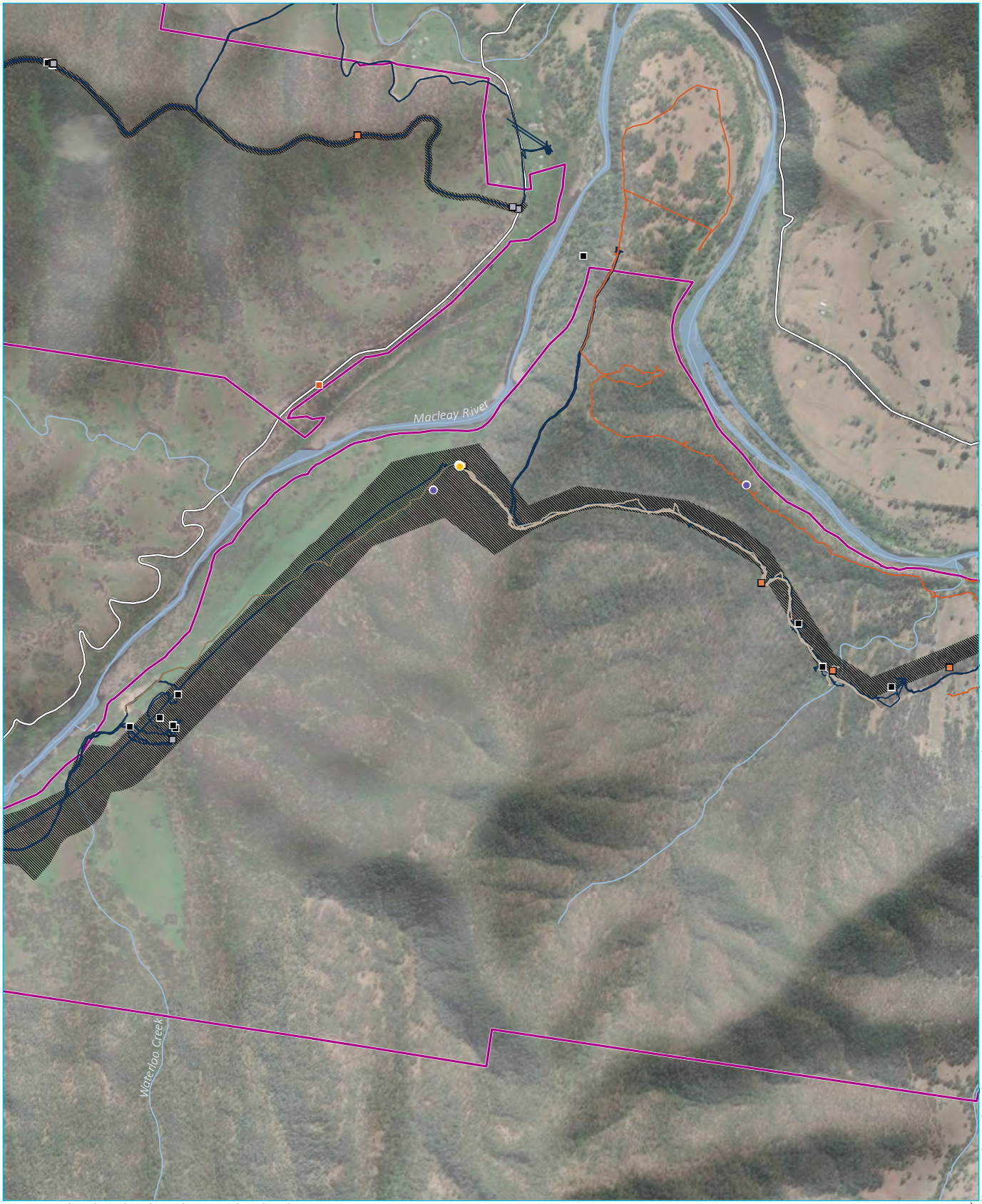
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Other targeted fauna surveys
Map 4 of 8

Oven Mountain Pumped Hydro Energy Storage Project
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Figure 6.2b

EMM creating opportunities



Source: EMM (2022); ABS (2021); DFSI (2020, 2021); GA (2011)

0 1 2 km

GDA 1994 MGA Zone 56

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Targeted fauna survey transect

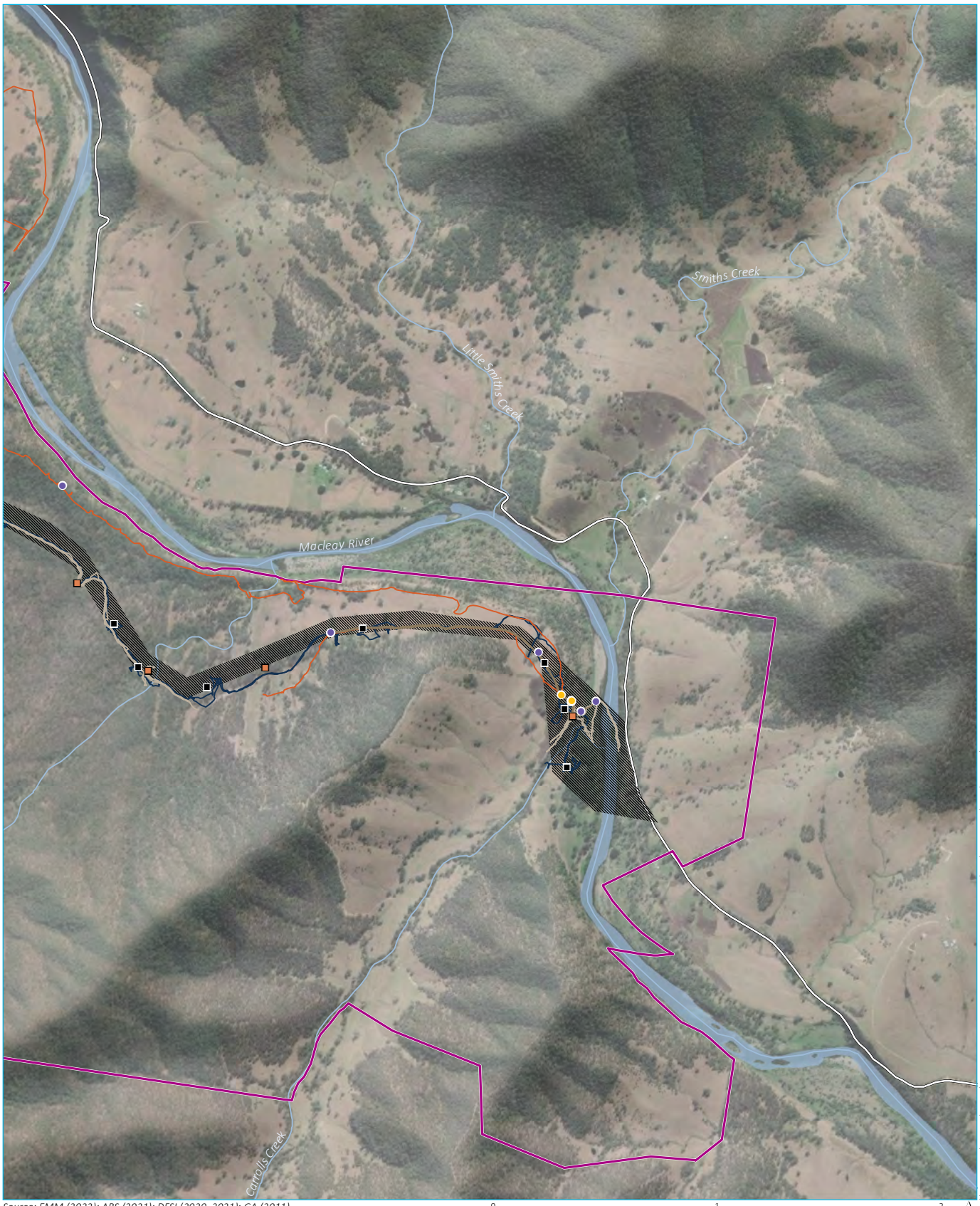
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Other targeted fauna surveys
Map 5 of 8

Oven Mountain Pumped Hydro Energy Storage Project
Biodiversity development assessment report
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Figure 6.2b

EMM creating opportunities



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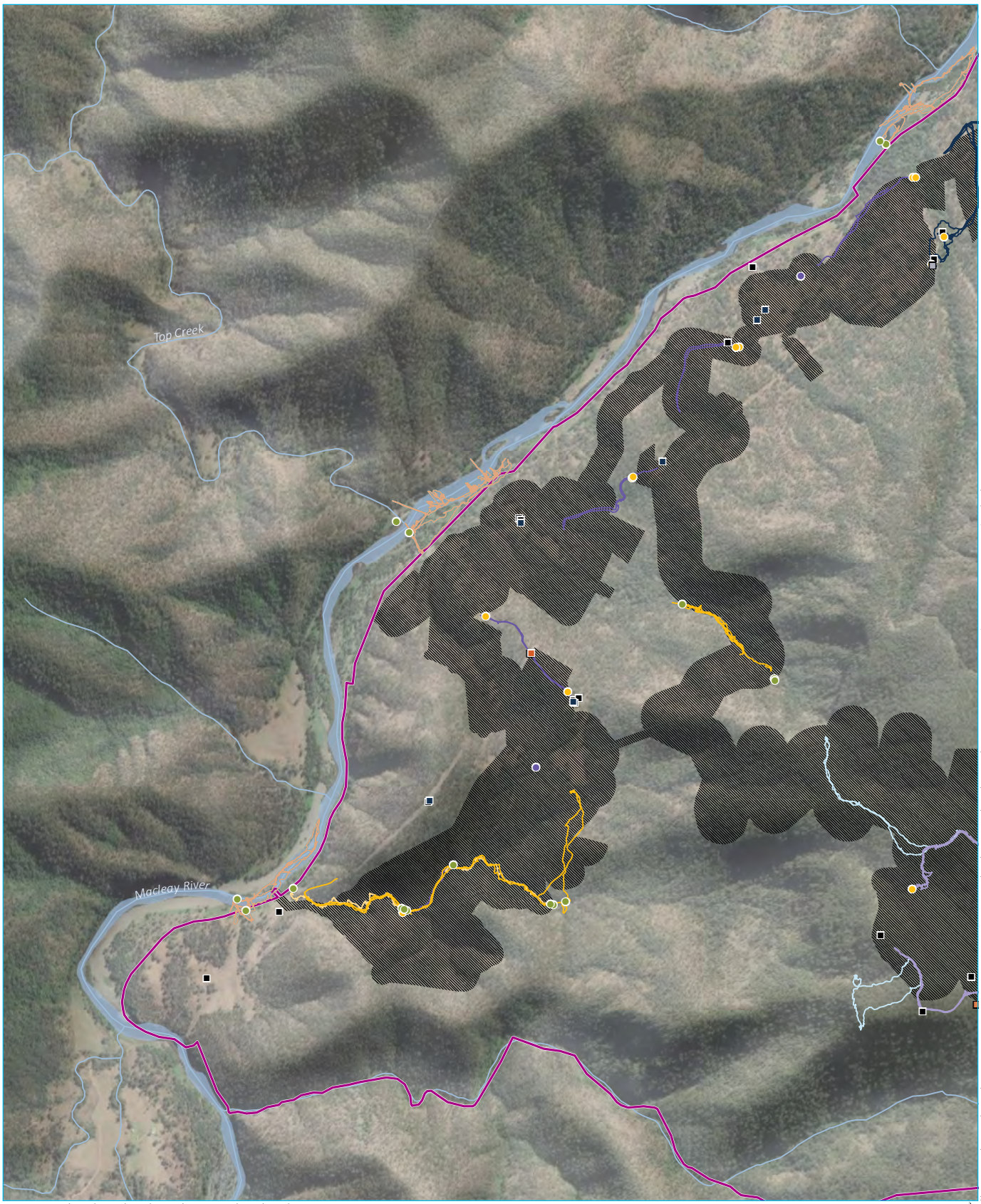
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Other targeted fauna surveys
Map 6 of 8

Oven Mountain Pumped Hydro Energy Storage Project
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OMPS Pty Ltd
Figure 6.2b

EMM creating opportunities



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Other targeted fauna surveys
Map 7 of 8

Oven Mountain Pumped Hydro Energy Storage Project
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OMPS Pty Ltd
Figure 6.2b

EMM creating opportunities



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Other targeted fauna surveys
Map 8 of 8

Oven Mountain Pumped Hydro Energy Storage Project
Biodiversity development assessment report
OMPS Pty Ltd
Figure 6.2b

EMM creating opportunities

6.3.5 Survey limitations

i Bushfire and drought influence

Surveys were initially undertaken by NGH in the generation area predominantly in 2020, less than a year after the 2019–2020 Australian bushfire season and at the end of a prolonged period of drought conditions in eastern Australia. These surveys included vegetation mapping, plots and some threatened flora and fauna survey effort. The majority of the Project area that includes the Generation site and access road was mapped as unburnt during the 2019/2020 bushfires. The transmission line, north of the Macleay River was burnt to varying degrees as mapped on the Fire Extent and Severity Mapping (FESM) (DPE, 2020) shown on Figure 6.3. The majority of the vegetation plots were undertaken within areas of unburnt or low – burnt understory with unburnt canopy to medium – partial canopy scorch areas. Some plots, mainly associated with PCT 1268, were undertaken two years after the bushfires along the transmission line in areas that showed strong recovery. It is likely that influences from La Niña have aided in the quick recovery of areas burnt during the 2019/2020 bushfires.

The FESM mapped some small areas of the transmission line as extreme – full canopy consumption, as such these areas require further assessment under Section 4.2.2 of the *Guideline for applying the Biodiversity Assessment Method at severely burnt sites* (DPIE 2020d). Table 6.15 evaluates if native vegetation is considered severely burnt on site and if further assessment is required.

Table 6.15 Decision support criteria to help evaluate if native vegetation is severely burnt

Features	Descriptive characteristics for severely burnt vegetation	Site assessment of areas mapped as severely burnt
Species richness	The range of species present before the fire are burnt and/or cannot be identified. Dominant species cannot be easily identified until regeneration occurs.	Species richness considered to be representative of plot data recorded within unburnt – low burnt areas. With the exception of PCT 1268, where no unburnt sample site could be obtained in the Project area, plots were undertaken in 2022 in habitat representing the best examples of species richness.
Growth form: trees	Canopy trees are killed and/or canopy is consumed or largely consumed with most leaf material charred/scorched. Epicormic growth, if present, is not well developed (<1 m long).	Canopy trees present. Canopy trees have recovered and were easily identifiable. Some trees (Stringybarks) showed evidence of fire (burnt bark); other trees, like Spotted Gums which shed bark each year, did not show evidence of fire.
Growth form: shrubs, forbs, ferns and other	All understorey plants are consumed or largely consumed (some charred). Re-growth, if present, is immature (very few species have attained full height).	Understory present. Strong recovery of understory observed with species diversity and shrubs forbs, ferns etc at height expected for growth form.
Growth form: grasses and glass-like	Ground cover is consumed, or largely consumed. Evidence of ground scorch is present. Re-growth, if present, consists predominately of new resprouting growth (native vegetation).	Ground cover present; some small patches of scorch earth was observed, largely associated where large logs or trees (likely stags) were once present.
Logs	Logs (if expected to have been previously on site) are absent or largely consumed.	Logs were observed to be present.
Litter cover	Pre-fire surface litter (if expected) is consumed. Soil organic layer is consumed or largely consumed. New leaf may be occurring where the canopy was burnt but not scorched	Little cover was present.

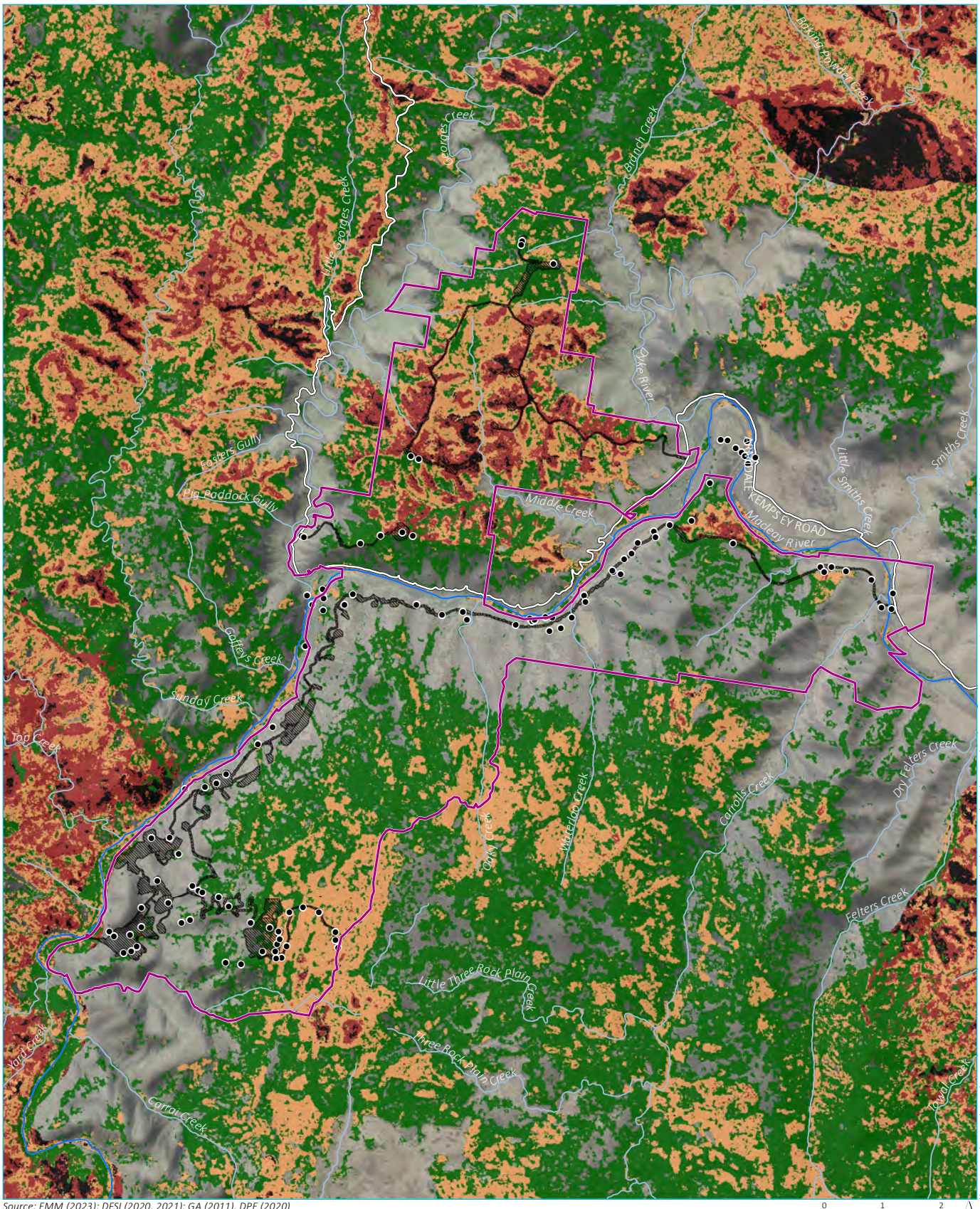
Table 6.15 Decision support criteria to help evaluate if native vegetation is severely burnt

Features	Descriptive characteristics for severely burnt vegetation	Site assessment of areas mapped as severely burnt
Ash	White ash deposition and charred organic matter is present to several centimetres' depth.	Ash was absent, not recorded within the construction envelope.

Using the criteria above, it is not considered that areas mapped as severely burnt apply to the areas within the construction envelope. Therefore, impacts from the 2019/2020 bushfires are not considered to have an impact on the vegetation integrity compared with the pre-fire condition. As stated above, the majority of plots undertaken within the Project area was within areas mapped as unburnt and therefore not considered to have a major impact on representative vegetation integrity scores for each vegetation zone.

The combination of drought and fire in the years preceding the surveys for the Project is likely to have reduced the populations of some animal and plant species, making some species more difficult to detect.

The conclusions in this report are therefore conservative and based on consideration of the results of field surveys in conjunction with desktop assessment of the likelihood that other threatened species may utilise the Project area. Due to the possibly lower detectability of some species, a conservative approach was taken in the development of some species polygons, which extend well beyond where the species were recorded, into contiguous areas of similar habitat.



KEY

Project area

Disturbance footprint

BAM plot location

Fire extent and severity

Unburnt

Low - burnt understory with unburnt canopy

Medium -partial canopy scorch

High- full canopy scorch/partial consumption

Extreme - full canopy consumption

Existing environment

Macleay River

Named watercourse

Major road

NPWS reserve

State forest

Fire Extent and Severity Mapping

Oven Mountain Pumped Hydro Energy Storage Project
Biodiversity development assessment report
OMPS Pty Ltd
Figure 6.3

EMM
creating opportunities

ii La Niña and flooding influence

Surveys undertaken by EMM began in June 2020, only months before the La Niña weather event began. Survey works continued during the La Niña period till November 2022 with unprecedented rainfall across eastern Australia. These weather conditions impacted surveys in a number of ways.

Rainfall events impacted accessibility, both to the site due to rising water levels in the Macleay River and, once on site, due to increasing unsafe conditions (see below). Rainfall events turned usually dry gullies into flowing areas of water and turned steep rocky drainage lines and cliff areas into slippery and hazardous sections to traverse.

With the mountainous terrain of the locality, weather events were hard to predict and forecasts largely incorrect. In some instances, surveys were delayed or had to be cut short due to the large number of storm events.

Flash flooding events and huge downpours occurred during periods when dry conditions were forecast. Some surveys, such as trapping, was compromised due to rising river levels that could have impacted on animal welfare. As a result, some survey effort could not follow the recommended survey guidance or meet the required survey effort.

Storm events also delayed rescheduled surveys, and some missed the required seasonal survey periods. These impacts were managed by using alternative survey methodology to complete the works, where they could be reasonably applied.

iii Safe access

Impacts from La Niña regularly restricted access to site. Access to site via Kempsey/Armidale Road was impacted due to continued landslides with road closures occurring after some heavy rainfall events, and landslides closed the road from Kempsey, with limited access via Armidale. Road works in this area also restricted available windows to move between areas of the Project area; i.e. no movements could occur during road work hours. Access to the upper areas of the Project area via Carrai and Cochrane Road was considered dangerous after storm events, with fallen trees blocking access, landslides, closed roads and deep mud along the unsealed road preventing access. The bridges that crossed the Macleay River providing access to the Carrai would be underwater during flood events. Access via the back roads that avoided bridge crossings was also periodically closed due to issues with small creek crossings and landslides.

Access onto the lower sections of the Project area was via the Macleay River that could only be safely crossed below 1.2 m water level. Regularly high-water levels and multiple flooding events meant that the only access in was determined by this river height. Once on site, access into the project area was via one unsealed track that travelled from the crossing point at Georges Junction 6 km south to the main survey locations of the lower reservoir and associated ancillaries. This track was heavily impacted after storm events, with sections that would flood, be prone to landslides, have sections of the track that would wash away and boggy sections that could not be crossed until they dried out or shrunk.

To mitigate access issues, helicopters were used to access the Project area. Access via helicopters was limited to dry spells and times when fog was not present in the valley or around Armidale where they were based. Boats were also used to cross the Macleay River during higher flows. However, boat access was only suitable outside flood events, or when the river level was below 3 m, due to dangerous river conditions. Access onsite was largely by using all-terrain vehicles as continued storm events and wet conditions make the site track unsafe for heavy 4WD vehicles.

The Project area is largely steep and, in places, near vertical with escarpments, cliff faces, often with loose unstable soil and rock. To traverse to other sections of the project area requires various descents down mountain slopes into and out of gullies or across deep rocky creeks with thick vines and vegetation. The Project area had an elevation change of 840 m, with some of the survey areas requiring a daily hike of up to 500 m elevation with equipment to undertake surveys.

Fauna surveys, such as detailed hollow bearing tree surveys and nocturnal surveys, in remote mountainous areas away from the access track could not be safely undertaken in some areas. New survey technologies, such as thermal drones, were employed to lower survey data gaps where applicable.

For flora survey transects walking of closely spaced and parallel flora survey transects was not always safe or feasible. In such areas, transects were more meandering with their path dictated by safe access. Due to the skeletal soil conditions and, in places, dense shrub cover, the habitat that could not be safely accessed was considered to be marginal as habitat for the targeted threatened plant species and unlikely to occur.

iv Covid-19 pandemic

Surveys were undertaken during the Covid-19 pandemic. The pandemic disrupted a number of field surveys, with either team members contracting the virus just before heading to site or having symptoms on site that caused surveys to be cancelled, and shared accommodation sterilised prior to other teams attending site. The evolving situation was managed as best as possible under the EMM Covid-19 policy; however, as state restrictions eased, the virus had a greater impact on survey teams, with some survey effort missing survey periods for threatened species due to staff being unable to attend site, the need for staff to demobilise and/or isolate.

6.3.6 Targeted survey results

i Targeted flora surveys

Six threatened flora species were recorded during the threatened flora surveys. Survey results summarised in Table 6.16 and species polygons are described in Table 6.22.

Table 6.16 Threatened flora results

Scientific name	Common name	BC Act Status	EPBC Act Status	BAM credit type	Observation method
Grevillea guthrieana	Guthrie's Grevillea	E	E	Species	Targeted threatened flora surveys.
Haloragis exalata subsp. *velutina*	Tall Velvet Sea-berry	V	V	Species	Targeted threatened flora surveys.
Lepidium peregrinum	Wandering Pepper Cress	E	E	Species	Targeted threatened flora surveys.
Pultenaea rubescens			E / CE	Species	Targeted threatened flora surveys.
Rhodamnia rubescens	Scrub Turpentine	CE	CE	Species	Targeted threatened flora surveys.
Tylophora woollsii[1]	Cryptic Forest Twiner	E	E	Species	Targeted threatened flora surveys.

Notes: 1. Unconfirmed by the herbarium.

An unidentified *Pultenaea* sp., with characteristics of Parris' Bush-pea (*Pultenaea parrisiae*), was sent to the herbarium for identification in January 2022 (see Photograph 6.1). Identification could not be confirmed by the herbarium at this time, with the response from the herbarium that "this is particularly interesting. In many features it looks very close to *P.parrisiae* but it is a very long way from previous records. The few bracteoles present showed some variability, which would need to be studied further. Russel Barrett at the NSW Herbarium is currently doing some work on *Pultenaea* and will likely be interested in this". At the time of survey, it was considered that the specimen could be Parris' Bush-pea (*Pultenaea parrisiae*) or an as yet undescribed Pultenaea spp. In July 2023 confirmation was received from the herbarium that the plants recorded on site were a new species for the genus. There is an existing phrase name for this taxon; *Pultenaea* sp. Werrikimbe NP. However, it is proposed to recognise this as a distinct species, Pultenaea rubescens (Barrett, In press).

Comprehensive and detailed surveys for this species were undertaken within the current and previous construction envelope (see Figure 6.1). Additional surveys were undertaken within the broader Project area, outside of the construction envelope, targeting similar microhabitats observed for this species within the construction envelope. The purpose of these surveys was to collect additional material and gain an understanding of the microhabitat requirements for the species.

From the data collected from detailed surveys for the Project, the following observations were made:

- This species was recorded in small patches of wet and heathy habitat in the Carrai Plateau.
- Most records were observed within or along edges of mesic habitat associated with PCT 1287, with one patch that was associated with PCT 822 that contained similarly wet and swampy habitat.
- This species grows in clumps associated with microhabitats that contain flat and wet areas.

These microhabitat conditions have now been confirmed during the description of the species by Barrett (In press) which states "The species grows in swampy drainage depressions in Eucalypt forest with a sparse canopy, with a ground layer of grasses, sedges and forbs, in sand over granite, at 900–1,030 m altitude…".



Photograph 6.1 *Pultenaea rubescens* recorded in the project area

ii Targeted fauna surveys

The results of targeted fauna surveys are summarised below for each group of species, including incidental records of non-targeted threatened species.

a Diurnal birds

Twelve threatened diurnal bird species were recorded during the diurnal bird survey. Survey results summarised in Table 6.17.

Table 6.17 Diurnal bird results

Scientific name	Common name	BC Act Status	EPBC Act Status	BAM credit type	Observation method
Artamus cyanopterus	Dusky Woodswallow	V	-	Ecosystem	Incidental
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	-	Dual	Incidental Assumed presence in suitable habitat outside of survey coverage area.
Climacteris picumnus	Brown Treecreeper	V	-	Ecosystem	Incidental
Daphoenositta chrysoptera	Varied Sittella	V	-	Ecosystem	Area searches and incidental

Table 6.17 Diurnal bird results

Scientific name	Common name	BC Act Status	EPBC Act Status	BAM credit type	Observation method
Glossopsitta pusilla	Little Lorikeet	V	-	Ecosystem	Incidental
Haliaeetus leucogaster	White-bellied Sea-eagle	V	-	Dual	Incidental
Hieraaetus morphnoides	Little Eagle	V	-	Dual	Incidental
Hirundapus caudacutus	White-throated Needletail	-	V	Ecosystem	Incidental
Petroica boodang	Scarlet Robin	V	-	Ecosystem	Incidental
Ptilinopus magnificus	Wompoo Fruit-dove	V	-	Ecosystem	Incidental
Pyrrholaemus sagittatus	Speckled Warbler	V	-	Ecosystem	Area searches and incidental
Stagonopleura guttata	Diamond Firetail	V	-	Ecosystem	Incidental

As no breeding habitat was recorded for the dual credit species in the construction envelope, no further assessment is required (excepting Glossy Black-cockatoo). Survey coverage did not include all habitat suitable for nesting Glossy Black-cockatoos due to access issues (see Section 6.3.4). Consultation with the North East Region of BCD indicates BCD does not support the use of thermal drones for nesting Glossy Black-Cockatoo surveys. As a result, this BDAR assumes presence for the Glossy Black-cockatoo in areas which could not be accessed. Following consultation with BCD, additional surveys will be undertaken as per the TBDC to establish the presence of any breeding pairs and, if safe access can be achieved, active nest trees will be surveyed during the EIS response to submission stage. The BDAR will be updated once these surveys have been completed.

b Nocturnal birds

Two threatened nocturnal bird species were recorded during the nocturnal bird survey. One additional species is assumed present in parts of the site. Survey results summarised in Table 6.18.

Table 6.18 Nocturnal bird results

Scientific name	Common name	BC Act Status	EPBC Act Status	BAM credit type	Observation method
Ninox connivens	Barking Owl	V	-	Dual	Not recorded. Assumed presence in suitable habitat outside of survey coverage area.
Ninox strenua	Powerful Owl	V	-	Dual	Nest surveys and incidental. Assumed presence in suitable habitat outside of survey coverage area.
Tyto novaehollandiae	Masked Owl	V	-	Dual	Nest surveys. Assumed presence in suitable habitat outside of survey coverage area.

Survey coverage did not include all habitat suitable for nesting forest owls due to access issues (see Section 6.3.4). Consultation with the North East Region of BCD indicates BCD does not support the use of thermal drones for nesting forest Owls. As a result, this BDAR assumes presence for the Barking owl, Powerful Owl and Masked Owl in areas which could not be accessed. Following consultation with BCD, additional surveys will be undertaken as per the DEC (2004) guidelines, including call playback surveys, to establish the presence of any breeding pairs. It should be noted, if breeding is confirmed, due to safety issues identification of an active breeding tree will be limited to diurnal surveys and may require approximation of a location rather than the exact location. Surveys are to be undertaken during the EIS response to submission stage.

c Terrestrial mammals

Four threatened mammal species, two of which are candidate species, were recorded during the terrestrial mammal survey. One species was assumed to be present within suitable habitat as surveys for this species could not be undertaken using current survey guidelines for this species. Survey results summarised in Table 6.19.

Table 6.19 Terrestrial mammal results

Scientific name	Common name	BC Act Status	EPBC Act Status	BAM credit type	Observation method
Dasyurus maculatus	Spotted-tailed Quoll	V	E	Ecosystem	Remote camera
Petrogale penicillata	Brush-tailed Rock Wallaby	V	E	Species	Remote camera, targeted habitat, aerial surveys, and incidental surveys
Potorous tridactylus	Long-nosed Potoroo	V	V	Species	Remote camera
Pseudomys oralis	Hastings river mouse	E	E	Ecosystem	Remote camera, incidental
Planigale maculata	Common Planigale	V	-	Species	Not recorded Assumed presence as survey effort was not undertaken using approved survey guidelines.

Due to rocky conditions, surveys for the Common Planigale were undertaken using funnels traps and remote cameras as opposed to pitfall traps (see Section 6.3.4). Consultation with the North East region of BCD indicates BCD does not support the use of funnel traps or remote cameras for survey effort for this species. An expert report could not be obtained due to the only recognised expert no longer being available. No alternative methods are currently approved. As a result, this BDAR assumes presence for the Common Planigale in all areas of suitable habitat. EMM is currently consulting with BCD on the use of a revised method for surveys for the Common Planigale. EMM have contacted the BOS helpdesk (27 June 2023) and are awaiting a response on a suitable survey method to the replace the use of pitfall traps. Surveys are scheduled to be undertaken during the EIS response to submission stage. The BDAR will be updated once these surveys have been completed.

The Hastings River Mouse was identified on camera traps from using key features such as fur colour (grey-brown on the back merging to off white or grey underneath), noticeable eye ring and where possible from camera images a bicoloured tail (same length as body). It was distinguished from similar looking species such as Bush Rat (*Rattus fuscipes*) which also have a noticeable eye ring and Black Rat (*Rattus rattus*) from difference in colour, tail type, and body shape. See Photograph 6.2 for an example photo of the Hastings River Mouse.



Photograph 6.2 Hastings River Mouse

Species polygons for species credit species are described in Table 6.23.

d Arboreal mammals

Four threatened arboreal mammal species, all of which are targeted candidate species, were recorded during the arboreal mammals survey. Species polygons for candidate species are described in Table 6.23. Survey results are summarised in Table 6.20.

Table 6.20 Arboreal mammal results

Scientific name	Common name	BC Act Status	EPBC Act Status	BAM credit type	Observation method
Petaurus norfolcensis	Squirrel Glider	V	-	Species	Trapping and remote camera.
Petauroides volans	Greater Glider	-	V	Species	Spotlighting and remote camera.
Phascogale tapoatafa	Brush-tailed Phascogale	V	-	Species	Remote camera.
Phascolarctos cinereus	Koala	E	E	Species	Koala detection dogs.

Species polygons are described in Table 6.23.

e Microchiropteran bats

Four threatened microchiropteran bat dual/species credit species and two ecosystem credit species were recorded during the Microchiroptera surveys. Species polygons for the two species credit species are described in Table 6.23. Survey results summarised in Table 6.21.

Table 6.21 Microchiropteran bat results

Scientific name	Common name	BC Act Status	EPBC Act Status	BAM credit type	Observation method
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V	-	Ecosystem	Anabat and harp trapping
Miniopterus orianae oceanensis	Large Bent-winged Bat	V	-	Dual	Anabat and harp trapping
Miniopterus australis	Little Bent-winged Bat	V	-	Dual	Anabat and harp trapping
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	V	-	Ecosystem	Anabat
Myotis macropus	Southern Myotis	V	-	Species	Anabat
Vespadelus troughtoni	Eastern Cave Bat	V	-	Species	Anabat

Species polygons for species credit species are described in Table 6.23.

f Amphibians

None of the targeted amphibian species were detected during survey efforts.

g Reptiles

None of the targeted reptile species were detected during survey efforts.

6.4 Step 5: Determination of the area or count of species and species polygons

For species identified as present in Step 4, the following was undertaken:

- For flora species, the species polygon was developed based on the following:
  - Where flora species are assessed by count, the species polygon was created using a 30 m buffer around all recorded locations, including all vegetation zones of PCTs associated with the species located within the buffer. Where this buffer intersected the disturbance footprint (including indirect impact areas) was defined as the species polygon. The number of individuals recorded within the disturbance footprint was entered into the BAMC.
  - Where flora species were assessed by area, the species polygon was created by:
    - identifying particular microhabitats or ecological niches (where relevant) and mapping the species polygon to these, or
    - including relevant vegetation zones associated with the record and any connected areas of the same vegetation zone.

- Where this intersected the disturbance footprint (including indirect impact areas) was defined as the species polygon. The area of the species polygon, including relevant areas of any vegetation zones, was entered into the BAMC.

- For fauna species, the species polygon was developed including relevant vegetation zones of associated PCTs and mapping of microhabitats or ecological niches. Where this intersected the disturbance footprint (including indirect impact areas) was defined as the species polygon. The area of the species polygon, including relevant areas of any vegetation zones, was entered into the BAMC.

Table 6.22 and Table 6.23 provide descriptions of the species polygons prepared for the calculation of species credit requirements, based on the results of surveys and habitat in and adjacent to the disturbance footprint included in vegetation zones listed in Section 6.3.2. Figure 6.4 to Figure 6.21 show the species polygon for each species.

Table 6.22 Flora species polygon descriptions

Scientific name	Common name	Habitat potential in the disturbance footprint	Species polygon description
Grevillea guthrieana	Guthrie's Grevillea	Recorded along creek-lines and steep rocky sections near gullies throughout the Project area.	Guthrie's Grevillea is a count-based species. 842 individuals were recorded within the construction envelope with 15 individuals recorded within the disturbance footprint. A species polygon was created as per the process for count based species above. Figure 6.4 shows the species polygon for this species.
Haloragis exalata subsp. *velutina*	Tall Velvet Sea-berry	Recorded along creek lines and in high numbers in steep moist floors throughout the Project area.	Tall Velvet Sea-berry is a count-based species. 2,742 individuals were recorded within the construction envelope with 363 individuals recorded within the disturbance footprint. A species polygon was created as per the process for count based species above. Figure 6.5 shows the species polygon for this species.
Lepidium peregrinum	Wandering Pepper Cress	Local occurrence of this species is from the flood plain area of the Macleay River. The majority of the individuals were recorded along the eastern bank of the Macleay, with a small number recorded along the northern bank.	Wandering Pepper Cress is an area-based species. 1,577 individuals were recorded within the construction envelope with two individuals within the disturbance footprint. This species is not associated with any PCTs within the Project area. A species polygon was created for all recorded locations and including all vegetation zones associated with records of the species and any connected areas of the same vegetation zone. Figure 6.6 shows the species polygon for this species.

Table 6.22 Flora species polygon descriptions

Scientific name	Common name	Habitat potential in the disturbance footprint	Species polygon description
Pultenaea rubescens	*Pultenaea rubescens*	This species was recorded in small patches of wet and heathy habitat in the Carrai Plateau. Most records within or along edges of wet habitat are associated with PCT 1287, excluding one patch that was associated with PCT 822 that contained similar wet habitat. This species grows in clumps associated with microhabitats that contain flat and wet areas. The species occurs in similar microhabitat described for Parris' Bush-pea (*Pultenaea rubescens*).	*Pultenaea rubescens* Is not included in the TBCD as it is a newly described species. In consultation with BCD, the species polygon is based on Parris' Bush-pea, which is an area-based species. 509 potential individuals were recorded within the Project area. No records occur in the disturbance footprint. This species is not associated with any PCTs or IBRA regions within the Project area. As this species was not associated with any PCTs, a 30 m buffered was applied around known habitat and mapped as occupied habitat, and potential habitat beyond this was mapped based on microhabitats observed during surveys and these described in Barrett (In press, p. 6) being "swampy drainage depressions in Eucalypt forest with a sparse canopy, with a ground layer of grasses, sedges and forbs, in sand over granite, at 900–1,030 m altitude". The area of both known and potential habitat was entered into the BAMC. Figure 6.7 shows the species polygon for this species.
Rhodamnia rubescens	Scrub Turpentine	Recorded in steep moist floors throughout the Project area. Individuals recorded were juvenile or as regrowth from the 2019 bushfires. All specimens were infected with myrtle rust.	Scrub Turpentine is a count-based species. 13 individuals were recorded within the Project area. No individuals were recorded within the disturbance footprint. This species was buffered by 30 m. The Project was redesigned to avoid any impact to this species and the 30 m buffer. As such, no species polygon was created as this species no longer has an offset liability.
Tylophora woollsii	Cryptic Forest Twiner	Three specimens of either this species or a related species were recorded during the flora surveys. Samples were sent to the herbarium for confirmation but could not be confirmed due to lack of flowering part for identification. Response from the herbarium was "?*Tylophora woolsii* – your specimen is a good vegetative match for this species but in the absence of fertile material I can't confidently rule out all other *Apocyanaceae* taxa". Assumed to be Cryptic Forest Twiner in preparation of this BDAR, with further surveys scheduled to confirm presence or absence.	Cryptic Forest Twiner is an area-based species. Five individuals were recorded in the Project area. None occur within the disturbance footprint. This species is not associated with any PCT within the Project area. A species polygon was created for all recorded locations and including all vegetation zones associated with records of the species and any connected areas of the same vegetation zone. Figure 6.8 shows the species polygon for this species.

Table 6.23 Fauna species polygon description

Scientific name	Common name	Habitat potential in the disturbance footprint	Species polygon description
Calyptorhynchus lathami	Glossy Black-cockatoo	This species was incidentally recorded as non-breeding throughout the Project area. Survey gaps have been identified within the generation site. Suitable nesting area is largely confined to an area of old growth forest. This area contains large mature trees with suitable hollows that may support breeding pairs. Due to the difficult terrain and health and safety concerns, full surveys could not be completed in this area.	Glossy Black-cockatoo is an area-based species. A species polygon is required for 200 m around recorded nest sites. No nest sites were recorded. A species polygon was created for all areas where surveys could not be completed. Figure 6.9 shows the species polygon for this species.
Ninox connivens	Barking Owl	Not recorded on site. Survey gaps have been identified within the generation site. Suitable nesting area is largely confined to an area of old growth forest. This area contains large mature trees with suitable hollows that may support breeding pairs. Due to the difficult terrain and health and safety concerns, full surveys could not be completed in this area.	Barking Owls are an area-based species. A species polygon is required for 100 m around recorded nest sites. No nest sites were recorded. A species polygon was created by making a 100 m buffer around the area where assumed presence was applied. Figure 6.10 shows the species polygon for this species.
Ninox strenua	Powerful Owl	Recorded as non-breeding within the Project area. Survey gaps have been identified within the generation site. Suitable nesting area is largely confined to an area of old growth forest. This area contains large mature trees with suitable hollows that may support breeding pairs. Due to the difficult terrain and health and safety concerns, full surveys could not be completed in this area.	Powerful Owls are an area-based species. A species polygon is required for 100 m around recorded nest sites. No nest sites were recorded. A species polygon was created by making a 100 m buffer around the area where assumed presence was applied. Figure 6.11 shows the species polygon for this species.
Tyto novaehollandiae	Masked Owl	An active Masked Owl nesting hollow was recorded outside of the survey footprint along the transmission line south of the Macleay River. Survey gaps have also been identified within the generation site. Suitable nesting area is largely confined to an area of old growth forest. This area contains large mature trees with suitable hollows that may support breeding pairs. Due to the difficult terrain and health and safety concerns, full surveys could not be completed in this area.	Masked Owls are an area-based species. A species polygon is required for 100 m around recorded nest sites. One nest sites was recorded outside the construction envelope. The 100 m buffer around the known nest tree does not overlap with the disturbance footprint. A species polygon was created by making a 100 m buffer around the area where assumed presence was applied. Figure 6.12 shows the species polygon for this species.

Table 6.23 Fauna species polygon description

Scientific name	Common name	Habitat potential in the disturbance footprint	Species polygon description
Petrogale penicillata	Brush-tailed Rock-wallaby	The Brush-tailed Rock-wallaby was recorded throughout the Project area, with the majority of the records concentrated where cliffs, outcrops and rocky terrain were present. Most records were within the generation site with a sub-population using the rocky terrain for denning and refuge along the road proposed to connect the lower and upper reservoir.	Brush-tailed Rock-wallaby is an area-based species. A species polygon was created for all associated PCTs within 1 km of rocky escarpment, gorges, steep slopes, boulder piles, rock outcrops and clifflines, for all associated PCTs and excluding areas of DNG, exotic grasslands. The figure also shows confirmed occupied habitat where colonies were recorded and potential habitat where colonies were not recorded during targeted surveys. Figure 6.13 shows the species polygon for this species.
Potorous tridactylus	Long-nosed Potoroo	Long-nosed Potoroo was recorded at four locations above 750 m in elevation, within areas that contained dense understorey.	Long-nosed Potoroo is an area-based species. Not associated with any PCTs within the project area. A species polygon was created for all recorded locations and including all vegetation zones associated with records of the species and any connected areas of the same vegetation zone. Figure 6.14 shows the species polygon for this species.
Petaurus norfolcensis	Squirrel Glider	Squirrel Glider was recorded throughout the Project area. The majority of the records were recorded within the generation site.	Squirrel Glider is an area-based species. A species polygon was created for all associated PCTs excluding areas lacking canopy cover (DNG and exotic grasslands). Figure 6.15 shows the species polygon for this species.
Petauroides volans	Southern Greater Glider	Greater Glider was recorded at higher elevations associated with areas containing old growth forest around the upper reservoir and transmission line.	Greater Glider is an area-based species. A species polygon was created for all recorded locations and including all vegetation zones of PCTs excluding areas lacking canopy cover (DNG and exotic grasslands). Figure 6.16 shows the species polygon for this species.

Table 6.23 Fauna species polygon description

Scientific name	Common name	Habitat potential in the disturbance footprint	Species polygon description
Phascogale tapoatafa	Brush-tailed Phascogale	Brush-tailed Phascogale was only recorded in the northern section of the Project area, throughout the Macleay Hastings IBRA sub-region and along the habitat where the Macleay's River runs west to east in the Macleay Gorges IBRA sub-region. A total survey effort of 349 cameras, comprising of 19,422 camera nights, failed to confirm the presence of this species in the southern section of the study area where 60% of the camera survey effort was concentrated. Of the 132 cameras 31 cameras confirmed presence, with 20 of these been terrestrial based cameras and 11 arboreal cameras. It should be noted that arboreal cameras are only considered to meet current survey guidance in the TBDC. This species is only predicted to occur within the Macleay Gorges IBRA sub-region. This is representative of what was observed on site from the camera survey effort, with results located within Macleay Hastings. The population recorded along the northern section of the study area is therefore considered the western most distribution of the local population.	Brush-tailed Phascogale is an area-based species. A species polygon was created for all associated PCTs where cameras recorded presence in the northern section of the study area that is largely associated with the Macleay Hasting IBRA sub-region, excluding areas lacking substantive canopy cover (DNG and exotic grasslands). Figure 6.17 shows the species polygon for this species.
Phascolarctos cinereus	Koala	Evidence of the Koala was recorded to the north of Macleay River with old scats found near the river in the most eastern section of the access road and a recent observation of scratch marks in a Eucalypt near the northern extent of the Transmission Line. All areas of PCTs associated with the species contained Koala use trees as defined in the Koala (*Phascolarctos cinereus*) Biodiversity Assessment Method Survey Guide (DPE, 2022).	Koala is an area-based species. A species polygon was created for all associated PCTs north of the Macleay River, excluding areas lacking canopy cover (DNG and exotic grasslands). Figure 6.18 shows the species polygon for this species.
Planigale maculata	Common Planigale	This species is assumed to be present within suitable habitat along the access road and transmission area where survey gaps exist.	Common Planigale is an area-based species. A species polygon was created for all associated PCTs within the access and transmission area as part of the Macleay and Hastings IBRA sub-region, excluding DNG, exotic grasslands and fragmented zones. Figure 6.19 shows the species polygon for this species.

Table 6.23 Fauna species polygon description

Scientific name	Common name	Habitat potential in the disturbance footprint	Species polygon description
Myotis macropus	Southern Myotis	Southern Myotis was recorded along the Macleay River which is considered suitable habitat for this species.	Southern Myotis is an area-based species. A species polygon was created for all associated PCTs within 200 m buffer of the Macleay River, excluding areas lacking canopy cover (DNG and exotic grasslands). This was the only waterbody with pools/stretches 3 m or wider. Figure 6.20 shows the species polygon for this species.
Vespadelus troughtoni	Eastern Cave Bat	Eastern Cave Bat was recorded on Anabats only along the Macleay River and not part of the harp trapping surveys. Breeding could not be confirmed present or absent as no individuals were captured to confirm lactating females.	Eastern Cave Bat is an area-based species. As this species was only recorded on Anabats, the TBDC requires assumed presence if breeding cannot be confirmed. A species polygon was created using a 2 km buffer from all potential breeding habitat such as caves, scarps and cliffs within the Macleay Hastings IBRA sub-region. Figure 6.21 shows the species polygon for this species.



Source: EMM (2022); DFSI (2020, 2021); GA (2011)

0 250 500 m

GDA 1994 MGA Zone 56

N

KEY

- Project area
- Disturbance footprint
- Indirect disturbance footprint
- Guthrie's Grevillea species polygon (30 m buffer around sighting)
- Guthrie's Grevillea species sighting

Existing environment

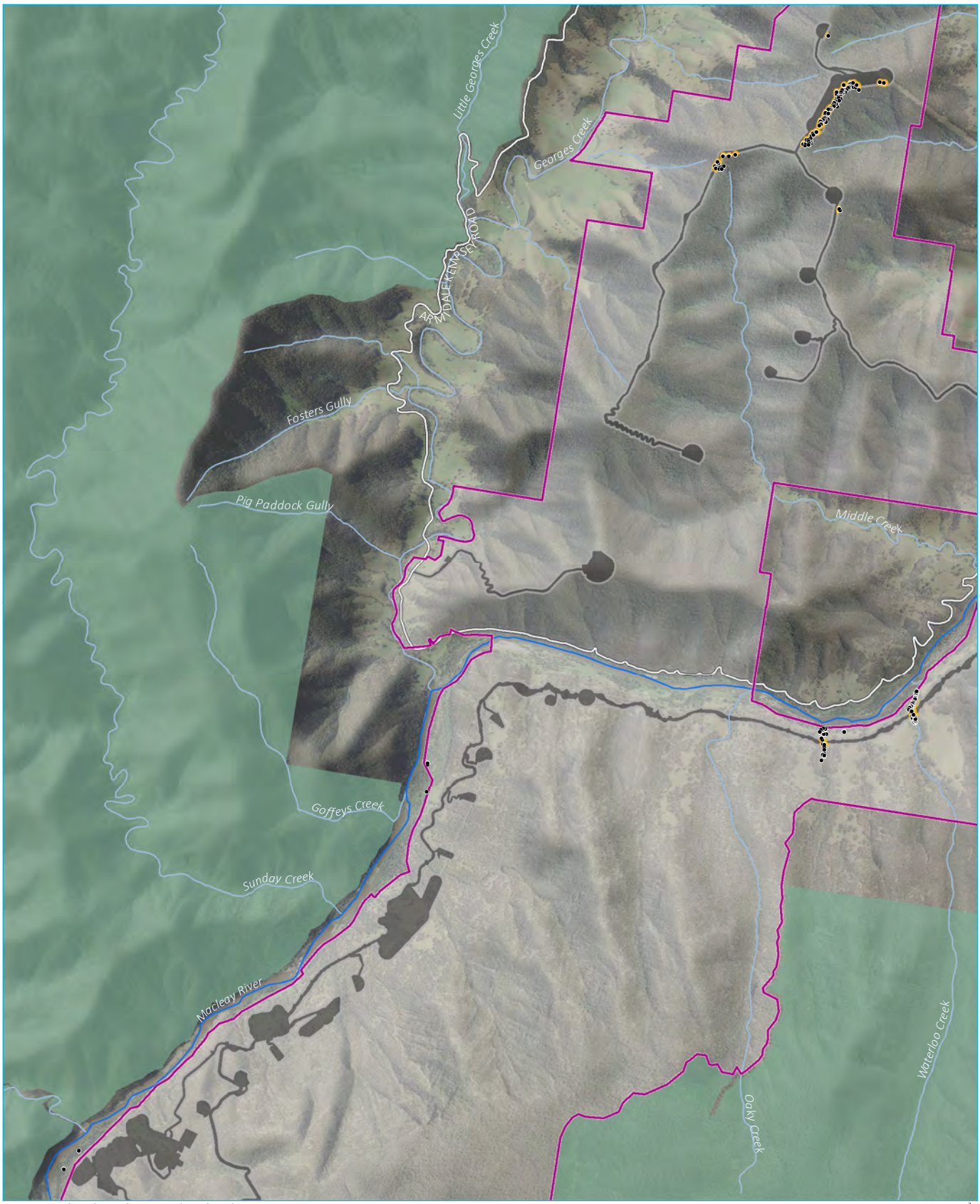
- Macleay River
- Named watercourse
- Major road
- NPWS reserve
- State forest

Guthrie's Grevillea species polygon

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Figure 6.4

EMM creating opportunities

\\emmsvr1\emm3\2021\J210465 - OMPS EIS - Generation Component\GIS\02_Maps_EIS_BDAR\BDAR007_SpeciesPolygon_20221208_01.mxd 6/07/2023



Source: EMM (2022); DFSI (2020, 2021); GA (2011)

0 1 2 km

GDA 1994 MGA Zone 56

N

KEY

- Project area
- Disturbance footprint
- Indirect disturbance footprint
- Tall Velvet Sea-berry species polygon (30 m buffer around sighting)
- Tall Velvet Sea-berry species sighting

Existing environment

- Macleay River
- Named watercourse
- Major road
- NPWS reserve
- State forest

Tall Velvet Sea-berry species polygon

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Figure 6.5

EMM creating opportunities

\\emmsvr1\emm3\2021\J210465 - OMPS EIS - Generation Component\GIS\02_Maps_EIS_BDAR\BDAR007_SpeciesPolygon_20221208_01.mxd 6/07/2023



Source: EMM (2022); DFSI (2020, 2021); GA (2011)

0 100 200 m

GDA 1994 MGA Zone 56

N

KEY

- Project area
- Disturbance footprint
- Indirect disturbance footprint
- Wandering Pepper Cress species polygon
- Wandering Pepper Cress species sighting

Existing environment

- Macleay River
- Named watercourse
- Major road
- NPWS reserve
- State forest

Wandering Pepper Cress species polygon

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Figure 6.6

EMM creating opportunities

\\emmsvr1\emm3\2021\J210465 - OMPS EIS - Generation Component\GIS\02_Maps_EIS_BDAR\BDAR007_SpeciesPolygon_20230822_03_WanderingPepperCress.mxd 22/08/2023



Source: EMM (2022); DFSI (2020, 2021); GA (2011)

0 250 500 m

GDA 1994 MGA Zone 56

N

KEY

- Project area
- Disturbance footprint
- Indirect disturbance footprint
- Pultenaea rubescens species sighting

Pultenaea rubescens species polygon

- Occupied habitat
- Potential habitat

Existing environment

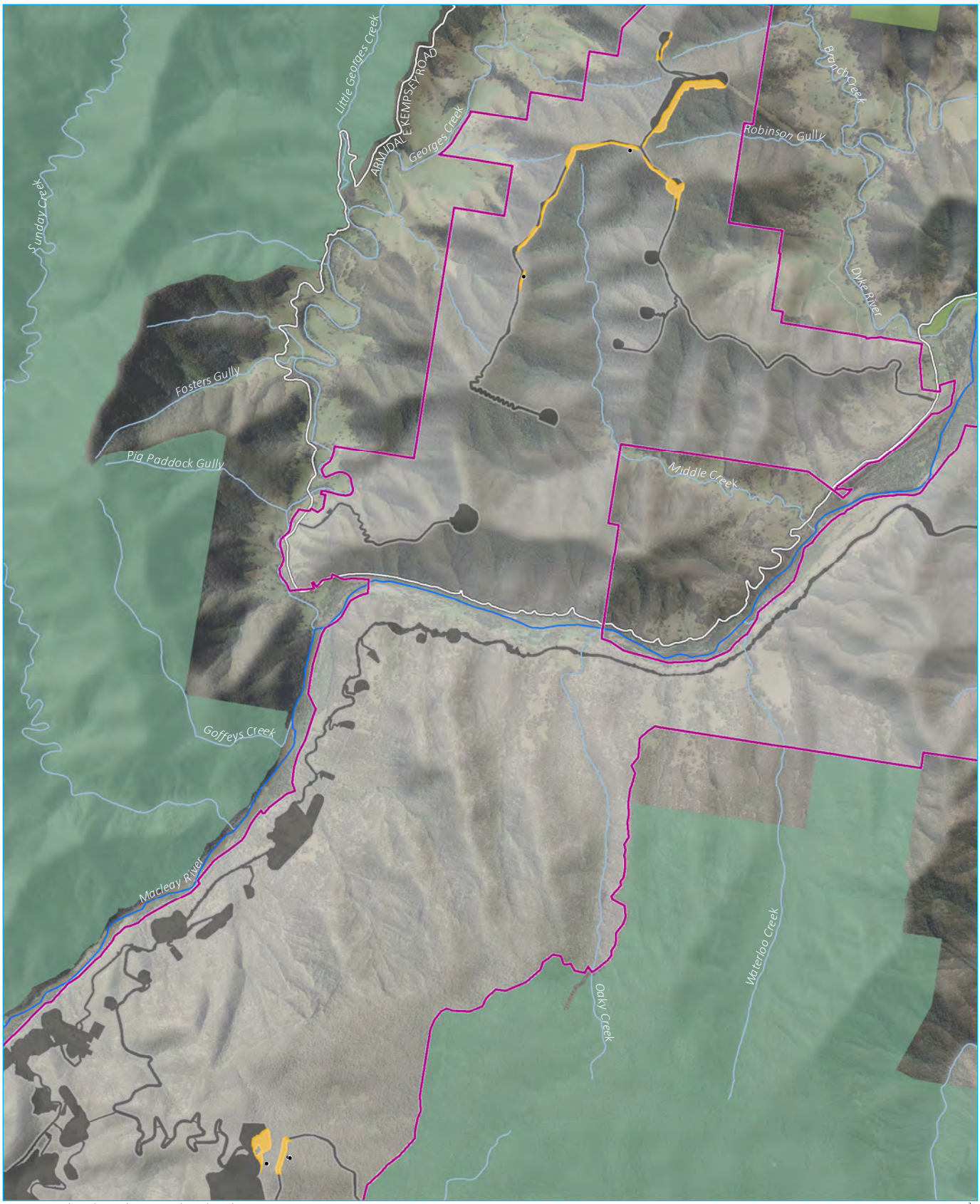
- Macleay River
- Named watercourse
- Major road
- NPWS reserve
- State forest

Pultenaea rubescens species pollygon

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Figure 6.7

EMM creating opportunities

\\emmsvr1\emm3\2021\J210465 - OMPS EIS - Generation Component\GIS\02_Maps_EIS_BDAR\BDAR007_SpeciesPolygon_20230705_01_Pultenaea.mxd 2/08/2023



Source: EMM (2022); DFSI (2020, 2021); GA (2011)

0 1 2 km

GDA 1994 MGA Zone 56

N

\\emmsvr1\emm3\2021\J210465 - OMPS EIS - Generation Component\GIS\02_Maps_EIS_BDAR\BDAR007_SpeciesPolygon_20221208_01.mxd 6/07/2023

KEY

- Project area
- Disturbance footprint
- Indirect disturbance footprint
- Cryptic Forest Twiner species polygon
- Cryptic Forest Twiner species sighting

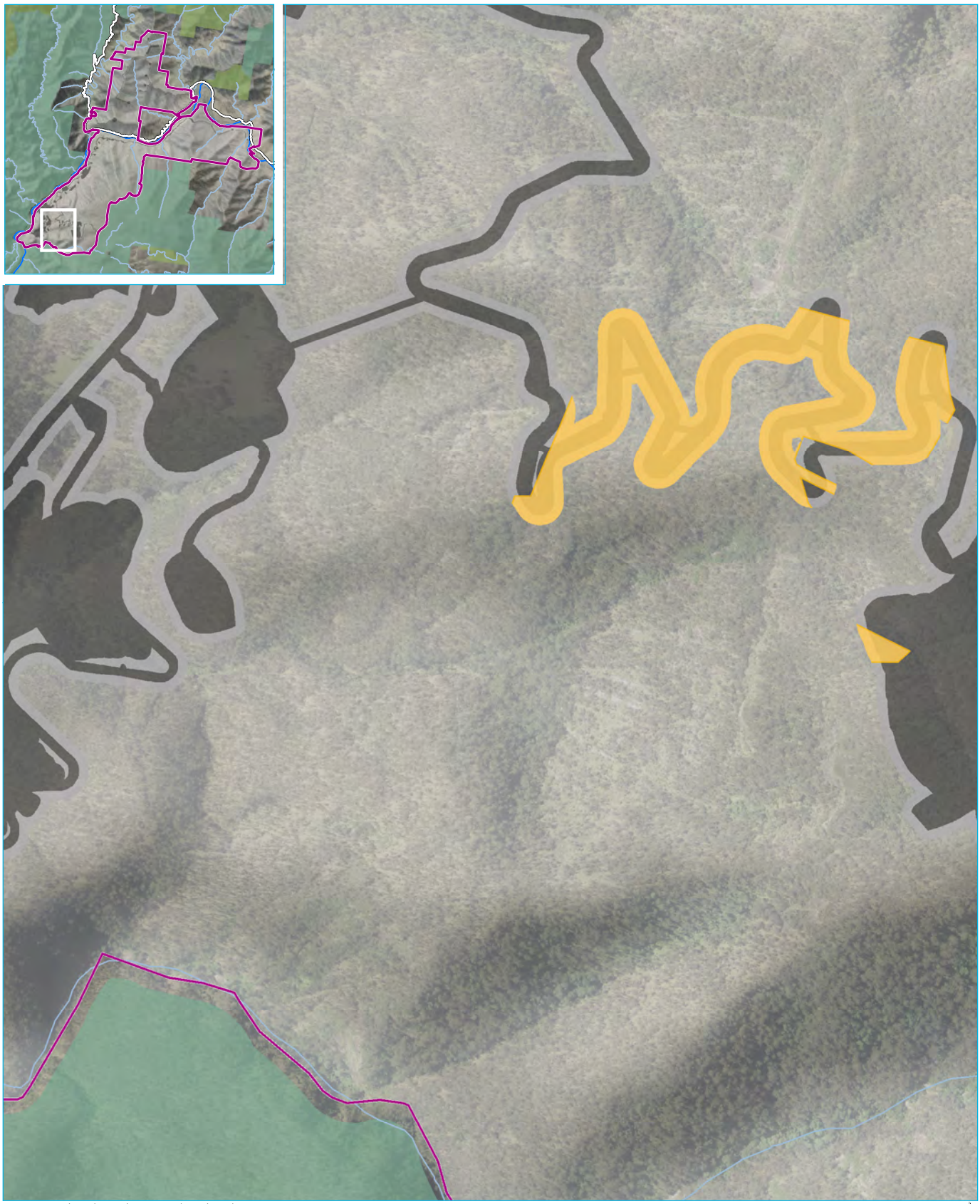
Existing environment

- Macleay River
- Named
- Major road
- NPWS
- State forest

Cryptic Forest Twiner species polygon

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Figure 6.8

EMM creating opportunities



Source: EMM (2022); DFSI (2020, 2021); GA (2011)

0 200 400 m

GDA 1994 MGA Zone 56

N

KEY

- Project area
- Disturbance footprint
- Indirect disturbance footprint
- Glossy Black-Cockatoo species polygon

Existing environment

- Macleay River
- Named watercourse
- Major road
- NPWS reserve
- State forest

Glossy Black-Cockatoo species polygon

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Figure 6.9

EMM creating opportunities

\\emmsvr1\emm3\2021\J210465 - OMPS EIS - Generation Component\GIS\02_Maps_EIS_BDAR\BDAR007_SpeciesPolygon_20221208_01.mxd 6/07/2023



Source: EMM (2022); DFSI (2020, 2021); GA (2011)

0 100 200 m

GDA 1994 MGA Zone 56

N

KEY

Project
Disturbance
Indirect disturbance
Barking Owl species

Existing environment
Macleay River
Named
Major
NPWS
State

Barking Owl species polygon

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Figure 6.10

EMM creating opportunities

\\emmsvr1\emm3\2021\J210465 - OMPS EIS - Generation Component\GIS\02_Maps_EIS_BDAR\BDAR007_SpeciesPolygon_20221208_01.mxd 6/07/2023



Source: EMM (2022); DFSI (2020, 2021); GA (2011)

0 100 200 m

GDA 1994 MGA Zone 56

N

KEY

Project
Disturbance
Indirect disturbance
Powerful Owl species

Existing environment
Macleay River
Named
Major
NPWS
State

Powerful Owl species polygon

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Figure 6.11

EMM creating opportunities

\\emmsvr1\emm3\2021\J210465 - OMPS EIS - Generation Component\GIS\02_Maps_EIS_BDAR\BDAR007_SpeciesPolygon_20221208_01.mxd 6/07/2023



Source: EMM (2022); DFSI (2020, 2021); GA (2011)

0 100 200 m

GDA 1994 MGA Zone 56

N

KEY

Project
Disturbance
Indirect disturbance
Masked Owl species

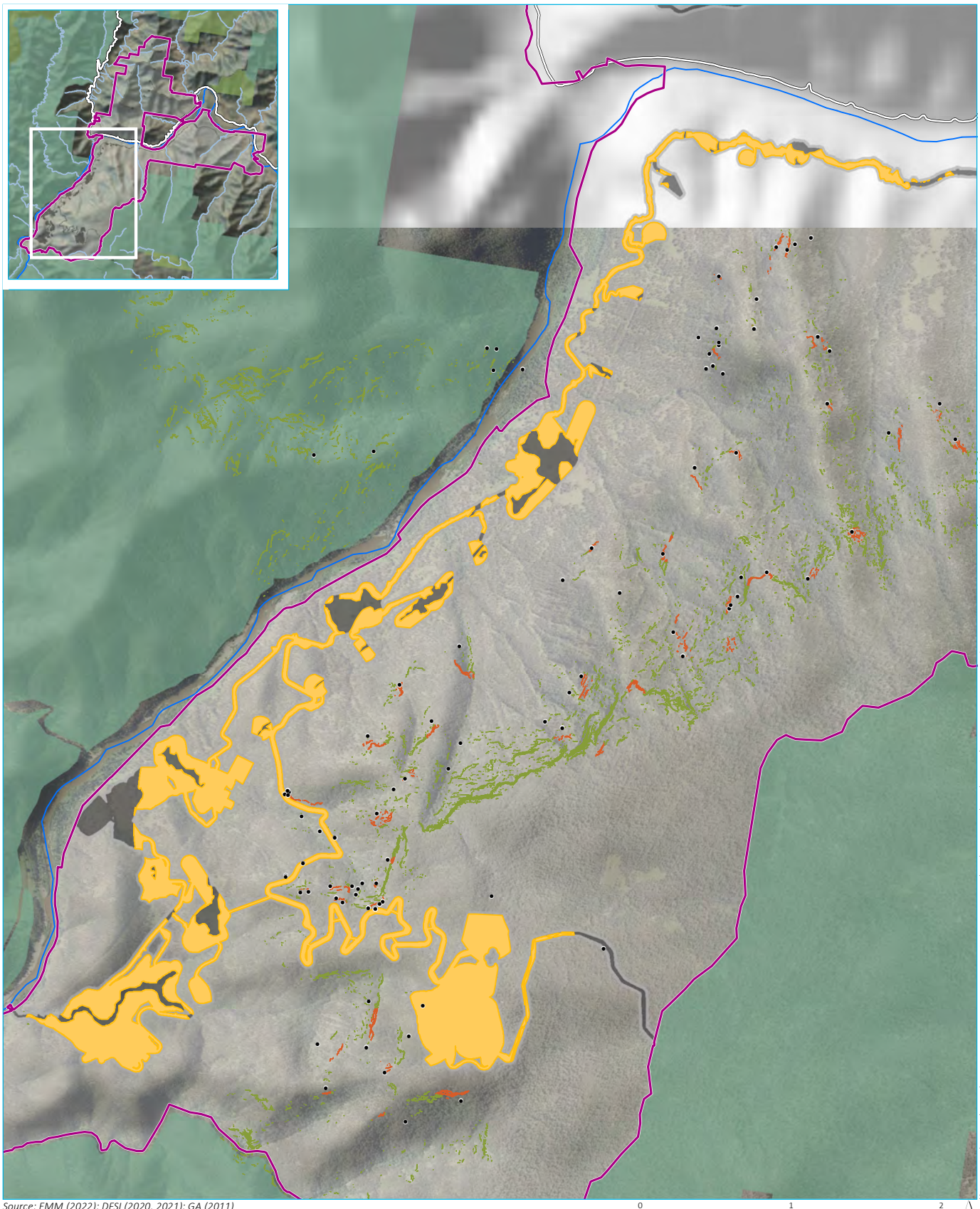
Existing environment
Macleay River
Named
Major
NPWS
State

Masked Owl species polygon

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Figure 6.12

\\emmsvr1\emm3\2021\J210465 - OMPS EIS - Generation Component\GIS\02_Maps_EIS_BDAR\BDAR007_SpeciesPolygon_20221208_01.mxd 6/07/2023

EMM creating opportunities



Source: EMM (2022); DFSI (2020, 2021); GA (2011)

0 1 2 km

GDA 1994 MGA Zone 56

N

KEY

- Project area
- Disturbance footprint
- Indirect disturbance footprint
- Brush-tailed Rock-wallaby species polygon
- Brush-tailed Rock-wallaby species sighting

Brush-tailed Rock-wallaby refuge habitat

- Occupied refuge habitat
- Potential refuge habitat

Existing environment

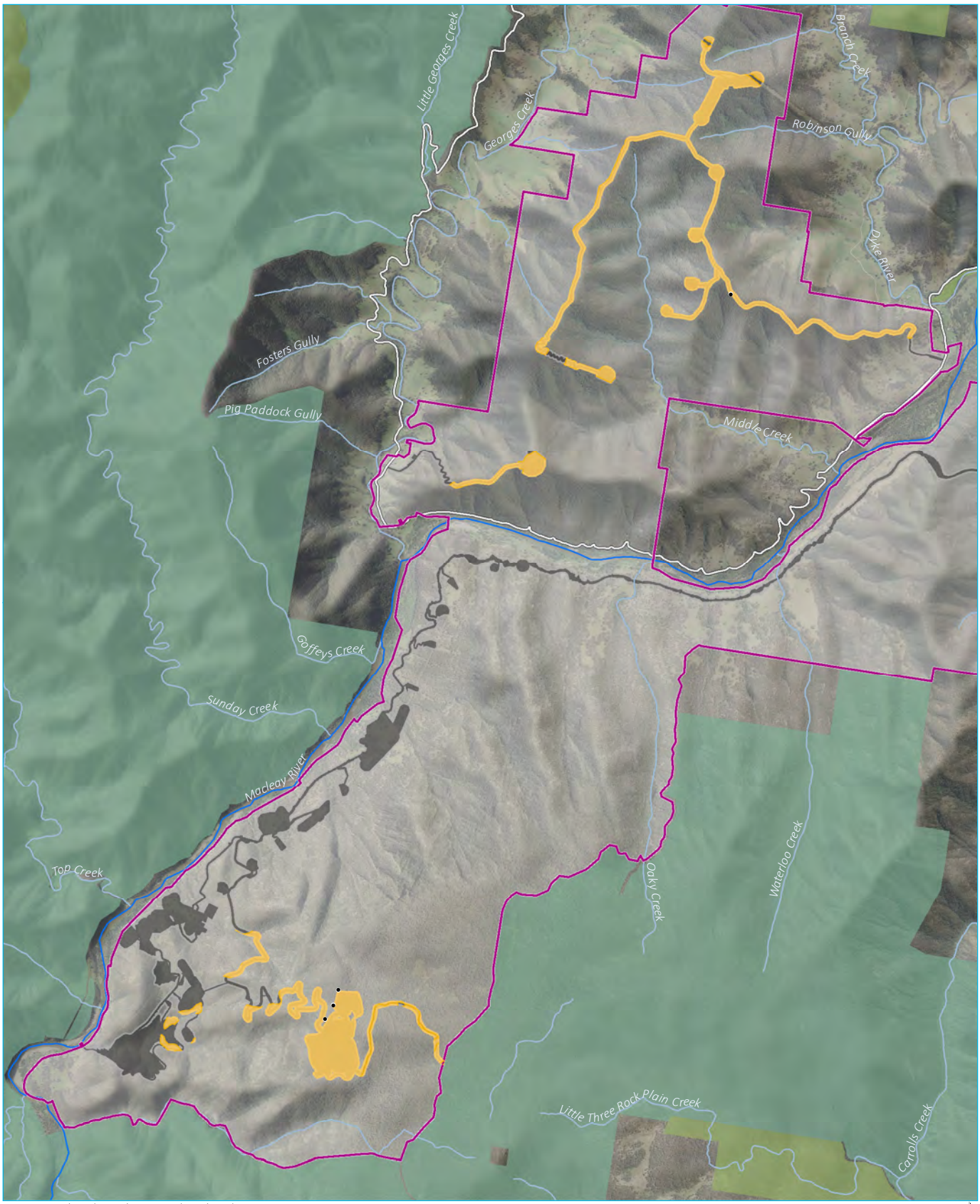
- Macleay River
- Named watercourse
- Major road
- NPWS reserve
- State forest

Brush-tailed Rock-wallaby species polygon

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Figure 6.13

EMM creating opportunities

\\emmsvr1\emm3\2021\J210465 - OMPS EIS - Generation Component\GIS\02_Maps_EIS_BDAR\BDAR007_SpeciesPolygon_20230822_03_BTRW.mxd 22/08/2023



Source: EMM (2022); DFSI (2020, 2021); GA (2011)

0 1 2 km

GDA 1994 MGA Zone 56

N

\\emmsvr1\emm3\2021\J210465 - OMPS EIS - Generation Component\GIS\02_Maps_EIS_BDAR\BDAR007_SpeciesPolygon_20230802_02.mxd 2/08/2023

KEY

- Project area
- Disturbance footprint
- Indirect disturbance footprint
- Long-nosed potoroo species polygon
- Long-nosed Potoroo species sighting

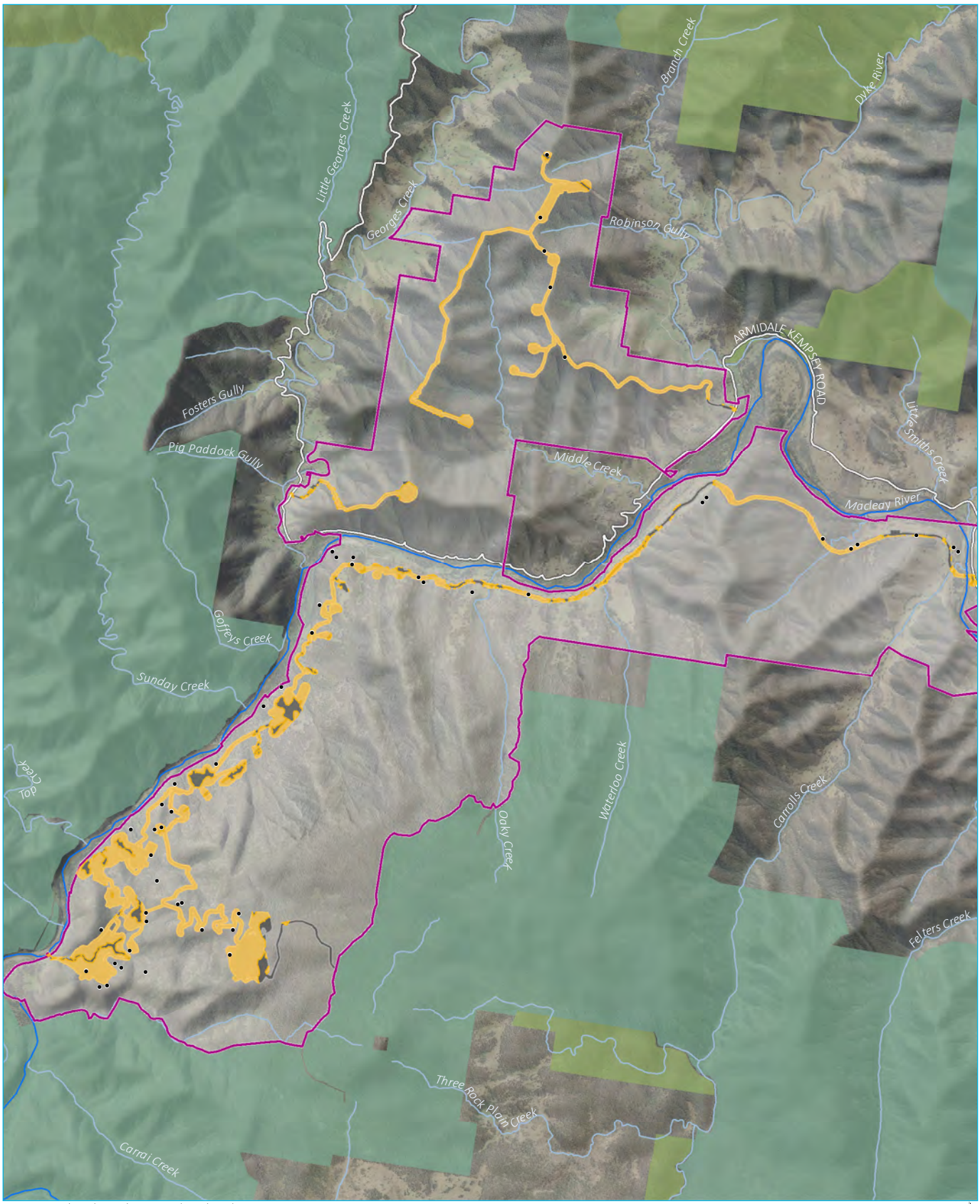
Existing environment

- Macleay River
- Named watercourse
- Major road
- NPWS reserve
- State forest

Long-nosed potoroo species polygon

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Figure 6.14

EMM creating opportunities



Source: EMM (2022); DFSI (2020, 2021); GA (2011)

0 1 2 km

GDA 1994 MGA Zone 56

N

\\emmsvr1\emm3\2021\J210465 - OMPS EIS - Generation Component\GIS\02_Maps_EIS_BDAR\BDAR007_SpeciesPolygon_20221208_01.mxd 6/07/2023

KEY

- Project area
- Disturbance footprint
- Indirect disturbance footprint
- Squirrel Glider species polygon
- Squirrel Glider species sighting

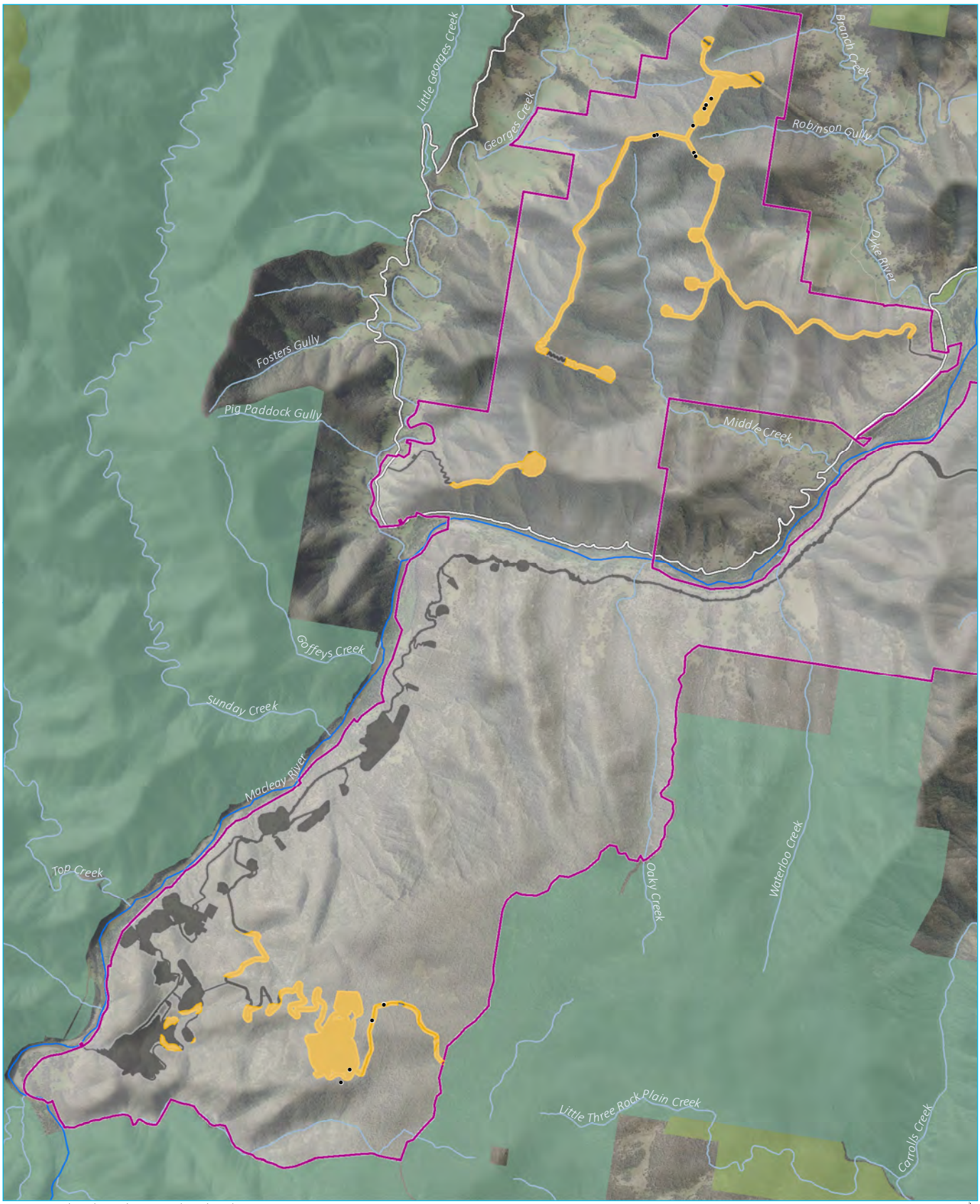
Existing environment

- Macleay River
- Named watercourse
- Major road
- NPWS reserve
- State forest

Squirrel Glider species polygon

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Figure 6.15

EMM creating opportunities



Source: EMM (2022); DFSI (2020, 2021); GA (2011)

0 1 2 km

GDA 1994 MGA Zone 56

N

KEY

- Project area
- Disturbance footprint
- Indirect disturbance footprint
- Greater Glider species polygon
- Greater Glider species sighting

Existing environment

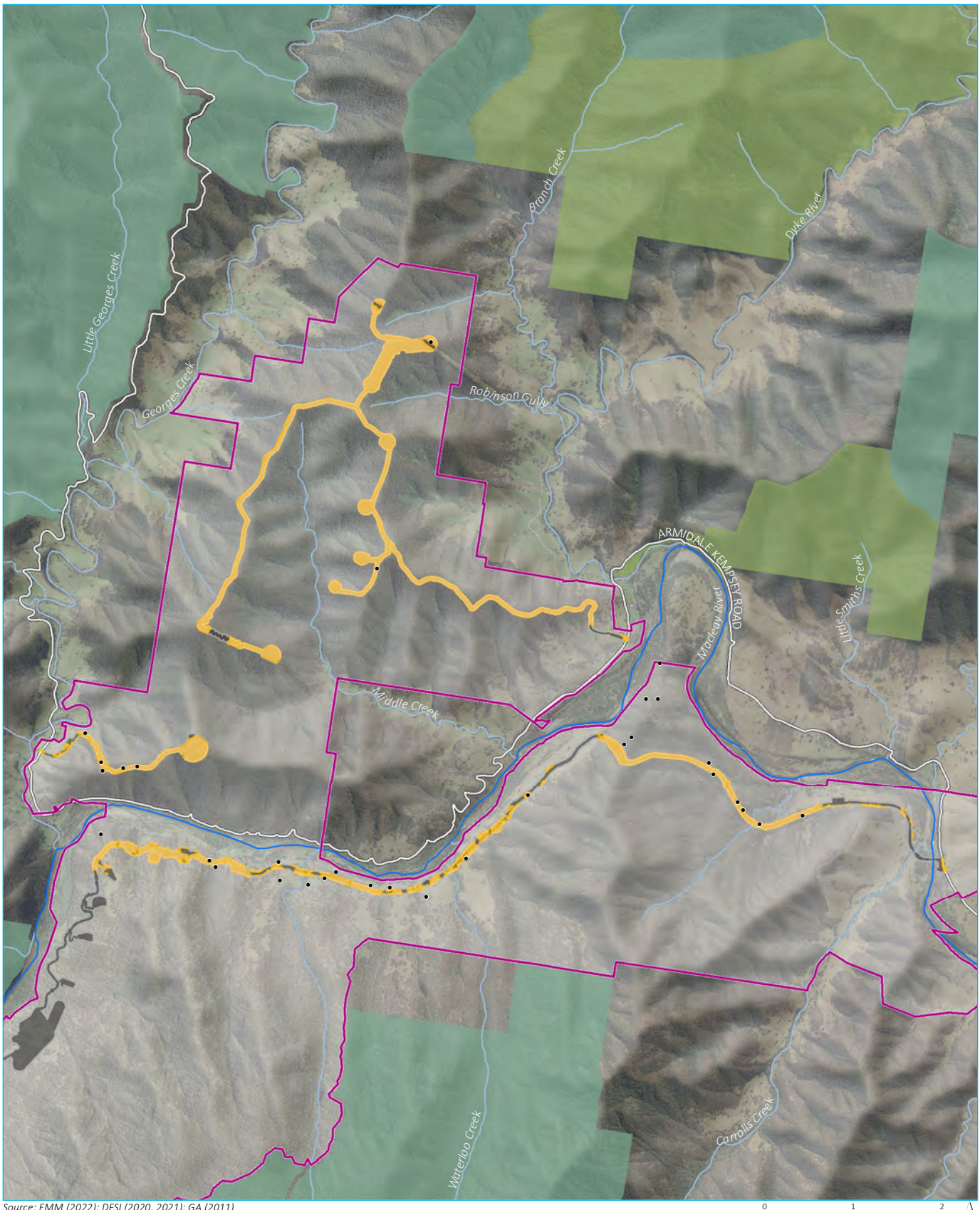
- Macleay River
- Named watercourse
- Major road
- NPWS reserve
- State forest

Greater Glider species polygon

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Figure 6.16

EMM creating opportunities

\\emmsvr1\emm3\2021\J210465 - OMPS EIS - Generation Component\GIS\02_Maps_EIS_BDAR\BDAR007_SpeciesPolygon_20230802_02.mxd 2/08/2023



Source: EMM (2022); DFSI (2020, 2021); GA (2011)

0 1 2 km

GDA 1994 MGA Zone 56

N

\\emmsvr1\emm3\2021\J210465 - OMPS EIS - Generation Component\GIS\02_Maps_EIS_BDAR\BDAR007_SpeciesPolygon_20221208_01.mxd 6/07/2023

Project area
Disturbance
Indirect disturbance
Brush-tailed Phascogale species

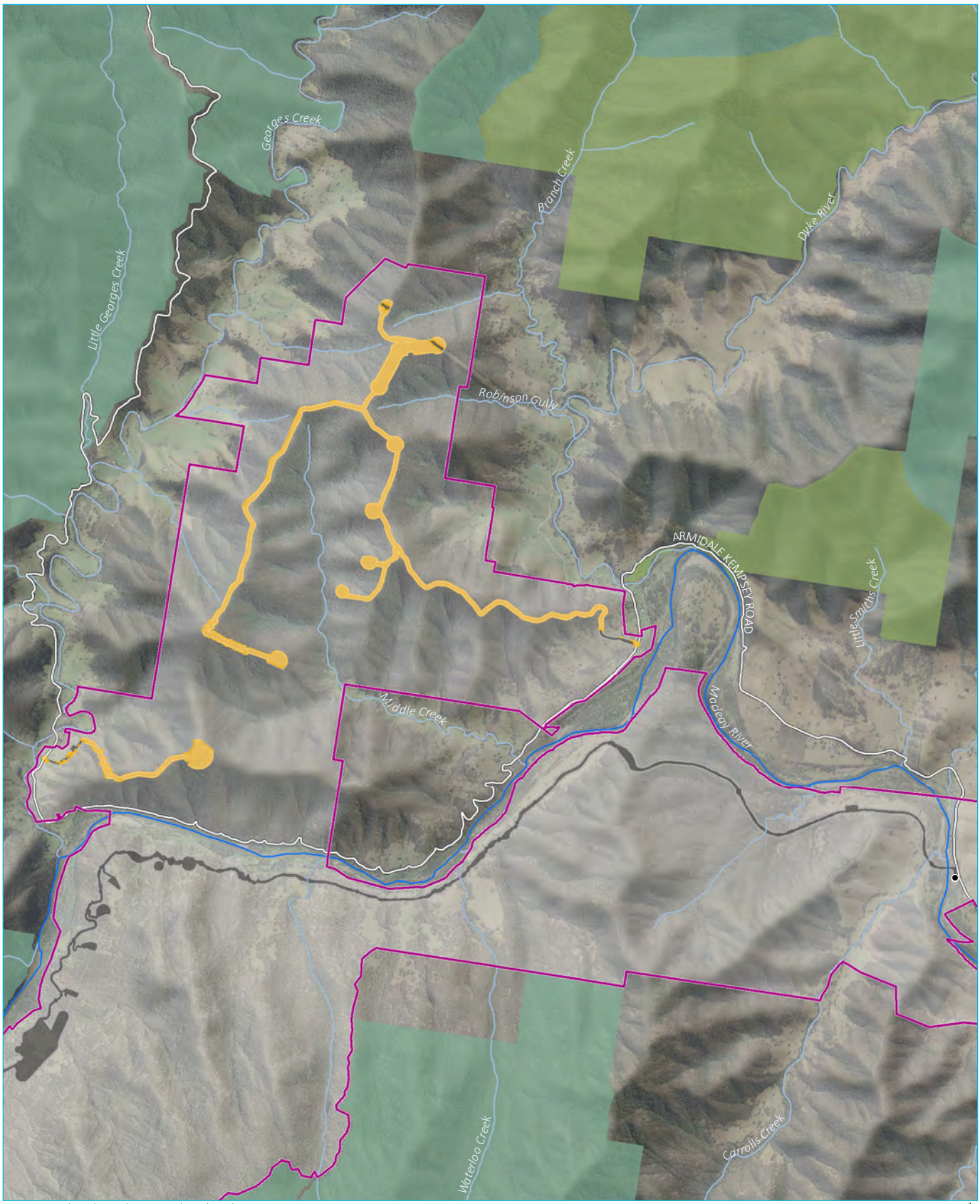
• Brush-tailed Phascogale species

Existing environment
Macleay River
Named
Major
NPWS
State

Brush-tailed Phascogale species polygon

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Figure 6.17

EMM creating opportunities



Source: EMM (2022); DFSI (2020, 2021); GA (2011)

0 1 2 km

GDA 1994 MGA Zone 56

N

KEY

- Project
- Disturbance
- Indirect disturbance
- Koala species
- Koala species

Existing environment

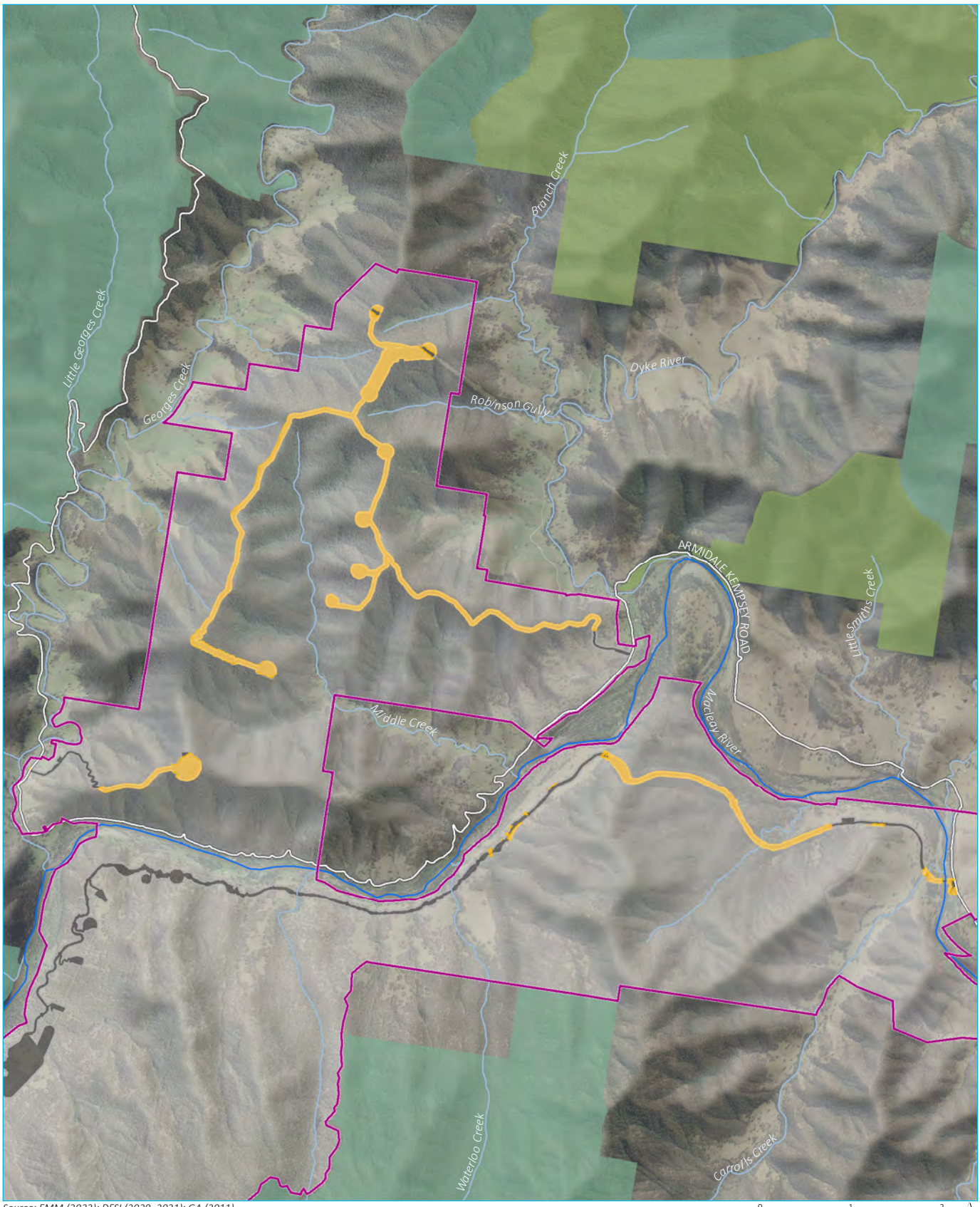
- Macleay River
- Named
- Major
- NPWS
- State

Koala species polygon

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Figure 6.18

EMM creating opportunities

\\emmsvr1\emm3\2021\P210465 - OMPS EIS - Generation Component\GIS\02_Maps_EIS_BDAR\BDAR007_SpeciesPolygon_20230802_02_Koala.mxd 2/08/2023



Source: EMM (2022); DFSI (2020, 2021); GA (2011)

0 1 2 km

GDA 1994 MGA Zone 56

N

\\emmsvr1\emm3\2021\J210465 - OMPS EIS - Generation Component\GIS\02_Maps_EIS_BDAR\BDAR007_SpeciesPolygon_20221208_01.mxd 6/07/2023

KEY

- Project area
- Disturbance footprint
- Indirect disturbance footprint
- Common Planigale species polygon

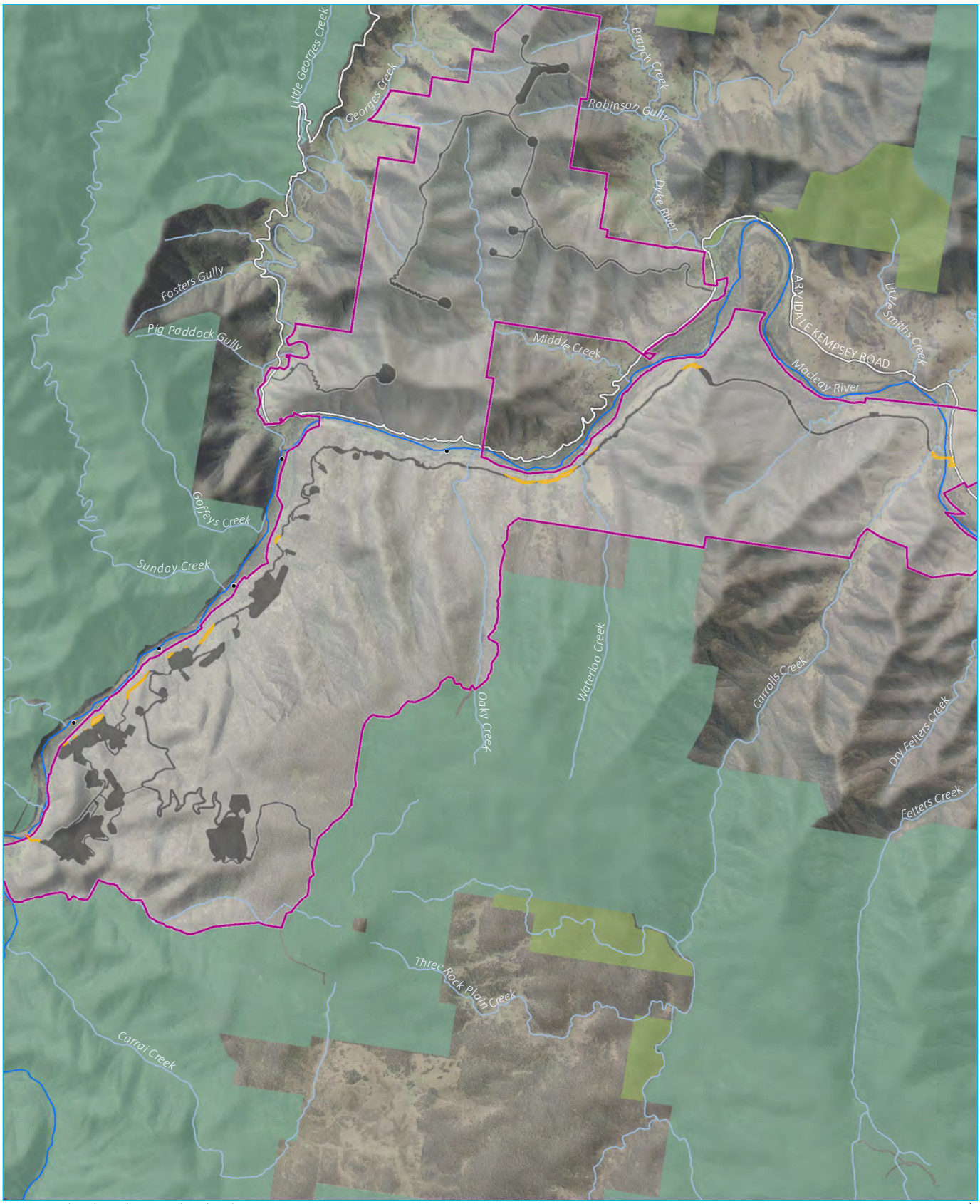
Existing environment

- Macleay River
- Named watercourse
- Major road
- NPWS reserve
- State forest

Common Planigale species polygon

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Figure 6.19

EMM creating opportunities



Source: EMM (2022); DFSI (2020, 2021); GA (2011)

0 1 2 km

GDA 1994 MGA Zone 56

N

\\emmsvr1\emm3\2021\J210465 - OMPS EIS - Generation Component\GIS\02_Maps_EIS_BDAR\BDAR007_SpeciesPolygon_20230802_02.mxd 2/08/2023

KEY

- Project area
- Disturbance footprint
- Indirect disturbance footprint
- Southern Myotis species polygon
- Southern Myotis species sighting

Existing environment

- Macleay River
- Named watercourse
- Major road
- NPWS reserve
- State forest

Southern Myotis species polygon

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Figure 6.20

EMM creating opportunities



Source: EMM (2022); DFSI (2020, 2021); GA (2011)

0 250 500 m

GDA 1994 MGA Zone 56

N

KEY

- Project area
- Disturbance footprint
- Indirect disturbance footprint
- 2 km buffer from cliffs and steep slopes
- Eastern Cave Bat species polygon

Existing environment

- Macleay River
- Named
- Major road
- NPWS
- State forest

Eastern Cave Bat species polygon

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Figure 6.21

\\emmsvr1\emm3\2021\J210465 - OMPS EIS - Generation Component\GIS\02_Maps_EIS_BDAR\BDAR007_SpeciesPolygon_20230802_02.mxd 2/08/2023

EMM creating opportunities

6.5 Step 6: Determination of the habitat condition within the species polygon for species assessed by area

The habitat condition within species polygons was determined by using the vegetation integrity score for each vegetation zone that is wholly or partially within the species polygon. The count of individuals or area of each vegetation zone entered into the BAMC is summarised in Table 6.24.

Table 6.24 The habitat condition within the species polygon for species assessed by area

Scientific name	Common name	Vegetation zones in species polygon	Extent of impact in species polygon (ha)/count
Grevillea guthrieana	Guthrie's Grevillea	PCT 842 High	11
Grevillea guthrieana	Guthrie's Grevillea	PCT 868 High	2
Grevillea guthrieana	Guthrie's Grevillea	PCT 842 High (indirect)	36
Grevillea guthrieana	Guthrie's Grevillea	PCT 842 DNG Moderate (indirect)	1
Haloragis exalata subsp. *velutina*	Tall Velvet Sea-berry	PCT 1215 High	350
Haloragis exalata subsp. *velutina*	Tall Velvet Sea-berry	PCT 842	13
Haloragis exalata subsp. *velutina*	Tall Velvet Sea-berry	PCT 1215 High (indirect)	1,017
Haloragis exalata subsp. *velutina*	Tall Velvet Sea-berry	PCT 762 Moderate (indirect)	1
Haloragis exalata subsp. *velutina*	Tall Velvet Sea-berry	PCT 842 High (indirect)	31
Lepidium peregrinum	Wandering Pepper Cress	PCT 1106 High	0.06 ha
Lepidium peregrinum	Wandering Pepper Cress	PCT 1106 High (indirect)	0.41 ha
Lepidium peregrinum	Wandering Pepper Cress	PCT 842 EG (indirect)	0.12 ha
Pultenaea rubescens	*Pultenaea rubescens*	PCT 822 High	0.3 ha
Pultenaea rubescens	*Pultenaea rubescens*	PCT 1287 High	0.03 ha
Pultenaea rubescens	*Pultenaea rubescens*	PCT 822 High (indirect)	0.7 ha
Pultenaea rubescens	*Pultenaea rubescens*	PCT High (indirect)	0.12 ha
Tylophora woollsii	Cryptic Forest Twiner	PCT 822 High	3.47 ha
Tylophora woollsii	Cryptic Forest Twiner	PCT 1215 High	9.26 ha
Tylophora woollsii	Cryptic Forest Twiner	PCT 822 High (indirect)	2.98 ha
Tylophora woollsii	Cryptic Forest Twiner	PCT 1215 High (indirect)	9.25 ha
Calyptorhynchus lathami	Glossy Black-cockatoo	PCT 842 High	1.95 ha
Calyptorhynchus lathami	Glossy Black-cockatoo	PCT 868 Dry	1.73 ha
Calyptorhynchus lathami	Glossy Black-cockatoo	PCT 868 High	4.91 ha
Calyptorhynchus lathami	Glossy Black-cockatoo	PCT 842 High (indirect)	0.12 ha
Calyptorhynchus lathami	Glossy Black-cockatoo	PCT 868 Dry (indirect)	1.5 ha
Calyptorhynchus lathami	Glossy Black-cockatoo	PCT 868 High (indirect)	3.56 ha

Table 6.24 The habitat condition within the species polygon for species assessed by area

Scientific name	Common name	Vegetation zones in species polygon	Extent of impact in species polygon (ha)/count
Ninox connivens	Barking Owl	PCT 842 High	0.19 ha
Ninox connivens	Barking Owl	PCT 868 High	1.02 ha
Ninox connivens	Barking Owl	PCT 842 High (indirect)	0.27 ha
Ninox connivens	Barking Owl	PCT 868 High (indirect)	0.79 ha
Ninox strenua	Powerful Owl	PCT 842 High	0.19 ha
Ninox strenua	Powerful Owl	PCT 868 High	1.02 ha
Ninox strenua	Powerful Owl	PCT 842 High (indirect)	0.27 ha
Ninox strenua	Powerful Owl	PCT 868 High (indirect)	0.79 ha
Tyto novaehollandiae	Masked Owl	PCT 842 High	0.19 ha
Tyto novaehollandiae	Masked Owl	PCT 868 High	1.02 ha
Tyto novaehollandiae	Masked Owl	PCT 842 High (indirect)	0.27 ha
Tyto novaehollandiae	Masked Owl	PCT 868 High (indirect)	0.79 ha
Petrogale penicillata	Brush-tailed Rock-wallaby	PCT 842 High	94.52 ha
Petrogale penicillata	Brush-tailed Rock-wallaby	PCT 868 Dry	4.44 ha
Petrogale penicillata	Brush-tailed Rock-wallaby	PCT 868 High	44.23 ha
Petrogale penicillata	Brush-tailed Rock-wallaby	PCT 822 High	9.32 ha
Petrogale penicillata	Brush-tailed Rock-wallaby	PCT 842 High (indirect)	77.96
Petrogale penicillata	Brush-tailed Rock-wallaby	PCT 868 Dry (indirect)	5.37 ha
Petrogale penicillata	Brush-tailed Rock-wallaby	PCT 868 High (indirect)	16.4 ha
Petrogale penicillata	Brush-tailed Rock-wallaby	PCT 822 High (indirect)	6.63 ha
Potorous tridactylus	Long-nosed Potoroo	PCT 868 Dry	4.44 ha
Potorous tridactylus	Long-nosed Potoroo	PCT 868 High	56.8 ha
Potorous tridactylus	Long-nosed Potoroo	PCT 822 High	11.14 ha
Potorous tridactylus	Long-nosed Potoroo	PCT 1215 High	41.4 ha
Potorous tridactylus	Long-nosed Potoroo	PCT 868 Dry (indirect)	5.37 ha
Potorous tridactylus	Long-nosed Potoroo	PCT 868 High (indirect)	16.4 ha
Potorous tridactylus	Long-nosed Potoroo	PCT 822 High (indirect)	10.13 ha
Potorous tridactylus	Long-nosed Potoroo	PCT 1215 High (indirect)	59.97 ha
Petaurus norfolcensis	Squirrel Glider	PCT 762 Poor	0.28 ha
Petaurus norfolcensis	Squirrel Glider	PCT 762 Moderate	0.3 ha

Table 6.24 The habitat condition within the species polygon for species assessed by area

Scientific name	Common name	Vegetation zones in species polygon	Extent of impact in species polygon (ha)/count
Petaurus norfolcensis	Squirrel Glider	PCT 842 Poor	1.48 ha
Petaurus norfolcensis	Squirrel Glider	PCT 842 High	148.99 ha
Petaurus norfolcensis	Squirrel Glider	PCT 868 Dry	4.44 ha
Petaurus norfolcensis	Squirrel Glider	PCT 868 High	45.45 ha
Petaurus norfolcensis	Squirrel Glider	PCT 1106 ModerateRF	0.43 ha
Petaurus norfolcensis	Squirrel Glider	PCT 1215 High	51.69 ha
Petaurus norfolcensis	Squirrel Glider	PCT 1268 High	1.05 ha
Petaurus norfolcensis	Squirrel Glider	PCT 762 Poor (indirect)	0.25 ha
Petaurus norfolcensis	Squirrel Glider	PCT 762 Moderate (indirect)	0.55 ha
Petaurus norfolcensis	Squirrel Glider	PCT 842 Poor (indirect)	2.74ha
Petaurus norfolcensis	Squirrel Glider	PCT 842 High (indirect)	53.53 ha
Petaurus norfolcensis	Squirrel Glider	PCT 868 Dry (indirect)	5.37 ha
Petaurus norfolcensis	Squirrel Glider	PCT 868 High (indirect)	22.67 ha
Petaurus norfolcensis	Squirrel Glider	PCT 1106 Moderate (indirect)	1.44 ha
Petaurus norfolcensis	Squirrel Glider	PCT 1106 (indirect) ModerateRF	0.41
Petaurus norfolcensis	Squirrel Glider	PCT 1215 High (indirect)	60.09
Petaurus norfolcensis	Squirrel Glider	PCT 1268 High (indirect)	0.95
Petauroides volans	Greater Glider	PCT 868 Dry	4.44 ha
Petauroides volans	Greater Glider	PCT 868 High	56.8 ha
Petauroides volans	Greater Glider	PCT 822 High	11.14 ha
Petauroides volans	Greater Glider	PCT 1215 High	41.4 ha
Petauroides volans	Greater Glider	PCT 868 Dry (indirect)	5.37 ha
Petauroides volans	Greater Glider	PCT 868 High (indirect)	16.4 ha
Petauroides volans	Greater Glider	PCT 822 High (indirect)	10.13 ha
Petauroides volans	Greater Glider	PCT 1215 High (indirect)	59.97 ha
Phascogale tapoatafa	Brush-tailed Phascogale	PCT 842 Poor	1.48 ha
Phascogale tapoatafa	Brush-tailed Phascogale	PCT 842 High	18.27 ha
Phascogale tapoatafa	Brush-tailed Phascogale	PCT 868 High	12.61 ha
Phascogale tapoatafa	Brush-tailed Phascogale	PCT 1215 High	51.68 ha
Phascogale tapoatafa	Brush-tailed Phascogale	PCT 842 Poor (indirect)	2.74 ha

Table 6.24 The habitat condition within the species polygon for species assessed by area

Scientific name	Common name	Vegetation zones in species polygon	Extent of impact in species polygon (ha)/count
Phascogale tapoatafa	Brush-tailed Phascogale	PCT 842 High (indirect)	20.28 ha
Phascogale tapoatafa	Brush-tailed Phascogale	PCT 868 High (indirect)	7.35 ha
Phascogale tapoatafa	Brush-tailed Phascogale	PCT 1215 High (indirect)	60.09 ha
Phascolarctos cinereus	Koala	PCT 842 Poor	0.52 ha
Phascolarctos cinereus	Koala	PCT 842 High	1.68 ha
Phascolarctos cinereus	Koala	PCT 868 High	12.61 ha
Phascolarctos cinereus	Koala	PCT 1215 High	41.43 ha
Phascolarctos cinereus	Koala	PCT 1268 High	1.05 ha
Phascolarctos cinereus	Koala	PCT 762 Poor (indirect)	0.01 ha
Phascolarctos cinereus	Koala	PCT 842 Poor (indirect)	1.14 ha
Phascolarctos cinereus	Koala	PCT 842 High (indirect)	2.32 ha
Phascolarctos cinereus	Koala	PCT 868 High (indirect)	7.35 ha
Phascolarctos cinereus	Koala	PCT 1215 High (indirect)	47.21 ha
Phascolarctos cinereus	Koala	PCT 1268 High (indirect)	0.95 ha
Planigale maculata	Common Planigale	PCT 762 Poor	0.28 ha
Planigale maculata	Common Planigale	PCT 762 Moderate	0.3 ha
Planigale maculata	Common Planigale	PCT 868 High	12.61 ha
Planigale maculata	Common Planigale	PCT 1106 Moderate	0.79 ha
Planigale maculata	Common Planigale	PCT 1215 High	51.67 ha
Planigale maculata	Common Planigale	PCT 1268 High	1.05 ha
Planigale maculata	Common Planigale	PCT 762 Poor (indirect)	0.25 ha
Planigale maculata	Common Planigale	PCT 762 Moderate (indirect)	0.3 ha
Planigale maculata	Common Planigale	PCT 868 High (indirect)	0.95 ha
Planigale maculata	Common Planigale	PCT 1106 Moderate (indirect)	1.43 ha
Planigale maculata	Common Planigale	PCT 1215 High (indirect)	60.09
Planigale maculata	Common Planigale	PCT 1268 High (indirect)	0.95 ha
Myotis macropus	Southern Myotis	PCT 762 Poor	0.28 ha
Myotis macropus	Southern Myotis	PCT 762 Moderate	0.37 ha
Myotis macropus	Southern Myotis	PCT 842 Poor	0.75 ha
Myotis macropus	Southern Myotis	PCT 842 High	3.38 ha

Table 6.24 The habitat condition within the species polygon for species assessed by area

Scientific name	Common name	Vegetation zones in species polygon	Extent of impact in species polygon (ha)/count
Myotis macropus	Southern Myotis	PCT 868 High	12.61 ha
Myotis macropus	Southern Myotis	PCT 1106 Moderate	0.97 ha
Myotis macropus	Southern Myotis	PCT 1106 Moderate RF	0.12 ha
Myotis macropus	Southern Myotis	PCT 1215 High	51.67 ha
Myotis macropus	Southern Myotis	PCT 1268 High	1.05 ha
Myotis macropus	Southern Myotis	PCT 762 Poor (indirect)	0.25 ha
Myotis macropus	Southern Myotis	PCT 762 Moderate (indirect)	0.3 ha
Myotis macropus	Southern Myotis	PCT 842 Poor (indirect)	1.94 ha
Myotis macropus	Southern Myotis	PCT 842 High (indirect)	50.1 ha
Myotis macropus	Southern Myotis	PCT 868 High (indirect)	7.35 ha
Myotis macropus	Southern Myotis	PCT 1106 Moderate (indirect)	1.51 ha
Myotis macropus	Southern Myotis	PCT 1215 High (indirect)	60.09 ha
Vespadelus troughtoni	Eastern Cave Bat	PCT 868 High	7.85 ha
Vespadelus troughtoni	Eastern Cave Bat	PCT 868 High (indirect)	4.4 ha

7 Groundwater dependent ecosystems

Division 6 of the *Water Management Act 2000* (WM Act) requires consideration of aquifer interference activities. The NSW Aquifer Interference Policy (AIP) (NOW 2012) requires an assessment of potential impacts on groundwater users, including groundwater dependent ecosystems.

A groundwater-dependent ecosystem (GDE) risk assessment has been completed in accordance with the NSW Government *Risk Assessment Guidelines for Groundwater Dependent Ecosystems* (Serov et al. 2012). This assessment has been undertaken in the Groundwater Dependent Ecosystems assessment (EMM 2023), and results are summarised below.

In accordance with the minimal impact criteria presented in the aquifer interference policy (DPI, 2012), water table drawdown has been assessed within 40 m of the identified terrestrial GDEs. No obligate GDEs are predicted to be impacted within the Project area. No ongoing drawdown is predicted within 40 m of facultative/opportunistic GDEs between the lower reservoir and Macleay River.

Terrestrial GDEs with a facultative and opportunistic dependence on groundwater predominantly depend on rainfall infiltration and adjacent surface watercourses to meet their water requirements, accessing groundwater opportunistically and seasonally when the water table is sufficiently close to the rooting depth of the particular PCT. Given the flow in the respective adjacent watercourse is likely to be sustained by rainfall runoff and releases from the upper reservoir during construction and operation, facultative/opportunistic GDEs are at low risk of potential impacts. It is noted that the drawdown predictions should be viewed as worst case based on conservative hydraulic conductivity values in the model and unmitigated tunnel and underground power station construction methods.

Stage 2 – Impact assessment

8 Impact assessment

This chapter identifies the potential impacts of the Project on the biodiversity values. Measures taken to date to avoid and minimise impacts are summarised and recommendations to assist in the design development that further avoids, minimises and mitigates impacts are provided.

8.1 Potential direct and indirect impacts

8.1.1 Direct impacts

Without any measures implemented to avoid, minimise or mitigate impacts in the disturbance footprint, the Project would have resulted in the following direct impacts on biodiversity:

- Loss of 7.43 ha of threatened ecological communities.
- Loss of 325 *Grevillea guthrieana* individuals, listed as Endangered under the BC Act and EPBC Act.
- Loss of over 384 Wandering Pepper Cress individuals, listed as Endangered under the BC Act and EPBC Act and a SAII entity.
- Loss of 143 *Pultenaea rubescens* individuals, a new species that is eligible to be listed as Endangered under as an emergency listing as set out in Division 4 of the BC Act 2016 (Barrett, In press).
- Loss of 13 Scrub Turpentine individuals, listed as Critically Endangered under the BC Act and EPBC Act and a SAII entity.
- Loss of four Cryptic Forest Twiner individuals, listed as Endangered under the BC Act and EPBC Act.
- Loss of 0.4 ha of occupied and 0.7 ha of potential refuge habitat for Brush-tailed Rock-wallaby, listed as Endangered under the BC Act and Vulnerable under the EPBC Act and a SAII entity for impacts on refuge habitat.
- Loss and degradation of threatened species habitats including hollow bearing trees, rocky areas, cliffs, and creeks.

8.1.2 Loss of native vegetation

The Project will involve clearing and inundation of land and will therefore result in loss of native vegetation in affected areas. A total area of approximately 328 ha of native vegetation of varying condition would be directly impacted (Table 8.1).

Table 8.1 Vegetation zone and impact summary

PCT ID	PCT Name	Vegetation Zone	Extent in disturbance footprint (ha)
762	Cabbage Gum open forest or woodland on flats of the North Coast	Moderate	0.5
762	Cabbage Gum open forest or woodland on flats of the North Coast	DNG Moderate	0.2
762	Cabbage Gum open forest or woodland on flats of the North Coast	Poor	0.3

Table 8.1 Vegetation zone and impact summary

PCT ID	PCT Name	Vegetation Zone	Extent in disturbance footprint (ha)
762	Cabbage Gum open forest or woodland on flats of the North Coast	Exotic Grassland (EG)	0.5
780	Coastal floodplain sedgelands, rushlands, and forblands of the North Coast	Moderate	0.1
822	Eurabbie tall open forest of the escarpment ranges of the NSW North Coast Bioregion	High	11.1
842	Forest Redgum – Broad-leaved Apple dry open forest of the gorges of NSW North Coast Bioregion	High	149
842	Forest Redgum – Broad-leaved Apple dry open forest of the gorges of NSW North Coast Bioregion	DNG Moderate	35.2
842	Forest Redgum – Broad-leaved Apple dry open forest of the gorges of NSW North Coast Bioregion	Poor	1.5
842	Forest Redgum – Broad-leaved Apple dry open forest of the gorges of NSW North Coast Bioregion	EG	6.7
868	Grey gum – stringybark open forest of the gorges of the NSW North Coast Bioregion and New England Tableland Bioregion	High	58.1
868	Grey gum – stringybark open forest of the gorges of the NSW North Coast Bioregion and New England Tableland Bioregion	Dry	4.4
1106	River Oak riparian woodland of the NSW North Coast Bioregion and northern Sydney Basin Bioregion	High	0.1
1106	River Oak riparian woodland of the NSW North Coast Bioregion and northern Sydney Basin Bioregion (associated with a TEC)	Moderate	0.8
1106	River Oak riparian woodland of the NSW North Coast Bioregion and northern Sydney Basin Bioregion (associated with a TEC)	Moderate RF	0.4
1142	Shatterwood – Giant Stinging Tree – Yellow Tulipwood dry rainforest of the NSW North Coast Bioregion and northern Sydney Basin Bioregion	Moderate	5
1215	Spotted Gum – Grey Ironbark open forest of the Macleay Valley lowlands of the NSW North Coast Bioregion	High	51.7
1215	Spotted Gum – Grey Ironbark open forest of the Macleay Valley lowlands of the NSW North Coast Bioregion	DNG Moderate	1.2
1268	Tallowwood open forest of the coastal ranges of the NSW North Coast Bioregion	High	1.1
1287	Upland heath swamps of the New England Tableland Bioregion	High	0.03
Total			**327.9 ha**

The majority of native vegetation in the disturbance footprint would generate an ecosystem credit offset requirement as described in Section 11.2.1. Areas that are habitat for species-credit species would also generate species credits as described in Section 11.2.2.

8.1.3 Indirect impacts

Section 8.2 of BAM (DPIE 2020a) requires the assessment of indirect impacts on native vegetation, threatened ecological communities and threatened species habitats.

Delineation of a project into different management zones allows for direct impacts (i.e. total loss of native vegetation and fauna habitat in a given area) and indirect impacts (e.g. decreasing condition in retained native vegetation and fauna habitats adjacent to direct impacts) to be quantified. The following section describes how the indirect impacts have been defined for the Project. Mitigation measures have been provided in Section 8.3.2 to manage these indirect impacts.

The indirect impacts are likely to include:

- edge effect on areas of retained native vegetation
- disturbance to native animals in adjacent habitat, particularly during construction
- interruption of animal movement
- vehicle strike and powerline collision impacts on animal populations
- increase in predatory and pest animal species, resulting in increased predation and competition and a consequent reduction in populations
- impacts to water quality during construction.

i Edge effects

Edge effects are zones of changed environmental conditions occurring along the edges of habitat fragments. These new environmental conditions along the edges can promote the growth of different plant species (including weeds), supress the growth of other plant species, promote invasion by animals (native and introduced) that specialise in edge habitats, or change the behaviour of resident animals (Moenting, AE & Morris DW 2006). Edge zones can be subject to higher levels of predation by introduced mammal and native bird predators. The distance of edge effects influence can vary, with edge effects in roads having been recorded as extending greater than 1 km (Forman, RT 2000) and as little as 20 m away (Bali, R 2000), (Bali, R 2005), (EMM 2019, 2019a).

Areas adjacent to the disturbance footprint were inspected during vegetation mapping, BAM plots and fauna surveys to determine the characteristics of vegetation and habitat present and their susceptibility to potential edge effects. The Project area has historically been logged in areas accessible by machinery and land use activity from grazing along the lower section of the generation site and access has already resulted in edge effects from existing access roads and clearing activities.

The upper reservoir and transmission line areas are not currently subject to edge effects. In these areas, construction of the Project has the potential to disperse weeds species into areas where they do not currently occur. The landscape surrounding these areas is dominated by areas of relatively intact forest and is unlikely to be a source of substantial weed introduction to retained areas around the reservoirs. The most likely causes of weed dispersal associated with the activity would include earthworks, movement of soil and attachment of seed (and other propagules) to vehicles and machinery.

Immediately adjacent to the areas of direct impact, native vegetation may be affected by changes to microclimatic conditions such as sunlight levels, average windspeed and soil moisture availability. Given that affected vegetation consists of dry sclerophyll forest and woodland, it is not likely to be substantially affected by such changes. Construction activities may also result in temporarily increased dust levels, covering adjacent vegetation and inhibiting growth.

These changes may result in minor degradation of native vegetation through weed invasion, changes to native plant species composition and diversity and habitat suitability for animal species.

ii Disturbance to native animals in adjacent habitat

In addition to permanent edge-effects, there may be temporary impacts from noise, vibration and artificial lighting during the construction period.

Possible effects of noise on native animals include permanent hearing impairment in the case of extremely loud noise, interference with communication between animals and disruption to normal activities such as foraging (Hoskin, CJ & Goosem, MW 2010).

Construction activities would result in increased levels of noise and vibration, particularly as a result of blasting activities during construction of the reservoirs walls and access roads, and as a result of general construction activities. Noise levels are expected to be transient during construction. Operational noise is expected to be minimal and restricted to immediately surrounding operational elements.

Lighting for night works also has the potential to result in light spill into adjacent habitat areas, and disturbance to fauna species during construction of the Project.

Noise, vibration and artificial lighting may lead to some animals temporarily ceasing to utilise habitat adjacent to the disturbance footprint during the construction of the Project or may impair their normal activities, but is unlikely to cause a significant impact on any species. Usage is predicted to return to pre-construction levels during operation due to minimal ongoing impacts.

iii Interruption of animal movement

Removal of native vegetation and associated habitat and inundation of land has the potential to result in fragmentation of fauna habitat, with resultant effects on fauna species movement, reproduction and gene flow (Bennett, AF 1990) (Keller, I & Largiadèr, C 2003) (Dixo, M et al. 2009). Clearing can result in the inability of species to move between patches of suitable habitat or a reduced level of movement. Species most vulnerable to fragmentation include relatively sedentary species with low mobility. Species least vulnerable to barrier effects tend to be those that are highly mobile (e.g. birds), although even these species can vary in their response to fragmentation. Ultimately, fragmentation can increase the vulnerability of flora and fauna populations to stochastic events and extinction (Bennett, AF 1990) (Smith, J & Hellmann, J 2002) (Fischer B, & Lindenmayer, D 2007).

Under present conditions, animals may move between the extensive areas of habitat within the Project area with the Macleay River contributing the largest constraint of movement for smaller animals less capable of swimming across the river. It is considered that animals may be able to cross the Macleay River during dry spells and lower rainfall years.

The reservoirs will impede movement directly across these two waterbodies; however, the Project would not prevent movement of animals between these areas as they would remain directly connected via large areas of continuous forest and woodland encircling the inundation areas of the proposed reservoirs. Birds, bats frogs and some reptiles are likely to be able to continue to cross the reservoirs during operation but may be less likely to do so due to reduced cover and higher risk of predation.

The access and powerline route elements of the Project would result in increases in the distance between patches of animal habitat through the removal of trees. In the lower portion of the Project area, the clearing in these areas would consist of narrow strips of land, in areas mostly along existing tracks and is considered unlikely to significant modify the ability of threatened species to move through the landscape between areas of habitat. In the upper portion of the Project area, where large areas of intact vegetation occur, access tracks have a greater capacity to interrupt animal movement for small, less mobile species that will not cross small open gaps.

The likely impact of interruption of movement on threatened species is discussed further in Section 8.2.2.

iv Vehicle strike and powerline collision impacts on animal populations

a Vehicle strike impacts

There will be increased vehicle traffic on publicly accessible roads adjacent to the Project area during the construction phase. All current access tracks in the disturbance footprint will be upgraded with new roads created. Unmitigated, this has the potential to result in increased mortality of animals due to vehicle strike in these areas. Rare or low-density populations are most at risk of significant impacts if this impact is not managed appropriately (Hoskin, CJ & Goosem, MW 2010). Despite some level of impact being possible, the majority of impacts will be limited to common or abundant species.

The potential for increased traffic during construction to result in increased mortality of native animals would be minimised by the construction traffic driving rules in high risk sections of road at night when most native animal species are active.

b Powerline collision impacts

The Project includes a new 15 km long corridor containing 132 and 330 kilovolt (kV) overhead powerlines. Overhead powerlines may be hazardous for medium to large species of birds, flying-foxes and arboreal mammals. If an animal simultaneously contacts two electrical wires (conductors or phases) or a single-phase and a ground wire, it may be electrocuted. Birds may also be injured through collision with conductors.

Indirect impacts, such as bird collision, could impact the following threatened species recorded within the Project area:

- White-bellied Sea-Eagle
- Little Eagle
- Square-tailed kite.

The transmission line route is proposed to generally follow the existing line south of the Macleay River where possible, so this potential impact is already present in this section of the Project. The transmission line connecting the existing Line 965 to south of the Macleay River will be a new feature within the landscape that may cause mortality to the species discussed above.

Minimising collision and electrocution hazards to animals will be considered in the design of the overhead powerlines, including the spacing and configuration of conductors and use of transmission line markers (bird flappers) or diverters to assist in birds being able to avoid impacts.

With the proposed design mitigation, it is anticipated that the new overhead powerlines are unlikely to result in a significant increased hazard to local wildlife or to significantly affect the populations of any animal species.

v Increase in predatory and pest animal species

Increased human activity and creation of new roads also has the potential to attract feral animals if unmitigated. Of key concern is an increase in feral Cat (*Felis catus*) and Red Fox (*Vulpes vulpes*) activity and consequent impacts on native animals. Predation by feral Cats and Red Foxes are listed as key threatening processes under the BC Act and EPBC Act (NPWS 2001, DEWHA 2008a, DoE 2015) with impacts from Foxes and feral Cats also listed as a threat to the Brush-tailed Rock-wallaby TBDC (DPIE 2020a). Introduced predators are also considered a threat to the Long-nosed Potoroo and Hastings River Mouse.

vi Impacts on water quality during construction

Construction activities have the potential to result in impacts to water quality in watercourses located downstream of construction area in the following ways:

- Release of poor-quality water to watercourses. In particular, any sediment laden water that could arise following mobilisation of soils/sediments during inclement weather over disturbed soils and sediments in areas where vegetation has been cleared and/or soil and construction material has been stockpiled. If untreated surface water was released to watercourses it could be detrimental to aquatic habitat and biota.
- Reduction in watercourse bank stability following any nearby construction and any clearing of riparian vegetation could also result in bank erosion and input of sediments into watercourses.
- Accidental release of chemicals and fuels (e.g. oils, hydraulic fluids and fuel from construction equipment) could result in the input of hydrocarbon and metal contaminants into watercourses. The accidental release into watercourses of any pesticides, herbicides and sewage could also affect aquatic biota.
- Disturbance of riparian vegetation could have indirect impacts on aquatic habitat quality and influence abundance, distribution and health of aquatic biota.

The likely impact of alteration of flow regimes and associated impacts on water quality is discussed further in Section 8.2.3.

8.1.4 Calculating the credit obligation for direct and indirect impacts

For all areas of direct impact, being all areas within the disturbance footprint, the future vegetation integrity score was set to zero to account complete loss of vegetation within these areas.

As a result of various design changes to the disturbance footprint, there has been a significant reduction in direct impacts to native vegetation and threatened species. However, it is acknowledged that indirect impacts may arise out of the Project, subsequently resulting in a reduction in the condition of retained areas of native vegetation (see Section 8.1.3i). These indirect impacts have been assessed in accordance with Section 2.4.1 of the BAM (DPIE 2020a) and credits have been calculated.

It is assumed that edge effects arising from the Project will impact all vegetation within 20 m of the disturbance footprint. This assessment was based on an assessment of data collected as a part of the biodiversity monitoring program for Snowy 2.0 Exploratory Works (EMM 2019a) which showed a statistically significant difference in weed cover from 10 m to 50 m, but not from 10 m to 20 m or from 20 m to 50 m.

To account for direct and indirect impact, vegetation zones were split into management zones based on whether they occurred within the direct impact footprint or the indirect impact footprint. Changes in vegetation integrity score (future vegetation integrity score) for indirect impacts were calculated based on the following:

- the structure (cover) scores for ‘grass’, ‘forbs’, ‘ferns’ and ‘other’ growth forms were reduced by 10%, leaving scores for all other growth forms at the current score
- functional score for litter cover was reduced by 5%.

8.2 Prescribed impacts

Consideration has been given to prescribed impacts on threatened species and communities recorded or assumed to be present within the disturbance footprint, as per Chapter 6 of the BAM (DPIE 2020a). The prescribed impacts relevant to the Project are documented in Table 8.2, and prescribed impacts are assessed in Table 8.3 to Table 8.5.

Table 8.2 Prescribed biodiversity impacts relevant to the Project

Prescribed impacts	Relevance to the Project
Karst, caves, crevices, cliffs, rocks and other geological features of significance.	No karst (eroded limestone landscape) features are found in the disturbance footprint. The Project is located within the Macleay Gorges which forms an extensive area of 167,000 ha, which contains cliff and gorges. Cliffs, from high to small that could contain cave features are found in and adjacent to the disturbance footprint. Assessed in Table 8.3.
Human-made structures.	The Project does not include the removal of human made structures. Therefore, this prescribed impact is not relevant to the Project.
Non-native vegetation.	Non-native vegetation is restricted within the disturbance footprint, and largely associated with grazing land. None of the threatened species likely to occupy the disturbance footprint are likely to be reliant on non-native vegetation for roosting, breeding or frequent foraging. The loss of this habitat would have a negligible impact on threatened species.
Impacts on areas connecting threatened species habitat, such as movement corridors.	The Project will impact on the connectivity of habitat within the Project area due to removal of vegetation and inundation of land. Assessed in Table 8.4.
Impacts that affect water quality, water bodies and hydrological processes that sustain threatened entities (including from subsidence or upsidence from underground mining).	The construction and operation of the Project will result in changes to the flow of waterways downstream from the lower reservoir. Assessed in Table 8.5.
Impacts on threatened and protected animals from turbine strikes from a wind farm.	Not relevant to the Project as it is not a wind farm.
Impacts on threatened species or fauna that are part of a TEC from vehicle strikes.	The Project will involve the creation of roads, widening tracks and temporary increase in local traffic movements. Several threatened species have been identified within the construction envelope that are likely to be susceptible to impacts from vehicle strikes. Assessed in Table 8.6.

8.2.1 Impact on habitat associated with karst, caves, crevices, cliffs, rocks and other geological features of significance

Impacts on habitat associated with crevices, cliffs and rocks on threatened entities are assessed in Table 8.3. The relevant threatened entities were generated from the candidate species and predicted species lists associated with karsts, caves, crevices, cliffs, rocks and other geological features of significance.

Table 8.3 Impact on habitats of threatened species or ecological communities associated with karst, caves, crevices, cliffs, rocks and other geological features of significance

Associated features of the disturbance footprint	Nature, extent and duration of impact	Relevant threatened entities	Consequences of impacts on threatened entities
No karst (eroded limestone landscape) features are found in the disturbance footprint. No cave features suitable to support roosting bats are found in the disturbance footprint. The Project is located within the Macleay Gorges which forms an extensive area of 167,000 ha, which contains cliff and gorges. Cliffs, from high to small that could contain cave features are found outside of the disturbance footprint.	Long-term decrease in the area of large rock outcrops accessible to terrestrial animals by approximately 0.2 ha. Possible short-term (construction phase) decrease in the availability of rocky habitat adjacent to the disturbance footprint due to noise and vibration associated with earthworks deterring occupation by sensitive animal species.	Little Bent-winged Bat (R, D) Large Bent-winged Bat (R, D) Eastern Cave Bat (R, S)	These species are unlikely to use the features in the disturbance footprint, or within 1–2 km, for breeding as no lactating females were recorded as part of the microbat survey effort; caves may be used for roosting habitat. Bent-wing bats require deep caves with very specific and stable humidity and temperature conditions for breeding (Dwyer, P D & Hamilton-Smith, E 1965). The Project will cause a small, permanent reduction in the availability of potential roosting habitat that may be intermittently used by the species for roosting. Similar habitat in adjacent areas (up to around 100 m away) may become temporary unsuitable as roosting habitat during construction, due to noise and vibration impacts, but would be available to the species post construction. This habitat is not considered limiting in the locality due to the extensive areas of cliffs. There is a small risk of mortality of a low number of individuals of these species during construction. Mitigation measures, including staged removal of habitat and pre-clearing surveys, have been identified to minimise this risk. The Project's impact on these features is unlikely to substantially affect populations of either species.
		Brush-tailed Rock-wallaby (R, S)	This species was recorded throughout the Project area using both cliff and rocky habitats within and adjacent to the development footprint and is likely to utilise these rocky features for refuge and breeding sites. The Project will cause permanent reduction in the availability of refuge and breeding habitat. Similar habitat in adjacent areas (up to around 100 m away) may become temporary unsuitable during construction but would be available to the species post construction. For this assessment, it is assumed that the displaced colony will have a moderate risk of mortality of a small number of individuals of the species during construction. Mitigation measures have been identified to minimise this risk.
		Spotted-tail Quoll (R, ES)	This species was recorded within the disturbance footprint and is likely to utilise these rocky features for den and breeding sites. The Project will cause permanent reduction in the availability of potential den and breeding habitat. Similar habitat in adjacent areas (up to around 100 m away) may become temporary unsuitable during construction but would be available to the species post construction. There is a low to negligible risk of mortality of a small number of individuals of the species during construction. Mitigation measures have been identified to minimise this risk.

Notes: R = Recorded in the disturbance footprint.

D = Dual credit (ecosystem-credit and species-credit) species.

S = Species-credit species

ES = Ecosystem credit species

8.2.2 Impact on areas connecting threatened species habitat such as movement corridors

Impacts on areas connecting threatened species habitat such as movement corridors are assessed in Table 8.4. The relevant threatened entities were generated by looking at the candidate species list that are susceptible to habitat fragmentation and isolation. (AS 2009) (DPIE 2020a).

Table 8.4 Impacts on areas connecting threatened species habitat such as movement corridors

Associated features of the disturbance footprint	Nature, extent and duration of impact	Relevant threatened entities	Consequences of impacts on threatened entities
Generation site	The construction of the upper and lower reservoirs and associated infrastructure and access roads will involve removal of native vegetation. Habitats will however remain directly connected via large areas of continuous forest and woodland encircling the inundation areas. Significant areas of infrastructure within the Generation Site will be rehabilitated following construction, reducing impacts to connectivity longer term.	**Arboreal mammals**: • Koala (R, S) • Squirrel Glider (R, S) • Greater Glider (R, S) • Brush-tailed Phascogale (R, S) • Long-nosed Potoroo (R, S). **Terrestrial mammals** • Spotted-tailed Quoll (R, ES) • Brush-tailed Rock-wallaby (R, S) • Hastings River Mouse (R, ES). **Microbats**: • Little Bent-winged Bat (R, D) • Large Bent-winged Bat (R, D) • Southern Myotis (R, S) • Eastern Cave Bat (R, S).	Under present conditions, these threatened animals may move between the extensive areas of habitat across the Project area. During the operation of the Project, the threatened arboreal and terrestrial mammals present in the disturbance footprint for the reservoirs and associated infrastructure and inundation area will no longer be able to easily cross these areas due to the associated clearing of vegetation and expanse of open water. Threatened small woodland and forest birds, owls and microbats are likely to continue to cross during operation but may be less likely to do so due to reduced cover and higher risk of predation. The movement of raptors is unlikely to be substantially affected. The infrastructure created for the construction phase will be rehabilitated on completion of the works and animal movements through these areas would slowly return. The Project is unlikely, however, to prevent long-term movement of any threatened species of animals from one side of the reservoirs to the other as habitat would remain directly connected via large areas of continuous forest and woodland encircling the inundation areas. The narrow bands of clearing required for the access roads (up to 20 m but typically around 10 m) are unlikely to interfere with animal movement since these species are capable of traversing narrow tracts of cleared land between forested areas. The increases or creation of canopy separation in movement paths of threatened species along the transmission line (130 m where clearance is required) may reduce the frequency of plant dispersal and animal movements for small, less mobile species; large, mobile species are unlikely to be impacted. Clearance areas for the transmission line is limited to that of the areas around the towers and any sag clearance requirements. Therefore, the entire line will not be cleared allowing threatened animals to move around either side of the tower clearance locations. It is unlikely, however, to significantly impact the ability of threatened species to move through the landscape between areas of habitat as the affected species are all able to move around the breaks in suitable habitat.
Access Road	The Project will involve removal of native vegetation and trimming of trees along part of an existing track and clearing of intact vegetation for the creation of the EAR. These impacts will be permanent as roads will be maintained during operation.		
Transmission Line	The Project will involve removal and trimming of trees along part of an existing track and clearing of intact vegetation for the creation of new access road, overhead powerline tower / pole locations and clearance for overhead wires. Connectivity will be maintained through retention of native vegetation within spanned valleys and partial clearing within the easement. These impacts will be permanent as roads and the transmission line will be maintained during operation.		

Notes: R = Recorded in the disturbance footprint.

D = Dual credit (ecosystem-credit and species-credit) species.

S = Species-credit species

ES = Ecosystem credit species

8.2.3 Impact on water quality, water bodies and hydrological processes that sustain threatened species

The Project will result in water table drawdown during construction that may have effects on terrestrial groundwater dependent ecosystems (GDEs), and groundwater available for baseflow to rivers and creeks. The reduction in baseflow is predicted to have greatest effect to the upper reaches of the various perennial streams (1% of lengths are affected) across the escarpment area, and similar impacts to the affected reaches of the Macleay River (3% of lengths are affected). The predicted effects will be localised to the area directly overlying the drawdown zone and are not predicted to significantly affect downstream reaches of these watercourses.

Table 8.5 Impacts on water quality, water bodies and hydrological processes

Associated features within the Project area	Relevant threatened entities	Consequences of impacts
Diversity and abundance of fish (including invertebrates) as prey	**Microbats**: • Little Bent-winged Bat (R, D) • Large Bent-winged Bat (R, D) • Southern Myotis (R, S) • Eastern Cave Bat (R, S).	Possibly slightly reduced prey availability for non-threatened water bird species and mammal species that feed on fish such as egrets, herons and cormorants and Rakali/Water-rat.
Instream habitat value		Slight reduction in the quality and availability of in-stream habitat for a variety of non-threatened semi-aquatic frogs, birds, reptiles and mammals during drought conditions.
In-stream drought refugia		Slight reduction in the suitability or availability of in-stream refugia for a variety of non-threatened semi-aquatic frogs, birds, reptiles and mammals.
Riparian forest and woodland		Possibly slightly reduced condition of riparian vegetation communities that provide habitat for a variety of non-threatened species.
Riparian drought refugia		Slight reduction in the condition of riparian vegetation and its ability to act as a heat and water stress refuge for terrestrial animals such as bats, birds and arboreal mammals.
Drinking water for terrestrial animals		Slight reduction in the availability of in-stream refugia as sources of drinking water for terrestrial animals, including non-threatened and threatened species of birds and mammals during drought conditions.
Instream habitat value		Slight reduction in the quality and availability of in-stream habitat for a variety of non-threatened semi-aquatic frogs, birds, reptiles and mammals during drought conditions.
Movement and dispersal opportunities		Possible beneficial impact on movement and dispersal opportunities for semi-aquatic frogs, reptiles and mammals due to more frequent larger flow events. During lower flow (Base-flow) conditions, the Project may slightly reduce the dispersal ability within the stream channels.

Notes: R = Recorded in the disturbance footprint.

D = Dual credit (ecosystem-credit and species-credit) species.

S = Species-credit species

8.2.4 Impacts on threatened species or fauna that are part of a TEC from vehicle strikes.

Impacts on threatened species or fauna that are part of a TEC from vehicle strikes are assessed in Table 8.6. The relevant threatened entities were generated from the candidate species and predicted species that are susceptible to vehicle strike.

Table 8.6 Impacts on threatened species or fauna that are part of a TEC from vehicle strikes

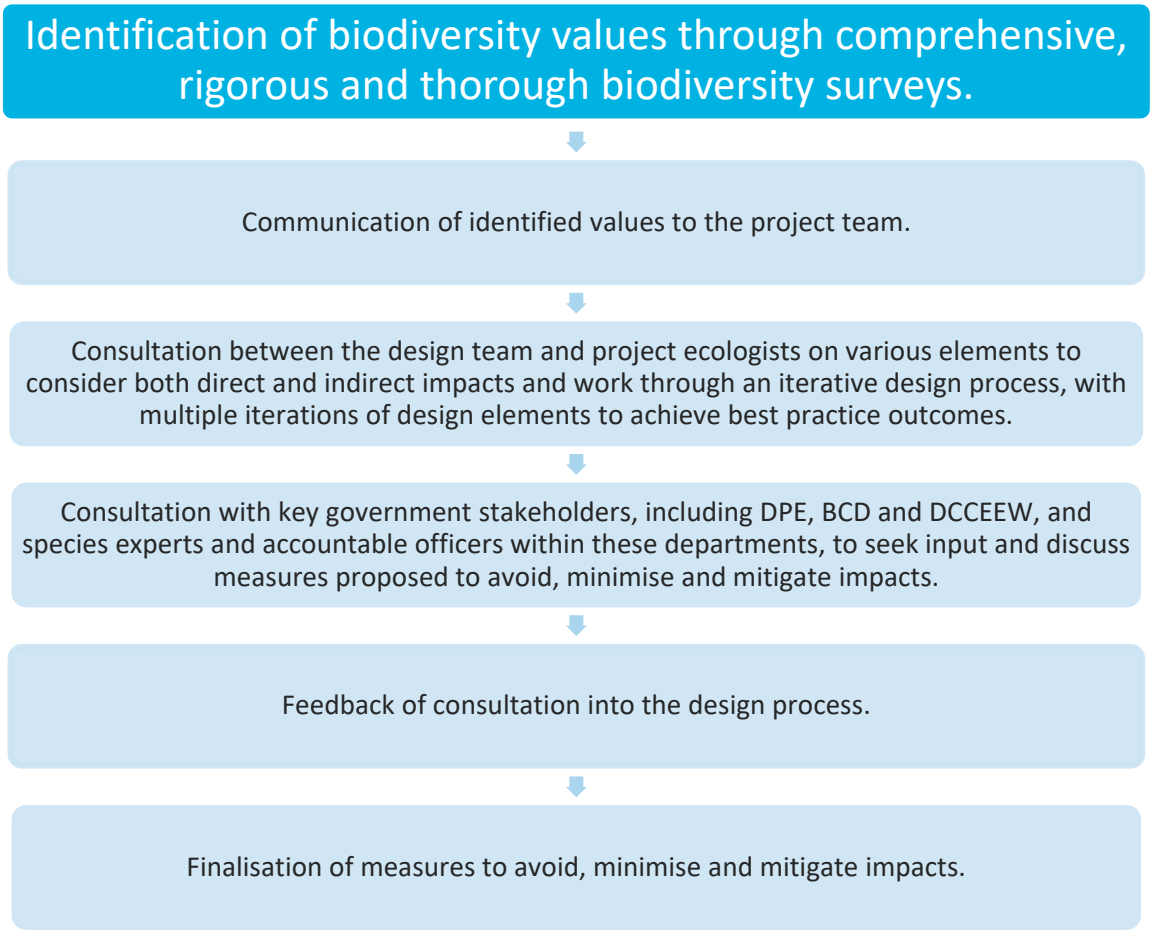
Associated features of the disturbance footprint	Nature, extent and duration of impact	Relevant threatened entities	Consequences of impacts on threatened entities
Newly created access roads. Public roads (Kempsey/Armidale Road).	Increased incidence of vehicle strikes on publicly accessible roads during construction due to increased traffic. New potential impacts of vehicles strikes on newly created access roads with the greater risk during construction due to increased traffic, with a lowered risk during operation as traffic would decreases post construction.	All fauna species	There will be increased vehicle traffic on publicly accessible roads adjacent to the Project area during the construction phase. All current access tracks in the disturbance footprint will be upgraded with new roads created. Unmitigated, this has the potential to result in increased mortality of animals due to vehicle strike in these areas. Rare or low-density populations are most at risk of significant impacts if this impact is not managed appropriately (Hoskin, CJ & Goosem, MW 2010). Despite some level of impact being possible, the majority of impacts will be limited to common or abundant species. The potential for increased traffic during construction to result in increased mortality of native animals would be minimised by the construction traffic driving rules in high risk sections of road at night when most native animal species are active.

8.3 Avoidance, minimisation and management

The hierarchy of avoid, minimise and mitigate has been used in the design of the Project, fine-tuning of the proposed investigation locations, and development of mitigation measures.

A key focus of project design has been to avoid and minimise impacts to biodiversity values identified during the field surveys, where feasible. The Project has undergone significant steps to avoid, minimise and mitigate impacts to ensure impacts are avoided and minimised to the greatest extent possible, within the design and other limitations of the Project. This has been achieved through the following process:

- Identification of biodiversity values through comprehensive, rigorous and thorough biodiversity surveys.
- Communication of identified values to the project team.
- Consultation between the design team and project ecologists on various elements to consider both direct and indirect impacts and work through an iterative design process, with multiple iterations of design elements to achieve best practice outcomes.
- Consultation with key government stakeholders, including DPE, BCD and DCCEEW, and species experts and accountable officers within these departments, to seek input and discuss measures proposed to avoid, minimise and mitigate impacts.
- Feedback of consultation into the design process.
- Finalisation of measures to avoid, minimise and mitigate impacts.



Measures undertaken to avoid, minimise and mitigate impacts that have arisen during the process outlined above are summarised below.

8.3.1 Avoidance in design

The consideration of options and development of the Project was informed by iterative environmental constraint assessment comprising both desktop and field survey, with the aim to reasonably avoid and minimise significant impacts to the environment, including biodiversity values. This resulted in changes including those to the lower and upper reservoir access roads, powerline routes, dam types, spoil emplacement and ancillary facilities and inform the proposed operating rules of the Project.

i Dam type considerations for spoil emplacement

Several alternate design options and locations for the dam types were considered through the conceptual design phase. The dam types and locations that were selected as the preferred options were selected on a merit-based approach balanced against the overall development constraints, including minimising impacts to the immediate and surrounding environment.

A Concrete Face Rockfill Dam (CFRD) was selected as the preferred option as this design type has the potential to enhance the utilisation of spoil generated on site, and proves to be more robust to managing ground risk, i.e. geotechnical and geological risk. Although a CFRD has a slightly larger permanent disturbance footprint it reduces the need for an onsite quarry and the result is a significantly reduced spoil emplacement area.

A CFRD design brings about benefits in the recycling and re-using of large amounts of spoil generated/excavated from dam foundations, reservoir excavations and tunnelling activities.

ii Conceptual spoil location selection

At the commencement of the Project feasibility design (circa Sept 2021), provisional spoil emplacement areas were located at the upper and lower construction areas. Two potential spoil emplacement locations were identified in the upper reservoir area that complemented selection of dam types, and that minimised other impacts that would be caused by hauling spoil material over longer distances. These footprints were provided to EMM for ecology surveys to be undertaken and, more specifically, to inform the construction envelope. These initial upper spoil areas are shown in Figure 8.1.

iii Avoidance for Guthrie's Grevillea, Cryptic Forest Twiner and water course

EMM undertook various fauna and flora site surveys and around March/April 2022 survey findings indicated that the northern-most upper spoil emplacement area (shown above) impacted a large population of Guthrie's Grevillea (*Grevillea guthrieana*).

The EMM land and soils surveys were also undertaken at this time and the results of these surveys indicated that the northern-most upper spoil emplacement area location was considered too close to a minor, natural water course.

As part of the Design Integration and Assessment (DIAA) process, which is outlined in the EIS, this area was removed from consideration as a Spoil Emplacement Area, with the southern upper Spoil Emplacement Area selected, as this area was still within the construction envelope.

The upper reservoir construction office pad and communications tower pad were also relocated to avoid the record of Cryptic Forest Twiner (*Tylophora woollsii*). A concept design to provide for the estimated spoil volumes was undertaken, based on geotechnical information available at the time.

iv Upper Reservoir spoil design refinement

During targeted flora surveys for *Pultenaea rubescens*, which were completed around November 2022, the findings indicated that additional individuals have been recorded near the southern end of the southern-upper Spoil Emplacement Area. Once this population was mapped, it was found that, at the time, the Project disturbance footprint intersected with a few individuals. As part of the DIAA process, avoidance of this area was considered the preferred option and, in consultation with EMM ecologists, a setback buffer of 30 m was implemented.

As a result of this re-design work, the construction office pad and communications tower Pad were relocated, and the disturbance area for the southern-upper Spoil Emplacement Area had to be re-designed to avoid these individuals. Design adjustments were also made to the emergency access Road. A summary of the spoil emplacement area design iterations is shown in Figure 8.1.

v Spoil emplacement areas – design considerations

During the feasibility design phase a site assessment was conducted to understand the topography, soil conditions and existing drainage patterns. The feasibility design was developed to allow for refinement through the next stage detail design phase to ensure proper slope and drainage flow away from the location of the *Pultenaea rubescens*. Surface water management features will be incorporated into the design and construction of the spoil emplacement area. This would include utilising suitably sized rock that would allow water to free drain, and not pond in any area that will lead to inundation. Further considerations include installations of drainage systems, (if and where required) to facilitate water movement and prevent water logging, and implementing landscaping techniques, such as berms/bunds and raised areas, to create natural barriers to prevent water from flowing into unwanted areas. This will also assist in redirecting water to designated drainage channels. Erosion control measures would also be considered in areas of high-water flow to maintain stability within the spoil emplacement area.

Most of the excess spoil material will be rockfill material (generated by blasting), which enables the spoil areas to be developed using rockfill embankment design principles. Rockfill embankments will provide long-term stability with limited maintenance requirements and will serve to maximise the available spoil area volumes within the lateral site constraints (or construction envelope).

The general design criteria applied to the spoil area designs are as follows:

- Batter Slope: 1.5H:1V.
- Bench Width: 3–5 m (horizontal).
- Bench Height: 10 m (vertical).

In addition to the geometric design principles for rockfill embankments, the internal design of the spoil area (or material zoning) will need to ensure materials placed adjacent to one another are compatible such that finer materials (e.g., unsuitable material) do not migrate into coarser materials (e.g. rockfill) – otherwise referred to as ‘filter compatibility’. As such, the internal zoning of the spoil area will need to include transition zones whereby the gradations of material progressively transition from fine to coarse (or vice versa).

In contrast to the lower spoil areas, which include rockfill embankments that store unsuitable materials in the rockfill void created upslope, the upper spoil area will be wholly comprised of rockfill with only a small volume of unsuitable material placed (or spread) amongst the rockfill. In this instance, the finer particle size of the unsuitable materials will occupy the voids between the coarser particle size of the rockfill.

In general, the spoil areas will be free draining embankments which are mainly comprised of granular materials ranging in size from gravels to large boulders (with a small proportion of soil-like materials). As these embankments will be unable to impound water or generate any porewater pressures, there will be no hydrostatic loading which will ensure long-term stability.

vi Access route via Georges Junction

One of the access options considered for the Project was initially proposed via a bridge that crossed at Georges Junction. The largest count of 384, 24% of the population recorded within the project area Wandering Pepper-cress (*Lepidium* peregrinum) was recorded within the construction envelope proximate to this crossing location during flora surveys in November 2021.

Input to the design was to move the proposed access road higher upslope away from the areas where this species was recorded. This also led to the design team to look for alternative access routes to the site. This area was avoided with the current access route crossing the Macleay River further east from Georges Junction that avoids Wandering Pepper-cress (*Lepidium* peregrinum) habitat (Figure 8.3). This has resulted in impacts to just two of the 1,577 plants recorded (0.12% of the population).

vii Other aspects of avoidance in design

As discussed above, the design of the Project has been through several iterations with biodiversity values being a key consideration in the design of project elements. The access roads and spoil pile locations were relocated, where practicable, to avoid areas known to contain threatened species. Associated ancillary infrastructure sites and spoil locations have also been moved away from sensitive areas containing threatened species locations and habitat. Table 8.7 outlines key examples of locations where the access road and ancillary sites were chosen to avoid threatened flora species and habitat to support threatened fauna species.

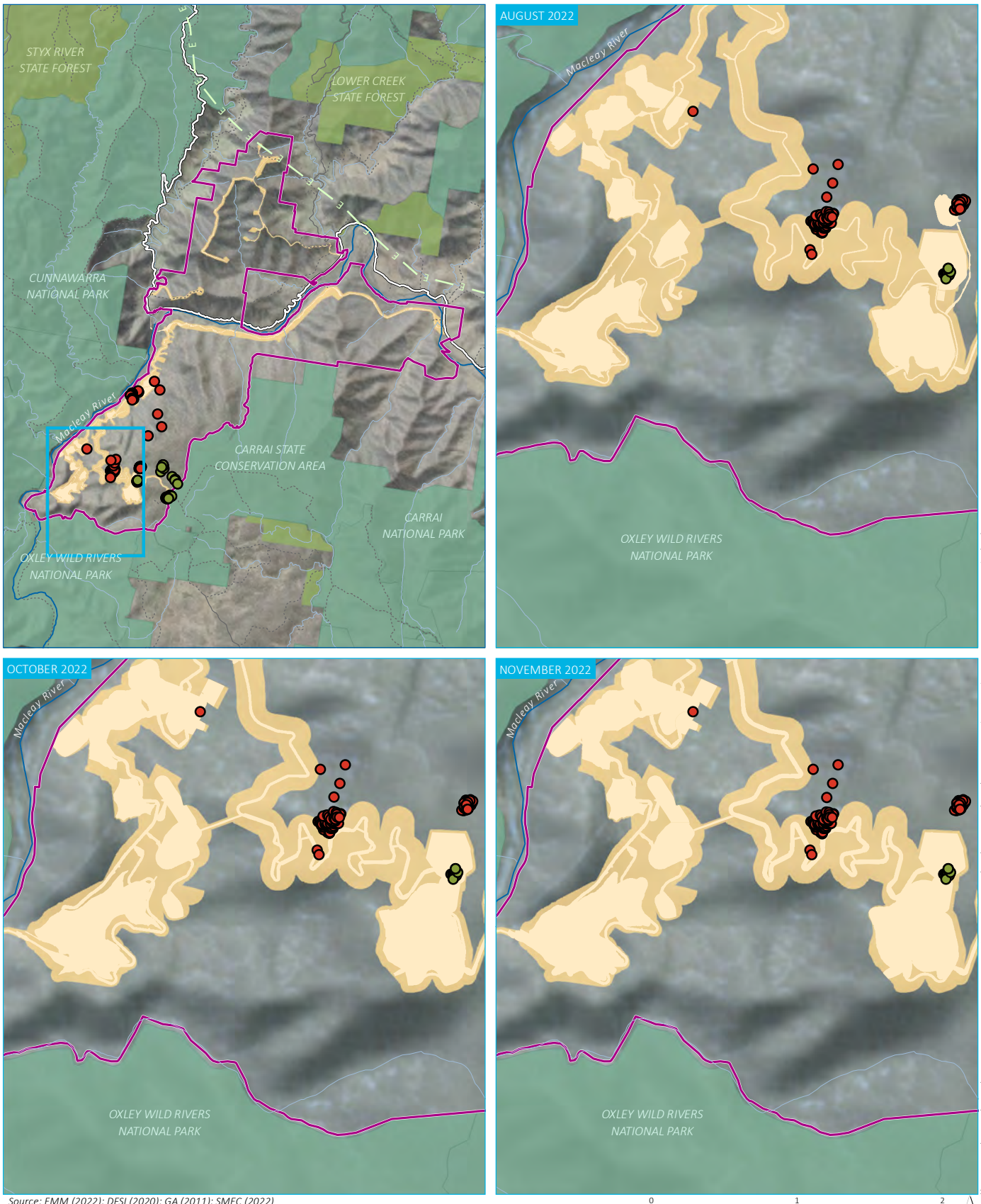
Table 8.7 Examples of avoidance measures through the design process

Impacted species	Avoidance measures
Flora	
Grevillea guthrieana	The following changes in disturbance footprint occurred for this species (see Figure 8.2 below): • The access road connecting the lower reservoir to the upper reservoir was realigned to avoid the largest population of this species recorded within the Project area. The design modification resulted in the retention of approximately 523 plants. • The spoil emplacement at the upper reservoir was reduced to avoid a large area where this species occurred. This design modification resulted in the retention of approximately 227 plants. • Transmission line towers/poles were located to avoid this species along the transmission line avoiding 98 plants.
Wandering Pepper Cress	The following changes in disturbance footprint occurred for this species (see Figure 8.3 below): • The disturbance footprint was moved outside of the floodplain area where this species was recorded to occur or identified as having habitat that supports this species where possible. This design modification will result in retention of over 384 plants.
Pultenaea rubescens	The following changes in disturbance footprint occurred for this species (see Figure 8.4 below): • Spoil locations and the emergency access road in the upper reservoir were modified to avoid impacts to *Pultenaea rubescens* following targeted surveys. This design modification will result in avoidance of removal of approximately 143 plants, including a 30 m buffer of habitat surrounding the 143 plants, avoiding direct impacts to all individuals recorded within the construction envelope.
Scrub Turpentine	The following changes in disturbance footprint occurred for this species (see Figure 8.5 below): • Clearance for the transmission line was altered to avoid direct impacts to approximately 13 plants, avoiding direct impacts to all individuals recorded within the construction envelope.

Table 8.7 Examples of avoidance measures through the design process

Impacted species	Avoidance measures
Cryptic Forest Twiner	The following changes in disturbance footprint occurred for this species (see Figure 8.6 below): • Access/haul road at the upper reservoir was relocated to avoid impacts to four plants that were recorded in the construction envelope, avoiding direct impacts to all individuals recorded within the construction envelope.
Fauna	
Brush-tailed Rock-wallaby	The following changes in disturbance footprint occurred for this species (see Figure 8.7 below): • The access road proposed to connect the lower reservoir to the upper reservoir was redesigned early in the Project's development when the presence of the Brush-tailed Rock-wallaby was confirmed within the Project area. Initial avoidance included use of LiDAR data to identify areas of habitat, such as cliff lines, rocky escarpments, and features that could support refuge areas for Brush-tailed Rock-wallabies, to avoid impacts to these areas as much as possible. Targeted surveys identified areas of occupied habitat within the project area. This process identified that the original concept design of the road, which was located further north, would directly impact on substantial areas of occupied refuge habitat. This change avoided 0.4 ha of occupied refuge habitat and 0.7 ha of potential refuge habitat. While this could not be completely avoided due to the large area of suitable habitat that separates the two reservoirs, impacts to this habitat was reduced as much as possible to incorporate the road design. • The northern-most upper spoil emplacement area, which was considered in the August 2022 design, would have impacted on additional foraging habitat for the Brush-tailed Rock Wallaby. The removal of this area has resulted in a reduction in impacts to foraging habitat for the species of 3.0 ha.

These examples of avoidance, and the overall changes to the design, have resulted in avoidance of a wider array of species and native vegetation.



Source: EMM (2022); DFSI (2020); GA (2011); SMEC (2022)

0 1 2 km

GDA 1994 MGA Zone 56

N

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KEY

- Project area
- Disturbance footprint
- Construction envelope
- Permanent road

Threatened species sighting

- Pultenaea rubescens
- Guthrie's Grevillea

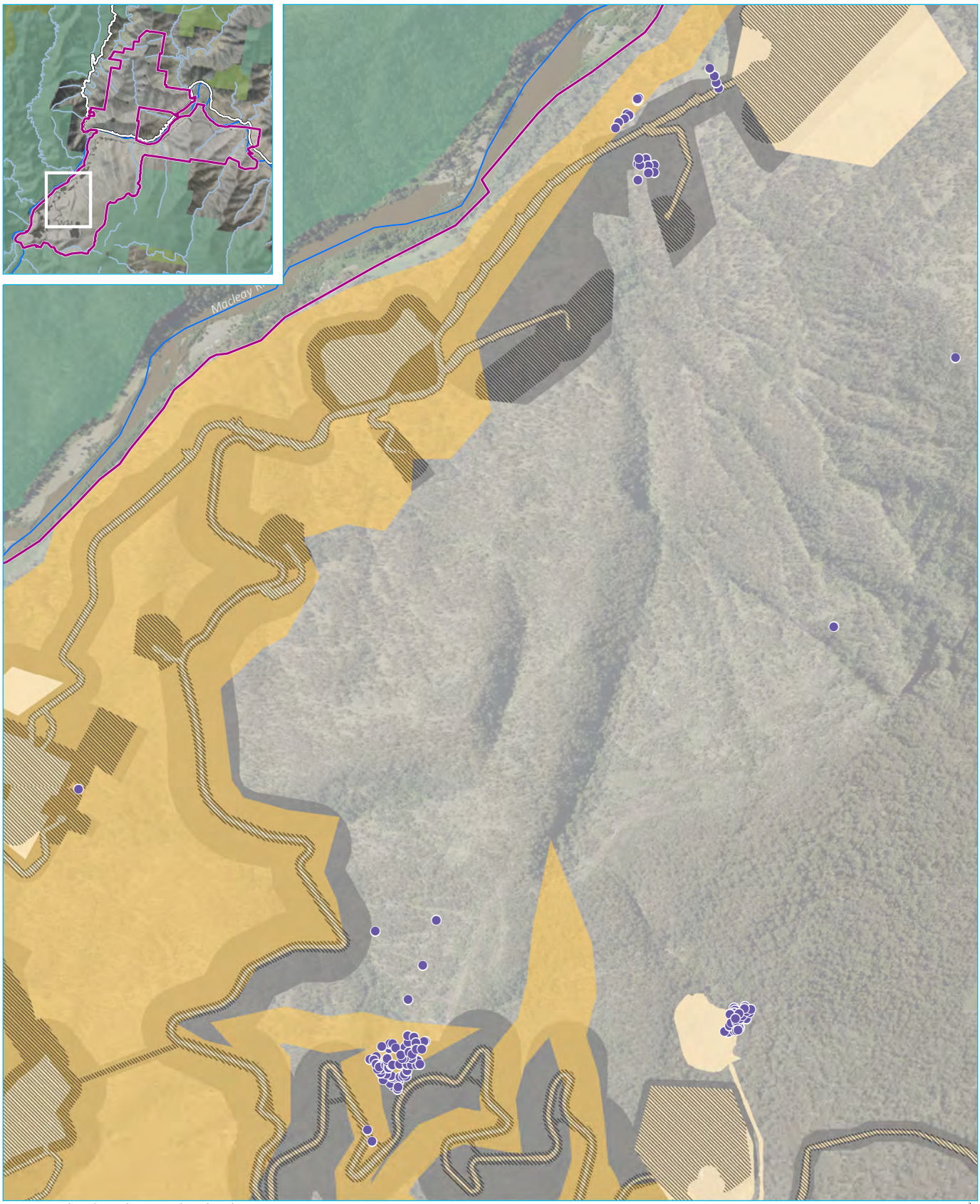
Existing environment

- Macleay River
- Watercourse/drainage line
- Kempsey-Armidale Road
- Existing transmission line
- NPWS reserve

Design iterations of Spoil Emplacement

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Figure 8.1

EMM creating opportunities



Source: EMM (2022); DFSI (2020, 2021); GA (2011)

0 250 500 m

GDA 1994 MGA Zone 56

N

KEY

- Project area
- Current disturbance footprint
- Existing design disturbance (Nov 2020)
- Existing design disturbance (Aug 2022)
- Construction envelope
- Guthrie's Grevillea sighting

Existing environment

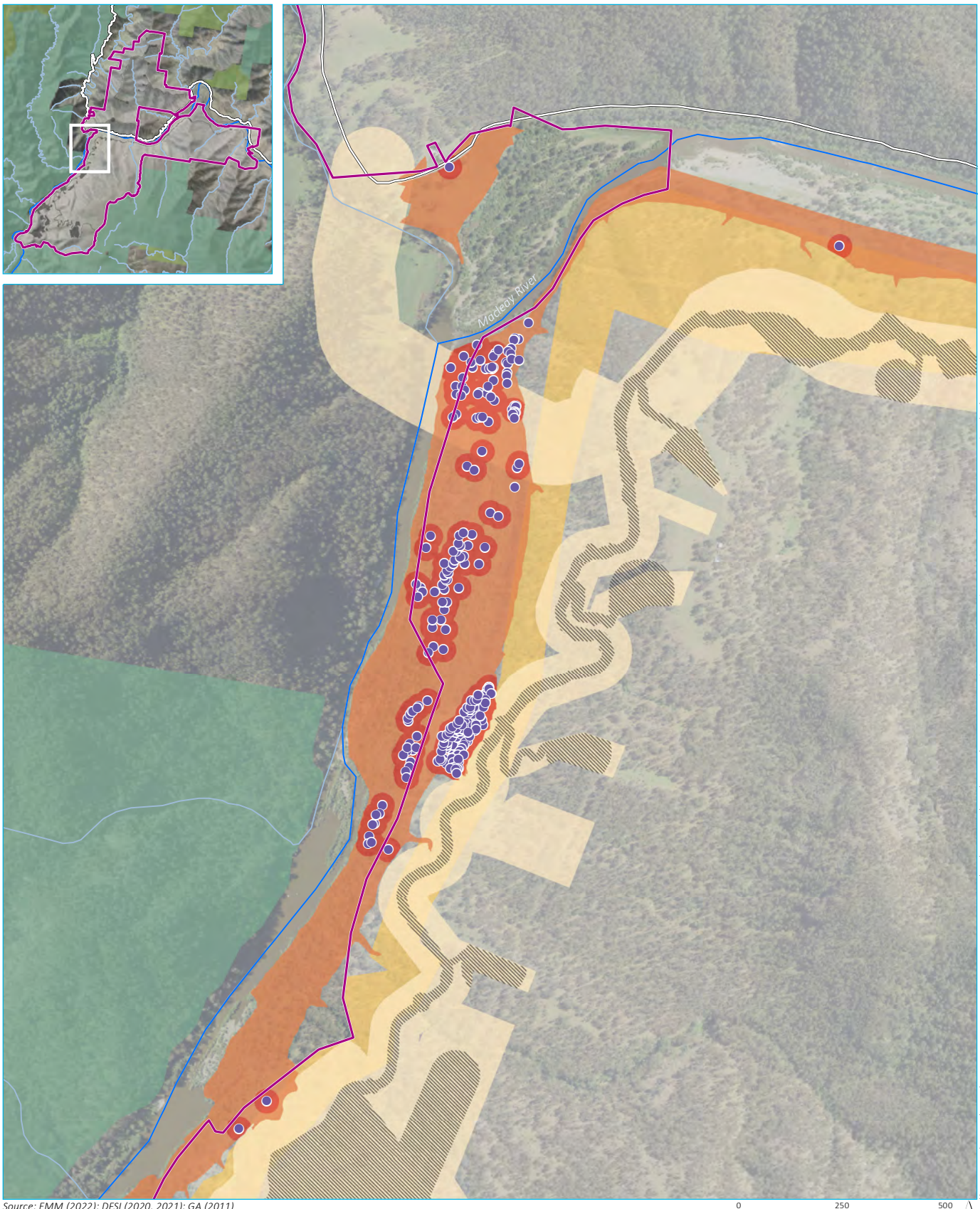
- Macleay River
- Named watercourse
- Major road
- NPWS reserve
- State forest

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Avoidance in design example: Guthrie's Grevillea

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Figure 8.2

EMM creating opportunities



Source: EMM (2022); DFSI (2020, 2021); GA (2011)

0 250 500 m

GDA 1994 MGA Zone 56

N

KEY

- Project
- Current disturbance
- Existing design disturbance (Aug 2022)
- Existing design disturbance (Nov 2020)
- Wandering Pepper Cress
- Occupied
- Potential

Existing environment

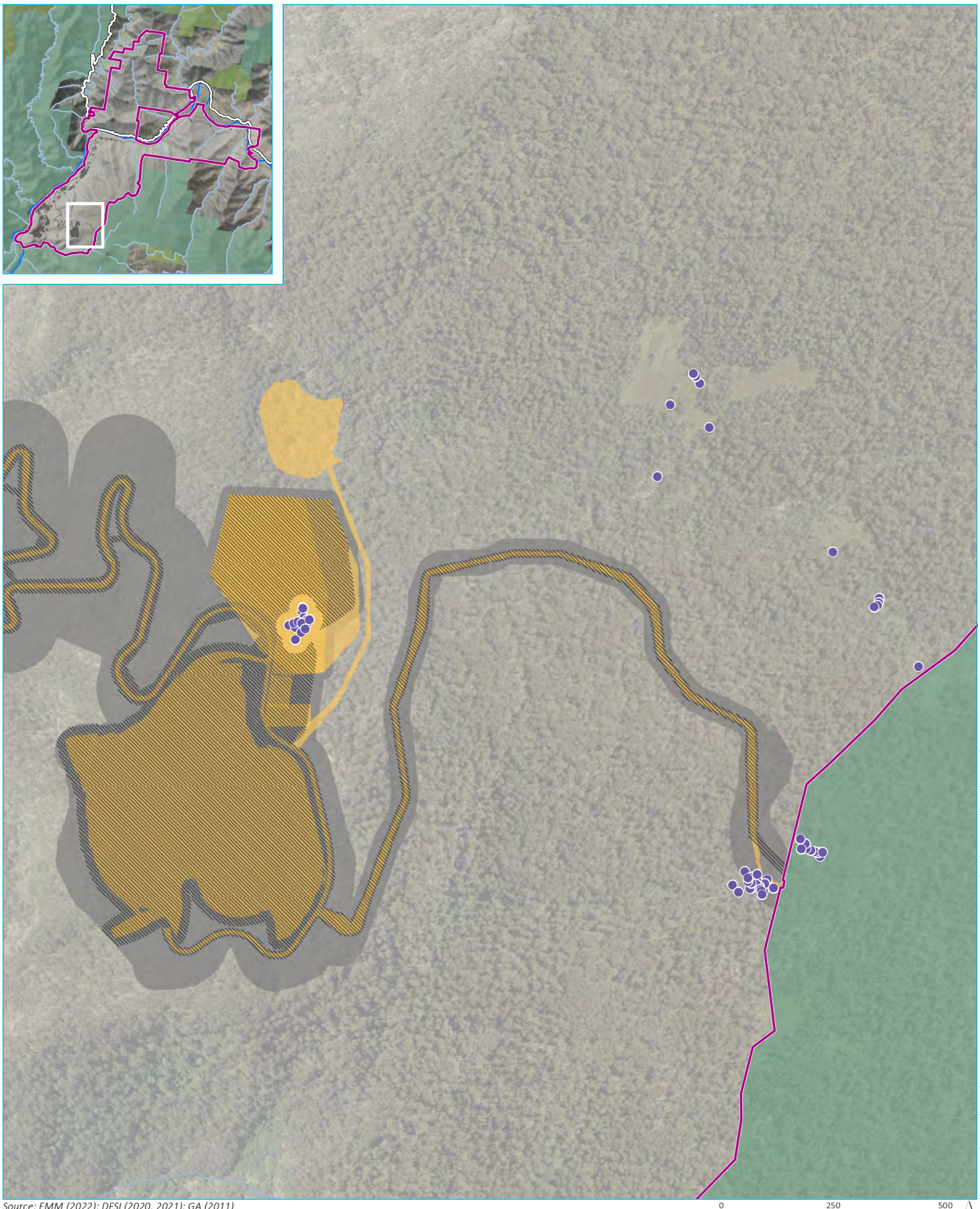
- Macleay River
- Named
- Major
- NPWS
- State

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Avoidance in design example: Wandering Pepper Cress

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Figure 8.3

EMM creating opportunities



Source: EMM (2022); DFSI (2020, 2021); GA (2011)

0 250 500 m

GDA 1994 MGA Zone 56

N

KEY

- Project area
- Construction envelope
- Current disturbance footprint
- Existing design disturbance (Aug 2022)
- Pultenaea rubescens

Existing environment

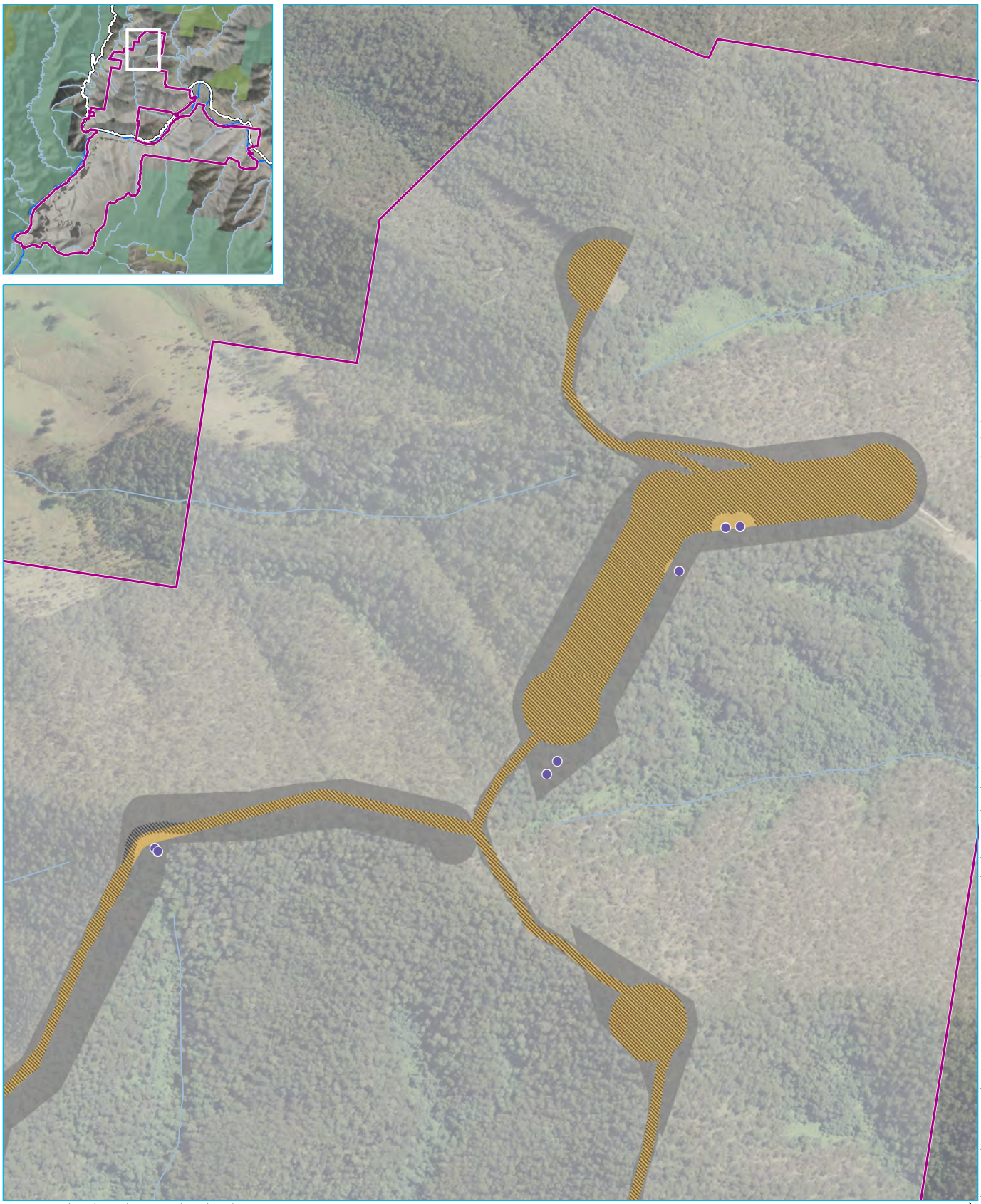
- Macleay River
- Named watercourse
- Major road
- NPWS reserve
- State forest

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Avoidance in design example: Pultenaea rubescens

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Figure 8.4

EMM creating opportunities



Source: EMM (2022); DFSI (2020, 2021); GA (2011)

0 250 500 m

GDA 1994 MGA Zone 56

N

KEY

- Project area
- Construction envelope
- Current disturbance footprint
- Existing design disturbance (Oct 2020)
- Scrub Turpentine sighting

Existing environment

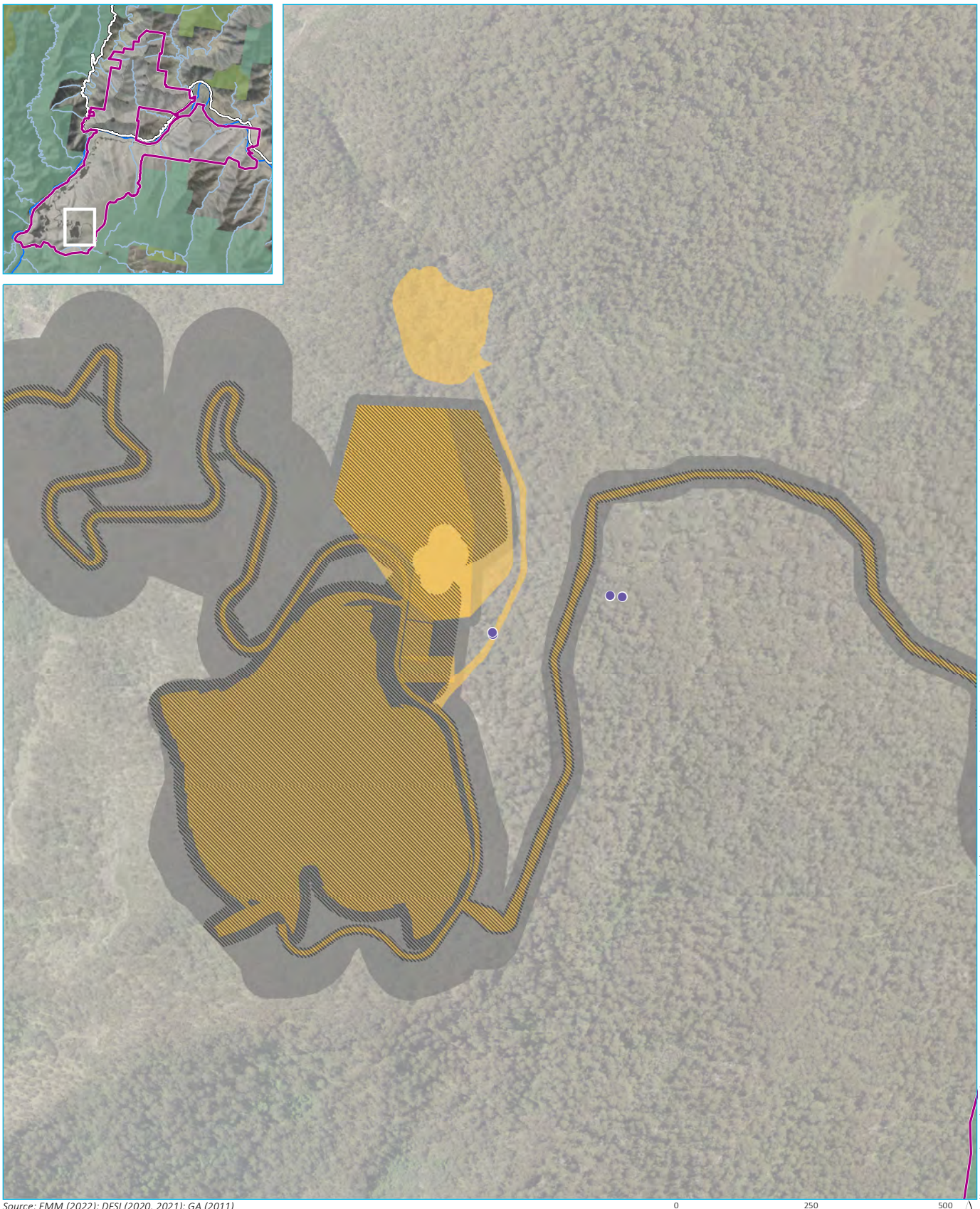
- Macleay River
- Named watercourse
- Major road
- NPWS reserve
- State forest

Avoidance in design example: Scrub Turpentine

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Figure 8.5

EMM creating opportunities

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Source: EMM (2022); DFSI (2020, 2021); GA (2011)

0 250 500 m

GDA 1994 MGA Zone 56

N

KEY

- Project area
- Construction
- Current disturbance footprint
- Existing design disturbance (Aug 2022)
- Cryptic Forest Twiner sighting

Existing environment

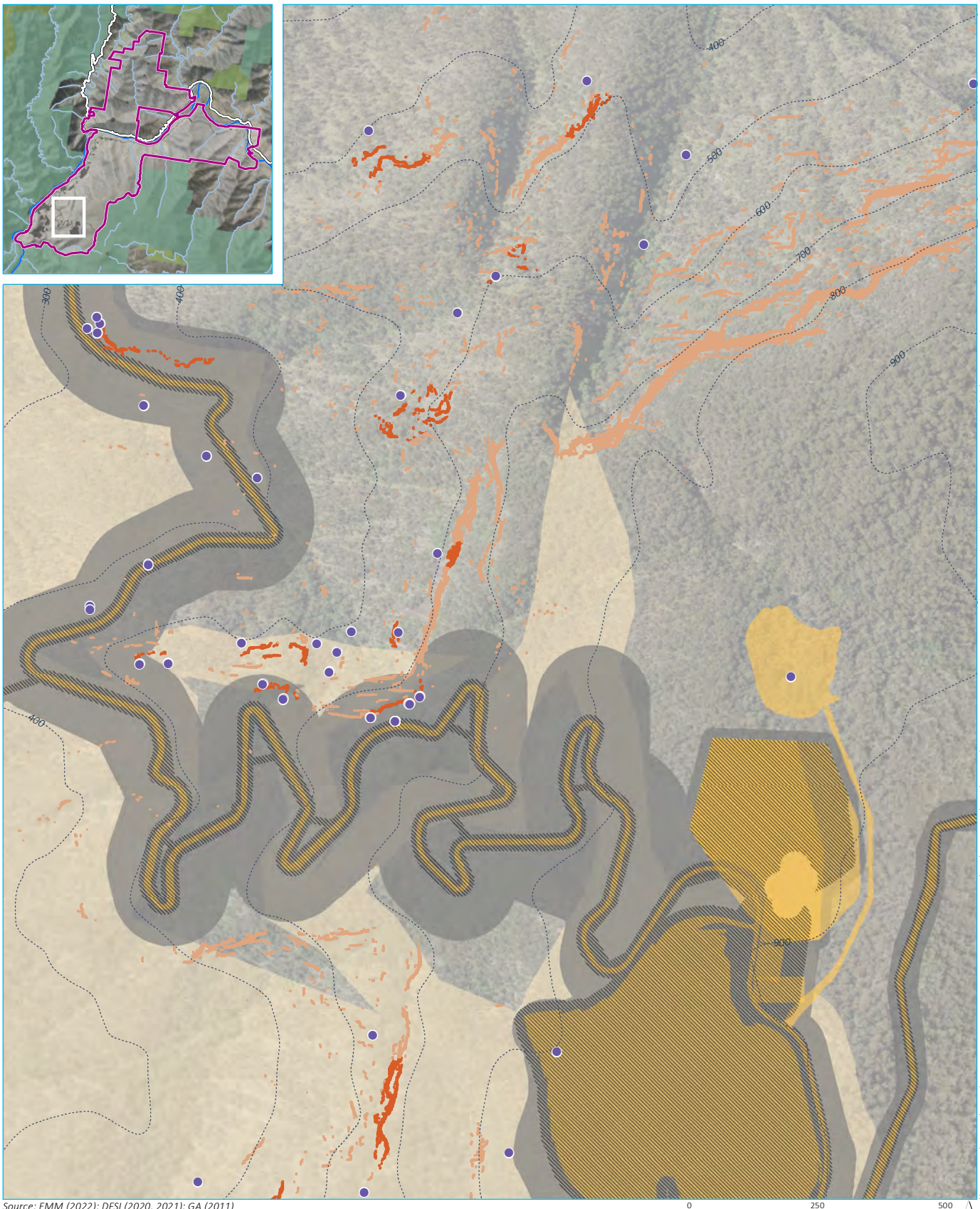
- Macleay River
- Named
- Major road
- NPWS
- State forest

\\emmsvr1\emm3\2021\J210465 - OMPS EIS - Generation Component\GIS\02_Maps_EIS_BDAR\BDAR022_AvoidanceDesignCrypticForestTwiner_20221219_01.mxd 19/07/2023

Avoidance in design example: Cryptic Forest Twiner

Oven Mountain Pumped Hydro Energy Storage Project
Biodiversity development assessment report
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Figure 8.6

EMM creating opportunities



Source: EMM (2022); DFSI (2020, 2021); GA (2011)

0 250 500 m

GDA 1994 MGA Zone 56

N

\\emmsvr1\emm3\2021\J210465 - OMPS EIS - Generation Component\GIS\02_Maps_EIS_BDAR\BDAR021_AvoidanceDesignBrushTailedRockWallaby_20230629_02.mxd 19/07/2023

KEY

- Project area
- Construction envelope
- Current disturbance footprint
- Existing design disturbance (Nov 2020)
- Existing design disturbance (Aug 2022)
- Brush-tailed Rock-wallaby sighting
- Occupied habitat
- Potential habitat

Existing environment

- Macleay River
- Named watercourse
- Major road
- Contours (100 m)
- NPWS reserve
- State forest

Avoidance in design example: Brush-tailed Rock-wallaby

Oven Mountain Pumped Hydro Energy Storage Project
Biodiversity development assessment report
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Figure 8.7

EMM creating opportunities

8.3.2 Minimisation and mitigation

All works will be undertaken in accordance with general mitigation measures to be identified in the construction environment management plan (CEMP). Prior to construction, a biodiversity management plan, forming part of the construction environmental management plan, would be prepared that would include the construction management measures proposed. Key minimisation and mitigation measures include:

- retention of vegetation and habitat
- minimising injury of native animals during clearing and construction
- weed control
- pest and predator monitoring program
- native vegetation restoration.

These measures are described in detail below.

i Retention of vegetation and habitat

Site preparation works will require clearing of native vegetation and habitat for native animals. These works have the potential to cause inadvertent impacts on retained vegetation and habitat in the absence of appropriate controls. To minimise impacts on vegetation and prevent inadvertent impacts on retained vegetation and habitat the following controls will be implemented:

- Native vegetation and fauna habitat will be retained, wherever possible, with clearing minimised to the extent required to construct and operate the Project.
- The removal of large trees (>0.5 m diameter at breast height (dbh)), would be avoided, wherever practicable, by designing the precise location of access tracks and excavation areas with consideration of the 'structural root zone' of trees as described in the relevant Standards Australia, Protection of trees on development sites, Standards Australia, Sydney (AS 2009). The precise locations of the trunks of large trees to be removed and retained would be identified by land survey and included on design plans to facilitate avoidance.
- Exclusion zones around all areas of retained vegetation and fauna habitat will be set up where practicable. These areas will be fenced using appropriate fencing materials and designated and signed as 'No-go Zones' or 'Environmentally Sensitive Areas'.
- Where feasible and required to protect significant vegetation, tree protection zones (TPZs) will be set up around all trees retained within and immediately adjacent to the disturbance footprint.
- When accessing construction sites, contractors would use only designated routes on existing tracks or through non-native vegetation.
- No materials, spoil or machinery should be stored or parked within the drip-line of any trees to be retained.

ii Minimising injury of native animals

The potential for increased traffic during construction to result in increased mortality of native animals should be minimised, where feasible, by the implementation of construction traffic driving rules in high risk sections of road at night. Relevant mitigation measures are included in the Traffic Impact Assessment (EMM 2022e). The CEMP will include measures to manage potential impacts of construction activities during non-standard work hours.

Clearing of native vegetation and fauna habitat have potential to harm native fauna species. To minimise inadvertent injury of animals a number of controls, described below, will be implemented.

Prior to vegetation clearing, pre-clearance surveys will be undertaken by appropriately qualified ecologists. Pre-clearing inspections will follow a two-phase process, as outlined below:

- Phase 1 survey may be taken as close as possible to Phase 2 clearing or immediately beforehand and will include:
    - a visual check for the evidence of presence of threatened species and, if practicable, capture and relocation of any animals found
    - flagging of key habitat features outside the disturbance footprint, including (but not limited to) nests, hollow bearing trees, surface rocks and large logs
    - identification of nearby habitat suitable for the release of any native animals that may be encountered during clearing works
    - contacting a wildlife carer or veterinarian to inform them of vegetation clearing works upcoming.
- Phase 2 survey should be undertaken immediately prior to Phase 2 clearing and will include:
    - searching of accessible habitat features (e.g. logs, rocks etc) for the presence of animals and capture of animals for relocation to previously identify release sites
    - a final check for nests (if more than two weeks after Stage 1 survey).

Where practicable, removal of hollow bearing trees would be undertaken in spring (September to November), and outside the main breeding period for hollow-dependent fauna likely to occupy the disturbance footprint, and when bat species are likely to be active and able to flee (i.e. not in torpor). If hollow-bearing trees are to be removed prior to September and after November, monitoring of breeding activity would be carried out by an ecologist/s approximately one week prior to the proposed tree removal as a part of pre-clearing surveys. If nesting activity is recorded, additional mitigation measures, such as short-term delays in the removal of trees or careful removal of nestlings for rearing by wildlife carers, would be recommended, as necessary.

Vegetation clearing works are to follow a two-phase process, as outlined below:

- Phase 1 will include the removal of all non-habitat vegetation (e.g. shrubs and non-habitat trees). A minimum of 24 hours will be allowed between Phase 1 and Phase 2.
- Phase 2 will include the removal of all habitat features:
    - If safe to do without significant risk to plant operators, hollow bearing trees should be knocked several times with an excavator on the day prior to removal to encourage animals to move away immediately or overnight. Knocking should also be repeated immediately prior to the removal of hollow-bearing trees.
    - Where safe for staff and practicable with regard to tree height and terrain, tree limbs containing hollows would be removed using tree-climbing techniques and/or an elevated work platform to allow hollows to be gently lowered to the ground, thus minimising the risk of injury to fauna.
    - Nests and on-ground logs and rocks will be carefully inspected by an ecologist. Logs and rocks should be carefully rolled and inspection beneath the log undertaken.

- Provision would be made for any fauna trapped in excavations to escape when works cease for the day. This may be achieved by placing logs in excavations to create escape ramps, or other means identified with the assistance of an ecologist.

- Any fauna species are to be relocated to habitat identified during the pre-clearing process or, if injured, transported to a veterinarian or wildlife carer.

iii Weed and pathogen management

Indirect impacts could occur due to the introduction and/or spread of weeds, or plant pathogens. There is also potential for the spread of weeds already established in the Project area to occur during construction activities, particularly clearing works, if weeds are not managed appropriately.

To prevent this occurring the following controls will be implemented:

- Baseline surveys of all areas within 50 m of the disturbance footprint to collect data on presence and abundance of weeds, particularly High Threat Weeds, to inform mitigation and management measures.
- A weed control protocol would be developed as part of the biodiversity management plan. This would aim to stop the spread of environmental weeds, particularly those listed as High Threat Weeds.
- Undertaking of weed control in key areas prior to construction works, to minimize the impacts of weeds during construction and to minimise the requirements for disposal and management of weeds on-site.
- Appropriate management and disposal of weed species during clearing works, in accordance with the biodiversity management plan.
- Active and intensive weed control will be undertaken within 50 m of the disturbance footprint, in areas where significant weeds are known to occur to reduce the cover of weeds adjacent to the construction activities, preventing the spread of weeds into other areas.
- Vehicles, machinery and equipment must be clear of soil and plant debris when they arrive at the site and prior to movement between sites to minimise the potential for the introduction of weeds and pathogens.
- Wash-down stations will be constructed at suitable locations near entry points into key Project components, with wash down for weeds as well as pathogens.
- A weed and pathogen monitoring program will be implemented, with a weed control program to be implemented if weeds are identified in the disturbance footprint.
- Revegetation of cleared areas as quickly as possible following construction works in an area.

iv Pest and predator monitoring program

There is potential for increased human activity and creation of roads to result in increased activity of predators, particularly feral Cats and Foxes, which will increase pressure on native fauna. This has the potential to result in significant impacts to some threatened species, particularly species such as the Brush-tailed Rock-wallaby.

To minimise the risk of increased predator activity, the following controls will be implemented across the Project during the construction phase:

- Waste will be stored appropriately in inaccessible bins and disposed off-site. No waste will be left outside in open areas accessible to feral animals.

- A monitoring program will be implemented using remote cameras to monitor feral animal activity. Remote cameras will be placed along sensitive areas, such as the access road between the lower and upper reservoirs to monitor feral animal movements.

- A predator control program will be implemented, in conjunction with DPIE, to control feral animals.

Whilst these controls will be implemented broadly across the Project area, key areas of focus will be where key activity is occurring. It is considered that these controls will avoid and minimise impacts from the Project.

v Native vegetation and habitat restoration

Following completion of construction of the Project, and removal of temporary ancillary and construction work areas, extensive areas of the site will be rehabilitated, with 60 ha of the 328 ha disturbance footprint to be rehabilitated. The following measures will be implemented during rehabilitation to maximise the effectiveness of restoration of native woodland and forest:

- As soon as practicable, and over at least one spring-summer season prior to substantial vegetation clearing, a seed collection specialist should be employed to collect seed on the disturbance footprint for use in revegetation. Collection of seed from large trees is likely to be most practical during vegetation clearing activities.

- Where practicable, large surface rocks should also be moved into rehabilitated areas or retained native vegetation to provide habitat for ground-dwelling animals.

- Woody native vegetation removed from the disturbance footprint should be utilised for vegetation and habitat restoration. This should include mulching of shrubs and smaller trees for use in soil amelioration and use of large woody debris (i.e. large sections of tree trucks, root balls and large branches) for habitat enhancement in revegetation areas.

- Rehabilitation and revegetation will be undertaken within temporary infrastructure locations and should include restoration of native species composition consistent with nearby areas of structurally intact native vegetation on similar soil and terrain.

- Restoration should be achieved, at least in part, by spreading topsoil stripped from donor sites in temporary infrastructure locations and from other areas of native vegetation in the operational footprint. Topsoil donor sites should have diverse native groundcover and low weed cover.

- The success of native vegetation restoration should be monitored to determine whether any changes to management such as additional weed management or seedling of planting of native species are required.

- The measures outlined above should be included within a rehabilitation management plan to be prepared post-approval.

8.3.3 Summary of measures to avoid, minimise and mitigate impacts

Table 8.8 provides a summary of the measures to minimise and mitigate impacts arising from the project.

Table 8.8 Summary of impacts and measures to avoid, minimise and mitigate

Impact	Impact avoidance	Impact minimisation	Impact mitigation
Removal of native vegetation and threatened species habitat. **Type**: direct impact. **Frequency**: once, during construction. **Intensity**: removal of large areas of habitat for threatened species. **Duration**: initial stages of construction. **Consequence**: permanent removal of native vegetation and threatened species habitat.	• Consideration of biodiversity values during design. • Investigation of alternative locations for access roads during detailed design works to avoid impacts on identified refuge areas known to support Brush-tailed Rock-wallaby colonies. • Siting of the proposed access roads and powerline routes primarily in areas of non-native and highly modified vegetation, where possible. • Siting of stockpiles for excavated materials in low-quality vegetation, where possible. • Siting of the construction compound and accommodation camp in partially cleared areas, where possible.	• Detailed design of the Project, seeking further minimisation of impacts to native vegetation. • Minimisation of clearing during construction, wherever possible. • Establishment of exclusion zones around retained vegetation, including fencing and signage. • TPZ and SRZs.	• Mulching and stockpiling of cleared native vegetation for use during rehabilitation. • Retention of hollows logs and limbs for placement within retained vegetation and reuse during rehabilitation. • Collection of native seeds for propagation. • Propagation of locally indigenous native species for use in rehabilitation works. • Restoration of native species composition consistent with nearby areas of structurally intact native vegetation on similar soil and terrain.
Injury of native animals during clearing and construction **Type**: direct impact. **Frequency**: once, during construction. **Intensity**: an unknown proportion of the local populations of some animal species may be injured. **Duration**: initial stages of construction. **Consequence**: reduction in the population of susceptible threatened species.	• Not applicable.	• Detailed design of the Project, resulting in further minimisation of impacts to native vegetation and fauna habitat. • Minimisation of clearing during construction, wherever possible.	• Pre-clearing surveys conducted prior to clearing, including translocation of less mobile fauna into areas of retained vegetation. • Vegetation clearing undertaken in accordance with the two-stage process.

Table 8.8 Summary of impacts and measures to avoid, minimise and mitigate

Impact	Impact avoidance	Impact minimisation	Impact mitigation
Edge effects **Type**: indirect impact. **Frequency**: once, during construction and rehabilitation. **Intensity:** unknown. **Duration**: ongoing through construction phase. **Consequence**: potential to impact on threatened species habitat, resulting in decline in habitat quality due to introduction or spread of weeds and pathogens.	• Not applicable.	• Weed control prior to construction works being undertaken, where possible. • Appropriate disposal and management of weeds during clearing works. • Construction of wash-down stations at a suitable location. • Re-vegetation of cleared areas as quickly as possible following construction. • Vehicles, machinery and equipment to be clear of soil and plant debris when they arrive on the disturbance footprint and prior to movement between sites to minimise the potential for the introduction of weeds and pathogens.	• Design and implementation of a weed and pathogen monitoring program.
Disturbance to animals in adjacent habitat **Type:** indirect impact. **Frequency**: once, during construction. **Intensity:** unknown. **Duration:** ongoing during construction. **Consequence**: potential to result in noise impacts to retained vegetation and light spill into adjacent habitat areas, impacting on occupancy for some species.	• Not applicable.	• Implementation of construction traffic driving rules in high risk sections of road speed limits and limitation of construction traffic movements at night.	• Use of directional lighting to retain lighting within works areas as much as possible.
Interruption of animal movement **Type:** indirect impact. **Frequency**: ongoing through construction and operation. **Intensity:** minor reduction in habitat connectivity at local and regional scale. **Duration:** permanent. **Consequence**: minor reduction in potential for dispersal between habitats on opposing sides of the reservoirs.	• Not applicable.	• Minimisation of tree clearing during construction of the access road and powerline.	• Rehabilitation and revegetation within temporary infrastructure locations.

Table 8.8 Summary of impacts and measures to avoid, minimise and mitigate

Impact	Impact avoidance	Impact minimisation	Impact mitigation
Vehicle strikes impacts on animal populations **Type:** indirect impact. **Frequency**: once, through construction. **Intensity:** minor increase in roadkill rate. **Duration:** temporary, during construction. **Consequence**: minor reduction in populations of susceptible species.	• Not applicable.	• Implementation of construction traffic driving rules in high risk sections of road speed limits and limitation of construction traffic movements at night.	• Construction traffic rules at night.
Increase in predatory and pest species. **Type:** indirect impact. **Frequency:** ongoing during construction and operation. **Intensity:** significant increases in the number of predators and pest species. **Duration:** construction and operation. **Consequence:** increased predation and competition and a consequent reduction in populations.	• Not applicable.	• Waste to be stored appropriately in inaccessible bins and disposed off-site. • No waste will be left outside in open areas accessible to feral animals.	• Design and implementation of a pest and predator monitoring program to ensure the Project does not result in a significant increase in numbers of pest and predatory species and impacts to threatened species remain within prediction. • Design and implementation of a predator control program will be implemented, in conjunction with DPIE, to control feral animals.

9 Serious and irreversible impacts (SAII)

Section 9.1.2 of the BAM 2020 (DPIE 2020a) requires additional impact assessment for threatened species that are listed in the TBDC as possibly at risk of SAII and known or likely to occur in the disturbance footprint. Table 9.1 provides an assessment of SAII triggers for species known or predicted to occur in the Project area that are listed as possibly at risk of SAII and whether further assessment is required.

Table 9.1 Threatened species requiring assessment of SAII

Species	SAII Trigger	Reason for inclusion of exclusion from further assessment
Wandering Pepper Cress	Principles 2 and 3 – Species has a very small population size and very limited geographic distribution.	Recorded within the construction envelope. This species is further assessed in Table 9.2 and Table 9.3.
Pultenaea rubescens	Principles 2 and 3 – Species has a very small population size and very limited geographic distribution[3].	An unidentified *Pultenaea* sp., recorded during surveys, has been as a new species for the genus. It is proposed to recognise this as a distinct species, *Pultenaea rubescens* (Barrett, In press). *Pultenaea rubescens* was recorded within the construction envelope. No records of this species have been recorded within the disturbance footprint. This species is currently known from three populations, two in close proximity to each other. The individuals The species has a small population size and a limited geographic distribution with a known area of occupancy of < 1 km^2 (Barrett, In press). Despite no direct impacts to this species, a precautionary approach has been undertaken and this species is further assessed in Table 9.4 and Table 9.5.
Scrub Turpentine	Principle 1 – Species in rapid rate of decline and unlikely to respond to management and is therefore irreplaceable.	Recorded within the construction envelope. No records within the disturbance footprint. Despite no impacts to this species, a precautionary approach has been undertaken and this species is further assessed in Table 9.7 and Table 9.8.

[3] Assessed based on surveys undertaken and Barrett (In press).

Table 9.1 Threatened species requiring assessment of SAII

Species	SAII Trigger	Reason for inclusion of exclusion from further assessment
Little Bent-winged Bat	Principle 4 – Species or ecological community that is unlikely to respond to management and is therefore irreplaceable.	Potential breeding features could be present within the disturbance footprint, these include caves, or other structures known or suspected to be used by the species, including species records in the NSW BioNet Atlas with microhabitat code 'IC – in cave'; observation type code 'E nest-roost'; with numbers of individuals >500; or from the scientific literature (OEH 2018a). Maternity sites consist of deep caves with very specific and stable humidity and temperature conditions (Dwyer and Hamilton-Smith, 1965). These species were recorded in the disturbance footprint by ultrasonic bat call recording and captured in harp traps (excluding Eastern Cave Bat that was only recorded by ultrasonic bat call recorders). The recorded activity of the species was not consistent with the presence of a large colony of the species on the disturbance footprint. The absence of lactating females caught as part of the bat surveys indicated that no maternity roosts were considered within 5 km of the disturbance footprint. These species are not at risk of a SAII as a result of the Project as breeding habitat is unlikely to be affected. These species are excluded from further assessment.
Large bent-winged bat		
Eastern Cave Bat		
Brush-tailed Rock-wallaby	Principle 4 – Any impacts on rocky habitat used by this species could be considered potentially SAII.	Recorded within the construction envelope. This species is further assessed in Table 9.9 and Table 9.10.

Table 9.2 to Table 9.10 provides SAII assessments for each species identified in Table 9.1 as requiring further assessment.

9.1 Wandering Pepper Cress

Table 9.2 provides an assessment of the current status of the Wandering Pepper Cress.

Table 9.2 Assessment of the current status of Wandering Pepper Cress

Factors contributing to the impact	Project impact on factors
Evidence of rapid decline (Principle 1)	
Change in population size in NSW in the past 10 years or 3 generations (indicate whether as a direct estimate of the population or if indicated by an index or surrogate).	Not required as not considered under Principle 1.
Evidence of small population size (Principle 2)	
Current population size in NSW.	< 250 mature individuals (BCD pers. comm., 1 November 2022, EES BOS Help Desk). This estimate is considered to have a low level of confidence given the current surveys have increased the known population by more than 600%. The species is likely to be much more extensive than previously realised.
Decline in species' population size in 3 years or one generation.	Not provided within the TBDC.
Number or percentage of mature individuals in each subpopulation or whether the species is likely to undergo extreme fluctuations.	Species is likely to undergo extreme fluctuations (BCD pers. comm., November 2022 EES BOS Help Desk).
Evidence of limited geographic range (Principle 3)	
Extent of occurrence (EOO) (ha).	86 km^2 (Best available estimates (BCD pers. comm., email 1 November 2022 EES BOS Help Desk).
Area of occupancy (AOO) (ha).	20 km^2 (Best available estimates BCD pers. comm., email 1 November 2022 EES BOS Help Desk).
Number of threat defined locations.	Not provided within the TBDC.
Whether the species' population is likely to undergo extreme fluctuations.	Not provided within the TBDC.

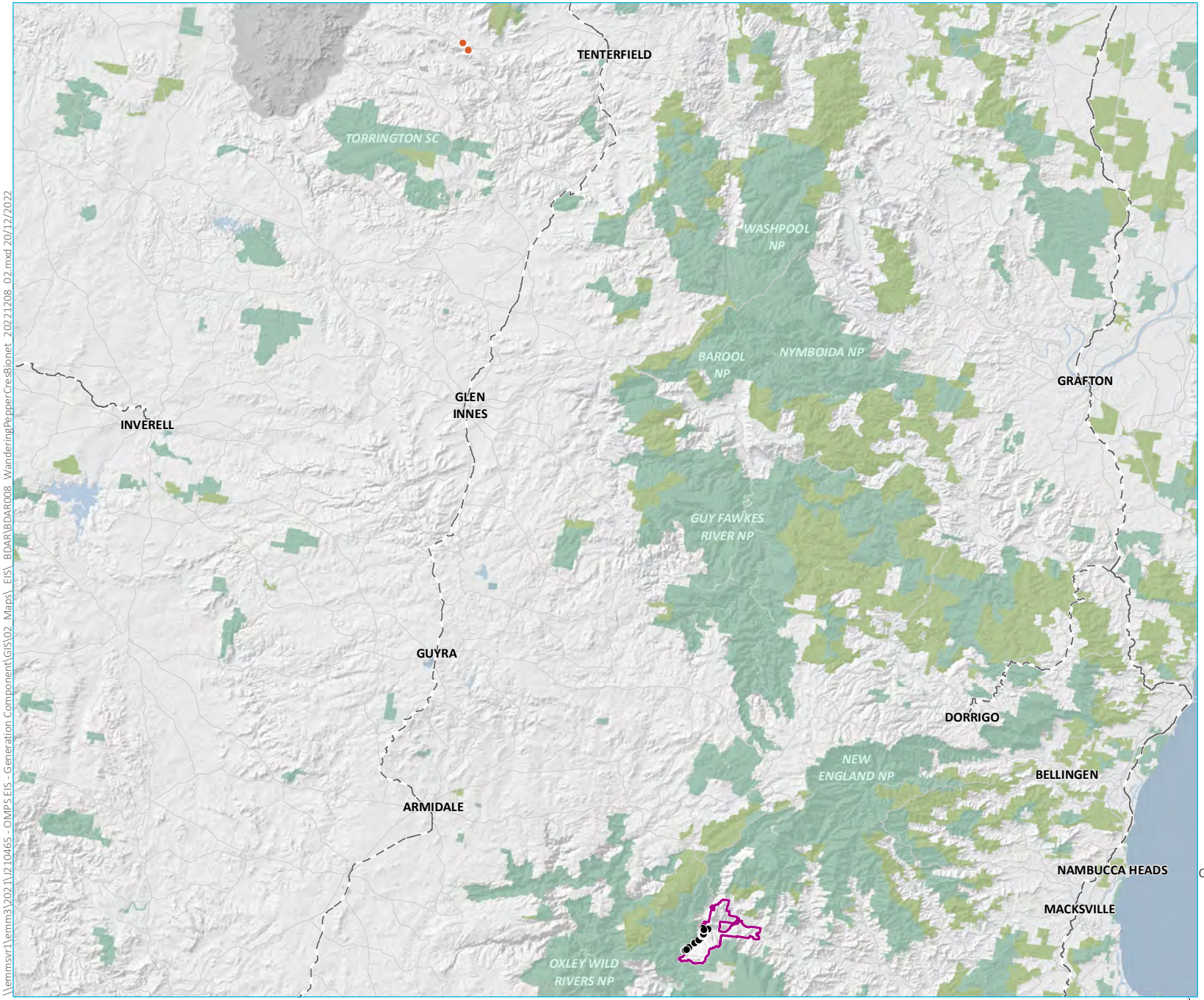
Table 9.3 provides an impact assessment for the Wandering Pepper Cress.

Table 9.3 Impact assessment Wandering Pepper Cress

Impact	Data/information
Number of individuals (mature and immature) present in the subpopulation on the subject land (disturbance footprint).	The Project area recorded 1,577 individuals, with the majority located along the Macleay River floodplain on the eastern back where the river runs south to north. It is considered that all records within the project area are part of the same subpopulation, and likely to exchange genetic material. Two individuals are present within the disturbance footprint; these two are considered outliers from the subpopulation and were recorded in a small wet depression area along a creekline.
Number of individuals (mature and immature) present as a percentage of total NSW population (%)	Targeted surveys in 2001 recorded a total of 192 mature plants and 123 juveniles across six sites in NSW and Queensland. This species has recently been recorded from 24 populations, mostly in Queensland, with only five known populations in NSW (excluding this site) (BCD pers. comm., email 1 November 2022 EES BOS Help Desk). As of 2014, the largest known population in Queensland contained 142 mature individuals (DoE 2014b). The TBDC estimates the NSW population to be less than 250 individuals. Figure 9.1 shows known locations in NSW. This would make the sub-population recorded within the Project area the largest population known within NSW. The plants present within the broader subpopulation in the Project area as a percentage of total NSW population would be: • 1,577 ÷ 250 x 100 = 630.8%. Including this new subpopulation within the estimated NSW population would make the percentage: • 1,577 ÷ (1,577 + 250) x 100 = 86.32% of the total NSW population located within the Project area.
Number of individuals (mature and immature) to be impacted by the proposal	The Project will impact on two individuals.
Individuals (mature and immature) to be impacted by the proposal as a percentage of total NSW population (%)	The two plants to be impacted by the proposal as a percentage of NSW population (inclusive of this new subpopulation) would be: • 2 ÷ (1,577 + 250) x 100 = 0.12%. However, given the current surveys have increased the known population by more than 600% these numbers are considered to have a low level of confidence and the species is likely to be much more extensive than previously realised.
Area of habitat to be impacted (ha) (for species measured by area only)	The Project will impact on 0.06 ha of habitat for the species.
Area of the species' geographic range to be impacted by the proposal (ha)	This population was recorded outside of this species previously known geographical range. Therefore, the Project area represents the only known occurrence of the species within the IBRA subregion (Macleay Gorges and Macleay Hastings). The area of habitat for this species within the Project area and adjoining flood plan of the Macleay River is 116.48 ha. Area of this species to be impacted within the disturbance footprint is 0.06 ha. Impact as a percentage = 0.06 ha ÷ 116.48 ha x 100 = 0.05% of the local geographic range of this species.
Area of the species' geographic range to be impacted as a percentage of the total area or extent of occupancy (%)	This population was recorded outside of this species previously known geographical range. The area of the impact as a percentage is: • Impact of AOO = 0.06 ha ÷ 20 km^2 x 100 = 0.003%. • Impact of EOO = 0.06 ha ÷ 86 km^2 = 0.0007%.
Individuals impacted	Two individuals that are considered outliers from the subpopulation of 1,577 and were recorded in a small wet depression area along a creekline.

Table 9.3 Impact assessment Wandering Pepper Cress

Impact	Data/information
Viability of a fragmented population	The construction envelope was moved to avoid the majority of the suitable habitat that was recorded within the Project area to support this species; refer to Section 8.3.1. This species will not become fragmented as part of the proposed works as the disturbance footprint is located upslope of all records of the species and extensive and continuous habitat will be maintained along the Macleay River.
Additional assessment	Based on the Project only impacting two individuals no further SAII assessment is undertaken for this species.





KEY

- Project area
- EMM species sighting
- BIONET species sighting

Existing environment

- Major road
- Rail line
- Named waterbody
- Waterbody
- NPWS reserve
- State forest

Source: EMM (2022); ABS (2021); DFSI (2020, 2021); GA (2011, 2020); DPE (2022)

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Species records of Wandering Pepper Cress in NSW

Oven Mountain Pumped Hydro Energy Storage Project
Biodiversity development assessment report
OMPS Pty Ltd
Figure 9.1

EMM
creating opportunities

9.2 Pultenaea rubescens

Table 9.4 provides an assessment of the current status of *Pultenaea rubescens*.

Table 9.4 SAII assessment of impact on *Pultenaea rubescens*

Factors contributing to the impact	Project impact on factors
Evidence of rapid decline (Principle 1)	
Change in population size in NSW in the past 10 years or 3 generations (indicate whether as a direct estimate of the population or if indicated by an index or surrogate).	Not required as not considered under Principle 1.
Evidence of small population size (Principle 2)	
Current population size in NSW.	The Project area recorded 509 individuals during the 2021/22 surveys.
Decline in species' population size in 3 years or one generation.	Unknown
Number or percentage of mature individuals in each subpopulation or whether the species is likely to undergo extreme fluctuations.	Unknown
Evidence of limited geographic range (Principle 3)	
Extent of occurrence (EOO) (ha).	1,000 km^2 (Barrett, In press)
Area of occupancy (AOO) (ha).	1 km^2 (Barrett, In press)
Number of threat defined locations.	Unknown
Whether the species' population is likely to undergo extreme fluctuations.	Unknown

Table 9.5 provides an impact assessment for *Pultenaea rubescens*.

Table 9.5 Impact assessment *Pultenaea rubescens*

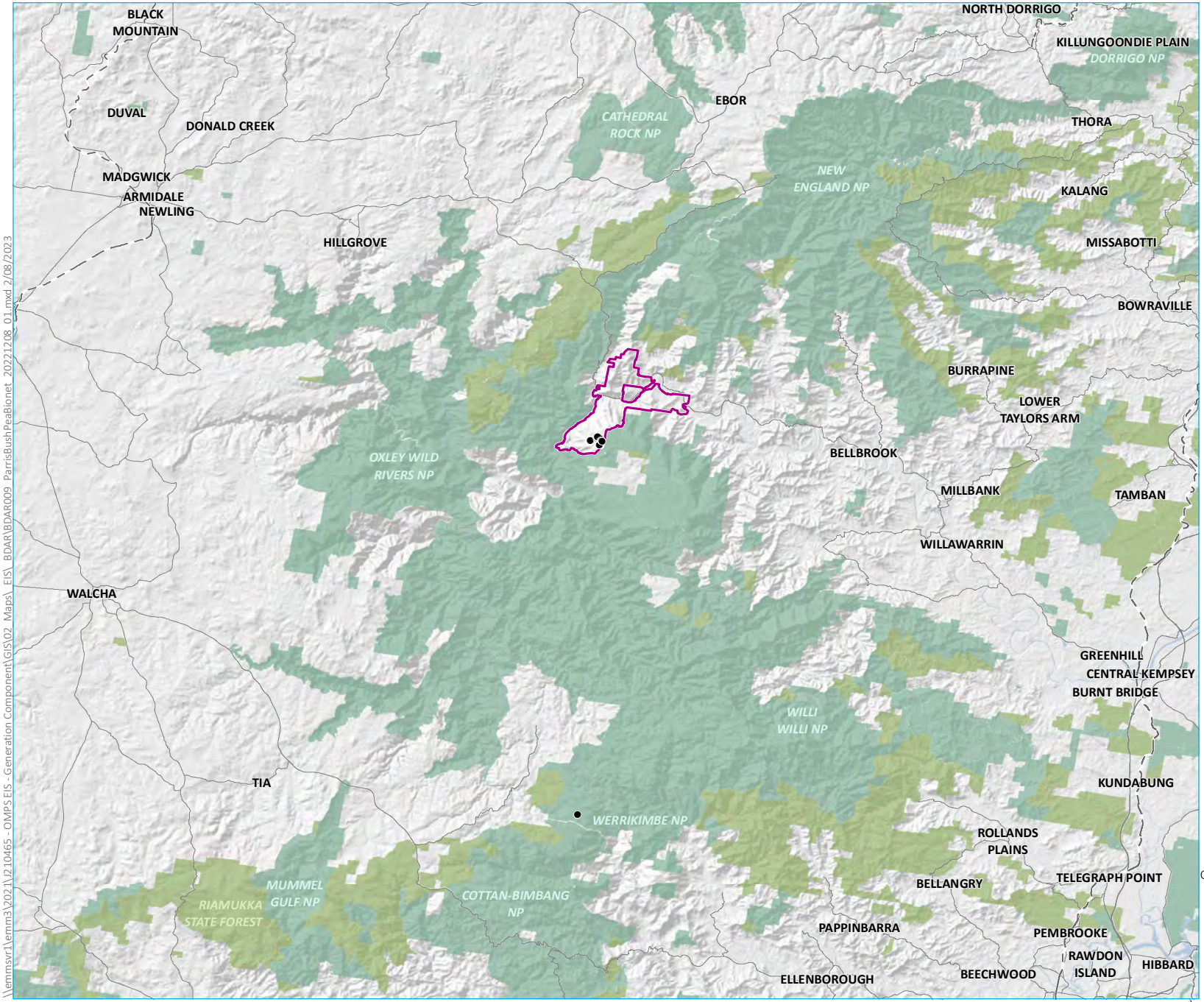
Impact	Data/information
Number of individuals (mature and immature) present in the subpopulation on the subject land (disturbance footprint).	The Project area recorded 509 individuals, all located within the Carrai Plateau IBRA subregion. Additional records were recorded by Lachlan Copeland from Werrikimbe National Park in 2010 (Barrett, In press); however, the number of individual plants is not provided. It is considered that all records within the Project area are part of the same subpopulation, and likely to exchange genetic material. Plants in Werrikimbe National Park are likely part of a separate subpopulation. No individuals occur within 30m of the disturbance footprint and have been removed from any potential impacts from design changes within the construction envelope. A total of 0.74 ha of potential habitat that could support this species occurs within the disturbance footprint.
Number of individuals (mature and immature) present as a percentage of total NSW population (%).	It is considered that this is a new species, with the current population number known only from what was recorded as part of the targeted threatened flora surveys within the Project area and two additional collections from Werrikimbe National Park (Barrett, In press); however, as the number of individual plants is not provided a conservative assessment is applied and it is assumed there is a single plant at each of these two locations resulting in a total known population of 511 individuals. The plants present within the broader subpopulation in and adjacent to the project area would be: • 509 ÷ 511 x 100 = 99.6%.

Table 9.5 Impact assessment *Pultenaea rubescens*

Impact	Data/information
Number of individuals (mature and immature) to be impacted by the proposal.	The Project will not impact on any individuals, or within the 30 m buffer of the known occurrences of this species. No direct impacts may occur on the known occurrences of this species from design change within the construction envelope as these areas have been excluded.
Individuals (mature and immature) to be impacted by the proposal as a percentage of total NSW population (%).	0%
Area of habitat to be impacted (ha) (for species measured by area only).	The project will impact on 0.74 ha of potential habitat for this species. Due to changes in design and avoidance of species records plus a 30 m buffer, no known habitat will be impacted.
Area of the species' geographic range to be impacted by the proposal (ha).	Detailed surveys are required to better inform the geographic range of this species in the locality. The area of known and potential habitat within the Project area is conservatively estimated at 14.51 ha. Impact as a percentage = 0.74 ha ÷ 14.51 ha x 100 = 5% of the currently known geographic range of this species.
Area of the species' geographic range to be impacted as a percentage of the total area or extent of occupancy (%).	The area of the impact as a percentage is: • Impact of EOO = 0.47 ha ÷ 1,000 km^2 x 100 = 0.00047%. • Impact of AOO = 0.47 ha ÷ 1 km^2 x 100 = 0.47%
Individuals impacted.	0
Viability of a fragmented population.	The development footprint and the construction envelope were moved to avoid all suitable habitat that was recorded within the project area to support this species (refer to Section 8.3.1). The Project is not considered to fragment the population from other sub-populations within the project area as the sub-population close to the disturbance footprint is located along the western edge of its known distribution. This species is associated with wet and flat area, mostly boggy swamps and fens. The Project is not considered to cause further fragmentation of the known populations.
Additional assessment.	Due to the impacts on critical habitat to support this species, additional assessment has been considered in Table 9.6.

Table 9.6 Additional impact assessment – *Pultenaea rubescens*

Impact	Data/information
Actions and measures taken to avoid direct and indirect impact on the potential entity for SAII.	The consideration of options and development of the Project was informed by the occurrence of this species within the construction envelope. Spoil locations and the emergency access road in the upper reservoir were modified to avoid impacts to *Pultenaea rubescens* following targeted surveys once this species was identified as potentially being classified as a new species. This design modification will result in avoidance of removal of approximately 143 plants, avoiding direct impacts to all individuals recorded within the construction envelope (refer to Section 8.3.1 and Table 8.7).
The extent to which the impact exceeds any threshold for the potential entity.	The Project will remove approximately 0.74 ha of potential habitat that could support this species. No thresholds are identified.
The likely impact on the ecology of the local population (breeding/ foraging and dispersal).	The disturbance footprint is located on the western edge of the currently known distribution for this subpopulation of the species. Detailed surveys within the construction envelope and targeted surveys within the Project area confirmed that this species is absent to the west of the confirmed subpopulation that is located near the proposed spoil stockpile. The Project may remove approximately 0.74 ha of potential dispersal habitat for this species. This habitat is located on the western edge of its currently known local distribution, as such impacts to this potential habitat will not restrict dispersal further west as no suitable habitat was recorded.
A description of the extent to which the local population will become fragmented.	The Project is not considered to split the subpopulation into two or more subpopulations as impacts will only occur on the western edge of the currently known distribution for this subpopulation of the species. The remaining subpopulations and potential habitat occur to the east in the remaining areas of the Project area and within private and National Parks estates associated with the Carrai Plateau.
The relationship of the local population to other populations.	No other populations are known for this species. A subpopulation of the species is located in Werrikimbe National Park approximately 47 km south of the records of the species in the Project area
The measures proposed to contribute to the recovery of the species in the IBRA subregion.	It is proposed that further surveys are undertaken to better assess the potential impacts on this species. It is proposed that, subject to landowner approval, surveys be undertaken in the 2023 flowering period (October and November) within the surrounding area and National Parks estate associated with the Carrai Plateau. This would better inform the distribution of this species, population numbers and better inform any impact assessment that may occur from the Project.



KEY

- Project area
- Pultenaea rubescens species sighting

Existing environment

- Major road
- Rail line
- Waterbody
- NPWS reserve
- State forest

Source: EMM (2022); ABS (2021); DFSI (2020, 2021); GA (2011, 2020); DPE (2022)

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Species records of Pultenaea rubescens in NSW

Oven Mountain Pumped Hydro Energy Storage Project
Biodiversity development assessment report
OMPS Pty Ltd
Figure 9.2

EMM creating opportunities

9.3 Scrub Turpentine

Table 9.7 provides an assessment of the current status of the Scrub Turpentine.

Table 9.7 SAII assessment of impact on Scrub Turpentine

Factors contributing to the impact	Project impact on factors
Evidence of rapid decline (Principle 1)	
Change in population size in NSW in the past 10 years or 3 generations (indicate whether as a direct estimate of the population or if indicated by an index or surrogate).	The population size has reduced by >=80% in the past 10 years or three generations (BCD pers. comm., email 1 November 2022 EES BOS Help Desk).
Evidence of small population size (Principle 2)	
Current population size in NSW.	Not required as not considered under Principle 2.
Decline in species' population size in 3 years or one generation.	Not required as not considered under Principle 2.
Number or percentage of mature individuals in each subpopulation or whether the species is likely to undergo extreme fluctuations.	Not required as not considered under Principle 2.
Evidence of limited geographic range (Principle 3)	
Extent of occurrence (EOO) (ha).	3,360 km^2 (BCD pers. comm., email 1 November 2022 EES BOS Help Desk).
Area of occupancy (AOO) (ha).	147,340 km^2 (BCD pers. comm., email 1 November 2022 EES BOS Help Desk).
Number of threat defined locations.	Threats beyond control for Scrub Turpentine (BCD pers. comm., email 1 November 2022 EES BOS Help Desk).
Whether the species' population is likely to undergo extreme fluctuations	Not provided within the TBDC.

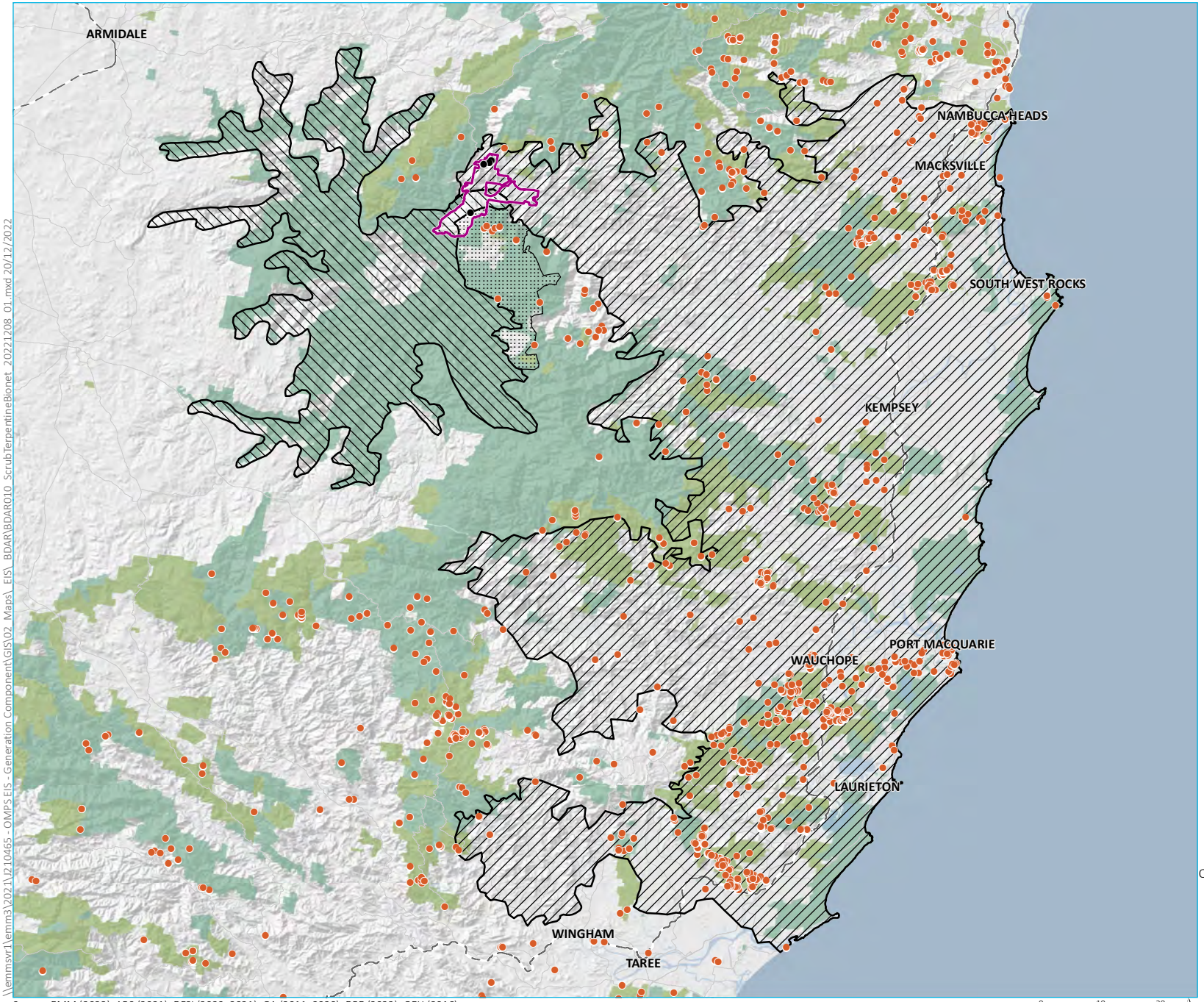
Table 9.8 provides an impact assessment for Scrub Turpentine.

Table 9.8 Impact assessment Scrub Turpentine

Impact	Data/information
Number of individuals (mature and immature) present in the subpopulation on the subject land (disturbance footprint).	Thirteen individuals were recorded within the transmission line survey area within Macleay Hastings IBRA subregion, with an additional four individuals observed incidentally within the Project area (Macleay Gorges IBRA subregion) outside of the survey area. Additional surveys were not targeted outside of the construction envelope so the Project area is considered to support larger numbers than what was recorded in the local area. All individuals were recorded as regrowth after the 2019/2020 bushfires or juvenile individuals. All effected by myrtle rust fungal disease. No individuals occur within the disturbance footprint.
Number of individuals (mature and immature) present as a percentage of total NSW population (%).	The number of distinct populations of Scrub Turpentine is unknown but is expected to be large given the wide distribution of the species. No formal estimate exists of the total pollution of the species however it is likely that that the number of mature individuals may be large (i.e. not <10,000) (TSSC 2020). It is unknown what the percentage is within the Project area, but assuming >10,000 individuals the 17 records within the Project area represent <1%.

Table 9.8 Impact assessment Scrub Turpentine

Impact	Data/information
Number of individuals (mature and immature) to be impacted by the proposal.	The Project will not impact on any individuals, or the 30 m buffer.
Individuals (mature and immature) to be impacted by the proposal as a percentage of total NSW population (%).	0%
Area of habitat to be impacted (ha) (for species measured by area only).	The records of this species recorded within the construction envelope were buffered by 30 m. The disturbance footprint avoids direct impacts to the 30 m buffered area. The area of this species to be impacted within the disturbance footprint is: 0 ha.
Area of the species' geographic range to be impacted by the proposal (ha).	The records of this species recorded within the construction envelope were not associated with any PCTs on site. Records were buffered by 30 m. The disturbance footprint avoids direct impacts to the 30 m buffered area. The area of this species to be impacted within the disturbance footprint is: 0 ha.
Area of the species' geographic range to be impacted as a percentage of the total area or extent of occupancy (%).	The area of the impact as a percentage is: 0%.
Individuals impacted.	0
Viability of a fragmented population.	The population recorded within the Project area was infected with myrtle rust fungal disease which is already impacting this population. The proposed works, which involves upgrading the existing access track and clearance required for the power easement, is outside of where this species occur. The construction envelope was moved to avoid the majority of the suitable habitat that was recorded within the Project area to support this species, refer to Section 8.3.1. Works are not considered to cause any additional fragmentation of these populations.
Additional assessment.	Based on the Project no having a direct impact on this species, no further SAII assessment is undertaken.



KEY

- Project area
- EMM species sighting
- BIONET species sighting

IBRA Subregion

- Carrai Plateau
- Macleay Gorges
- Macleay Hastings

Existing environment

- Major road
- Rail line
- Waterbody
- NPWS reserve
- State forest

Source: EMM (2022); ABS (2021); DFSI (2020, 2021); GA (2011, 2020); DPE (2022); OEH (2016)

0 10 20 km
GCS GDA 1994

N

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Species records of Scrub Turpentine in the project IBRA sub-regions (Macleay Gorges, Carrai Plateau and Macleay Hastings)

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9.4 Brush-tailed Rock-wallaby

Table 9.9 provides an assessment of the current status of the Brush-tailed Rock-wallaby.

Table 9.9 SAII assessment of impact on Brush-tailed Rock-wallaby

Factors contributing to the impact	Project impact on factors
Evidence of rapid decline (Principle 1)	
Change in population size in NSW in the past 10 years or 3 generations (indicate whether as a direct estimate of the population or if indicated by an index or surrogate).	Not required as not considered under Principle 1.
Evidence of small population size (Principle 2)	
Current population size in NSW.	>1,000 (BCD pers. comm., September 2022 EES BOS Help Desk).
Decline in species' population size in 3 years or one generation.	Not provided within the TBDC.
Number or percentage of mature individuals in each subpopulation or whether the species is likely to undergo extreme fluctuations.	Not likely to undergo extreme fluctuations (BCD pers. comm., 7 September 2022 EES BOS Help Desk).
Evidence of limited geographic range (Principle 3)	
Extent of occurrence (EOO) (ha).	172,205 km^2 (BCD pers. comm., email 7 September 2022 EES BOS Help Desk).
Area of occupancy (AOO) (ha).	2,712 km^2 (BCD pers. comm., email 7 September 2022 EES BOS Help Desk).
Number of threat defined locations.	Unknown. Likely to be >10 (BCD pers. comm., email 7 September 2022 EES BOS Help Desk).
Whether the species' population is likely to undergo extreme fluctuations.	Not provided within the TBDC.

Table 9.10 provides an impact assessment for the Brush-tailed Rock-wallaby, including additional information as discussed in Appendix B in (DPIE, 2019).

Table 9.10 Impact assessment- Brush-tailed Rock-wallaby

Impact	Data/information
Number of individuals (mature and immature) present in the subpopulation on the subject land (disturbance footprint).	The Brush-tailed Rock-wallaby was recorded in various locations throughout the Project area. The Brush-tailed Rock-wallaby lives in colonies comprising one or more social groups, colonies can range from 2–60 individuals (Bayne, 1994) (Piggott, Banks, & Taylor, 2006). Individual home ranges range from 6–30 ha which often overlap in nocturnal or crepuscular foraging areas (Laws, RJ & Goldizen, AW 2003, 2003). Surveys within the Project area include a combination of remote cameras, scat collection for genotype analysis, aerial surveys, targeted and incidental counts. Summarised count data can be found in Appendix C. From the survey data collected it is estimated that the Project area supports a subpopulation of approximately 126 individuals across approximately 20–25 colonies. Within this area, the disturbance footprint supports refuge habitat for one colony that contain a minimum number of 11 individuals. Due to the mobility of this species obtaining an exact number is difficult. The Project area contains an area of 6,572 ha with this species associated with difficult terrain that contains areas that are inaccessible. Surveys required multiple site visits which may have double counted or missed individuals. Presence of colonies were also observed adjacent to the Project area heading along the northern gorges of the Carrai Plateau, west within Cunnawarra National Park and south within Oxley Wild Rivers National Park (see Figure 9.4). Numbers were not accurately counted in colonies located outside of the project area.
Number of individuals (mature and immature) present as a percentage of total NSW population (%).	• BCD: 126 ÷ 1,000 x 100 = 12%.
Number of individuals (mature and immature) to be impacted by the proposal.	Critical habitat that supports this species may be directly and indirectly impacted on. This habitat includes rocky areas that contain overhangs, crevices, caves and ledges with refuge features that were observed to contain a colony of Brush-tailed Rock-wallabies (occupied refuge habitat). The disturbance footprint was observed to support one l colony, within the proposed access road connecting the lower reservoir to the upper reservoir. This colony contained a minimum number of 11 individuals calculated from results of genotype scat analysis and aerial surveys.
Individuals (mature and immature) to be impacted by the proposal as a percentage of total NSW population (%).	Impacts on critical habitat that supports this species will affect one colony. Number of individuals associated within the project area as a percentage is: • BCD: 11 ÷ 1,000 x 100 = 1.1%.
Area of habitat to be impacted (ha) (for species measured by area only).	The Project area was observed to contain approximately 2.89 ha of occupied refuge habitat (overhangs, crevices, caves and ledges) that supported colonies. The construction envelope contains 0.13 ha of occupied refuge habitat; refuge habitat within the construction footprint has been excluded from any changes in design from further impacts. The occupied refuge habitat that is currently within the development footprint is: 0.002 ha (approximately 5% of the occupied habitat within the project area) Foraging habitat, to be impacted on, which has been calculated using this species' associated PCTs within 1 km of rocky escarpment, gorges, steep slopes, boulder piles, rock outcrops and cliff lines is: 184 ha.
Area of the species' geographic range to be impacted by the proposal (ha).	184 ha
Area of the species' geographic range to be impacted as a percentage of the total area or extent of occupancy (%).	The area of the impact as a percentage is: • Impact of EOO = 184 ha ÷ 172,205 km^2 = 0.1%. • Impact of AOO = 184 ha ÷ 2,712 km^2 = 7%.

Table 9.10 Impact assessment- Brush-tailed Rock-wallaby

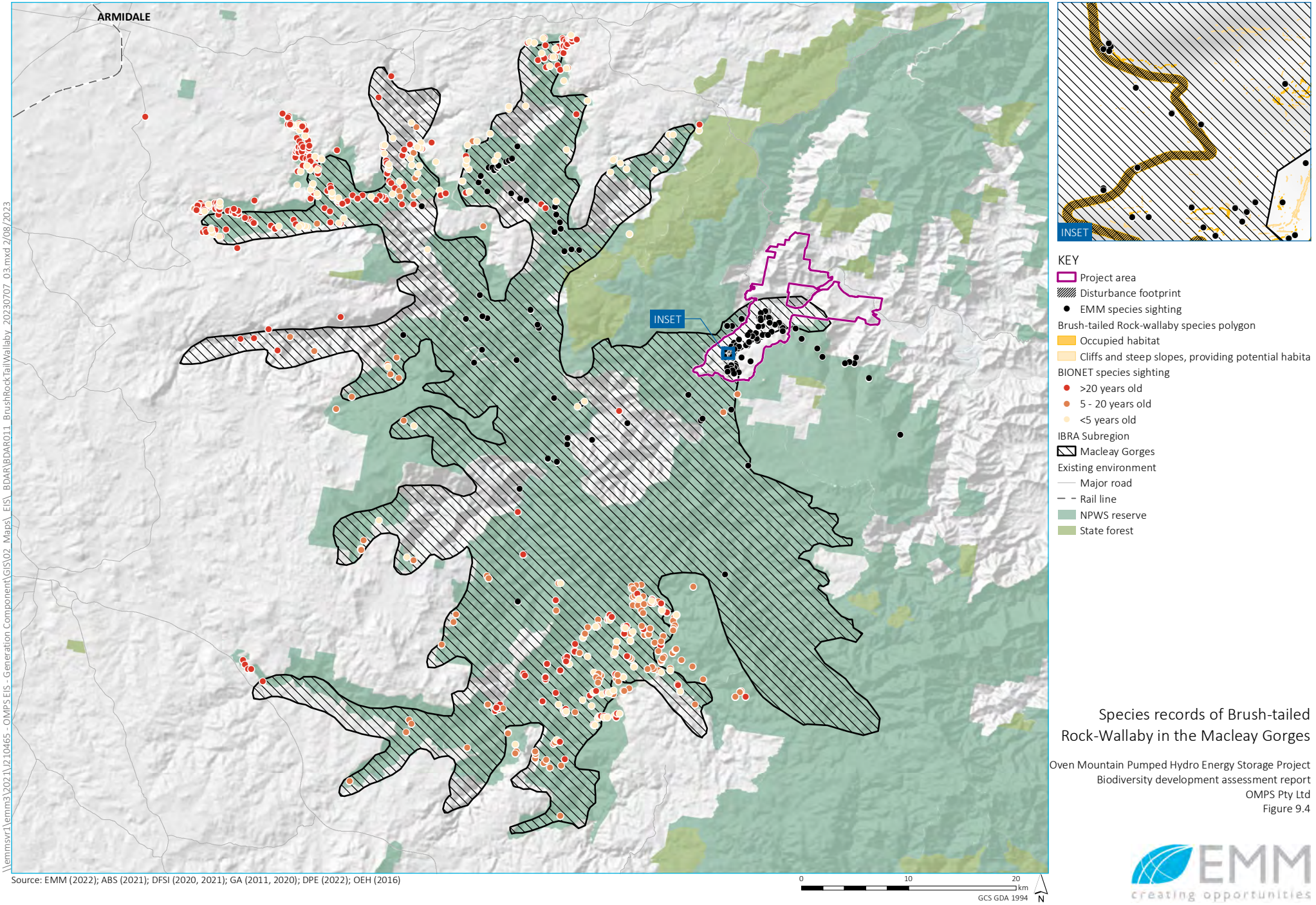
Impact	Data/information
Individuals impacted.	One colony with a minimal number of 11 individuals associated with critical habitat will be impacted as part of the proposed works.
Viability of a fragmented population.	The critical habitat to be impacted on is part of the Macleay Gorges. Suitable habitat within the Project area runs along the Carrai plateau, with cliffs and rocky habitat that support refuge areas running to the north-east of the Project area and south through the section where the proposed road joins the lower reservoir with the upper reservoir. It is considered that the construction of the access road between the two reservoirs is likely to impact on the two colonies within the development footprint. Existing colonies located immediately adjacent to Green Gully track in Oxley Wild Rivers National Park are known to tolerate road upgrade works and disturbance from public accessing the park in cars and on foot (Piers Thomas, NPWS Senior Conservation Planning Officer, pers. comm.). While males are known to move between colonies within their home range to access females, females are largely sedentary over a smaller home range (DPE, 2023). It is therefore considered that any indirect impacts to adjacent colonies from the Project are unlikely to occur, as the colonies are unlikely to disperse to other areas of habitat. Operational use of the access road will be limited to maintenance works and emergency egress as part of the Project lifespan. As such it is likely that any adjacent colonies of Brush-tail Rock-wallabies will not be impacted by the Project over the long term once construction ends.
Additional assessment.	Due to the impacts on critical habitat to support this species, additional assessment has been considered in Table 9.11.

Table 9.11 Additional impact assessment – Brush-tailed Rock-wallaby

Impact	Data/information
Actions and measures taken to avoid direct and indirect impact on the potential entity for SAII.	The consideration of options and development of the Project was informed by occurrence of critical habitat to support Brush-tailed Rock-wallabies and records of this species on site resulted in changes to the lower and upper reservoir access roads. The design of the Project has been through several iterations. The access toads were chosen, where practicable, to avoid large areas of critical habitat known to support Brush-tailed Rock-Wallabies (refer to Section 8.3.1. and Table 8.7). Further constructability investigations are occurring with respect to the potential to feasibly move the access road further to the west within the construction envelope, to avoid and minimise direct impacts to critical habitat that supports one colony within the disturbance footprint. This may involve ground truthing of the access road between the lower and upper reservoir or re-designing the road further below where critical habitat has been identified. Indirect impacts could occur due to fauna vehicle strike along the access road. A reduced speed limit will be imposed. Indirect impacts from increases of predatory and pest animal species could result from an increase of human activity and creation of roads adjacent to colonies that could lead to greater predator incursions. The Project will implement a pest and predator monitoring program to ensure the works do not result in a significant increase in predator numbers. The Project will also design and implement a predator control program that will be implemented, in conjunction with DPIE, to control feral animals during construction.
The extent to which the impact exceeds any threshold for the potential entity.	The Project will remove approximately 0.002 ha of critical habitat known to support this species. No thresholds are defined.

Table 9.11 Additional impact assessment – Brush-tailed Rock-wallaby

Impact	Data/information
The likely impact on the ecology of the local population (breeding/ foraging and dispersal).	Brush-tailed Rock-wallabies typically have low migration rates between colonies and low recolonisation rates (TSSC, 2003). As discussed in Table 9.9 males are generally the only ones to move between colonies. Should there be the loss of the colony within the development footprint, this may have an impact on nearby colonies as it relates to gene flow. The Project will impact on 184 ha of foraging and dispersal habitat; however, the Project area contains large amounts of suitable foraging and refuge habitat to support this species.
A description of the extent to which the local population will become fragmented.	The Project will impact on the most western and lowest in elevation colony within the Project area. Connection to other colonies within the Project area are to the east and north-east, upslope. Observations within the Project area as part of the Brush-tailed Rock-wallaby habitat assessment and targeted surveys recorded outlier records of younger males and potential connective mammal paths with some having evidence of Brush-tailed Rock-wallaby scats. The majority of critical habitat that supports this species will be retained within the Project area. The Project area supports an estimated 20–25 colonies containing a minimum of 126 individuals. The local population is confined to identified refuge habitat associated with areas of rocky escarpment, gorges, steep slopes, boulder piles, rock outcrops, cliff lines and adjacent foraging habitat. This runs from the southwest to the northwest of the Project area. A proposed access road that will be used to connect the Lower Reservoir with the Upper Reservoir takes advantage of an area along the rocky escarpment which avoids large areas of rocky habitat that is associated with potential refuge areas. The Lower and Upper Reservoirs are situated below and above the rocky escarpment. The likely preferred movement of Brush-tailed Rock-wallabies within the Project area would be along the rocky escarpment. They are likely to use the shortest distance between the break in the escarpment which will only be intersected by the access road. During construction the colonies located to the north and south of the disturbance footprint could potentially become temporarily fragmented due to indirect disturbance during construction activities. The creation of the access road is not considered to cause a permanent fragmentation as, once construction ends, this road would only be used for maintenance and inspection purposes only, with minimal traffic flow. The narrow bands of clearing required for the access are unlikely to interfere with Brush-tailed Rock-wallaby movement since wallabies are capable of traversing narrow tracts of cleared land between forested areas.
The relationship of the local population to other populations.	Additional aerial presence/absence surveys were undertaken to close data gaps between the two known large sub-populations located approximately 20 km south-west at Kunderang Brook and north-west in Dangar and Gara Gorges. This extensive work, undertaken in consultation with species experts from DPE and NPWS, resulted in a greater understanding of the Brush-tailed Rock-wallaby populations in this area, confirming connection between the two known sub-populations. Colonies were recorded along the Macleay, Chandler and Apsley River which are likely to provide a connection to the larger and the smaller colonies located within the Macleay Gorges. It is noted that colonies remain largely in situ with home ranges potentially limited to 4 km or less and gene flow would be expected to occur at a low rate for neighbouring colonies over time (DPE, 2022a)). The project area is likely to be an area of high occupancy for colonies and the additional surveys show that they form part of another large sub-population that is linked largely by the river systems to the other sub-populations within the Macleay Gorges. See Figure 9.4.
The measures proposed to contribute to the recovery of the species in the IBRA subregion.	Part of the survey effort to inform this SAII impact assessment contributed to the recovery objective: • Determine distribution, abundance for the Brush-tailed Rock-wallaby within the IBRA subregion. • Survey effort extending throughout the Macleay Gorges where record gaps existed. These surveys identified an additional 70+ colonies outside of the project area within the IBRA subregion.



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Source: EMM (2022); ABS (2021); DFSI (2020, 2021); GA (2011, 2020); DPE (2022); OEH (2016)

Species records of Brush-tailed Rock-Wallaby in the Macleay Gorges

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10 Cumulative impacts

10.1 Introduction

This section provides consideration of the Project's potential to generate cumulative impacts in the region related to biodiversity.

The *Cumulative Impact Assessment Guidelines for State Significant Projects* (DPIE 2021) are part of the Rapid Assessment Framework introduced in 2021, aimed at improving the assessment of major projects in NSW. The scoping phase for OMPS preceded the implementation of these guidelines and as such, a scoping assessment for cumulative impacts was not performed at the time. The EIS has therefore performed a screening exercise of future projects, focusing on key matters that could be materially affected, to inform the cumulative impact assessment (EIS Section 6.16).

The Project is located within the Armidale Regional Council LGA. The cumulative impact assessment has considered other future projects (on the DPE Major Projects Planning Portal) that have the potential to interact with the Project, within the following spatial extent:

- within the Armidale Regional LGA
- within Kempsey Shire LGA
- within Walcha Council LGA
- within 70 km of the project area.

The following projects are within the above domain were considered in the biodiversity cumulative impact assessment:

- Doughboy Wind Farm (SSD-9161599) – 30.5 km north of the Project
- Winterbourne Wind Farm (SSD-10471) – 37 km south-west of the Project
- Metz Solar Farm (SSD-7931) – 40.5 km north-west of the Project
- Stringybark Solar Farm (DA 112-2019) – 45.5 km north-west of the Project
- Olive Grove Solar Farm (DA 17-2020) – 46 km north-west of the Project
- Oxley Solar Farm (SSD-10346) – 47 km north-west of the Project
- Armidale Battery Energy Storage System (SSD-23515853) – 52 km north-west of the Project
- Armidale Solar Farm (DA 164-2019) – 54 km north-west of the Project
- New England Solar Farm (SSD-9255) – 61 km north-west of the Project
- Salisbury Solar Farm (SSD-10347) – 62 km west of the Project
- Thunderbolt Community Solar Farm (DA-8-2021) – 67.5 km west of the Project
- Tilbuster Solar Farm (SSD-9619) – 68 km north-west of the Project.

10.2 Consideration of cumulative impacts related to biodiversity

Following review of impacts related to biodiversity from surrounding projects within the study domain, all projects identified are unlikely to result in any key interaction due to the distance, nature and scale of the Project (i.e. no operational interaction). Therefore, no cumulative impacts are expected related to biodiversity from the Project.

11 Impact summary

11.1 Impacts not requiring offsets

In accordance with Section 9.2.1 of BAM (DPIE 2020a), impacts on vegetation zones and threatened species habitat do not require offsets where:

- a vegetation zone representative of a critically endangered or endangered ecological community has a vegetation integrity score less than 15, and/or
- a vegetation zone representative of a vulnerable ecological community and/or threatened species habitat has a vegetation integrity score less than 17, and/or
- a vegetation zone that is not listed has a vegetation integrity score less than 20.

Table 11.1 provides a summary of the vegetation zones that do not trigger the above thresholds.

Table 11.1 Summary of impacts not requiring offsets

PCT ID	PCT Name	Vegetation Zone	Extent in disturbance footprint (ha)	Current vegetation integrity score	Future vegetation integrity score	Change in vegetation integrity score	Credits required
762	Cabbage Gum open forest or woodland on flats of the North Coast	DNG Moderate	0.7	11.7	0	-11.7	0
		Exotic Grassland	0.4	1.9	0	-1.9	0
780	Coastal floodplain sedgelands, rushlands, and forblands of the North Coast	Moderate	0.1	10.7	0	-10.7	0
842	Forest Redgum – Broad-leaved Apple dry open forest of the gorges of NSW North Coast Bioregion	DNG Moderate	35.22	12.1	0	-12.1	0
		Exotic Grassland	6.7	0.6	0	-0.6	0

Areas not requiring assessment in accordance with Section 9.3 of BAM (DPIE 2020a) include:

- existing roads
- cleared and highly disturbed land
- watercourses.

Areas of the disturbance footprint that do not generate an offset are displayed in Figure 11.1.

11.2 Impacts requiring offset

This section provides an assessment of the impacts requiring offsetting in accordance with the BAM (DPIE 2020a).

11.2.1 Impacts on native vegetation requiring offsets

A summary of ecosystem credits required for all vegetation zones, including changes in vegetation integrity score, are provided in Table 11.2 for the Macleay Gorges IBRA subregion – area assessment, Table 11.3 for the Macleay Gorges IBRA subregion – linear assessment and Table 11.4 for the Macleay Hastings IBRA subregion – linear assessment. Vegetation zones that require an offset are displayed in Figure 11.1. Credit reports are provided in Appendix D.

Table 11.2 Ecosystem credits required for impacts to all vegetation zones in the Macleay Gorges IBRA and Carrai Plateau subregions – area assessment

PCT ID	PCT Name	Vegetation Zone	Extent in disturbance footprint / indirect disturbance footprint (ha)	Current vegetation integrity score	Future vegetation integrity score	Change in vegetation integrity score	Credits required
842	Forest Redgum – Broad-leaved Apple dry open forest of the gorges of NSW North Coast Bioregion	High	103.49	73	0	-73	2,832
842	Forest Redgum – Broad-leaved Apple dry open forest of the gorges of NSW North Coast Bioregion	High (indirect)	33.3	73	70.9	-2.1	27
Sub-total							**2,859**
868	Grey gum – stringybark open forest of the gorges of the NSW North Coast Bioregion and New England Tableland Bioregion	Dry	4.4	72.2	0.0	-72.2	120
868	Grey gum – stringybark open forest of the gorges of the NSW North Coast Bioregion and New England Tableland Bioregion	Dry (indirect)	4.6	72.2	70.5	-1.7	3
868	Grey gum – stringybark open forest of the gorges of the NSW North Coast Bioregion and New England Tableland Bioregion	High	44.1	77.6	0.0	-77.6	1,288
868	Grey gum – stringybark open forest of the gorges of the NSW North Coast Bioregion and New England Tableland Bioregion	High (indirect)	12.6	77.6	75.7	-1.9	9
Sub-total							**1,420**
822	Eurabbie tall open forest of the escarpment ranges of the NSW North Coast Bioregion	High	11.1	75.1	0.0	-75.1	314
822	Eurabbie tall open forest of the escarpment ranges of the NSW North Coast Bioregion	High (indirect)	10.1	75.1	75.1	0	1
Sub-total							**315**

Table 11.2 Ecosystem credits required for impacts to all vegetation zones in the Macleay Gorges IBRA and Carrai Plateau subregions – area assessment

PCT ID	PCT Name	Vegetation Zone	Extent in disturbance footprint / indirect disturbance footprint (ha)	Current vegetation integrity score	Future vegetation integrity score	Change in vegetation integrity score	Credits required
1106	River Oak riparian woodland of the NSW North Coast Bioregion and northern Sydney Basin Bioregion	High	0.07	54.5	0.0	-54.5	2
1106	River Oak riparian woodland of the NSW North Coast Bioregion and northern Sydney Basin Bioregion	High (indirect)	0.4	54.5	53.6	-0.9	1
Sub-total							**3**
1142	Shatterwood – Giant Stinging Tree – Yellow Tulipwood dry rainforest of the NSW North Coast Bioregion and northern Sydney Basin Bioregion	Moderate	5	37.6	0.0	-37.6	70
1142	Shatterwood – Giant Stinging Tree – Yellow Tulipwood dry rainforest of the NSW North Coast Bioregion and northern Sydney Basin Bioregion	Moderate (indirect)	0.36	37.6	37.8	+0.2	1
Sub-total							**71**
1287	Upland heath swamps of the New England Tableland Bioregion	High	0.03	100	0.0	-100	2
1287	Upland heath swamps of the New England Tableland Bioregion	High (indirect)	0.15	100	99.3	-0.7	1
Sub-total							**3**

Table 11.3 Ecosystem credits required for impacts to all vegetation zones in the Macleay Gorges IBRA subregion – linear assessment

PCT ID	PCT Name	Vegetation Zone	Extent in disturbance footprint / indirect disturbance footprint (ha)	Current vegetation integrity score	Future vegetation integrity score	Change in vegetation integrity score	Credits required
762	Cabbage Gum open forest or woodland on flats of the North Coast	Moderate (indirect)	0.2	63.1	62	-1.1	1
Sub-total							**1**
822	Eurabbie tall open forest of the escarpment ranges of the NSW North Coast Bioregion	High (indirect)	0.04	75.1	75.1	0	1
Sub-total							**1**
842	Forest Redgum – Broad-leaved Apple dry open forest of the gorges of NSW North Coast Bioregion	High	42.6	73	0.0	-73	1167
842	Forest Redgum – Broad-leaved Apple dry open forest of the gorges of NSW North Coast Bioregion	High (indirect)	53.5	73	70.9	-2.1	42
842	Forest Redgum – Broad-leaved Apple dry open forest of the gorges of NSW North Coast Bioregion	Poor	0.73	48.8	0.0	-48.8	13
842	Forest Redgum – Broad-leaved Apple dry open forest of the gorges of NSW North Coast Bioregion	Poor (indirect)	0.81	48.8	48.2	-0.6	1
Sub-total							**1,223**
868	Grey gum – stringybark open forest of the gorges of the NSW North Coast Bioregion and New England Tableland Bioregion	High	1.2	77.6	0.0	-77.6	36
868	Grey gum – stringybark open forest of the gorges of the NSW North Coast Bioregion and New England Tableland Bioregion	High (indirect)	3.8	77.6	75.4	-2.2	3
868	Grey gum – stringybark open forest of the gorges of the NSW North Coast Bioregion and New England Tableland Bioregion	Dry (indirect)	0.83	72.2	70.5	-1.7	1
Sub-total							**40**

Table 11.3 Ecosystem credits required for impacts to all vegetation zones in the Macleay Gorges IBRA subregion – linear assessment

PCT ID	PCT Name	Vegetation Zone	Extent in disturbance footprint / indirect disturbance footprint (ha)	Current vegetation integrity score	Future vegetation integrity score	Change in vegetation integrity score	Credits required
1106	River Oak riparian woodland of the NSW North Coast Bioregion and northern Sydney Basin Bioregion	ModerateRF	0.4	62.7	0.0	-62.7	17
1106	River Oak riparian woodland of the NSW North Coast Bioregion and northern Sydney Basin Bioregion	ModerateRF (indirect)	0.4	62.7	61.6	-1.1	1
1106	River Oak riparian woodland of the NSW North Coast Bioregion and northern Sydney Basin Bioregion	Moderate (indirect)	0.01	75.5	73.6	-1.9	1
Sub-total							**19**
1142	Shatterwood – Giant Stinging Tree – Yellow Tulipwood dry rainforest of the NSW North Coast Bioregion and northern Sydney Basin Bioregion	Moderate	0.11	37.6	37.8	+0.2	1
Sub-total							**1**

Table 11.4 Ecosystem credits required for impacts to all vegetation zones in the Macleay Hastings IBRA subregion – linear assessment

PCT ID	PCT Name	Vegetation Zone	Extent in disturbance footprint / indirect disturbance footprint (ha)	Current vegetation integrity score	Future vegetation integrity score	Change in vegetation integrity score	Credits required
762	Cabbage Gum open forest or woodland on flats of the North Coast	PCT 762 Moderate	0.3	63.1	0.0	-63.1	9
762	Cabbage Gum open forest or woodland on flats of the North Coast	PCT 762 Poor	23.4	23.3	0.0	-23.3	3
762	Cabbage Gum open forest or woodland on flats of the North Coast	PCT 762 Moderate (indirect)	0.3	63.1	62	-1.1	1

Table 11.4 Ecosystem credits required for impacts to all vegetation zones in the Macleay Hastings IBRA subregion – linear assessment

PCT ID	PCT Name	Vegetation Zone	Extent in disturbance footprint / indirect disturbance footprint (ha)	Current vegetation integrity score	Future vegetation integrity score	Change in vegetation integrity score	Credits required
762	Cabbage Gum open forest or woodland on flats of the North Coast	PCT 762 Poor (indirect)	23.4	23.3	23.2	-0.1	1
Sub-total							**14**
842	Forest Redgum – Broad-leaved Apple dry open forest of the gorges of NSW North Coast Bioregion	PCT 842 High	3	73	0.0	-73	81
842	Forest Redgum – Broad-leaved Apple dry open forest of the gorges of NSW North Coast Bioregion	PCT 842 Poor	0.76	48.8	0.0	-48.8	14
842	Forest Redgum – Broad-leaved Apple dry open forest of the gorges of NSW North Coast Bioregion	PCT 842 High (Indirect)	4.4	73	70.9	-2.1	3
842	Forest Redgum – Broad-leaved Apple dry open forest of the gorges of NSW North Coast Bioregion	PCT 842 Poor (Indirect)	1.9	48.8	48.2	-0.6	1
Sub-total							**99**
868	Grey gum – stringybark open forest of the gorges of the NSW North Coast Bioregion and New England Tableland Bioregion	PCT 868 High	12.6	77.6	0.0	-77.6	367
868	Grey gum – stringybark open forest of the gorges of the NSW North Coast Bioregion and New England Tableland Bioregion	PCT 868 High (Indirect)	7.4	77.6	75.4	-2.2	6
Sub-total							**373**
1106	River Oak riparian woodland of the NSW North Coast Bioregion and northern Sydney Basin Bioregion	PCT 1106 Moderate	0.8	75.5	0.0	-75.5	38
1106	River Oak riparian woodland of the NSW North Coast Bioregion and northern Sydney Basin Bioregion	PCT 1106 Moderate (Indirect)	1.5	75.5	73.6	-1.9	2
Sub-total							**40**

Table 11.4 Ecosystem credits required for impacts to all vegetation zones in the Macleay Hastings IBRA subregion – linear assessment

PCT ID	PCT Name	Vegetation Zone	Extent in disturbance footprint / indirect disturbance footprint (ha)	Current vegetation integrity score	Future vegetation integrity score	Change in vegetation integrity score	Credits required
1215	Spotted Gum – Grey Ironbark open forest of the Macleay Valley lowlands of the NSW North Coast Bioregion	PCT 1215 High	51.7	64.9	0.0	-64.9	1258
1215	Spotted Gum – Grey Ironbark open forest of the Macleay Valley lowlands of the NSW North Coast Bioregion	PCT 1215 DNG Moderate	1.2	41	0.0	-41	12
1215	Spotted Gum – Grey Ironbark open forest of the Macleay Valley lowlands of the NSW North Coast Bioregion	PCT 1215 High (Indirect)	60.1	64.9	63.8	-1.1	24
1215	Spotted Gum – Grey Ironbark open forest of the Macleay Valley lowlands of the NSW North Coast Bioregion	PCT 1215 DNGModerate (Indirect)	0.36	41	40.1	-0.9	1
Sub-total							**1,295**
1268	Tallowwood open forest of the coastal ranges of the NSW North Coast Bioregion	PCT 1268 High	1.1	72.7	0.0	-72.7	29
1268	Tallowwood open forest of the coastal ranges of the NSW North Coast Bioregion	PCT 1268 High (Indirect)	0.96	72.7	71.5	-1.2	1
Sub-total							**30**

11.2.2 Impacts on threatened species requiring offsets

A summary of the species credits required for all vegetation zones occupied by the threatened species, is provided Table 11.5 for the Macleay Gorges IBRA subregion – area assessment, Table 11.6 for Macleay Gorges IBRA subregion – linear assessment and Table 11.7 for the Macleay Hastings IBRA subregion – linear assessment of the NSW North Coast IBRA bioregion. Credit reports are provided in Appendix D. Offsets will be provided in accordance with the biodiversity offset framework outlined in Chapter 12.

Table 11.5 Threatened species credits require for impacts in the Macleay Gorges and Carrai Plateau IBRA subregion – area assessment

Scientific name	Common name	Vegetation zones in species polygon	Area (ha)/count	Potential SAII	Credits required
Grevillea guthrieana	Guthrie's Grevillea	PCT 842 High	12	No	24

Table 11.5 Threatened species credits require for impacts in the Macleay Gorges and Carrai Plateau IBRA subregion – area assessment

Scientific name	Common name	Vegetation zones in species polygon	Area (ha)/count	Potential SAII	Credits required
Grevillea guthrieana	Guthrie's Grevillea	PCT 868 High	2	No	4
Grevillea guthrieana	Guthrie's Grevillea	PCT 842 High (Indirect)	21	No	42
Grevillea guthrieana	Guthrie's Grevillea	PCT 868 High (Indirect)	8	No	16
Sub-total					**86**
Lepidium peregrinum	Wandering Pepper Cress	PCT 1106 High	0.06 ha	Yes	2
Lepidium peregrinum	Wandering Pepper Cress	PCT 1106 High (Indirect)	0.4 ha	Yes	3
Sub-total					**5**
Pultenaea rubescens		PCT 822 High	0.03	Yes	2
Pultenaea rubescens		PCT 1287 High	0.03	Yes	2
Pultenaea rubescens		PCT 822 High (Indirect)	0.7	Yes	2
Pultenaea rubescens		PCT 1287 High (Indirect)	0.12	Yes	1
Sub-total					**7**
Tylophora woollsii	Cryptic Forest Twiner	PCT 822 High	3.5	No	130
Tylophora woollsii	Cryptic Forest Twiner	PCT 822 High (Indirect)	3	No	7
Sub-total					**137**
Calyptorhynchus lathami	Glossy Black-Cockatoo	PCT 842 High	2	No	72
Calyptorhynchus lathami	Glossy Black-Cockatoo	PCT 868 Dry	4.9	No	63
Calyptorhynchus lathami	Glossy Black-Cockatoo	PCT 868 High	1.7	No	191
Calyptorhynchus lathami	Glossy Black-Cockatoo	PCT 842 High (Indirect)	2.1	No	9
Calyptorhynchus lathami	Glossy Black-Cockatoo	PCT 868 Dry (Indirect)	3.2	No	3
Calyptorhynchus lathami	Glossy Black-Cockatoo	PCT 868 High (Indirect)	1.5	No	10

Table 11.5 Threatened species credits require for impacts in the Macleay Gorges and Carrai Plateau IBRA subregion – area assessment

Scientific name	Common name	Vegetation zones in species polygon	Area (ha)/count	Potential SAII	Credits required
Sub-total					**348**[6]
Myotis Macropus	Southern Myotis	PCT 842 High	2.5	No	92
Myotis Macropus	Southern Myotis	PCT 1106 High	0.04	No	1
Myotis Macropus	Southern Myotis	PCT 1142 Moderate	0.01	No	1
Sub-total					**94**
Ninox connivens	Barking Owl	PCT 842 High	0.19 ha	No	7
Ninox connivens	Barking Owl	PCT 868 High	1 ha	No	40
Ninox connivens	Barking Owl	PCT 842 High (Indirect)	0.27	No	1
Ninox connivens	Barking Owl	PCT 868 High (Indirect)	0.09	No	1
Sub-total					**49**[6]
Ninox strenua	Powerful Owl	PCT 842 High	0.19 ha	No	7
Ninox strenua	Powerful Owl	PCT 868 High	1 ha	No	40
Ninox strenua	Powerful Owl	PCT 842 High (Indirect)	0.27	No	1
Ninox strenua	Powerful Owl	PCT 868 High (Indirect)	0.09	No	1
Sub-total					**49**[6]
Petauroides volans	Greater Glider	PCT 822 High	11.1	No	418
Petauroides volans	Greater Glider	PCT 868 High	43.9	No	1705
Petauroides volans	Greater Glider	PCT 868 Dry	4.4	No	160
Petauroides volans	Greater Glider	PCT 822 High (Indirect)	10.1	No	24
Petauroides volans	Greater Glider	PCT 868 High (Indirect)	8.8	No	28
Petauroides volans	Greater Glider	PCT 868 Dry (Indirect)	1.7	No	4
Sub-total					**2,339**
Petaurus norfolcensis	Squirrel Glider	PCT 822 High	11.1	No	418
Petaurus norfolcensis	Squirrel Glider	PCT 842 High	103.4	No	3,775
Petaurus norfolcensis	Squirrel Glider	PCT 868 High	44.2	No	1,717

Table 11.5 Threatened species credits require for impacts in the Macleay Gorges and Carrai Plateau IBRA subregion – area assessment

Scientific name	Common name	Vegetation zones in species polygon	Area (ha)/count	Potential SAII	Credits required
Petaurus norfolcensis	Squirrel Glider	PCT 1106 High	0.06	No	2
Petaurus norfolcensis	Squirrel Glider	PCT 1142 Moderate	5	No	94
Petaurus norfolcensis	Squirrel Glider	PCT 868 Dry	4.4	No	160
Petaurus norfolcensis	Squirrel Glider	PCT 842 High (Indirect)	33.3	No	138
Petaurus norfolcensis	Squirrel Glider	PCT 868 High (Indirect)	12.6	No	40
Petaurus norfolcensis	Squirrel Glider	PCT 1106 High (Indirect)	0.4	No	2
Petaurus norfolcensis	Squirrel Glider	PCT 868 Dry (Indirect)	1.7	No	4
Sub-total					**6,350**
Petrogale penicillata	Brush-tailed Rock Wallaby	PCT 822 High	9.3	Yes	525
Petrogale penicillata	Brush-tailed Rock Wallaby	PCT 842 High	94.5	Yes	5,177
Petrogale penicillata	Brush-tailed Rock Wallaby	PCT 868 High	44.2	Yes	2,575
Petrogale penicillata	Brush-tailed Rock Wallaby	PCT 1142 Moderate	0.69	Yes	19
Petrogale penicillata	Brush-tailed Rock Wallaby	PCT 868 Dry	4.4	Yes	240
Petrogale penicillata	Brush-tailed Rock Wallaby	PCT 822 High (Indirect)	6.6	Yes	23
Petrogale penicillata	Brush-tailed Rock Wallaby	PCT 842 High (Indirect)	31.1	Yes	193
Petrogale penicillata	Brush-tailed Rock Wallaby	PCT 868 High (Indirect)	8.8	Yes	41
Petrogale penicillata	Brush-tailed Rock Wallaby	PCT 1142 Moderate (Indirect)	0.06	Yes	1
Petrogale penicillata	Brush-tailed Rock Wallaby	PCT 868 Dry (Indirect)	4.6	Yes	14
Sub-total					**8,808**
Potorous tridactylus	Long-nosed Potoroo	PCT 868 Dry	4.4 ha	No	160

Table 11.5 Threatened species credits require for impacts in the Macleay Gorges and Carrai Plateau IBRA subregion – area assessment

Scientific name	Common name	Vegetation zones in species polygon	Area (ha)/count	Potential SAII	Credits required
Potorous tridactylus	Long-nosed Potoroo	PCT 868 High	43.1 ha	No	1705
Potorous tridactylus	Long-nosed Potoroo	PCT 822 High	11.1 ha	No	418
Potorous tridactylus	Long-nosed Potoroo	PCT 822 High (Indirect)	10.1	No	24
Potorous tridactylus	Long-nosed Potoroo	PCT 868 High (Indirect)	12.6	No	40
Potorous tridactylus	Long-nosed Potoroo	PCT 868 Dry (Indirect)	4.6	No	10
Sub-total					**2,357**
Tyto novaehollandiae	Masked Owl	PCT 842 High	0.19 ha	No	7
Tyto novaehollandiae	Masked Owl	PCT 868 High	1 ha	No	40
Tyto novaehollandiae	Masked Owl	PCT 842 High (Indirect)	0.27	No	1
Tyto novaehollandiae	Masked Owl	PCT 868 High (Indirect)	0.7	No	2
Sub-total					**50**

6. Assumed presence.

Table 11.6 Threatened species credits require for impacts in the Macleay Gorges IBRA subregion – linear assessment

Scientific name	Common name	Vegetation zones in species polygon	Area (ha)/count	Potential SAII	Credits required
Grevillea guthrieana	Guthrie's Grevillea	PCT 842 High	1	No	2
Grevillea guthrieana	Guthrie's Grevillea	PCT 842 High (Indirect)	15	No	30
Grevillea guthrieana	Guthrie's Grevillea	PCT 842 DNG Moderate (Indirect)	1	No	2
Sub-total					**34**
Haloragis exalata subsp. velutina	Tall Velvet Sea-berry	PCT 842 High	13	No	26
Haloragis exalata subsp. velutina	Tall Velvet Sea-berry	PCT 842 High (Indirect)	31	No	62

Table 11.6 Threatened species credits require for impacts in the Macleay Gorges IBRA subregion – linear assessment

Scientific name	Common name	Vegetation zones in species polygon	Area (ha)/count	Potential SAII	Credits required
Haloragis exalata subsp. velutina	Tall Velvet Sea-berry	PCT 762 Moderate (Indirect)	1	No	2
Sub-total					**90**
Myotis Macropus	Southern Myotis	PCT 842 High	2.5	No	92
Myotis Macropus	Southern Myotis	PCT 1106 ModerateRF	0.04	No	1
Myotis Macropus	Southern Myotis	PCT 842 Poor	0.52	No	13
Myotis Macropus	Southern Myotis	PCT 842 High (Indirect)	0.62	No	1
Myotis Macropus	Southern Myotis	PCT 762 Moderate (Indirect)	0.08	No	1
Myotis Macropus	Southern Myotis	PCT 1106 ModerateRF01 (Indirect)	0.15	No	1
Sub-total					**109**
Petauroides volans	Greater Glider	PCT 868 High	1.1 ha	No	42
Petauroides volans	Greater Glider	PCT 868 High (Indirect)	2.7	No	3
Petauroides volans	Greater Glider	PCT 868 Dry (Indirect)	0.72	No	1
Sub-total					**46**
Petaurus norfolcensis	Squirrel Glider	PCT 842 High	42.6	No	1,555
Petaurus norfolcensis	Squirrel Glider	PCT 1106 ModerateRF	0.4	No	13
Petaurus norfolcensis	Squirrel Glider	PCT 842 High (Indirect)	53.5	No	56
Petaurus norfolcensis	Squirrel Glider	PCT 868 High (Indirect)	2.7	No	3
Petaurus norfolcensis	Squirrel Glider	PCT 762 Moderate (Indirect)	0.25	No	1
Petaurus norfolcensis	Squirrel Glider	PCT 1106 ModerateRF01 (Indirect)	0.41	No	1
Petaurus norfolcensis	Squirrel Glider	PCT 868 Dry (Indirect)	0.72	No	1
Petaurus norfolcensis	Squirrel Glider	PCT 842 Poor (Indirect)	0.8	No	1

Table 11.6 Threatened species credits require for impacts in the Macleay Gorges IBRA subregion – linear assessment

Scientific name	Common name	Vegetation zones in species polygon	Area (ha)/count	Potential SAII	Credits required
Sub-total					**1,631**
Petrogale penicillata	Brush-tailed Rock Wallaby	PCT 842 High	37.7	Yes	2,065
Petrogale penicillata	Brush-tailed Rock Wallaby	PCT 868 High	1.2	Yes	71
Petrogale penicillata	Brush-tailed Rock Wallaby	PCT 868 High (Indirect)	1.1	Yes	2
Petrogale penicillata	Brush-tailed Rock Wallaby	PCT 822 High (Indirect)	0.03	Yes	1
Petrogale penicillata	Brush-tailed Rock Wallaby	PCT 868 Dry (Indirect)	0.1	Yes	1
Sub-total					**2,140**
Petrogale penicillata	Brush-tailed Phascogale	PCT 842 High	15	No	549
Petrogale penicillata	Brush-tailed Phascogale	PCT 842 Poor	0.73	No	18
Petrogale penicillata	Brush-tailed Phascogale	PCT 842 High (Indirect)	15.9	No	17
Petrogale penicillata	Brush-tailed Phascogale	PCT 842 Poor (Indirect)	4.2	No	1
Sub-total					**585**

Table 11.7 Threatened species credits require for impacts in the Macleay Hastings IBRA subregion – linear assessment

Scientific name	Common name	Vegetation zones in species polygon	Area (ha)/count	Potential SAII	Credits required
Haloragis exalata subsp. velutina	Tall Velvet Sea-berry	PCT 1215 High	350	No	700
Haloragis exalata subsp. *velutina*	Tall Velvet Sea-berry	PCT 1215 High (Indirect)	1017	No	2034
Sub-total					**2,734**
Tylophora woollsii	Cryptic Forest Twiner	PCT 1215	9.27 ha	No	301
Tylophora woollsii	Cryptic Forest Twiner	PCT 1215 High (Indirect)	9.2	No	5
Sub-total					**306**

Table 11.7 Threatened species credits require for impacts in the Macleay Hastings IBRA subregion – linear assessment

Scientific name	Common name	Vegetation zones in species polygon	Area (ha)/count	Potential SAII	Credits required
Myotis Macropus	Southern Myotis	PCT 1215 High	0.13	No	4
Myotis Macropus	Southern Myotis	PCT 842 High (Indirect)	4.4	No	5
Myotis Macropus	Southern Myotis	PCT 842 Poor (Indirect)	1.9	No	1
Myotis Macropus	Southern Myotis	PCT 868 High (Indirect)	7.4	No	8
Myotis Macropus	Southern Myotis	PCT 1215 High (Indirect)	60.1	No	32
Myotis Macropus	Southern Myotis	PCT 1268 High (Indirect)	0.95	No	1
Myotis Macropus	Southern Myotis	PCT 762 Moderate 0101 (Indirect)	0.3	No	1
Myotis Macropus	Southern Myotis	PCT 762 Poor 0101 (Indirect)	0.25	No	1
Myotis Macropus	Southern Myotis	PCT 1106 Moderate 01 (Indirect)	1.4	No	1
Sub-total					**54**
Petauroides volans	Greater Glider	PCT 868 High	12.6	No	489
Petauroides volans	Greater Glider	PCT 1215 High	41.4	No	1,345
Petauroides volans	Greater Glider	PCT 868 High (Indirect)	7.4	No	8
Petauroides volans	Greater Glider	PCT 1215 High (Indirect)	60	No	32
Petauroides volans	Greater Glider	PCT 762 Moderate 0101 (Indirect)	0.01	No	1
Sub-total					**1,875**
Petaurus norfolcensis	Squirrel Glider	PCT 842 High	2.6	No	93
Petaurus norfolcensis	Squirrel Glider	PCT 1268 High	1	No	38
Petaurus norfolcensis	Squirrel Glider	PCT 842 Poor	0.75	No	18
Petaurus norfolcensis	Squirrel Glider	PCT 842 High (Indirect)	3	No	3
Petaurus norfolcensis	Squirrel Glider	PCT 868 High	12.6	No	489

Table 11.7 Threatened species credits require for impacts in the Macleay Hastings IBRA subregion – linear assessment

Scientific name	Common name	Vegetation zones in species polygon	Area (ha)/count	Potential SAII	Credits required
Petaurus norfolcensis	Squirrel Glider	PCT 868 High (Indirect)	7.4	No	8
Petaurus norfolcensis	Squirrel Glider	PCT 1215 High	51.7	No	1678
Petaurus norfolcensis	Squirrel Glider	PCT 1215 High (indirect)	51.7	No	28
Petaurus norfolcensis	Squirrel Glider	PCT 1268 High (Indirect)	0.95	No	1
Petaurus norfolcensis	Squirrel Glider	PCT 762 Moderate 0101 (Indirect)	0.3	No	1
Petaurus norfolcensis	Squirrel Glider	PCT 1106 Moderate01 (Indirect)	0.79	No	1
Petaurus norfolcensis	Squirrel Glider	PCT 762 Poor 0101 (Indirect)	0.25	No	1
Petaurus norfolcensis	Squirrel Glider	PCT 842 Poor (Indirect)	0.75	No	1
Sub-total					**2,360**
Petrogale penicillata	Brush-tailed Phascogale	PCT 842 High	2.6	No	94
Petrogale penicillata	Brush-tailed Phascogale	PCT 868 High	12.6	No	489
Petrogale penicillata	Brush-tailed Phascogale	PCT 1215 High	51.6	No	1,677
Petrogale penicillata	Brush-tailed Phascogale	PCT 842 Poor	0.19	No	5
Petrogale penicillata	Brush-tailed Phascogale	PCT 842 High (Indirect)	4.4	No	5
Petrogale penicillata	Brush-tailed Phascogale	PCT 868 High (Indirect)	7.4	No	8
Petrogale penicillata	Brush-tailed Phascogale	PCT 1215 High (Indirect)	60.1	No	32
Petrogale penicillata	Brush-tailed Phascogale	PCT 842 Poor (Indirect)	1.9	No	1
Sub-total					**2,311**
Phascolarctos cinereus	Koala	PCT 842 High	1.7	No	61
Phascolarctos cinereus	Koala	PCT 1215 High	41.4	No	1,345

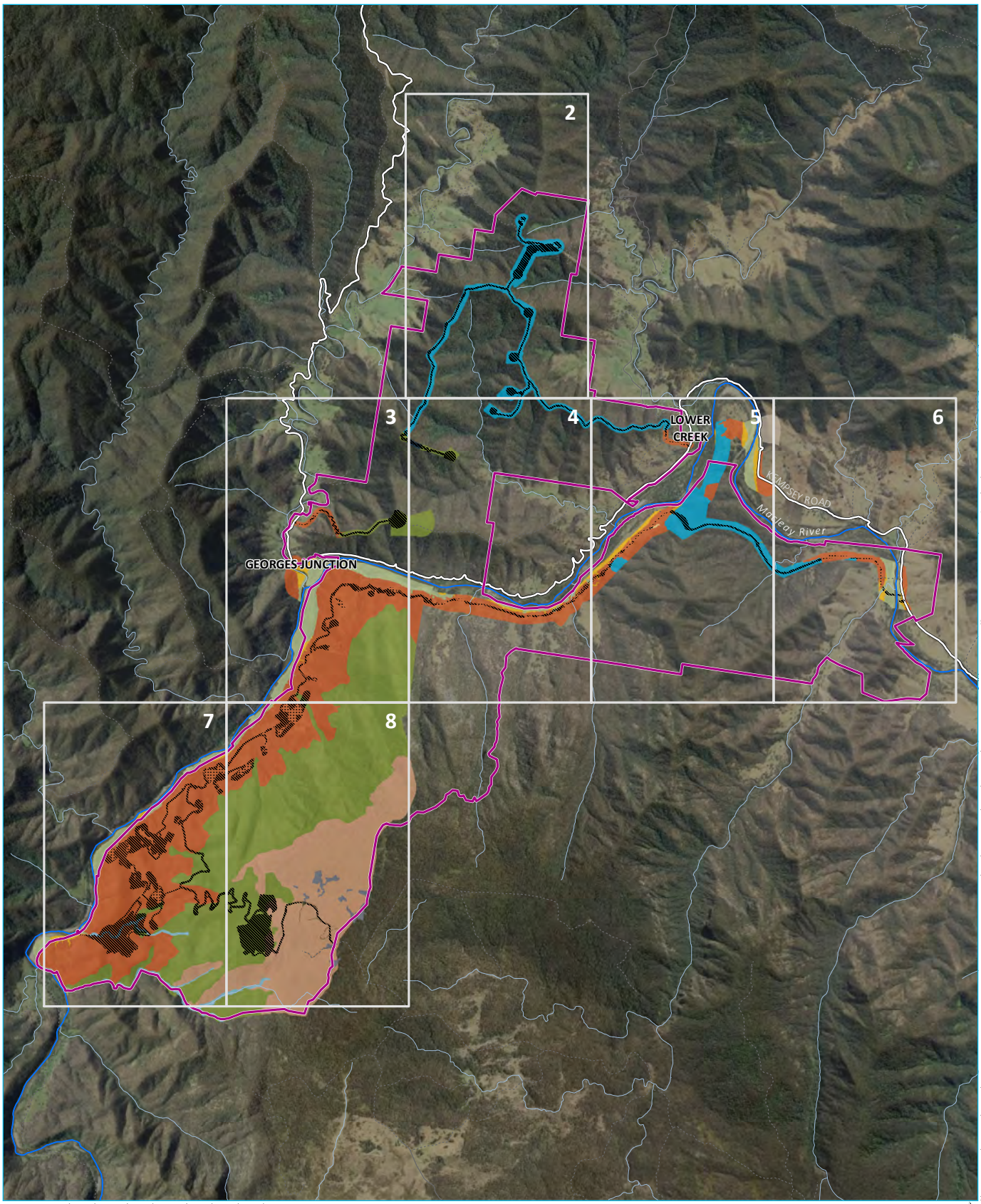
Table 11.7 Threatened species credits require for impacts in the Macleay Hastings IBRA subregion – linear assessment

Scientific name	Common name	Vegetation zones in species polygon	Area (ha)/count	Potential SAII	Credits required
Phascolarctos cinereus	Koala	PCT 1268 High	1	No	38
Phascolarctos cinereus	Koala	PCT 842 Poor	0.56	No	14
Phascolarctos cinereus	Koala	PCT 868 High	12.6	No	489
Phascolarctos cinereus	Koala	PCT 842 High (Indirect)	2.3	No	2
Phascolarctos cinereus	Koala	PCT 868 High (Indirect)	7.4	No	8
Phascolarctos cinereus	Koala	PCT 1215 High (Indirect)	47.2	No	25
Phascolarctos cinereus	Koala	PCT 1268 High (Indirect)	0.95	No	1
Phascolarctos cinereus	Koala	PCT 762 Poor 0101 (Indirect)	0.01	No	1
Phascolarctos cinereus	Koala	PCT 842 Poor (Indirect)	1.1	No	1
Sub-total					**1,985**
Planigale maculata	Common Planigale	PCT 868 High	12.6	No	489
Planigale maculata	Common Planigale	PCT 1215 High	51.7	No	1,678
Planigale maculata	Common Planigale	PCT 1268 High	1	No	38
Planigale maculata	Common Planigale	PCT 762 Moderate 0101	0.3	No	9
Planigale maculata	Common Planigale	PCT 1106 Moderate 01	0.79	No	30
Planigale maculata	Common Planigale	PCT 762 Poor 0101	0.28	No	3
Planigale maculata	Common Planigale	PCT 868 High (Indirect)	7.4	No	8
Planigale maculata	Common Planigale	PCT 1215 High (Indirect)	60.1	No	32
Planigale maculata	Common Planigale	PCT 1268 High (Indirect)	0.95	No	1
Planigale maculata	Common Planigale	PCT 762 Moderate 0101 (Indirect)	0.3	No	1
Planigale maculata	Common Planigale	PCT 1106 Moderate 01 (Indirect)	1.4	No	1

Table 11.7 Threatened species credits require for impacts in the Macleay Hastings IBRA subregion – linear assessment

Scientific name	Common name	Vegetation zones in species polygon	Area (ha)/count	Potential SAII	Credits required
Planigale maculata	Common Planigale	PCT 762 Poor0101 (Indirect)	0.25	No	1
Sub-total					**2,291**[1]
Potorous tridactylus	Long-nosed Potoroo	PCT 868 High	12.6	No	489
Potorous tridactylus	Long-nosed Potoroo	PCT 1215 High	41.4	No	1,345
Potorous tridactylus	Long-nosed Potoroo	PCT 868 High (Indirect)	7.4	No	8
Potorous tridactylus	Long-nosed Potoroo	PCT 1215 High (Indirect)	60	No	32
Potorous tridactylus	Long-nosed Potoroo	PCT 762 Moderate 0101 (Indirect)	0.01	No	1
Sub-total					**1,875**
Vespadelus troughtoni	Eastern Cave Bat	PCT 868 High	7.9	Yes	458
Vespadelus troughtoni	Eastern Cave Bat	PCT 868 High (Indirect)	7.3	Yes	12
Sub-total					**470**

1. Assumed present.



Source: EMM (2022); DFSI (2020); DPIE (2022); GA (2011)

0 1 2 km

GDA 1994 MGA Zone 56

N

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KEY

- Project area
- Impacts requiring offsets
- Impacts not requiring offsets

Existing environment

- Macleay River
- Watercourse/drainage line
- Major road
- Minor road
- Vehicular track

Plant community type

- 762
- 780
- 822
- 842
- 868
- 1106
- 1142
- 1215
- 1268
- 1287
- 1549

Impacts requiring offsets and impacts not requiring offsets

Map 1 of 8

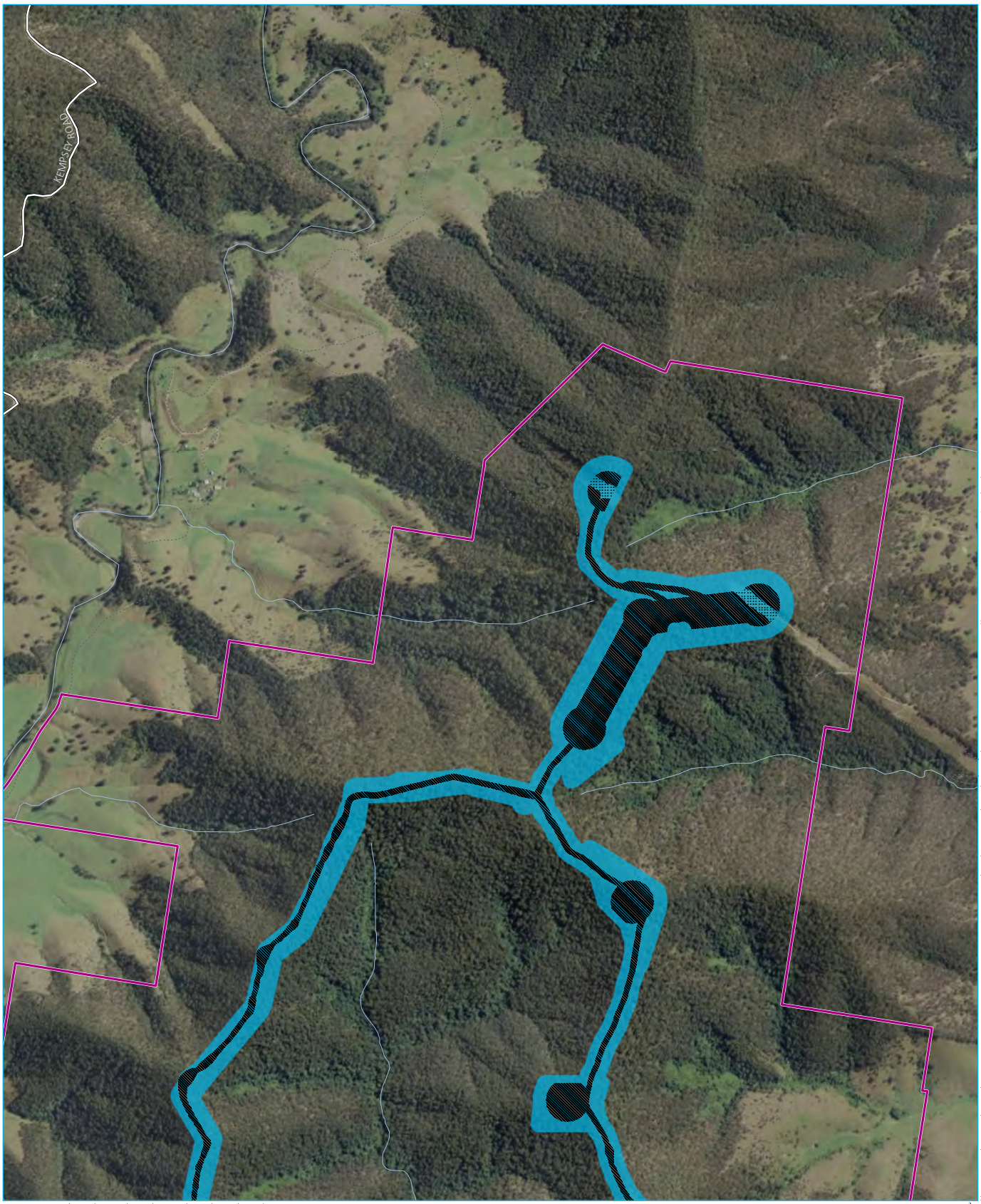
Oven Mountain Pumped Hydro Energy Storage Project

Biodiversity development assessment report

OMPS Pty Ltd

Figure 11.1

EMM creating opportunities



Source: EMM (2022); DFSI (2020); DPIE (2022); GA (2011)

0 1 2 km

GDA 1994 MGA Zone 56

N

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KEY

- Project area
- Impacts requiring offsets
- Impacts not requiring offsets

Existing environment

- Macleay River
- Watercourse/drainage line
- Major road
- Vehicular track

Plant community type

- 1215

Impacts requiring offsets and impacts not requiring offsets

Map 2 of 8

Oven Mountain Pumped Hydro Energy Storage Project

Biodiversity development assessment report

OMPS Pty Ltd

Figure 11.1

EMM creating opportunities



Source: EMM (2022); DFSI (2020); DPIE (2022); GA (2011)

0 1 2 km

GDA 1994 MGA Zone 56

N

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KEY

- Project area
- Impacts requiring offsets
- Impacts not requiring offsets

Existing environment

- Macleay River
- Watercourse/drainage line
- Major road
- Vehicular track

Plant community type

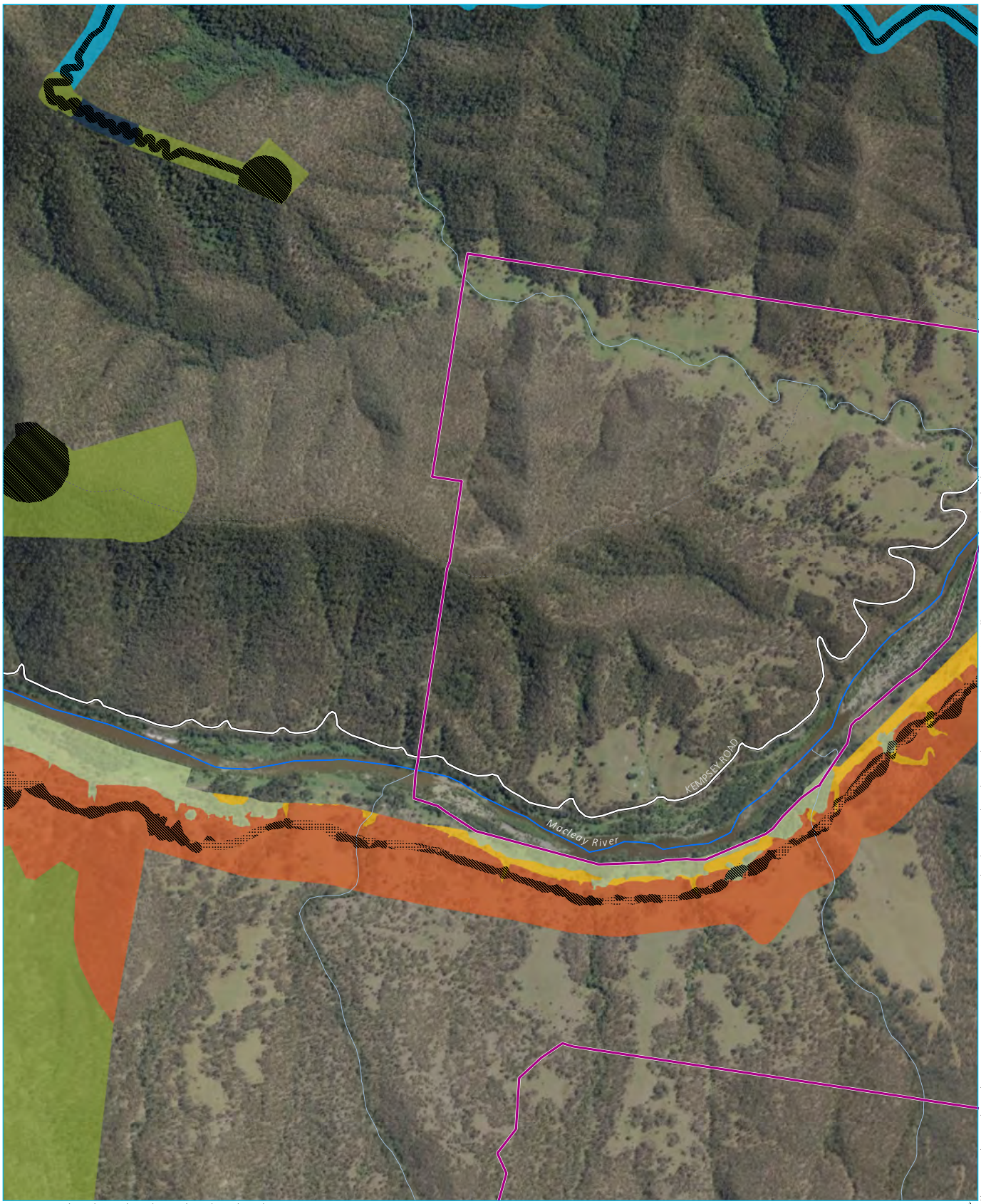
- 762
- 842
- 868
- 1106
- 1215
- 1268

Impacts requiring offsets and impacts not requiring offsets

Map 3 of 8

Oven Mountain Pumped Hydro Energy Storage Project
Biodiversity development assessment report
OMPS Pty Ltd
Figure 11.1

EMM creating opportunities



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Source: EMM (2022); DFSI (2020); DPIE (2022); GA (2011)

0 1 2 km

GDA 1994 MGA Zone 56

N

KEY

- Project area
- Impacts requiring offsets
- Impacts not requiring offsets

Existing environment

- Macleay River
- Watercourse/drainage line
- Major road
- Vehicular track

Plant community type

- 762
- 842
- 868
- 1106
- 1215
- 1268

Impacts requiring offsets and impacts not requiring offsets

Map 4 of 8

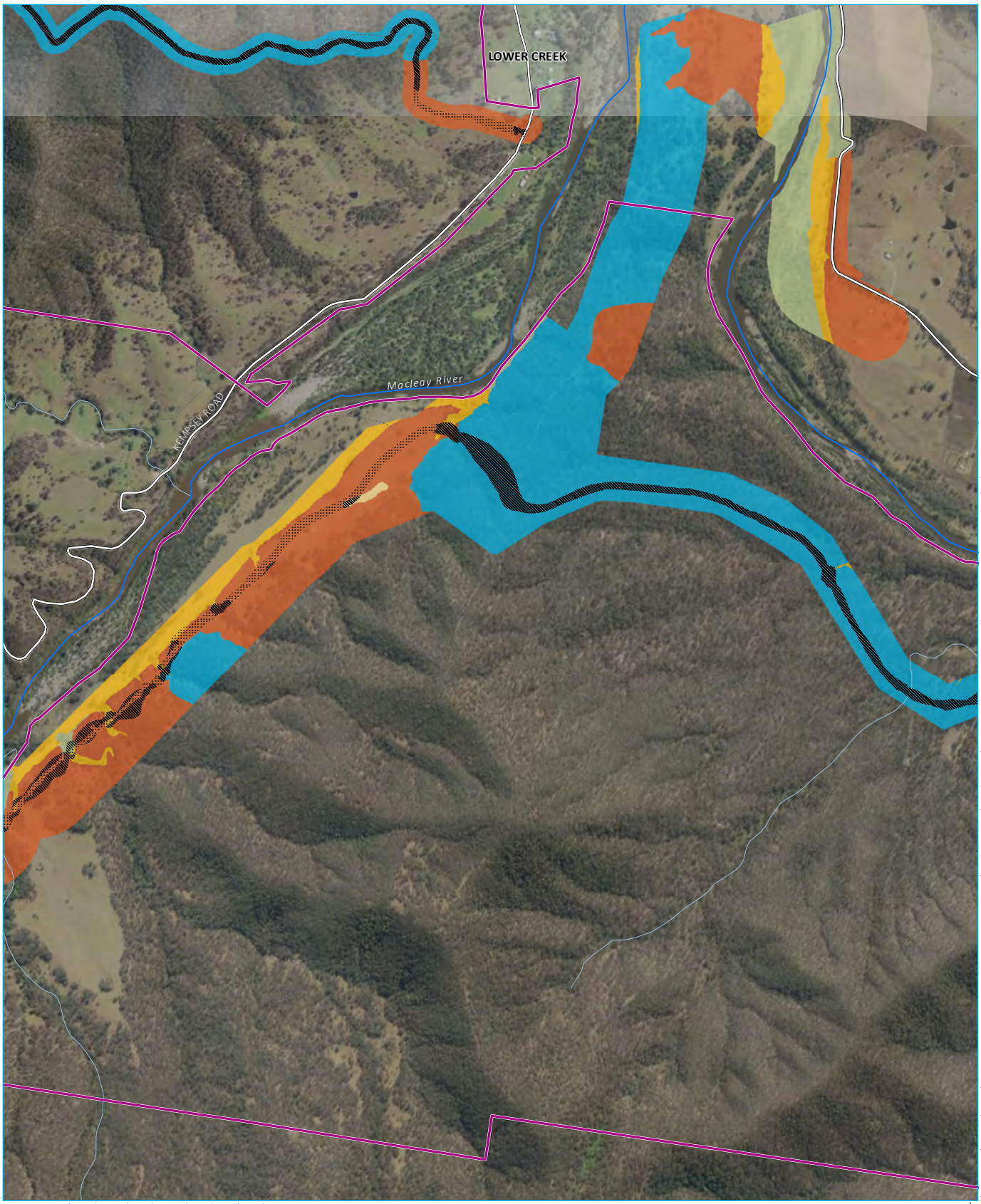
Oven Mountain Pumped Hydro Energy Storage Project

Biodiversity development assessment report

OMPS Pty Ltd

Figure 11.1

EMM creating opportunities



Source: EMM (2022); DFSI (2020); DPIE (2022); GA (2011)

0 1 2 km

GDA 1994 MGA Zone 56

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KEY

- Project area
- Impacts requiring offsets
- Impacts not requiring offsets

Existing environment

- Macleay River
- Watercourse/drainage line
- Major road
- Vehicular track

Plant community type

- 762
- 780
- 842
- 1106
- 1215
- 1549

Impacts requiring offsets and impacts not requiring offsets

Map 5 of 8

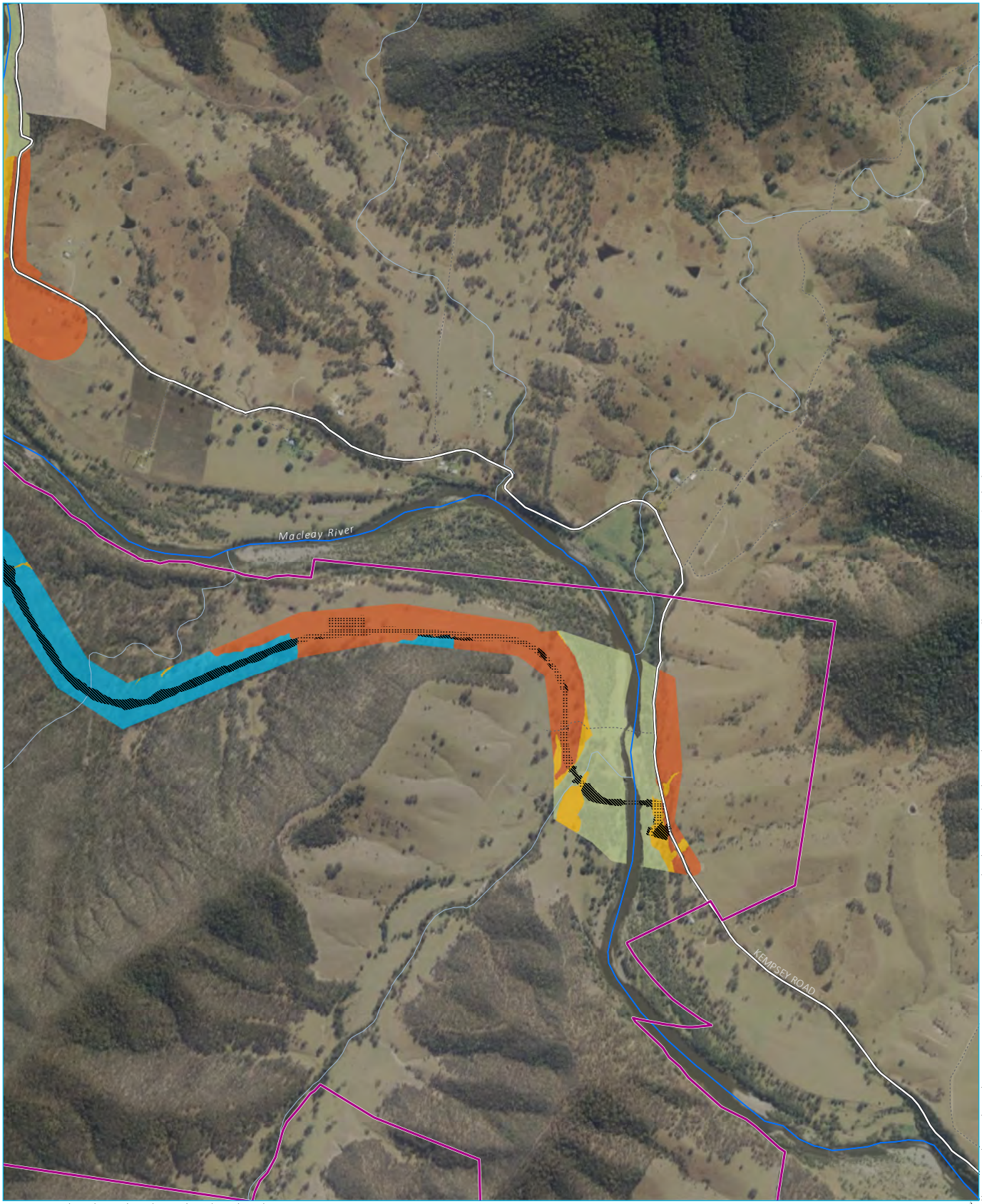
Oven Mountain Pumped Hydro Energy Storage Project

Biodiversity development assessment report

OMPS Pty Ltd

Figure 11.1

EMM creating opportunities



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Source: EMM (2022); DFSI (2020); DPIE (2022); GA (2011)

0 1 2 km

GDA 1994 MGA Zone 56

N

KEY

- Project area
- Impacts requiring offsets
- Impacts not requiring offsets

Existing environment

- Macleay River
- Watercourse/drainage line
- Major road
- Vehicular track

Plant community type

- 762
- 842
- 1106
- 1215
- 1549

Impacts requiring offsets and impacts not requiring offsets

Map 6 of 8

Oven Mountain Pumped Hydro Energy Storage Project

Biodiversity development assessment report

OMPS Pty Ltd

Figure 11.1

EMM creating opportunities



Source: EMM (2022); DFSI (2020); DPIE (2022); GA (2011)

0 1 2 km

GDA 1994 MGA Zone 56

N

KEY

- Project area
- Impacts requiring offsets
- Impacts not requiring offsets

Existing environment

- Macleay River
- Watercourse/drainage line
- Vehicular track

Plant community type

- 762
- 822
- 842
- 868
- 1106
- 1142

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Impacts requiring offsets and impacts not requiring offsets

Map 7 of 8

Oven Mountain Pumped Hydro Energy Storage Project

Biodiversity development assessment report

OMPS Pty Ltd

Figure 11.1

EMM creating opportunities



Source: EMM (2022); DFSI (2020); DPIE (2022); GA (2011)

0 1 2 km

GDA 1994 MGA Zone 56

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KEY

- Project area
- Impacts requiring offsets
- Impacts not requiring offsets

Existing environment

- Macleay River
- Watercourse/drainage line
- Vehicular track

Plant community type

- 762
- 822
- 842
- 868
- 1106
- 1142
- 1287

Impacts requiring offsets and impacts not requiring offsets

Map 8 of 8

Oven Mountain Pumped Hydro Energy Storage Project

Biodiversity development assessment report

OMPS Pty Ltd

Figure 11.1

EMM creating opportunities

12 Biodiversity offset strategy

12.1 Offset requirements

Impacts and offset requirements for the Project are outlined above. The Project will result in clearing of 328 ha of native vegetation of varying condition and habitat for threatened species. A consolidated summary of the offset requirements is provided in Table 12.1 and summarised in credit class in Table 12.2. The credit calculations are based upon the layout as currently proposed, and may change, subject to final design. Offset requirements will be updated in the Biodiversity Offset Package to be prepared prior to any development being carried out that would impact on biodiversity values.

Table 12.1 Summary of offsets requirements for the Project

PCT ID	PCT Name/Species	Offset trading group	Credits
762	Cabbage Gum open forest or woodland on flats of the North Coast	Coastal Valley Grassy Woodlands; >=70% and <90%	0
		Subtropical Coastal Floodplain Forest of the New South Wales North Coast Bioregion	15
780	Coastal floodplain sedgelands, rushlands, and forblands of the North Coast	Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	0
822	Eurabbie tall open forest of the escarpment ranges of the NSW North Coast Bioregion	Northern Escarpment Dry Sclerophyll Forests; <50%	316
842	Forest Redgum – Broad-leaved Apple dry open forest of the gorges of NSW North Coast Bioregion	Northern Gorge Dry Sclerophyll Forests; <50%	4,181
868	Grey gum – stringybark open forest of the gorges of the NSW North Coast Bioregion and New England Tableland Bioregion	Northern Gorge Dry Sclerophyll Forests; <50%	1,833
1106	River Oak riparian woodland of the NSW North Coast Bioregion and northern Sydney Basin Bioregion	Lowland Rainforest on Floodplain in the New South Wales North Coast Bioregion	18
		Subtropical Coastal Floodplain Forest of the New South Wales North Coast Bioregion	44
1142	Shatterwood – Giant Stinging Tree – Yellow Tulipwood dry rainforest of the NSW North Coast Bioregion and northern Sydney Basin Bioregion	Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions	72
1215	Spotted Gum – Grey Ironbark open forest of the Macleay Valley lowlands of the NSW North Coast Bioregion	Hunter-Macleay Dry Sclerophyll Forests; <50%	1,295
1268	Tallowwood open forest of the coastal ranges of the NSW North Coast Bioregion	Northern Hinterland Wet Sclerophyll Forests; <50%	30
1287	Upland heath swamps of the New England Tableland Bioregion	Montane Peatlands and Swamps of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands and Australian Alps bioregions	3
	Guthrie's Grevillea	–	120

Table 12.1 Summary of offsets requirements for the Project

PCT ID	PCT Name/Species	Offset trading group	Credits
	Tall Velvet Sea-berry	–	2,824
	Wandering Pepper Cress	–	5
	Cryptic Forest Twiner	–	443
	Pultenaea rubescens	–	7
	Glossy Black-cockatoo	–	348
	Barking Owl	–	49
	Powerful Owl	–	49
	Masked Owl	–	50
	Brush-tailed Rock-wallaby	–	10,948
	Long-nosed Potoroo	–	4,232
	Squirrel Glider	–	10,341
	Greater Glider	–	4,260
	Brush-tailed Phascogale	–	2,896
	Koala	–	1,985
	Southern Myotis	–	257
	Eastern Cave Bat	–	470
	Common Planigale	-	2,291

Table 12.2 Summary of total offset credits

Credit type	Total
Ecosystem	7,807
Species	41, 575
Total	**49,382**

12.1.1 Staging of offsets

Typically, offset liabilities need to be met before construction commences; however, Section 7.14 of the BC Act allows for the staged retirement of credits in line with the stages of development and OMPS will be seeking to separate offsets for three stages. The proposed timeframe for direct offset delivery is listed in Table 12.3.

The area of each stage and the associated biodiversity credit requirements are yet to be determined as advice will be required from construction contractors to determine the exact areas required to be disturbed during each phase.

Table 12.3 Proposed timing and offsetting approach

Component	Impact	Offset timing
Stage 1: clearing for access roads and associated infrastructure	Direct loss of vegetation	Retirement of biodiversity credits prior to construction and/or clearing works commencing on Stage 1.
Stage 2: clearing for reservoirs	Direct loss of vegetation	Retirement of biodiversity credits prior to construction and/or clearing works commencing on Stage 2.
Stage 3: clearing for transmission line	Direct loss of vegetation	Retirement of biodiversity credits prior to construction and/or clearing works commencing on Stage 3.

Further, as this project is CSSI, OMPS is seeking two years from the date of approval to source initial credits for Stage 1 and 2, with further credits to be secured before any development is carried out that would impact on biodiversity values for remaining components.

12.2 Objectives of the biodiversity offset strategy

The objectives of the biodiversity offset strategy are to:

- meet the requirements of the NSW Biodiversity Offset Scheme and the EPBC Environmental Offsets Policy (DSEWPaC 2012)
- maximise the benefits to biodiversity values through the offset program
- identify offsets that have additional social, economic and/or environmental co-benefits, particularly for the local environment
- minimise costs to the Project.

12.3 Options under the Biodiversity Offsets Scheme

Under the NSW Biodiversity Offsets Scheme, several pathways are available to the proponent to meet the offset obligation arising from the Project. These pathways are shown in Plate 12.1. Funding of a biodiversity conservation action is only available for a limited set of species and communities, as set out in the *Ancillary rules: Biodiversity conservation actions* (OEH, 2017); none of these species occur. The Project is not a State Significant Development (SSD) mining project and thus ecological rehabilitation is not available. This means that offsets will need to be provided via retirement of like-for-like credits or payment into the Biodiversity Conservation Fund (BCF).

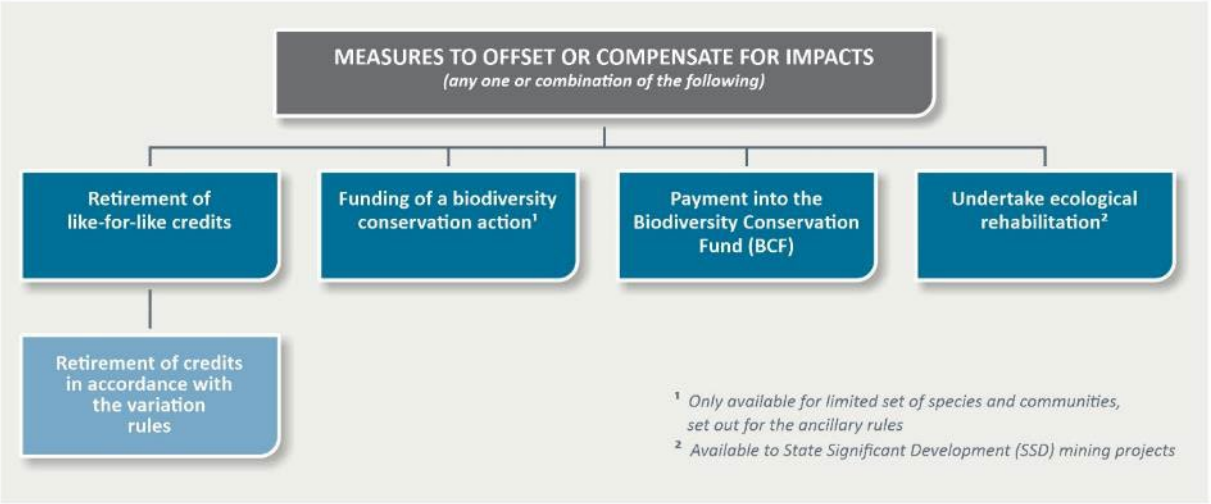


Plate 12.1 NSW Biodiversity Offset Scheme offset options

The various options available to meet the offset requirements of the are discussed below.

12.3.1 Like-for-like credits

i Credits available on the market

A review of existing credits available in the market indicates that while there are limited credits available for a number of offset trading groups or species, there are insufficient credits available to meet the needs of the Project. A review of credits available in the market is provided in Table 12.4.

Table 12.4 Summary of like-for-like credits available to offset impacts of the

PCT ID	PCT Name/Species	Offset trading group	Credits required	Credits available
762	Cabbage Gum open forest or woodland on flats of the North Coast	Coastal Valley Grassy Woodlands; >=70% and <90%	0	0
		Subtropical Coastal Floodplain Forest of the New South Wales North Coast Bioregion	15	388
780	Coastal floodplain sedgelands, rushlands, and forblands of the North Coast	Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	0	0
822	Eurabbie tall open forest of the escarpment ranges of the NSW North Coast Bioregion	Northern Escarpment Dry Sclerophyll Forests; <50%	316	22
842	Forest Redgum – Broad-leaved Apple dry open forest of the gorges of NSW North Coast Bioregion	Northern Gorge Dry Sclerophyll Forests; <50%	4,181	255
868	Grey gum – stringybark open forest of the gorges of the NSW North Coast Bioregion and New England Tableland Bioregion	Northern Gorge Dry Sclerophyll Forests; <50%	1,833	255

Table 12.4 Summary of like-for-like credits available to offset impacts of the

PCT ID	PCT Name/Species	Offset trading group	Credits required	Credits available
1106	River Oak riparian woodland of the NSW North Coast Bioregion and northern Sydney Basin Bioregion	Lowland Rainforest on Floodplain in the New South Wales North Coast Bioregion	18	0
		Subtropical Coastal Floodplain Forest of the New South Wales North Coast Bioregion	44	388
1142	Shatterwood – Giant Stinging Tree – Yellow Tulipwood dry rainforest of the NSW North Coast Bioregion and northern Sydney Basin Bioregion	Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions	72	468
1215	Spotted Gum – Grey Ironbark open forest of the Macleay Valley lowlands of the NSW North Coast Bioregion	Hunter-Macleay Dry Sclerophyll Forests; <50%	1,295	0
1268	Tallowwood open forest of the coastal ranges of the NSW North Coast Bioregion	Northern Hinterland Wet Sclerophyll Forests; <50%	30	25
1287	Upland heath swamps of the New England Tableland Bioregion	Montane Peatlands and Swamps of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands and Australian Alps bioregions	3	31
	Guthrie's Grevillea		120	0
	Tall Velvet Sea-berry		2,824	0
	Wandering Pepper Cress		5	0
	Cryptic Forest Twiner		443	0
	Glossy Black-cockatoo	–	348	0
	Barking Owl	–	49	0
	Powerful Owl	–	49	0
	Masked Owl	–	50	0
	Brush-tailed Rock-wallaby	–	10,948	1,851
	Long-nosed Potoroo	-	4,232	0
	Squirrel Glider	–	10,341	29,595
	Greater Glider	–	4,260	1,121
	Brush-tailed Phascogale	–	2,896	19,461
	Koala	–	1,985	50,621
	Southern Myotis	–	257	3,206
	Eastern Cave Bat	–	470	243
	Common Planigale	-	2,291	4,285

Table 12.4 Summary of like-for-like credits available to offset impacts of the

PCT ID	PCT Name/Species	Offset trading group	Credits required	Credits available
	Pultenaea rubescens	-	7	0

Notes: Based on searches of the credit supply registers 23 November 2022

ii Proponent driven offsets

OMPS have options to use the land surrounding the disturbance footprint to offset the impacts of the Project. This approach would have several benefits:

- Use of surrounding land is most likely to meet the needs of the Project by providing the right types of credits. PCTs and species impacted by the Project are likely occur within the land immediately adjacent to the site.
- This approach has the additional benefit of adding to and further protecting the adjacent National Parks.
- This approach would provide a local benefit for the Project.

Preliminary assessments, including high-level PCT mapping and some surveys for threatened species (where adjacent to the disturbance footprint), have been undertaken. This preliminary work has identified that this land is likely to generate sufficient ecosystem credits to meet a significant proportion of the offset requirements for the Project, excepting three offset trading groups (Table 12.5).

Table 12.5 Estimate of credit yield from land surrounding the disturbance footprint and comparison for the offsets required by the Project

Offset trading group	PCT ID	PCT name	Credits required	Credits generated	Difference
Coastal Valley Grassy Woodlands; >=70% and <90%	762	Cabbage Gum open forest or woodland on flats of the North Coast	0	0	0
Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	780	Coastal floodplain sedgelands, rushlands, and forblands of the North Coast	0	0	0
Hunter-Macleay Dry Sclerophyll Forests; <50%	1215	Spotted Gum - Grey Ironbark open forest of the Macleay Valley lowlands of the NSW North Coast Bioregion	1,295	0	-1,295
Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions	1142	Shatterwood - Giant Stinging Tree - Yellow Tulipwood dry rainforest of the NSW North Coast Bioregion and northern Sydney Basin Bioregion	72	0	-72
Lowland Rainforest on Floodplain in the New South Wales North Coast Bioregion	1107	River Oak riparian woodland of the NSW North Coast Bioregion and northern Sydney Basin Bioregion	18	0	-18

Table 12.5 Estimate of credit yield from land surrounding the disturbance footprint and comparison for the offsets required by the Project

Offset trading group	PCT ID	PCT name	Credits required	Credits generated	Difference
Montane Peatlands and Swamps	1287	Upland heath swamps of the New England Tableland Bioregion	3	13	10
Northern Escarpment Dry Sclerophyll Forests; <50%	822	Eurabbie tall open forest of the escarpment ranges of the NSW North Coast Bioregion	316	0	-316
Northern Gorge Dry Sclerophyll Forests; <50%	842	Forest Redgum - Broad-leaved Apple dry open forest of the gorges of NSW North Coast Bioregion	6,014	10,378	4,364
	868	Grey gum - stringybark open forest of the gorges of the NSW North Coast Bioregion and New England Tableland Bioregion			
	983	New England Blackbutt - stringybark grassy forest the eastern New England Tableland Bioregion and NSW North Coast Bioregion			
Northern Hinterland Wet Sclerophyll Forests; <50%	1268	Tallowwood open forest of the coastal ranges of the NSW North Coast Bioregion	30	0	-30
Subtropical Coastal Floodplain Forest of the New South Wales North Coast Bioregion	762	Cabbage Gum open forest or woodland on flats of the North Coast	59	346	287
	1106	River Oak riparian woodland of the NSW North Coast Bioregion and northern Sydney Basin Bioregion			
Total			**7,807**	**10,737**	**2,930**

Further detailed assessment of this land is required to provide more detailed estimates of credit yield and confirm presence of threatened species within this land and determine credit yields. Subject to agreements with the landowners, the proponent proposes to develop a Biodiversity Stewardship Agreement over this land to offset the impacts arising from the Project.

12.3.2 Credits under the variation rules

Following reasonable steps to obtain like-for-like credits the proponent may seek to retire credits under the variation rules. The variation rules allow broader trading:

- For ecosystem credits:
  - they represent the same vegetation formation
  - they are in the same or a higher offset trading group
  - they represent a location that is in:
    - the same Interim Biogeographic Regionalisation of Australia region as the impacted site, or
    - a subregion that is within 100 kilometres of the outer edge of the impacted site

- if the impacted habitat contains hollow bearing trees—they represent vegetation that contains hollow bearing trees or artificial hollows.

- For species credits:
  - if the impacted species is a plant—they represent a plant
  - if the impacted species is an animal—they represent an animal
  - they represent a species that has the same or a higher category of listing under the BC Act as a threatened species
  - they represent a location that is in:
    - the same Interim Biogeographic Regionalisation of Australia region as the impacted site, or
    - a subregion that is within 100 kilometres of the outer edge of the impacted site.

A review of public registers indicates that currently there are no additional ecosystem or species credits available under the variation rules. The proponent will continue to investigate these options.

12.4 Biodiversity Offset Package

Prior to any development being carried out that would impact on biodiversity values, a detailed Biodiversity Offset Package will be prepared that is consistent with this Biodiversity Offset Strategy. The Biodiversity Offset Package will include:

- Details of the specific biodiversity offset measures to be implemented and delivered in accordance with the EIS and this Biodiversity Offset Strategy, including the proposed location for the retirement of like-for-like credits from existing and proponent driven offset sites and certainty that this can be achieved.
- The estimated cost which would be required to be paid into the BCF if the relevant proponent driven offset measure is not implemented and delivered (as calculated in accordance with Division 6 of *the BC Act* and the biodiversity offsets payment calculator).
- The timing and responsibilities for the implementation and delivery of the measures required in the Package.
- Confirmation that the biodiversity offset measures will be implemented and delivered within two years of approval.

The Biodiversity Offset Strategy outlined herein, and the detailed Biodiversity Package to be developed post-approval will provided certainty that the residual impacts of the Project can be adequately offset.

13 Assessment of other relevant legislation

13.1 Environment Protection and Biodiversity Conservation Act 1999

On 1 February 2021, a delegate of the Federal Minister for the Environment determined that the Project was a controlled action under Section 75 of the EPBC Act. The Project will be assessed under the bilateral agreement. This section provides an assessment of the Project's impacts specific to species and communities listed under the EPBC Act. On 23 December 2022, the variation of the proposal was agreed by the delegate for the Minister (EPBC 2020/8850) this included the access road and transmission line into the Project.

13.1.1 Likelihood of occurrence

i Threatened ecological communities

Candidate EPBC Act listed endangered ecological communities (EECs) were predicted to occur in the locality based on searches of the EPBC Act Protected Matters Search Tool (PMST) including an assessment of EEC associated with PCTs recorded within the project area. The PMST identified five TECs as having potential to occur in the project area:

- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland
- Lowland Rainforest of Subtropical Australia
- Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland
- New England Peppermint (*Eucalyptus nova-anglica*) Grassy Woodlands
- Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions.

An assessment of the likelihood of these EECs occurring within the project area is provided in Table 13.1.

Table 13.1 Endangered ecological communities known or predicted to occur in the locality

Ecological community	Status	Habitat requirements	Likelihood of occurrence
Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland	Endangered	The ecological community typically occurs in low-lying coastal alluvial areas with minimal relief, such as swamps, floodplain pockets, depressions, alluvial flats, back-barrier flats, fans, terraces, and behind fore-dunes. The Coastal Swamp Sclerophyll Forest typically features a canopy and/or sub-canopy dominated by *Melaleuca spp*. and/or *Eucalyptus robusta*.	Absent. No areas of lowland coastal swamp sclerophyll forest that meet the criteria of this listing were recorded within the construction envelope.

Table 13.1 Endangered ecological communities known or predicted to occur in the locality

Ecological community	Status	Habitat requirements	Likelihood of occurrence
Lowland Rainforest of Subtropical Australia	Critically Endangered	The ecological community occurs on basalt and alluvial soils, including sand and old/elevated alluvial soils as well as floodplain alluvia. The ecological community is generally a moderately tall (≥20 m) to tall (≥30 m) closed forest (canopy cover ≥70%). Tree species with compound leaves are common and leaves are relatively large (notophyll to mesophyll). Typically, there is a relatively low abundance of species from the genera Eucalyptus, Melaleuca and Casuarina. Buttresses are common as is an abundance and diversity of vines.	Low. All occurrences of this PCT within the construction envelope were determined to be inconsistent with the EEC definitions under the EPBC Act as it does not meet the species richness required as per the key diagnostic characteristics of the listing advice (NSW TSSC 2011b)
New England Peppermint (*Eucalyptus nova-anglica*) Grassy Woodlands	Critically Endangered	This woodland occurs in valley bottoms, flats or lower slopes, often in areas subject to cold air drainage. Characterised by a tree canopy is typically dominated (>50%) or co-dominated (>30%) by the tree species *Eucalyptus nova-anglica* (New England Peppermint). A range of other associated tree species may be present, and may be co-dominant in the ecological community, but do not dominate it by themselves, in particular *E. pauciflora* (Snow Gum) and *E. dalrympleana subsp. heptantha* (Mountain Gum). The understorey is usually made up of a dense, species-rich ground layer of grasses and herbs. Shrubs are typically sparse to absent.	Negligible. New England Peppermint was not recorded anywhere in the construction envelope. No vegetation within or adjacent to the subject land has a tree canopy dominated or co-dominated by New England Peppermint.
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Characterised by a species-rich understorey of native tussock grasses, herbs and scattered shrubs, and the dominance, or prior dominance, of White Box, Yellow Box or Blakely's Red Gum trees. Tree-cover is generally discontinuous and consists of widely spaced trees of medium height in which the canopies are clearly separated.	Negligible. White Box, Yellow Box, and Blakely's Red Gum were not recorded anywhere in the construction envelope.
Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions	Endangered	Is a floodplain forest community characterised by the dominance of eucalypt and other myrtaceous trees. It may be dominated by a single tree species, or by a mix of several tree species, from five genera that characterise the ecological community. These five genera are *Angophora, Corymbia, Eucalyptus, Lophostemon* and *Syncarpia.*	Recorded. The EEC is associated with PCT 762 as part of the following vegetation class: Moderate, Poor and DNG Moderate.

ii Threatened species

The PMST and/or BAMC predicted that 27 flora species and 28 fauna species listed under the EPBC Act could occur within the project area. The likelihood of occurrence for these species is assessed in Table 13.2 and Table 13.3.

Table 13.2 Threatened flora species known or predicted to occur in the locality

Name (common and scientific)	Status	Source*	Likelihood of occurrence
Hairy Joint grass *Arthraxon hispidus*	Vulnerable	PMST	Negligible. This species was not recorded during the surveys.
North Brothers Wattle *Acacia courtii*	Vulnerable	BAM-C	Negligible. Construction envelope is outside of its geographic restriction. This species was not recorded during the surveys.
Trailing Woodruff *Asperula asthenes*	Vulnerable	BAM-C	Negligible. This species was not recorded during the surveys.
Callistemon pungens	Vulnerable	PMST SEARs	Negligible. This species was not recorded during the surveys.
Leafless Tongue-orchid *Cryptostylis hunteriana*	Vulnerable	PMST	Negligible. This species was not recorded during the surveys.
White-flowered Wax Plant *Cynanchum elegans*	Endangered	SEARs BAM-C	Negligible. This species was not recorded during the surveys.
Bluegrass *Dichanthium setosum*	Vulnerable	PMST BAM-C	Negligible. This species was not recorded during the surveys.
Diuris eborensis *Diuris eborensis*	Endangered	PMST SEARs	Negligible. This species was not recorded during the surveys.
Small Snake Orchid *Diuris pedunculata*	Vulnerable	SEARs	Negligible. This species was not recorded during the surveys.
Narrow-leaved Peppermint *Eucalyptus nicholii*	Vulnerable	PMST BAM-C	Negligible. This species was not recorded during the surveys.
Euphrasia arguta	Critically Endangered	PMST SEARs	Negligible. This species was not recorded during the surveys.
Beadle's Grevillea *Grevillea beadleana*	Endangered	BAM-C	Negligible. This species was not recorded during the surveys.
Guthrie's Grevillea *Grevillea guthrieana*	Endangered	PMST SEARs BAM-C	Recorded. This species was recorded at multiple locations within the survey area south of the Macleay River. This species was recorded along creek lines and steep cliff areas close to creek and drainage lines and gullies.
Gorge Hakea *Hakea fraseri*	Vulnerable	BAM-C	Negligible. This species was not recorded during the surveys.
Big Nellie Hakea *Hakea archaeoides*	Vulnerable	BAM-C	Negligible. This species was not recorded during the surveys.

Table 13.2 Threatened flora species known or predicted to occur in the locality

Name (common and scientific)	Status	Source*	Likelihood of occurrence
Tall Velvet Sea-berry *Haloragis exalata* subsp. *velutina*	Vulnerable	PMST SEARs BAM-C	Recorded. This species was recorded at multiple locations. South of the Macleay River, this species was associated with wet creek lines. North of the Macleay River this species was associated with steep wet slopes.
Wandering Pepper Cress *Lepidium peregrinum*	Endangered		Recorded. This species was recorded along the eastern bank of the Macleay River with one individual recorded along the northern bank of the Macleay River.
Macadamia Nut *Macadamia integrifolia*	Vulnerable	PMST	Negligible. Habitat in the project area is considered unsuitable given the absence of associated PCTs. The project area is outside of the known distribution for this species. The closest record of this species occurring is in Bellingen. The species was not recorded during surveys.
Slender Marsdenia *longiloba*	Vulnerable	PMST SEARs BAM-C	Negligible. This species was not recorded during the surveys.
Biconvex Paperbark *Melaleuca biconvexa*	Vulnerable	BAM-C	Negligible. Construction envelope is outside of its geographic restriction.
Milky Silkpod *Parsonsia dorrigoensis*	Endangered	BAM-C	Negligible. This species was not recorded during the surveys.
Pultenaea rubescens			Recorded. Recorded within the project area, outside of the construction envelope. This species is not associated with PCTs within the project area. Identification could not be confirmed by the herbarium, potential undescribed species. At the time of survey it was considered that the specimen could be Parris' Bush-pea (*Pultenaea parrisiae*). Identification could not be confirmed. Response from the herbarium was "this is particularly interesting. In many features it looks very close to *P.parrisiae* but it is a very long way from previous records. The few bracteoles present showed some variability, which would need to be studied further. Russel Barrett at the NSW Herbarium is currently doing some work on *Pultenaea* and will likely be interested in this".
Scrub Turpentine *Rhodamnia rubescens*	Critically Endangered	PMST SEARs	Recorded. This species was recorded outside of the construction envelope within the transmission line as regrowth from fire affected individuals or as juveniles. All individuals were infected by myrtle rust fungus.
Native Guava *Rhodomytus psidioides*	Critically Endangered	PMST	Negligible. Habitat in the project area is considered unsuitable given the absence of associated PCTs. Closet record of this species occurring is Ngambaa Nature Reserve towards South West Rocks. The species was not recorded during surveys.

Table 13.2 Threatened flora species known or predicted to occur in the locality

Name (common and scientific)	Status	Source*	Likelihood of occurrence
Ravine Orchid *Sarcochilus fitzgeraldii*	Vulnerable	PMST SEARs	Negligible. This species was not recorded during the surveys.
Austral Toadflax *Thesium australe*	Vulnerable	PMST	Negligible. Habitat in the project area is considered unsuitable given the absence of associated PCTs. Closet record of this species occurring is Armidale. The species was not recorded during surveys.
Cryptic Forest Twiner *Tylophora woollsii*	Endangered	PMST SEARs	Recorded. Potentially recorded within the project area at two locations. This species is not associated with PCTs within the project area. Identification could not be confirmed by the herbarium. Response from the herbarium was "?*Tylophora woolsii* – your specimen is a good vegetative match for this species but in the absence of fertile material I can't confidently rule out all other *Apocyanaceae* taxa".

Note * PMST - indicates that the species was returned from the EPBC Protected Matter Search Tool.

BAM-C - indicates that the species was returned from the BAM Calculator based on the PCTs present.

SEARs – indicates that the species, although not returned from the BAM-C or PMST was referenced in the SEARs as possibly affected.

Table 13.3 Threatened fauna species known or predicted to occur in the locality

Name (common and scientific)	Status	Source*	Likelihood of occurrence
Birds			
Regent Honeyeater *Atnthochaera phrygia*	Critically Endangered	PMST BAM-C SEARs	Low. Potential habitat was recorded in the project area. Unlikely to breed in the construction envelope or regularly forage there but may forage there intermittently. The species was not recorded during surveys.
Rufous Scrub-bird *Atrichornis rufescens*	Endangered	PMST	Negligible. This species occurs above 600 m elevation in subtropical, warm temperate and cool temperate rainforests and wet sclerophyll forests. Species requires suitable areas of wet rainforest habitat that is absent within the project area. The species was not recorded during surveys.
Australasian Bittern *Botaurus poiciloptilus*	Endangered	PMST BAM-C	Negligible. Associated wetland habitats are absent from the construction envelope.
Curlew Sandpiper *Calidris ferruginea*	Critically Endangered	PMST	Negligible. Associated habitats, including intertidal mudflat or mud and sand edges of lakes, are absent from the construction envelope.

Table 13.3 Threatened fauna species known or predicted to occur in the locality

Name (common and scientific)	Status	Source*	Likelihood of occurrence
Coxen's Fig-Parrot *Cyclositta diophthalma coxeni*	Endangered	PMST	Negligible. The project area is outside of the known distribution for this species. Closet historical records are around Coffs Harbour. This species has not been recorded in Australia for over 50 years. The species was not recorded during surveys.
Eastern Bristlebird *Dasyornis brachypterus*	Endangered	PMST SEARs	Negligible. In northern NSW this species requires dense tussocky grass understorey and sparse mid-storey near rainforest ecotone. Generally found more towards the coast. Closest records are around Dorigo. This project area does not contain suitable habitat to support this species. The species was not recorded during surveys.
Red Goshawk *Erythrotriorchis radiatus*	Vulnerable	PMST	Negligible. This project area is located just south of the southernmost distribution for this species. This species hunts along permanent water and riparian habitats along watercourses or wetlands. Closest record is in Armidale. The species was not recorded during surveys.
Grey Falcon *Falco hypoleucos*	Vulnerable	PMST	Negligible. The project area is outside of the known distribution for this species. The species was not recorded during surveys.
Painted Honeyeater *Grantiella picta*	Vulnerable	PMST	Negligible. There are no records of the species in the Project's locality. Closest records are in Armidale. The project area lacked large numbers of trees that supported mistletoe, the main food source for this species. The species was not recorded during surveys.
White-throated Needletail *Hirundapus caudacutus*	Vulnerable	PMST BAM-C SEARs	Recorded. This species was recorded flying overhead near the Macleay River along the proposed access route.
Swift Parrot *Lathamus discolor*	Critically Endangered	PMST BAM-C SEARs	Low. Potential habitat was recorded in the project area. The species was not recorded during surveys. This species only breeds in Tasmania and is therefore highly unlikely to breed in the construction envelope or regularly forage there but may forage there intermittently. The species was not recorded during surveys.
Eastern Curlew *Numenius madagascariensis*	Critically Endangered	PMST	Negligible. This species is a shoreland and coastal wetland species. The Project is outside the known species distribution.
Australian Painted Snipe *Rostratula australis*	Endangered	PMST BAM-C	Negligible. Associated wetland habitats are absent from the construction envelope.

Table 13.3 Threatened fauna species known or predicted to occur in the locality

Name (common and scientific)	Status	Source*	Likelihood of occurrence
Mammals			
Large-eared Pied Bat *Chalinolobus dwyeri*	Vulnerable	PMST SEARs BAM-C	Negligible. The species was not recorded during surveys.
Spotted-tailed Quoll *Dasyurus maculatus*	Endangered	PMST BAM-C SEARs	Recorded. The species was recorded sporadically within the construction envelope, largely restricted in the higher and rocky terrain associated with the project area.
Greater Gilder *Pelauroides Volans*	Endangered	PMST SEARs BAM-C	Recorded. This species was recorded around the flatter terrain at the Carrai Plateau.
Yellow-bellied Glider *Petaurus australis australis*	Vulnerable	PMST BAM-C	Low. Potential habitat was recorded in the project area, however, this species was not recorded during surveys.
Brush-tailed Rock-wallaby *Petrogale penicillata*	Vulnerable	PMST SEARs BAM-C	Recorded. This species was recorded throughout the project area south of the Macleay River, largely associated with cliffs, escarpments, rocky areas and steep terrain.
Koala *Phascolarctos cinereus*	Endangered	PMST SEARs BAM-C	Recorded. Evidence of Koala was recorded to the north of Macleay River with old scats found near the river in the most eastern section of the access road.
Long-nosed Potoroo *Potorous tridactylus*	Vulnerable	PMST SEARs	Recorded. This species was recorded at higher altitudes where the understorey was more intact and were habitat comprised of damper and thicker understory. Recorded above within the Carrai Plateau and along the transmission line.
New Holland Mouse *Pseudomys novae-hollandiae*	Vulnerable	PMST SEARs	Negligible. No potential habitat was recorded in the project area, this species occurs on sandstone country (Wilson & Laidlaw 2003), this species requires deeper topsoils and softer substrates for digging burrows, this species was not recorded during surveys.
Hastings River Mouse *Pseudomys novaehollandiae*	Endangered	PMST SEARs	Recorded. This species was recorded throughout the survey area.
Grey-headed Flying-fox *Pteropus poliocephalus*	Vulnerable	PMST SEARs BAM-C	Recorded. This species was recorded either feeding or commuting through the project area.
Frogs			
Stuttering Frog *Mixophyes balbus*	Vulnerable	PMST SEARs BAM-C	Negligible. This species was not recorded during the surveys.

Table 13.3 Threatened fauna species known or predicted to occur in the locality

Name (common and scientific)	Status	Source*	Likelihood of occurrence
Green and Golden Bell Frog *Litoria aurea*	Vulnerable	BAM-C	Negligible. Associated swamp, semi-permanent/ephemeral wet areas are absent from the construction envelope.
Booroolong Frog *Litoria booroolongensis*	Endangered	BAM-C	Negligible. This species occurs west of the great dividing range. The project area is outside of the known distribution for this species. The species was not recorded during surveys.
Giant Barred Frog *Mixophyes iteratus*	Endangered	BAM-C	Negligible. No permanent or semi-permanent creeks within the Macleay Hastings IBRA sub-region contained suitable habitat such as rainforest with deep leaf litter for this species.
Reptiles			
Three-toed Snake-tooth Skink *Coeranoscincus reticulatus*	Vulnerable	PMST SEARs	Negligible. Habitat in the project area is considered unsuitable given the absence of associated PCTs. The project area is outside of the known distribution for this species. Closet historical records are around Coffs Harbour.

Note* PMST - indicates that the species was returned from the EPBC Protected Matter Search Tool.

BAM-C - indicates that the species was returned from the BAM Calculator based on the PCTs present.

SEARs – indicates that the species, although not returned from the BAM-C or PMST was referenced in the SEARs as possibly affected.

Six threatened flora and eight threatened fauna species were recorded within the project area. These included:

- Guthrie's Grevillea
- Tall Velvet Sea-berry
- Wandering Pepper Cress
- *Pultenaea rubescens* Scrub Turpentine
- Cryptic Forest Twiner[9]
- White-throated Needletail
- Spotted-tailed Quoll
- Greater Glider
- Brush-tailed Rock-wallaby
- Koala
- Long-nosed Potoroo
- Hastings River Mouse

- Grey-headed Flying-fox.

These species are discussed further in Section 13.1.2.

iii Migratory species

Thirteen species listed as migratory under the EPBC Act were predicted to occur in the project area based on database searches undertaken. Table 13.4 provides an assessment of the likelihood of these species using the habitat within the construction envelope.

Table 13.4 Likelihood of occurrence for migratory species

Name (common and scientific)	Status	Source	Likelihood of occurrence
Black-faced Monarch *Monarcha melanopsis*	Migratory	PMST	Recorded. This species was recorded within the project area.
Spectacled Monarch *Monarcha trivirgatus*	Migratory	PMST	Moderate. Potential habitat was recorded in the project area. This species has been recorded within Oxley Wild National Park, located adjacent to the project area.
Common Sandpiper *Actitis hypoleaucos*	Migratory	PMST	Negligible. This species is a shoreland and coastal wetland species. The Project is outside the known species distribution.
Curlew Sandpiper *Calidris ferruginea*	Critically Endangered, migratory	PMST	Negligible. This species is a shoreland and coastal wetland species. The Project is outside the known species distribution.
Eastern Curlew *Numenius madagascariensis*	Critically Endangered, migratory	PMST	Negligible. This species is a shoreland and coastal wetland species. The Project is outside the known species distribution.
Fork-tailed Swift *Apus pacificus*	Migratory	PMST	Moderate. This species is mainly an aerial species and is likely to fly over the project area.
Oriental Cuckoo *Cuculus optatus*	Migratory	PMST	Negligible. Likely to be a vagrant species further south of QLD, where the majority of the records occur.
Latham's Snipe *Gallinago hardwickii*	Migratory	PMST	Moderate–high. Substantial wetland habitats are absent from the construction envelope but creek lines and the flood plains of the Macleay River constituting potential habitat are present. Historical species records occur within the project area.
Osprey *Pandion haliaetus*	Migratory	PMST	Low–Moderate. This species is largely coastal, preferring rocky shorelines, islands and reefs. Historical records occur along the Macleay River, it is considered likely they are from individuals moving through the area or juveniles dispersing. They are unlikely to use the project area for breeding.
Pectoral Sandpiper *Calidris melanotos*	Migratory	PMST	Negligible. This species is a shoreland and coastal wetland species. The Project is outside the known species distribution.

Table 13.4 Likelihood of occurrence for migratory species

Name (common and scientific)	Status	Source	Likelihood of occurrence
Rufous Fantail *Rhipidura rufifrons*	Migratory	PMST	Recorded. This species was recorded within the project area.
Satin Flycatcher *Myiagra cyanoleuca*	Migratory	PMST	Recorded. This species was recorded within the project area.
Sharp-tailed Sandpiper *Calidris acuminata*	Migratory	PMST	Negligible. This species is a shoreland and coastal wetland species. The project is outside the known species distribution.
White-throated Needletail *Hirundapus caudacutus*	Migratory	PMST	Recorded. This species was recorded within the project area.
Yellow Wagtail *Motacilla flava*	Migratory	PMST	Negligible. Species is a vagrant and preferred wetland habitats are absent from the construction envelope.

Four listed migratory species under the EPBC Act were recorded within the project area, with four species that are likely to occur infrequently and sporadically, these are:

- Migratory species recorded within the project area:
  - Black-faced Monarch
  - Satin Flycatcher
  - Rufous Fantail
  - White-throated Needletail.
- Migratory species likely to occur infrequently and sporadically:
  - Spectacled Monarch
  - Fork-tailed Swift
  - Latham's Snipe
  - Osprey.

13.1.2 Significant impact assessments

The following section contains the significant impact assessment for one EEC, six threatened flora, eight threatened fauna and eight migratory species. An assessment of significance for these species, in accordance with the assessment criteria for critically endangered, endangered and vulnerable species (DEWHA 2013), is provided below.

i Endangered Ecological Communities

One endangered ecological communities (EEC) was recorded within the project area. PCT 762 align with Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions listed as an EEC under the EPBC Act. An assessment of significance for the removal of 1.9 ha of this EEC, in accordance with the assessment criteria for EECs (DEWHA 2013), is provided in Table 13.7. This assessment concluded that the Project is unlikely to result in a significant impact on the listed community as the EEC is considered to be of moderate condition (Class C2).

a Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions

The Commonwealth Approved Conservation Advice for the endangered Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions (DCCEEW 2022) provides a general description of the community and describes its current status. Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions occurs on the floodplains of the eastern watershed of the Great Dividing Range, from mid NSW (Newcastle area) to just north of Gladstone in Queensland. Much of the community's original distribution has been cleared for agriculture, and most remaining patches are located on productive agricultural land and/or coastal areas where urban development is expected (DCCEEW 2022).

The community is characterised by the dominance of myrtaceous trees specifically from the *Eucalyptus, Angophora, Corymbia, Lophostemon* and S*yncarpia* genera. Clearing may have reduced the canopy to scattered trees, however in its undisturbed state it varies from tall open forest to woodland with 40–60% crown cover (DCCEEW 2022). A mid-layer of small trees (e.g. from the Melaleuca and Leptospermum genera) may be present with scattered to dense shrubs, and an understory that is generally more diverse and abundant than ecological communities on adjoining slopes (DCCEEW 2022).

Section 4 of the Approved Conservation Advice (DCCEEW 2022) lists clearing and selective harvesting, changed fire and hydrological regimes, grazing, invasive flora and fauna, climate change, disease, pathogens and dieback, and human disturbance as the primary impacts to this ecological community.

While the Approved Conservation Advice (ACA) (DCCEEW 2022) as a whole was used to identify the presence of this ecological community within the construction envelope, Sections 2.1, 2.2 and Table 2 in the ACA contain specific criteria that must be addressed to determine the presence and condition of this ecological community. Section 2.1 and 2.2 in the ACA were used first, to generate a list of patches that have the potential to be the EEC.

The Key Diagnostic Characteristics from Section 2.1 of the Approved Conservation Advice (DCCEEW 2022) are summarised below.

Table 13.5 Assessment key diagnostic criteria for Subtropical eucalypt floodplain forest and woodland

EEC key diagnostics	Project area assessment
It occurs in the New South Wales North Coast (NNC) and South Eastern Queensland (SEQ) IBRA bioregions, and on Curtis Island in the Brigalow Belt North IBRA Bioregion (BBN).	The Project occurs within the New South Wales North Coast (NNC) IBRA region.
It occurs in the catchments of the eastern watershed of the Great Dividing Range, typically in their lower reaches.	The Macleay River is part of the eastern watershed of the Great Dividing Range. However, the site occurs along mid reaches of this waterway (not lower).
It occurs at elevations up to 250 m above sea-level (ASL), most typically below 50 m ASL.	The minimum elevation within the project area is 145 m AHD.

Table 13.5 Assessment key diagnostic criteria for Subtropical eucalypt floodplain forest and woodland

EEC key diagnostics	Project area assessment
It occurs on alluvial landforms including river floodplains, riparian zones (e.g. along riverbanks, lake foreshores and creek lines), the floors of tributary gullies, floodplain pockets, alluvial flats, fans, terraces, and localised colluvial fans; as well as on localised depressions amongst low rises and on associated sites where water can pond.	Extensive alluvial landforms occur along the Macleay River, and adjacent riparian zones support alluvial flats. Localised colluvial fans and localised depressions amongst low rises. All patches are considered to meet this key diagnostic criteria.
It occurs on alluvial soils of various textures including silts, clay loams, sandy loams, gravel and cobbles.	The Macleay River floodplain contains various alluvial soils due to the varied nature of flow regimes along its course.
It does not typically occur on soils that are primarily marine or aeolian sands, but may occur on such substrates after they have been modified by fluvial activity.	The project area is located 70 km inland with the Macleay River comprised of fresh water conditions not considered to be marine or contain aeolian sands.
It occurs as a tall closed-forest, tall open-forest, closed forest, open forest, tall woodland, or woodland (Specht 1970). The canopy has a crown cover of at least 20%.	The EEC is associated with tall open-forest that has had impacts from historical clearing.
It has a canopy dominated by one or a combination of Angophora, Corymbia, Eucalyptus, Lophostemon and/or Syncarpia tree species, but not dominated by *Eucalyptus robusta* (Swamp Mahogany). Other canopy tree species may be present, and in some areas rainforest trees may be prominent.	Canopy included a mixture of Eucalyptus, Corymbia and Angophora species and was not dominated by Swamp Mahogany.
A mid-layer (including a sub-canopy, and/or shrub-layer) may be present, sparse or absent; and fauna may be abundant or rare.	Mid-layer within the project area was open with only sparse shrub layer, generally comprised of weed species such as lantana.

Section 2.2 of the Approved Conservation Advice (DCCEEW 2022) provides additional information to assist in identifying the ecological community. The key points are summarised below:

- The smallest patch size that can be identified is 0.5 ha, because the key diagnostic characteristics cannot reliably be identified for smaller areas.
- When it comes to defining a patch of the ecological community, allowances are made for 'breaks' of up to 30 m between areas that meet the key diagnostic characteristics.
- Where there is a break in the ecological community of 30 m or more then the gap indicates that separate patches are present. This includes breaks "due to a different type of vegetation" (DCCEEW 2022, p.14).

Using the above criteria, four potential patches of the EEC were identified. These four patches were then assessed against the conditions categories, classes and thresholds in Table 2 of the Approved Conservation Advice (DCCEEW 2022) (Plate 13.1) to determine the condition class of the patches. Following this assessment all four patches were determined to be Class C2. This assessment is provided in Table 13.6 below.

Table 2: Condition categories, classes and thresholds

<table>
<tr><th colspan="2">Patch size thresholds →
Biotic thresholds ↓</th><th>Large patch
Patch size ≥2 ha</th><th>Small contiguous[4] patch ≥ 0.5 ha, within a larger area of native vegetation ≥ 5 ha</th><th>Small patch
Patch size ≥ 0.5 ha</th></tr>
<tr><th>Vegetation</th><th>Arboreal mammals</th><th colspan="3"></th></tr>
<tr><td>HIGH CONDITION
Ground cover richness[1] ≥ 10 native species per sample plot
AND
≥ 20 large native trees[2] per ha.
AND
≥ 80% of its total perennial understorey vegetation cover[3] comprises native species</td><td></td><td colspan="2">CLASS A1
Large or contiguous[4] patch, with high quality understorey and many large native trees</td><td>CLASS B1
Small patch, with high quality understorey and many large native trees</td></tr>
<tr><td rowspan="2">GOOD CONDITION
Ground cover richness[1] ≥ 6 native species per sample plot
AND
≥ 10 large native trees[2] per ha.
AND
≥ 50% of its total perennial understorey vegetation cover[3] comprises native species</td><td>AND
≥5 species of arboreal mammals[5] detected[6] in the patch.</td><td colspan="2">CLASS A2
Large or contiguous[4] patch, with good quality understorey, large native trees and evidence of many arboreal mammal species</td><td>CLASS B2
Small patch, with good quality understorey, large native trees and evidence of arboreal mammals</td></tr>
<tr><td></td><td colspan="2">CLASS B3
Large or contiguous[4] patch, with good quality understorey and large native trees</td><td>CLASS C1
Small patch, with good quality understorey and large native trees</td></tr>
<tr><td>MODERATE CONDITION
Ground cover richness ≥ 4 native species per sample plot[1]
AND at least one of:
≥ 6 very large native trees[7] per ha
AND/OR
≥ 30% of its total perennial understorey vegetation cover[3] comprises native species</td><td></td><td colspan="2">CLASS C2
Large or contiguous[4] patch, with moderate quality understorey and/or some very large native trees</td><td>Not nationally protected</td></tr>
<tr><td colspan="5">Notes
[1] Ground cover richness includes combined species richness of native grasses, forbs, ferns and sedges per 0.04 ha (20 x 20 m sample plot) on average.
[2] Large native trees are greater than 45 cm [diameter at breast height (dbh)]. This is used as a surrogate for tree hollows and other habitat values. These should be counted, and averaged across the patch as a whole. For larger patches, they can be counted in plots of at least 0.5 ha.
[3] Perennial understorey vegetation cover includes all vegetation below the canopy layer, from species with a life-cycle of more than two growing seasons. It includes herbs (graminoids and forbs), grasses, shrubs, shorter trees, juvenile canopy species, resprouting or suckering of the lower portions of canopy trees, and cryptograms; but it does not include annual plants, plant litter, or exposed soil.
[4] Contiguous means the patch is connected to, or in close proximity to (i.e., within 30 m of), one or more areas of native vegetation (i.e., an area where the total perennial vegetation cover is dominated (50% or more) by native plant species).
[5] For the purposes of this calculation, evidence of any number of micro-bat species (Microchiroptera) found in the patch counts as one species of arboreal mammal.
[6] Survey guidelines include DSEWPC (2011).
[7] Very large native trees are greater than 60 cm dbh. These should be counted, and averaged across the patch as a whole. For larger patches, they can be counted in plots of at least 0.5 ha (i.e., an average of 3 very large native trees per 0.5 ha plot).</td></tr>
</table>

Plate 13.1 Condition categories, classes and thresholds

Table 13.6 Key diagnostic characteristics per patch

Key diagnostic characteristics[4]	GEN-TEC-01	EAR-TEC-01	EAR-TEC-02	EAR-TEC-03
Ground cover richness	≥10	≥10	≥10	≥10
Very large trees/ha	30	30	30	10
Native perennial understorey vegetation cover %	6.84%	6.84%	6.84%	1.3%
Determination	**Class C2** **Despite being below understorey cover thresholds, all patches meet large tree and groundcover richness thresholds.**			

Table 13.7 Assessment of significance for Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions

Criteria	Discussion
Reduce the extent of an ecological community.	The impact area has been designed to avoid as much of the endangered ecological community (EEC) as practicable. The proposed activity would remove approximately 1.9 ha of the EEC in moderate (Class C2) condition.
Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines.	The patches impacted on have moderate connectivity to other intact patches of the ecological community in the broader landscape. Impacts from the proposed works are mainly on the outer edges of patches adjacent to existing clearing. Some areas may be fragmented where access roads pass through patches; however, this will be limited to the width of the road. Due to the already fragmented patches existing within the project area and the small amount of clearance required for the access road. Further, extensive areas of the community adjacent to the disturbance footprint will ensure genetic exchange can continue to occur. The Project is unlikely to significantly fragment or isolate any occurrence of the community.

[4] Note that the patch data for GEN-TEC-01, EAR-TEC-01, and EAR-TEC-02 was based off one plot: EAR31. This is because this was the only plot undertaken within the vegetation zone that these three patches are located in (762_Moderate). Patch EAR-TEC-03 had no plot data within the patch so plot EAR14 was used as this plot was undertaken within the same vegetation zone that this patch is located in (762_Poor).

Table 13.7 Assessment of significance for Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions

Criteria	Discussion
Adversely affect habitat critical to the survival of an ecological community.	No critical habitat, as defined under Section 207A of the EPBC Act, has been identified or included in the register of critical habitat for this species. Habitat critical to this EEC, as listed in the conservation advice (DCCEEW 2022), is comprised of patches that are in the 'best' condition and those that represent parts of the EEC with the highest diversity, most intact structure and ecological functions. These are classified as Class A and Blass B (high and good condition). Patches within the disturbance footprint are considered to be of moderate condition (Class C2). This is still classified as habitat critical for this EEC if they occur in locations important for biodiversity or have the potential to recover or be restored. The patches located along the floodplain contains degrees of degradation from historical clearing, grazing and weed infestation, therefore unlikely to be considered habitat critical for this EEC. The activity is therefore unlikely to have a significant adverse impact on critical habitat for the community.
Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns.	Because the land use is effectively unchanged from the present, it is not expected to significantly alter the existing abiotic factors which currently exist within the area. The existing surface water drainage will remain as it is at present. Disturbed areas will be reinstated to match existing landforms, trenches will be backfilled with the previously excavated subsoil material and care will be taken to maintain separation between topsoil from subsoil during this process. Soil conditions would therefore remain largely unchanged. There is unlikely to be a significant change to abiotic factors for the community within or outside of the immediate area of direct impact.
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.	The Project will result in the reduction of 1.9 ha of the ecological community. The Project also has the potential to increase weeds within the project area that my affect the quality of the habitat of the community. Mitigation measures will be implemented to protect the community, these include: • weed control prior to construction works being undertaken, where possible • appropriate disposal and management of weeds during clearing works • collection of native seed for rehabilitation propagation • implementation of a weed monitoring program. Therefore, given the extent of the ecological community and the mitigation measures in place to protect the quantity and quality of remaining vegetation it is unlikely the Project will result in a substantial reduction in quality of the listed community.
Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community.	With the impact mitigation and management proposed, the impact is unlikely to cause any substantial reduction in quality or integrity of the community outside of the area of direct impact.

Table 13.7 Assessment of significance for Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions

Criteria	Discussion
Interfere with recovery of an ecological community	No recovery plan is required for this EEC as it is not considered to provide benefits to the conservation advice (DCCEEW 2022). The Project could potentially contribute to the following EPBC-listed threatening processes: • land clearance • loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants • novel biota and their impact on biodiversity. Mitigation measures will be applied to minimise the risk of indirect impacts such as weed invasion and the introduction of pathogens. For instance, machinery will be cleaned between sites to reduce the chance of weed and pathogen spread. Removal of 1.9 hectares would contribute to the land clearance key threatening process affecting the community and would thereby interfere with the recovery of this community.
Consideration of impacts from 2019–2020 bushfires.	This EEC occurs along the flood plans in the local area. The FRSM shows that large areas of the Macleay River flood plan was unburnt, with patches of potential areas that may contain the EEC as having a low to medium FESM severity class, therefore it is not considered that the EEC within the development footprint is critical to the survival of this EEC as part of impacts from the 2019–2020 bushfires.
Conclusion	Based on the above assessment, the activity is unlikely to significantly impact on this EEC.

ii Threatened flora

a Grevillea guthrieana (Endangered)

Table 13.8 Grevillea guthrieana (Endangered)

Criteria	Discussion
Would the action lead to a long-term decrease in the size of a population?	*Grevillea guthrieana* is known from three areas on the mid-north coast of New South Wales, namely the Carrai Plateau vicinity, near Mount Banda Banda, and east of Booral. The total number of individual plants was estimated to be more than 10,000 and the number of plants in all populations on the Carrai Plateau was estimated to be around 5,000 (DoE 2014a) The recorded population present within and adjacent to the construction envelope is additional to previously recorded subpopulations continuous but is considered to be part of the broader Carrai Plateau population. A minimal number of 842 individuals of the species were recorded in the project area, this species was observed in high numbers along steep cliff areas where accurate counts could not be safely obtained. 15 individuals recorded within the disturbance footprint that would be removed by the Project. This sub-population also extends to areas outside of the construction envelope. The size of the sub-population outside of the construction envelope is unknown. The Project is therefore likely to lead to a small long-term decrease in the size of a population of the species.
Would the action reduce the area of occupancy of the species?	The IUCN recommends standardization of estimates of area of occupancy by applying a 2 x 2 km grid to occurrence data, a method which is adopted in assessment of conservation status under the EPBC Act (TSSC 2015). The Project is unlikely to reduce area of occupancy of the species as defined a 2 x 2 km grid applied to occurrence data as it will not result in the complete loss of individuals or potential habitat from any individual grid cell.

Table 13.8 Grevillea guthrieana (Endangered)

Criteria	Discussion
Would the action fragment an existing population into two or more populations?	The Project is unlikely to create a significant barrier to the operation of seed dispersal mechanisms as all recorded locations are in areas where only narrow bands of clearing for linear infrastructures such as access roads and powerline easements would be required. The relatively narrow breaks (up to 10 m and no greater than 100 m wide) in habitat created by these elements of the Project are unlikely to prevents seed dispersal or prevent cross-pollination of plants remaining on either side of the impacted areas. The Project is therefore unlikely to fragment an existing important population.
Would the action adversely affect habitat critical to the survival of a species?	No critical habitat has been listed for the *Grevillea guthrieana* under the EPBC Act. Habitat critical to the survival of a species may also include areas not listed on the Register of Critical Habitat if they are necessary for: • activities such as foraging, breeding, roosting, or dispersal • 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 • the reintroduction of populations or recovery of the species or ecological community (DoE, 2013). Habitat that is critical to the survival of *Grevillea guthrieana* is likely to include areas containing large populations, particularly those at the extremities of the species' distribution, that are likely to be important for breeding, dispersal, maintenance of genetic diversity, long-term evolutionary development and reintroduction. The sub-population on the construction envelope is part of the broader Carrrai Plateau population that is estimated to consist of approximately 5,000 individuals. The affected plants comprise the north-east edge of the Carrai population and are therefore at an extremity of the species' distribution. The Project is therefore likely to adversely affect part of an area of habitat critical to the survival of the species.
Would the action disrupt the breeding cycle of a population?	The clearing of individuals and habitat for the species due to the Project is unlikely to create a significant barrier to the movement of pollinators or the operation of seed dispersal mechanisms. The Project is therefore unlikely to significantly disrupt the breeding cycle of the remaining (at least 80% of the population) members of the Carrai population of the species.
Would the action modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	The Project would reduce available habitat by up to 1 ha. This reduction in habitat would result in a small long-term reduction (approximately 0.3 %) in the size of the Carrai population of the species. The Project is unlikely to degrade remaining habitat or result in any further decline of the remaining population.
Would the action result in invasive species that are harmful to an endangered species becoming established in the endangered species' habitat?	Site hygiene protocols will be in place during construction to minimise the risk of introduction of invasive species. The Project is unlikely facilitate further invasions of harmful species.
Would the action introduce disease that may cause the species to decline?	There are no diseases known to affect *Grevillea guthrieana* and the Project is unlikely to introduce pathogens to the area.

Table 13.8 Grevillea guthrieana (Endangered)

Criteria	Discussion
Would the action interfere with the recovery of the species?	No recovery plans are available for *Grevillea guthrieana*. The actions below are a subset of those recommended in the Conservation Advice for the species: • ensure there is no inappropriate disturbance in areas where Grevillea guthrieana occurs, excluding necessary actions to manage the conservation of the species • investigate formal conservation arrangements, management agreements and covenants on private land, and for crown and private land investigate and/or secure inclusion in reserve tenure if possible • develop and implement a management plan for the control of Lantana (Lantana camara) and Mist Flower (*Ageratina riparia*) in the region • if necessary, implement a management plan for the control and/or eradication of feral goats in the region • engage with private landholders and land managers responsible for the land on which populations occur and encourage these key stakeholders to contribute to the implementation of conservation management actions • undertake appropriate seed collection and storage • suitably control and manage access on private land and other land tenure • minimise adverse impacts from land use at known sites. The Project will not interfere with most of the identified recovery actions for the species. Given the apparent, large size of the local population, and that Carrai population outside of the project area would be retained, it is unlikely however to interfere substantially with the recovery of the species.
Consideration of impacts from 2019–2020 bushfires.	FESM severity mapping of the Carrai Plateau were populations of this species occur were mapped as unburnt, with areas of low to medium FESM severity class. It is there likely that the population of this species was not significantly impacted by the 2019–2020 bushfires. This species also occurs in drainage ditches and creek lines which are less likely to burn due to their position in the landscape and higher soil moisture content. The loss of 15 individuals is not considered critical to the survival of this species as part of impacts from the 2019–2020 bushfires.
Conclusion	Based on the above assessment, the Project is unlikely to have a significantly impact the *Grevillea guthrieana*.

b Tall Velvet Sea-berry (Vulnerable)

Table 13.9 Tall Velvet Sea-berry (Vulnerable)

Criteria	Discussion
Would the action lead to a long-term decrease in the size of 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. The recorded population present in the locality consists of a minimal count of 2,742 individuals. Areas along the transmission line contained steep wet slopes where this species was the dominant shrub cover. Accurate counts were undertaken where possible, however due to the sheer numbers of the species that were located outside of the disturbance footprint, the number provided here is the minimal for this species. The populations recorded along the transmission line north of the Macleay may be considered an important population due to containing thousands of plants. 363 individuals of the species were recorded in the disturbance footprint and would be removed by the Project. This population also extends to areas outside of the construction envelope however the size of the is unknown. The Project is therefore likely to lead to a long-term decrease in the size of an important population of the species.
Would the action reduce the area of occupancy of an important population?	The IUCN recommends standardization of estimates of area of occupancy by applying a 2 x 2 km grid to occurrence data, a method which is adopted in assessment of conservation status under the EPBC Act (TSSC 2015). The Project may reduce area of occupancy of the species as defined by a 2 x 2 km grid applied to occurrence data as the presence of the species has only been confirmed in areas within and immediately adjacent to the construction envelopes. However, it may not result in an actual loss of the species from any 2 km x 2 km grid cell as the complete loss of potential habitat from any individual grid cell is unlikely to occur.
Would the action fragment an existing important population into two or more populations?	The Project is unlikely to create a significant barrier to the operation of seed dispersal mechanisms as all recorded locations are in areas where only narrow bands of clearing for linear infrastructures such as access roads and powerline easements would be required. The relatively narrow breaks (up to 10 m to 100 m wide) in habitat created by these elements of the Project are unlikely to prevents seed dispersal or prevent cross-pollination of plants remaining on either side of the impacted areas. The Project is therefore unlikely to fragment an existing important population.
Would the action adversely affect habitat critical to the survival of a species?	No critical habitat has been listed for this species under the EPBC Act. Habitat critical to the survival of this species may also include areas not listed on the Register of Critical Habitat if they are necessary for: • activities such as foraging, breeding, roosting, or dispersal • 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 • the reintroduction of populations or recovery of the species or ecological community (DoE 2013). There is insufficient data available for the regional Tall Velvet Sea-Berry population to determine if habitat within and surrounding the construction envelope may be considered critical habitat. However, given the large local population observed, for the purposes of this assessment, it has been assumed to constitute habitat critical to the survival of the species. The Project is therefore unlikely to adversely affect part of an area of habitat critical to the survival of the species.
Would the action disrupt the breeding cycle of an important population?	The clearing of individuals and habitat for the species due to the Project is unlikely to create a significant barrier to the movement of pollinators or the operation of seed dispersal mechanisms. The Project is therefore unlikely to significantly disrupt the breeding cycle of the remaining members of the local population of the species.

Table 13.9 Tall Velvet Sea-berry (Vulnerable)

Criteria	Discussion
Would the action modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	The Project would reduce the local population by up to 363 individuals over an area of 4.2 ha. This population also extends to adjacent areas outside of the construction envelope however the size of the population outside of the construction envelope is unknown. This reduction in individuals and habitat could result in a long-term reduction in the size of the local population of the species.
Would the action result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat?	The existing landscape contains many invasive species that are directly or indirectly harmful to the species, either through herbivory, competition or alteration of habitat. With the mitigation and management measures proposed, it is unlikely that any further species invasions will be facilitated by the Project. Therefore, the proposed impacts are considered unlikely to facilitate the spread of invasive species or their adverse impacts to the survival of the threatened species (either directly or indirectly).
Would the action interfere substantially with the recovery of the species?	No recovery plans or Listing Advice is available for Tall Velvet Sea-Berry. The actions below are a subset of those recommended in the Conservation Advice for the species: • undertake seed germination trials to determine the requirements for successful establishment • investigate fire ecology including response to different fire regimes in its habitat • monitor known populations to identify threats • undertake appropriate seed collection and storage • Implement national translocation protocols if establishing of additional populations is considered necessary and feasible • control access routes to suitable habitat and constrain public access to known sites on public land • ensure chemicals used to eradicate weeds do not adversely harm the threatened species • ensure road widening and maintenance activities (or other infrastructure or development activities) involving substrate or vegetation disturbance in areas where H. exalata subsp. velutina occurs do not adversely impact on known populations. The Project will not interfere with most of the identified recovery actions for the species. The clearing of 363 individuals and associated habitat will adversely impact a known population and thereby interfere with the recovery of the species in the local context. Given the apparent, large size of the local population, it is unlikely however to interfere substantially with the recovery of the species.
Consideration of impacts from 2019–2020 bushfires.	FESM severity mapping of the majority of known populations where this species occur within the Oxley Wild Rivers National Park are located south of the Macleay River in areas mapped as unburnt, low to medium FESM severity classes. It is there likely that the population of this species was not significantly impacted by the 2019–2020 bushfires. This species also occurs in wetter habitats and creek lines which are less likely to burn due to their position in the landscape and higher soil moisture content. The loss of 7% of the recorded population within the construction envelope is not considered critical to the survival of this species as part of impacts from the 2019–2020 bushfires.
Conclusion	Based on the above assessment, the Project is unlikely to have a significant impact on Tall Velvet Sea-Berry.

c Wandering Pepper Crest (Endangered)

Table 13.10 Wandering Pepper Crest (Endangered)

Criteria	Discussion
Would the action lead to a long-term decrease in the size of a population?	Prior to the surveys conducted for the Project in 2021, Wandering Pepper Cress was not known or predicted to occur in the region, with the nearest areas where the species was then known to occur being located more than 200 km to the north. Targeted surveys in 2001 recorded a total of 192 mature plants and 123 juveniles across six sites in NSW and Queensland. This species has recently been recorded from 24 populations, mostly in Queensland. As of 2014, the largest known population contained 142 mature individuals (DoE 2014b). The recorded population present within the project area consists of at least 1,577 plants most of which were mature at the time of survey. It is therefore likely to represent the largest known population of the species. The population in the construction envelope would also represent the most southerly known population, however, the EMM ecologist who found the species on site has also recently opportunistically recorded it growing further south, near Forster in April 2022 (Inaturalist refence https://www.inaturalist.org/observations/111387787). Two individuals of the species were recorded in the disturbance footprint and would be removed by the Project. The plants to be impacted on occur over an area of around 1.4 ha, including polygons encompassing the recorded locations and intervening areas of suitable habitat. The Project is therefore unlikely to lead to a small to moderate long-term decrease in the size of a population of the species.
Would the action reduce the area of occupancy of the species?	The IUCN recommends standardization of estimates of area of occupancy by applying a 2 x 2 km grid to occurrence data, a method which is adopted in assessment of conservation status under the EPBC Act (TSSC 2015). The Project may reduce area of occupancy of the species as defined by a 2 x 2 km grid applied to occurrence data as the presence of the species has only been confirmed in areas within and immediately adjacent to the construction envelopes. However, it may not result in an actual loss of the species from any 2 km x 2 km grid cell as the complete loss of potential habitat from any individual grid cell is unlikely to occur.
Would the action fragment an existing population into two or more populations?	The Project would only result in narrow bands of clearing at the edge of areas containing the species and would not divide any area of habitat. The Project is therefore unlikely to create a significant barrier to the operation of pollination or seed dispersal mechanisms. The Project is therefore unlikely to fragment an existing population.
Would the action adversely affect habitat critical to the survival of a species?	No critical habitat has been listed for the Wandering Pepper Cress under the EPBC Act. Habitat critical to the survival of a species may also include areas not listed on the Register of Critical Habitat if they are necessary for: • activities such as foraging, breeding, roosting, or dispersal • 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 • the reintroduction of populations or recovery of the species or ecological community (DoE, 2013). Habitat that is critical to the survival of Wandering Pepper Cress is likely to include areas containing large populations, particularly those at the extremities of the species' distribution, that are likely to be important for breeding, dispersal, maintenance of genetic diversity, long-term evolutionary development and reintroduction. Given the large population recorded within the project area and its location, approx. 140 km southeast of the closest population and 200 km south of the far northern NSW and southern Queensland populations, the habitat on and adjacent to the construction envelope may be considered critical habitat. The Project is therefore unlikely to adversely affect part of an area of habitat critical to the survival of the species.

Table 13.10 Wandering Pepper Crest (Endangered)

Criteria	Discussion
Would the action disrupt the breeding cycle of a population?	The clearing of individuals and habitat for the species due to the Project is unlikely to create a significant barrier to the movement of pollinators or the operation of seed dispersal mechanisms. The Project is therefore unlikely to significantly disrupt the breeding cycle of the remaining (approximately 80% of the population) members of the local population of the species.
Would the action modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	The Project would reduce available habitat by up to 1.4 ha. This reduction in habitat would result in a small reduction in the size of the local population of the species. The Project is unlikely to degrade remaining habitat or result in any further decline of the remaining population.
Would the action result in invasive species that are harmful to an endangered species becoming established in the endangered species' habitat?	Site hygiene protocols will be in place during construction to minimise the risk of introduction of invasive species. The Project is unlikely facilitate further invasions of harmful species.
Would the action introduce disease that may cause the species to decline?	There are no diseases known to affect the Wandering Pepper Cress and the Project is unlikely to introduce pathogens to the area.
Would the action interfere with the recovery of the species?	No recovery plans are available for Wandering Pepper Cress. The actions below are a subset of those recommended in the Conservation Advice for the species: • ensure there is no inappropriate disturbance in areas where Wandering Pepper Cress occurs, excluding necessary actions to manage the conservation of the species • investigate formal conservation arrangements, management agreements and covenants on private land, and for crown and private land investigate and/or secure inclusion in reserve tenure if possible • develop and implement a management plan for the control of weeds in the region • develop and implement a management plan for the control and eradication of rabbits in the region • engage with private landholders and land managers responsible for the land on which populations occur and encourage these key stakeholders to contribute to the implementation of conservation management actions • undertake appropriate seed collection and storage • suitably control and manage access on private land and other land tenure • minimise adverse impacts from land use at known sites. The Project will not interfere with most of the identified recovery actions for the species. The clearing of two individuals and associated habitat will unlikely adversely impact the population within the project area and thereby interfere with the recovery of the species in the local context.
Consideration of impacts from 2019–2020 bushfires.	This species occurs along the flood plans of the Macleay River. The FRSM shows that large areas of the Macleay River flood plan was unburnt, with patches of potential areas that may contain this species as having a low to medium FESM severity class. As only two individuals out of the 1,577 recorded within the project area will be impacted on as part of the Project, it is not considered that the development footprint habitat is critical to the survival of this species as part of impacts from the 2019–2020 bushfires.
Conclusion	Based on the above assessment, the Project is unlikely to have a significant impact on the Wandering Pepper Cress.

d Assessment of significance: *Pultenaea rubescens*

Table 13.11 *Pultenaea rubescens*

Criteria	Discussion
Would the action lead to a long-term decrease in the size of a population of a species?	For *Pultenaea rubescens* a sample of an undescribed species was sent to the herbarium for identification. At the time of survey it was considered that the specimen could be Parris' Bush-pea (*Pultenaea parrisiae*). Identification could not be confirmed by the herbarium. Response from the herbarium was "this is particularly interesting. In many features it looks very close to *P.parrisiae* but it is a very long way from previous records. The few bracteoles present showed some variability, which would need to be studied further. Russel Barrett at the NSW Herbarium is currently doing some work on *Pultenaea* and will likely be interested in this". Specimen could be an undescribed species related to this species. Detailed surveys for this species were undertaken within the current and previous construction for this species. In addition, sample surveys within the Project area outside of the construction envelope targeted the similar microhabitat observed for this species within the construction envelope. It is noted as this is an undescribed species as such, no information is known about this species. From the data collected from detailed surveys for the Project, survey results observed the following: • This species was recorded in small patches of wet and heathy habitat in the Carrai Plateau. • Most records within or along edges of wet habitat associated with PCT 1287, excluding one patch that was associated with PCT 822 that contained similar wet habitat. • This species grows in clumps associated with microhabitats that contain flat and wet areas. Microhabitat where this species was recorded within the Project area was the same as that described for Parris' Bush-pea: "moist heathlands in loam soils, sometimes at the margins of woodlands and also in riparian vegetation" (DEWHA 2008). Currently from surveys within and adjacent to the construction envelope the area of potential known habitat for this species is 14.51 ha. No individuals will be removed as part of the Project, the Project has been redesigned to avoid any direct impacts or loss to this species. The Project is therefore unlikely to lead to a long-term decrease in the size of an important population of the species.
Would the action reduce the area of occupancy of a population?	The IUCN recommends standardization of estimates of area of occupancy by applying a 2 x 2 km grid to occurrence data, a method which is adopted in assessment of conservation status under the EPBC Act (TSSC 2015). The Project is unlikely to reduce area of occupancy of the species as defined a 2 x 2 km grid applied to occurrence data as it will not result in the complete loss of individuals or potential habitat from any individual grid cell.
Would the action fragment an existing population into two or more populations?	The Project has been redesigned to avoid any direct impacts to this species. The Project is not considered to fragment the population from other subpopulations within the project area as the subpopulation close to the disturbance footprint is located along the western edge of its known distribution. This species is associated with wet and flat areas. No suitable habitat is present further west from the most western subpopulation within the project area.

Table 13.11 *Pultenaea rubescens*

Criteria	Discussion
Would the action adversely affect habitat critical to the survival of a species?	No critical habitat has been listed for the *Pultenaea rubescens* under the EPBC Act. Habitat critical to the survival of a species may also include areas not listed on the Register of Critical Habitat if they are necessary for: • activities such as foraging, breeding, roosting, or dispersal • 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 • the reintroduction of populations or recovery of the species or ecological community (DoE, 2013). Habitat that is critical to the survival of *Pultenaea rubescens* is likely to include areas containing large populations, particularly those at the extremities of the species' distribution, that are likely to be important for breeding, dispersal, maintenance of genetic diversity, long-term evolutionary development and reintroduction. Given the large population within the project area and its location a large distance north of other populations, the habitat within the project area may be considered critical habitat. The disturbance footprint has been designed to avoid habitat where this species was recorded. The Project is therefore unlikely to adversely affect part of an area of habitat critical to the survival of the species.
Would the action disrupt the breeding cycle of an important population?	The clearing surrounding vegetation is unlikely to create a significant barrier to the movement of pollinators or the operation of seed dispersal mechanisms. The Project is therefore unlikely to significantly disrupt the breeding cycle of the local population of the species.
Would the action modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	The disturbance footprint has been designed to avoid habitat where this species was recorded. No suitable habitat was recorded within the disturbance footprint The Project is unlikely to degrade remaining habitat or result in any further decline of the remaining population.
Would the action result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat?	Site hygiene protocols will be in place during construction to minimise the risk of introduction of invasive species. The Project is unlikely facilitate further invasions of harmful species.
Would the action introduce disease that may cause the species to decline?	There are no diseases known to affect the *Pultenaea rubescens* and the Project is unlikely to introduce pathogens to the area.
Would the action interfere substantially with the recovery of the species?	No recovery plan is available for the *Pultenaea rubescens*. The actions below are a subset of relevant recommendations in the Conservation Advice for the species: • manage any changes to hydrology that may result in changes to the water table levels, increased run-off. The Project will incorporate relevant construction site management methodology into the CEMP to reduce impacts such as runoff into sensitive environmental areas, including habitat that supports threatened species. It is unlikely that the Project would interfere substantially with the recovery of the species.
Consideration of impacts from 2019–2020 bushfires.	FESM severity mapping of the majority of known populations where this species occur within the Carrai Plateau recorded by EMM were in areas mapped as low to medium FESM severity classes. The Project is not impacting on this species or habitat where this species was recorded, as such the Project will not impact on habitat critical to the survival of this species as part of impacts from the 2019–2020 bushfires.

Table 13.11 *Pultenaea rubescens*

Criteria	Discussion
Conclusion	Based on the above assessment, the Project is unlikely to significantly impact the *Pultenaea rubescens*

e Assessment of significance: Scrub Turpentine (Critically Endangered)

Table 13.12 Scrub Turpentine (Critically Endangered)

Criteria	Discussion
Would the action lead to a long-term decrease in the size of a population?	The number of distinct populations of Scrub Turpentine is unknown but is expected to be large given the wide distribution of the species. Occurrences of Scrub Turpentine are contiguous along the entire range of the species with no significant disjunctions. No formal estimate exists of the total population of the species however it is likely that that the number of mature individuals may be large (i.e. not <10,000) (TSSC 2020). The recorded population within the project area consists of approximately 13 plants, with none recorded within the disturbance footprint. The impacted habitat is contiguous with areas containing records of the species to the north-east. The size of the broader population is unknown however, the amount of contiguous potential habitat is very large. The Project is therefore unlikely to lead to a small to moderate long-term decrease in the size of a population of the species.
Would the action reduce the area of occupancy of the species?	The IUCN recommends standardization of estimates of area of occupancy by applying a 2 x 2 km grid to occurrence data, a method which is adopted in assessment of conservation status under the EPBC Act (TSSC 2015). The Project is unlikely to reduce area of occupancy of the species as defined a 2 x 2 km grid applied to occurrence data as it will not result in the complete loss of individuals or potential habitat from any individual grid cell.
Would the action fragment an existing population into two or more populations?	The Project would only result in bands of clearing within the species' habitat that are not substantial in the context of the species' animal-assisted pollination and dispersal mechanisms. The Project is therefore unlikely to create a significant barrier to the operation of pollination or seed dispersal mechanisms. The Project is therefore unlikely to fragment an existing population.
Would the action adversely affect habitat critical to the survival of a species?	No critical habitat has been listed for the Scrub Turpentine under the EPBC Act. Habitat critical to the survival of a species may also include areas not listed on the Register of Critical Habitat if they are necessary for: • activities such as foraging, breeding, roosting, or dispersal • 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 • the reintroduction of populations or recovery of the species or ecological community (DoE, 2013). There is insufficient data available for the regional Scrub Turpentine population to determine if habitat within and surrounding the construction envelope may be considered critical habitat. The individuals observed all will infected by myrtle rust and are already considered unlikely to survive or pollinate in the area. However, given that the species is listed as critically endangered, for the purposes of this assessment, it has been assumed to constitute habitat critical to the survival of the species. The Project is therefore likely to adversely affect part of an area of habitat critical to the survival of the species.
Would the action disrupt the breeding cycle of a population?	The individuals recorded were all infected by myrtle rust, this causes populations to rabidly decline and impacts all life stages of the species (TSSC 2020).

Table 13.12 Scrub Turpentine (Critically Endangered)

Criteria	Discussion
Would the action modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	This species was not associated with any of the PCTs recorded within the project area. This species occurred within wetter, damper areas which the Project is avoiding where this species was recorded. The Project is unlikely to degrade remaining habitat or result in any further decline of the remaining population.
Would the action result in invasive species that are harmful to an endangered species becoming established in the endangered species' habitat?	Site hygiene protocols will be in place during construction to minimise the risk of introduction of invasive species. The Project is unlikely facilitate further invasions of harmful species.
Would the action introduce disease that may cause the species to decline?	The individuals recorded were all infected by myrtle rust, as such, the disease that impact the survival of this species is already present within the Project area.
Would the action interfere with the recovery of the species?	No recovery plans have been applied to Scrub Turpentine as the implement of priority actions and mitigation against key threats cannot be achieved.
Conclusion	Based on the above assessment, the Project is unlikely to significantly impact the Scrub Turpentine.

f Assessment of significance: Cryptic Forest Twiner (Endangered)

Table 13.13 Cryptic Forest Twiner (Endangered)

Criteria	Discussion
Would the action lead to a long-term decrease in the size of a population?	This species is not associated with any PCTs within the project area. A number of possible records of the species have been recorded during targeted surveys but could not be confirmed as Cryptic Forest Twiner. Specimens have been sent to herbarium for identification but could not be definitively identified due to a lack of fertile material. Response from the herbarium was "?*Tylophora woolsii* – your specimen is a good vegetative match for this species but in the absence of fertile material I can't confidently rule out all other *Apocyanaceae* taxa". Using the precautionary principle, the records within the construction envelope will be assumed to be Cryptic Forest Twiner within the BDAR. Five individuals were recorded within the project area with none recorded within the disturbance footprint. The Project is therefore unlikely to lead to a long-term decrease in the size of a population of this species.
Would the action reduce the area of occupancy of the species?	The IUCN recommends standardization of estimates of area of occupancy by applying a 2 x 2 km grid to occurrence data, a method which is adopted in assessment of conservation status under the EPBC Act (TSSC 2015). The Project may reduce area of occupancy of the species as defined by a 2 x 2 km grid applied to occurrence data as the presence of the species has only been confirmed in areas within and immediately adjacent to the construction envelopes. However, it may not result in an actual loss of the species from any 2 x 2 km grid cell as the complete loss of potential habitat from any individual grid cell is unlikely to occur.

Table 13.13 Cryptic Forest Twiner (Endangered)

Criteria	Discussion
Would the action fragment an existing population into two or more populations?	The Project would only result in narrow bands of clearing at the edge of areas containing the species and would not divide any area of habitat. The Project is therefore unlikely to create a significant barrier to the operation of pollination or seed dispersal mechanisms. The Project is therefore unlikely to fragment an existing population.
Would the action adversely affect habitat critical to the survival of a species?	No critical habitat has been listed for the Cryptic Forest Twiner under the EPBC Act. Habitat critical to the survival of a species may also include areas not listed on the Register of Critical Habitat if they are necessary for: • activities such as foraging, breeding, roosting, or dispersal • 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 • the reintroduction of populations or recovery of the species or ecological community (DoE, 2013). It is considered unlikely that the habitat within and surround the construction envelope is considered critical habitat for this species, as this species was not associated with any PCTs recorded. The Project is therefore unlikely to affect an area of habitat critical to the survival of the species.
Would the action disrupt the breeding cycle of a population?	The clearing of individuals and habitat for the species due to the Project is unlikely to create a significant barrier to the movement of pollinators or the operation of seed dispersal mechanisms. The Project is therefore unlikely to significantly disrupt the breeding cycle of this species.
Would the action modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	The Project would reduce available habitat by up to 13 ha. This reduction in habitat would result in a small long-term reduction in the size of the local population of the species. The Project is unlikely to degrade remaining habitat or result in any further decline of the remaining population.
Would the action result in invasive species that are harmful to an endangered species becoming established in the endangered species' habitat?	Site hygiene protocols will be in place during construction to minimise the risk of introduction of invasive species. The Project is unlikely facilitate further invasions of harmful species.
Would the action introduce disease that may cause the species to decline?	There are no diseases known to affect the Cryptic Forest Twiner and the Project is unlikely to introduce pathogens to the area.
Would the action interfere with the recovery of the species?	No recovery plan is available for Cryptic Forest Twiner. The actions below are a subset of relevant recommended in the Conservation Advice for the species: • develop and implement a management plan for the control of invasive weeds in the region. The Project will incorporate relevant construction site management methodology into the CEMP to reduce impacts such as runoff into sensitive environmental areas, including habitat that supports threatened species. It is unlikely that the Project would interfere substantially with the recovery of the species.

Table 13.13 Cryptic Forest Twiner (Endangered)

Criteria	Discussion
Consideration of impacts from 2019–2020 bushfires.	The closest records of this species located to the north in Cunnawarra National Park, Thumb Creek State Forest and Mistake State Forest had FESM severity mapping as low to extreme FESM severity classes. This species was also recorded in the project area outside of the disturbance footprint. Due to the large area of potential habitat for this species and know individuals the occur outside of the development footprint, the Project is not considered to be impacting on critical habitat for the survival of this species as part of impacts from the 2019–2020 bushfires.
Conclusion	Based on the above assessment, the Project is unlikely to significantly impact the Cryptic Forest Twiner.

iii Threatened fauna

a Assessment of significance: Spotted-tailed Quoll (Endangered)

Table 13.14 Spotted-tailed Quoll (Endangered)

Criteria	Discussion
Would the action lead to a long-term decrease in the size of a population?	The Spotted-tailed Quoll has been recorded in the project area, primarily in the higher elevations near the upper reservoir. Risk of direct mortality of individuals of the species would be minimised through clearing protocols, however, it is possible that a small number of individuals could be affected. Spotted-tailed Quoll populations may be classified as being of importance to the long-term survival and recovery of the species if they are: • 'stronghold' populations within a region (i.e. areas of high abundance) • populations that are known to be genetically disparate • populations that, if lost, would cause a significant contraction in the species' range • populations that have been the focus of long-term research and hence have good base-line data that will increase the understanding of the species' ecology (DELWP 2016). Habitat that is critical to the survival of the Spotted-tailed Quoll includes large patches of forest with adequate denning resources and relatively high densities of medium-sized mammalian prey (DELWP 2016). All habitats that are known to be occupied are considered important (DELWP 2016). The locality of the construction envelope is not listed in the recovery plan as an important populations however it is moderately well connected at a landscape level with areas of listed important populations to the west (Walcha-Armidale) and north (Dorrigo Plateau) (DELWP 2016). The Project will decrease Spotted-tailed Quoll habitat by up to 184 ha. The habitat affected consists of woodland of PCTs associated with the species. This reduction in habitat could result in a small long-term reduction in the size of the local population of the species.
Would the action reduce the area of occupancy of the species?	The IUCN recommends standardization of estimates of area of occupancy by applying a 2 x 2 km grid to occurrence data, a method which is adopted in assessment of conservation status under the EPBC Act (TSSC 2015). The Project is unlikely to reduce area of occupancy of the species as defined a 2 x 2 km grid applied to occurrence data as it will not result in the complete loss of potential habitat from any individual grid cell.

Table 13.14 Spotted-tailed Quoll (Endangered)

Criteria	Discussion
Would the action fragment an existing population into two or more populations?	Whilst the operation of the reservoirs will impede movement across the valleys around the inundation area, the Project would not prevent movement of animals between these areas as they would remain directly connected via large areas of continuous forest and woodland encircling the inundation areas of the existing and proposed reservoirs. The narrow bands of clearing required for the access and transmission are unlikely to interfere with quoll movement since quolls are capable of traversing narrow tracts of cleared land between forested areas. The Project will not create any major barriers to movement (such as large roads). The Project is unlikely to fragment any existing quoll populations into multiple populations.
Would the action adversely affect habitat critical to the survival of a species?	No critical habitat has been listed for the Spotted-tailed Quoll under the EPBC Act. Habitat critical to the survival of a species may also include areas not listed on the Register of Critical Habitat if they are necessary for: • activities such as foraging, breeding, roosting, or dispersal • 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 • the reintroduction of populations or recovery of the species or ecological community (DoE, 2013). The Project will reduce foraging and some potential dens site habitat for this species as such will have a minor adverse impact that affects part of an area of habitat critical to the survival of the species.
Would the action disrupt the breeding cycle of a population?	The Project would affect possible den sites such as deep crevices, boulder piles and fallen logs. Removal of these features could temporarily disrupt the breeding cycle for a small proportion of the local population of the species.
Would the action modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	The Project would reduce available habitat by up to 184 ha. This reduction in habitat could result in a small long-term reduction in the size of the local population of the species. The Project is unlikely to degrade remaining habitat or result in any further decline of the remaining population.
Would the action result in invasive species that are harmful to an endangered species becoming established in the endangered species' habitat?	Site hygiene protocols will be in place during construction to minimise the risk of introduction of invasive species. The Project is unlikely facilitate further invasions of harmful species.
Would the action introduce disease that may cause the species to decline?	There are no diseases known to affect the Spotted-tailed Quoll and the Project is unlikely to introduce pathogens to the area.
Would the action interfere with the recovery of the species?	The National Recovery Plan for the Spotted-tailed Quoll lists objectives and actions for the species recovery (DELWP 2016). The following is a subset of objectives relevant to the Project: • determine and manage the threat posed by introduced predators (foxes, cats, wild dogs) and of predator control practices on Spotted-tailed Quoll populations • reduce the frequency of Spotted-tailed Quoll road mortality • reduce the rate of habitat loss and fragmentation on private land. The Project will have a minor adverse impact on habitat that may contribute to the ability of the species to move through the landscape. The Project is unlikely to increase road mortality. The clearing of 184 ha of known and potential habitat for the species would detract from the objective of reducing the rate of habitat loss and fragmentation on private land.

Table 13.14 Spotted-tailed Quoll (Endangered)

Criteria	Discussion
Consideration of impacts from 2019–2020 bushfires.	Suitable habitat to support this species is considered to the widespread throughout the project area associated with the Macleay Gorges rocky cliffs and escapement habitat. The FESM severity mapped this area as unburnt to medium severity classes. As large areas of suitable habitat to support this species will not be impacted as part of the Project, the Project is not considered to impact critical habitat for the survival of this species as part of impacts from the 2019–2020 bushfires.
Conclusion	Based on the above assessment, the Project is unlikely to significantly impact the Spotted-tailed Quoll.

b Assessment of significance: White-throated Needletail (Vulnerable)

Table 13.15 White-throated Needletail (Vulnerable)

Criteria	Discussion
Would the action lead to a long-term decrease in the size of 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. The White-throated Needletail is a migratory species that exists as a series of interconnected subpopulations with animals moving between widely dispersed summer foraging areas in the southern hemisphere and breeding sites in the northern hemisphere. The concept of an important population is not readily applicable to this species. For the purposes of this assessment important habitat has been used to assess whether or not an impact on an 'important population' is likely. Important habitat for the White-throated Needletail is likely to include productive landscapes with high flying insect activity, typically wetlands, open forests and woodlands. The dry forests and woodlands that are prevalent in the project area are likely to be marginal as habitat. The species is conspicuous, and the low density of local records suggests that the locality is not a stronghold for the species. The project area is not at or near the limit of the species' range. Therefore, the Project is unlikely to affect an important population of White-throated Needletail.
Would the action reduce the area of occupancy of an important population?	The Project is unlikely to affect an important population of White-throated Needletail. The IUCN recommends standardization of estimates of area of occupancy by applying a 2 x 2 km grid to occurrence data, a method which is adopted in assessment of conservation status under the EPBC Act (TSSC 2015). The Project is unlikely to reduce area of occupancy of the species as defined a 2 x 2 km grid applied to occurrence data as it will not result in the complete loss of potential habitat from any individual grid cell.
Would the action fragment an existing important population into two or more populations?	Owing to the mobility of the species, the quality of the habitat and the location of the site within the species distribution area. It is unlikely to fragment an existing important population into two or more populations.

Table 13.15 White-throated Needletail (Vulnerable)

Criteria	Discussion
Would the action adversely affect habitat critical to the survival of a species?	No critical habitat has been listed for this species under the EPBC Act. Habitat critical to the survival of this species may also include areas not listed on the Register of Critical Habitat if they are necessary for: • activities such as foraging, breeding, roosting, or dispersal • 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 • the reintroduction of populations or recovery of the species or ecological community (DoE 2013). The White-throated Needletail is a migratory species with animals moving between widely dispersed summer foraging areas in the southern hemisphere and breeding sites in the northern hemisphere. Important habitat for the White-throated Needletail in Australia is likely to include productive landscapes with high flying insect activity, typically wetlands, open forests and woodlands. The dry forests and woodlands that are prevalent in the project area are likely to be marginal as habitat. The species is conspicuous when flying high over open habitat, and the moderate number of local records suggests that the locality is not a stronghold for the species. The project area is not at or near the limit of the species' range. Therefore, the Project is unlikely to affect critical habitat of the White-throated Needletail.
Would the action disrupt the breeding cycle of an important population?	The species does not breed in Australia. The potential habitat present in the impact area is of marginal suitability for the species. The Project is therefore unlikely to affect an important population of White-throated Needletail. The Project is not considered likely to disrupt the breeding cycle of an important population of the species.
Would the action modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	The Project may reduce potential White-throated Needletail habitat by up to 328 ha. The Project is not likely to cause the species to decline, due to: • the condition of habitat present • availability of larger area of similar and higher quality habitat in the broader locality • the ability of the species to forage in fragmented landscapes (including agricultural landscapes) • the mobility of the species.
Would the action result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat?	The existing landscape contains many invasive species that are directly or indirectly harmful to the species, either through predation, competition or alteration of habitat. With the mitigation and management measures proposed, it is unlikely that any further species invasions will be facilitated by the Project. Therefore, the proposed impacts are considered unlikely to facilitate the spread of invasive species or their adverse impacts to the survival of the threatened species (either directly or indirectly).
Would the action interfere substantially with the recovery of the species?	No Recovery Plan or Listing Advice has been created for the White-throated Needletail. The Project is unlikely to affect key habitat or otherwise interfere substantially with the recovery of the species.
Consideration of impacts from 2019–2020 bushfires.	This species is largely aerial and highly mobile. Impacts to potential roosting habitat within the development footprint is not considered to impact critical habitat for the survival of this species as part of impacts from the 2019–2020 bushfires.
Conclusion	Based on the above assessment, the Project is unlikely to cause a significant impact to White-throated Needletail.

c Assessment of significance: Greater Glider (Endangered)

Table 13.16 Greater Glider (Endangered)

Criteria	Discussion
Would the action lead to a long-term decrease in the size of a population?	The Greater Glider has been recorded in the project area, primarily in the higher elevations near the upper reservoir. Risk of direct mortality of individuals of the species would be minimised through clearing protocols, however, it is possible that a small number of individuals could be affected. The Project will decrease Greater Glider habitat by up to 239 ha. This reduction in habitat could result in a small long-term reduction in the size of the local population of the species.
Would the action reduce the area of occupancy of the species?	The IUCN recommends standardization of estimates of area of occupancy by applying a 2 x 2 km grid to occurrence data, a method which is adopted in assessment of conservation status under the EPBC Act (TSSC 2015). The Project is unlikely to reduce area of occupancy of the species as defined a 2 x 2 km grid applied to occurrence data as it will not result in the complete loss of potential habitat from any individual grid cell.
Would the action fragment an existing population into two or more populations?	Whilst the operation of the reservoirs will impede movement across the valleys around the inundation area, the Project would not prevent movement of animals between these areas as they would remain directly connected via large areas of continuous forest and woodland encircling the inundation areas of the existing and proposed reservoirs. The narrow bands of clearing required for the access and transmission are unlikely to interfere with glider movement since gliders are capable of traversing narrow tracts of cleared land between forested areas. The Project will not create any major barriers to movement (such as large roads). The Project is unlikely to fragment any existing Greater Glider populations into multiple populations.
Would the action adversely affect habitat critical to the survival of a species?	No Critical Habitat as defined under section 207A of the EPBC Act has been identified or included in the Register of Critical Habitat (DCCEW 2022). The greater glider is sensitive to forest clearance (Tyndale-Biscoe & Smith 1969a). Habitat critical to the survival is broadly defined as: • large contiguous areas of eucalypts forest, which contain mature hollow bearing trees and a diverse range of preferred food species • habitat connectivity • cool microclimate forest or woodland areas • areas identified as refuges under future climate change scenarios • short-term or long-term post fire refuges that allow species to persist, recover and recolonise burnt areas. The Project will have a minor adverse impact that affects part of an area of habitat critical to the survival of the species.
Would the action disrupt the breeding cycle of a population?	All Greater Glider populations are considered important (DCCEW 2022). The removal of habitat could temporarily disrupt the breeding cycle for this species within the disturbance footprint.
Would the action modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	The Project would reduce available habitat by up to 239 ha. This reduction in habitat could result in a small long-term reduction in the size of the local population of the species. The Project is unlikely to degrade remaining habitat or result in any further decline of the remaining population.

Table 13.16 Greater Glider (Endangered)

Criteria	Discussion
Would the action result in invasive species that are harmful to an endangered species becoming established in the endangered species' habitat?	Site hygiene protocols will be in place during construction to minimise the risk of introduction of invasive species. The Project is unlikely facilitate further invasions of harmful species.
Would the action introduce disease that may cause the species to decline?	There are no diseases known to affect the Greater Glider and the Project is unlikely to introduce pathogens to the area.
Would the action interfere with the recovery of the species?	The Conservation Advice for the Greater Glider lists conservation and recovery actions for the species recovery (DECCW 2022). The following is a subset of actions that may be relevant to the Project: • protect any unburnt habitat (within or adjacent to recently burnt landscapes) in order to support population recovery • protect and maintain sufficient areas of suitable habitat, including denning and foraging resources and habitat connectivity • protect hollow-bearing trees • develop and implement longer-term strategies to control predation by the European red fox and feral cat. The Project will have a minor adverse impact on habitat that may contribute to the ability of the species to move through the landscape including denning and foraging. It is currently unknown how many suitable hollow bearing trees will be lost as part of the Project that is suitable for this species.
Consideration of impacts from 2019–2020 bushfires.	Suitable habitat to support this species is considered to the widespread throughout the project area associated with the older growth forests. The FESM severity mapped this area as unburnt to extreme severity classes. As large areas of suitable habitat to support this species will not be impacted as part of the Project, the Project is not considered to impact critical habitat for the survival of this species as part of impacts from the 2019–2020 bushfires.
Conclusion	Based on the above assessment, the Project is unlikely to significantly impact the Greater Glider.

d Assessment of significance: Hastings River Mouse (Endangered)

Table 13.17 Hastings River Mouse (Endangered)

Criteria	Discussion
Would the action lead to a long-term decrease in the size of a population?	The Hasting River Mouse was recorded within the project area generally at higher elevations throughout each component of the Project. The habitat affected consists of areas containing dense vegetation for cover and that are contiguous with recorded locations. The approved NSW Recovery Plan (DECC 2005) do not list important populations of this species, however, the Carrai Plateau within Oxley Wild Rivers National Park is one of the monitoring sites for Hastings River Mouse. The Project may therefore affect an important population of the Hastings River Mouse. The reduction in important habitat by 290 ha may result in a small a long-term decrease in the size of an important population of a species.

Table 13.17 Hastings River Mouse (Endangered)

Criteria	Discussion
Would the action reduce the area of occupancy of the species?	The IUCN recommends standardization of estimates of area of occupancy by applying a 2 x 2 km grid to occurrence data, a method which is adopted in assessment of conservation status under the EPBC Act (TSSC 2015). The Project would reduce the area of occupancy of the species at a fine scale within the construction envelope but is unlikely to reduce the area of occupancy as defined by a 2 x 2 km grid as the complete loss of potential habitat from any individual grid cell is unlikely to occur.
Would the action fragment an existing population into two or more populations?	Whilst the operation of the reservoirs will impede movement across the valleys around the inundation area, the Project would not prevent movement of animals between these areas as they would remain directly connected via large areas of continuous forest and woodland encircling the inundation areas of the existing and proposed reservoirs. The narrow bands of clearing required for the access and transmission are unlikely to interfere with Hastings River Mouse movement since this species is capable of traversing narrow tracts of cleared land between forested areas. The Project will not create any major barriers to movement (such as large roads).
Would the action adversely affect habitat critical to the survival of a species?	No critical habitat has been listed for the species under the EPBC Act. Habitat critical to the survival of the species may also include areas not listed on the Register of Critical Habitat if they are necessary for: • activities such as foraging, breeding, roosting, or dispersal • 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 • the reintroduction of populations or recovery of the species or ecological community (DoE 2013a). Habitat critical for the survival of Hastings River Mouse includes open wet or dry sclerophyll forests and woodlands with native grass, sedges, rush, fern or heath understorey in the presence of shelter features such as tree root hollows, rock piles, boulders and fallen logs. 290 ha of habitat affected by the Project may be considered critical foraging habitat. The Project will have a minor adverse impact that affects part of an area of habitat critical to the survival of the species.
Would the action disrupt the breeding cycle of a population?	The Project may disrupt the breeding cycle for a small proportion of the local population of the species that utilises habitat within and immediately adjacent to the construction envelope.
Would the action modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	The Project would reduce available habitat by up to 290 ha. This reduction in habitat could result in a small long-term reduction in the size of the local population of the species. The Project is unlikely to degrade remaining habitat or result in any further decline of the remaining population.
Would the action result in invasive species that are harmful to an endangered species becoming established in the endangered species' habitat?	Site hygiene protocols will be in place during construction to minimise the risk of introduction of invasive species. The Project is unlikely facilitate further invasions of harmful species.
Would the action introduce disease that may cause the species to decline?	There are no diseases known to affect the Hasting River Mouse and the Project is unlikely to introduce pathogens to the area.

Table 13.17 Hastings River Mouse (Endangered)

Criteria	Discussion
Would the action interfere with the recovery of the species?	The Project will not interfere with any of the proposed recovery objectives, actions and performances criteria listed in the approved recovery plan for Hastings River Mouse (DECC 2005). The recovery plan is set to expire in 2022, conservation actions listed in the Conservation Advice (TSSC 2020) are likely to adopt the following actions in a new recovery plan relevant to the Project: • protect unburnt areas or adjacent to recently burnt areas during the 2019–20 bush fires • invasive species • habitat loss, disturbance and modifications. The Project may interfere with likely objectives such as an increasing in habitat loss, disturbance and modification to 290 ha of habitat known to support this species.
Consideration of impacts from 2019–2020 bushfires.	Suitable habitat to support this species is considered to the widespread throughout the project area. The FESM severity mapped this area as unburnt to extreme severity classes. As large areas of suitable habitat to support this species will not be impacted as part of the Project, the Project is not considered to impact critical habitat for the survival of this species as part of impacts from the 2019–2020 bushfires.
Conclusion	Based on the above assessment, the Project is unlikely to significantly impact the Hastings River Mouse.

e Assessment of significance: Brush-tailed Rock-wallaby (Vulnerable)

Table 13.18 Brush-tailed Rock-wallaby (Vulnerable)

Criteria	Discussion
Would the action lead to a long-term decrease in the size of an important population of a species?	The Brush-tailed Rock-wallaby has been recorded throughout the project area, primarily in the higher elevations and in associated with areas off rocky habitat, cliffs and escarpments. Risk of direct mortality of individuals of the species would be minimised through clearing protocols, however, it is possible that a small number of individuals could be affected. Threatening processes likely to affect the Brush-tailed Rock-wallaby that may contribute to a long-term decrease in the size of the population as part of the Project include: • increase in predation by feral cat and European Red Fox • land clearance/clearing of native vegetation • invasion of native vegetation by environmental weeds (DECC 2008). The locality of the Project is listed in the recovery plan as an important population (Macleay Gorges, the largest known population in NSW) and is well connected to habitat where larger colonies are present (DECC 2008). The Project will decrease critical habitat by approximately 0.002 ha and foraging habitat up to 184 ha. The habitat affected consists of woodland of PCTs associated with the species. This reduction in habitat could result in a small long-term reduction in the size of the local population of the species.
Would the action reduce the area of occupancy of an important population?	The IUCN recommends standardization of estimates of area of occupancy by applying a 2 x 2 km grid to occurrence data, a method which is adopted in assessment of conservation status under the EPBC Act (TSSC 2015). The Project is unlikely to reduce area of occupancy of the species as defined a 2 x 2 km grid applied to occurrence data as it will not result in the complete loss of potential habitat from any individual grid cell.

Table 13.18 Brush-tailed Rock-wallaby (Vulnerable)

Criteria	Discussion
Would the action fragment an existing important population into two or more populations?	The Project will impact on the most western and lowest in elevation colony within the project area. Connection to other colonies within the project area are to the east up slope. Observations within the project area as part of the Brush-tailed Rock-wallaby habitat assessment and targeted surveys recorded outlier records of younger males and potential connective mammal paths with some having evidence of Brush-tailed Rock-wallaby scats. The majority of critical habitat that supports this species will be retained within the project area. The project area supports an estimated 20–25 colonies containing a minimum of 126 individuals. The local population is confined to identified refuge habitat associated with areas of rocky escarpment, gorges, steep slopes, boulder piles, rock outcrops, cliff lines and adjacent foraging habitat. This runs from the south west to the north west of the project area. A proposed access road that will be used to connect the Lower Reservoir with the Upper Reservoir takes advantage of an area along the rocky escarpment which avoids large areas of rocky habitat that is associated with potential refuge areas. The Lower and Upper Reservoirs are situated below and above the rocky escarpment, with the likely movement of Brush-tailed Rock-wallabies confined to the rocky escarpment and shortest distance between the break in the escarpment which will only be intersected by the access road. During construction the colonies located to the north and south of the disturbance footprint could potentially become temporarily fragmented due to indirect disturbance during construction activities. The creation of the access road is not considered to cause a permanent fragmentation as once construction ends, this road would only be used for maintenance and inspection purposes, therefore having minimal traffic flow. The narrow bands of clearing required for the access are unlikely to interfere with Brush-tailed Rock-wallaby movement since wallabies are capable of traversing narrow tracts of cleared land between forested areas. The Project is unlikely to fragment any existing Brush-tailed Rock-wallaby populations into multiple populations.
Would the action adversely affect habitat critical to the survival of a species?	Habitat critical to survival of the species includes rocky refuge habitat, foraging habitat and commuting routes between the two (DECC 2008). The Project will remove areas that contain known refuge for one colony of Brush-tailed Rock-wallaby. The Project will have an adverse impact that affects an area of habitat critical to the survival of the species.
Would the action disrupt the breeding cycle of an important population?	Brush-tailed Rock-wallabies typically have low migration rates between colonies and low recolonisation rates (TSSC 2003). While males are known to move between colonies within their home range to access females, females are largely sedentary over a smaller home range (DPE 2023). The loss of the colony within the development footprint may have an impact on nearby colonies for gene flow.
Would the action modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	The Project would reduce available foraging habitat by up to 184 ha and 0.13 ha of occupied refuge habitat. This reduction in habitat could result in a small long-term reduction in the size of the local population of the species. The Project is unlikely to degrade remaining habitat or result in any further decline of the remaining sub-population within the Project area.
Would the action result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat?	Indirect impacts from increases of predatory and pest animal species could result from an increase of human activity and creation of roads adjacent to colonies that could lead to greater predator incursions. The Project will implement a pest and predator monitoring program to ensure the works do not result in a significant increase in numbers. The Project will also design and implement a predator control program that will be implemented, in conjunction with DPIE, to control feral animals.
Would the action introduce disease that may cause the species to decline?	There are no diseases known to affect the Brush-tailed Rock-wallaby and the Project is unlikely to introduce pathogens to the area.

Table 13.18 Brush-tailed Rock-wallaby (Vulnerable)

Criteria	Discussion
Would the action interfere substantially with the recovery of the species?	The National Recovery Plan for the Brush-tailed Rock-wallaby lists objectives and actions for the species recovery (DECC 2008). The following is an object that may be relevant to the Project: • determine and manage threat to the Brush-tailed Rock-wallaby and its habitat. The Project will have an impact on critical habitat that supports the most western and lowest in elevation colony within the project area.
Consideration of impacts from 2019-2020 bushfires.	Suitable habitat to support this species is considered to the widespread throughout the project area associated with the Macleay Gorges rocky cliffs and escapement habitat. The FESM severity mapped this area as unburnt to medium severity classes. Aerial surveys undertaken in 2022 throughout the Oxley Wild Rivers National Park Recorded over 70 new colonies, some in areas that were mapped as extreme severity classes. As large areas of suitable habitat to support this species will not be impacted as part of the Project, the Project is not considered to impact critical habitat for the survival of this species as part of impacts from the 2019–2020 bushfires.
Conclusion	Based on the above assessment, the Project will have an adverse impact on critical habitat for this species, however, it is unlikely to significantly impact the local population of Brush-tailed Rock-wallabies.

f Assessment of significance: Koala (Endangered)

Table 13.19 Koala (Endangered)

Criteria	Discussion
Would the action lead to a long-term decrease in the size of a population?	There is a historical record of Koalas from 1980 in the locality surrounding the construction envelope within the Carrai State Conservation Area. Koala scats were found in one location, northern side of the Macleay River near the proposed bridge crossing. No evidence of Koala was recorded south of the Macleay River during targeted surveys. It is likely to occur at low density in the more intact woodland and forest and may utilise habitat in more disturbed and fragmented parts of the construction envelope, at least intermittently for dispersal between more intact areas of habitat. Risk of direct mortality of individuals of the species would be low due to the implementation of clearing protocols. The Project will decrease Koala habitat by up to 57 ha. The habitat affected consists of woodland, scattered trees and derived shrubland of PCTs associated with the species. Grassland areas are considered to be of low value to this species. This reduction in habitat could result in a small long-term reduction in the size of the local population of the species.
Would the action reduce the area of occupancy of the species?	The IUCN recommends standardization of estimates of area of occupancy by applying a 2 x 2 km grid to occurrence data, a method which is adopted in assessment of conservation status under the EPBC Act (TSSC 2015). The Project is unlikely to reduce area of occupancy of the species as defined a 2 x 2 km grid applied to occurrence data as it will not result in the complete loss of potential habitat from any individual grid cell.

Table 13.19 Koala (Endangered)

Criteria	Discussion
Would the action fragment an existing population into two or more populations?	Whilst the Project will impede movement immediately around the construction area of components north of the Macleay River, the Project would not isolate these areas as they would remain directly connected via large areas of continuous forest and woodland. The narrow bands of clearing required for the access road and powerline are unlikely to interfere with Koala movement since Koalas are capable of traversing narrow tracts of cleared land between forested areas. The Project will not create any major barriers to movement (such as large roads) or impact significantly on any heavily vegetated areas of riparian corridors outside of the inundation area. The Project is unlikely to fragment any existing Koala populations into multiple populations.
Would the action adversely affect habitat critical to the survival of a species?	No critical habitat has been listed for the Koala under the EPBC Act. Habitat critical to the survival of a species may also include areas not listed on the Register of Critical Habitat if they are necessary for: • activities such as foraging, breeding, roosting, or dispersal • 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 • the reintroduction of populations or recovery of the species or ecological community (DoE, 2013). The national recovery plan for the Koala states that the following are key factors in evaluating whether habitat is critical to the survival of Koalas: a) whether the habitat is used during periods of stress (examples flood, drought or fire) b) whether the habitat is used to meet essential life cycle requirements (e.g. foraging, breeding, social behaviour, dispersal) c) the extent to which the habitat is used by important populations d) whether the habitat is necessary to maintain genetic diversity and long-term evolutionary development e) whether the habitat is necessary for use as corridors to allow the species to move freely between sites used to meet essential life cycle requirements f) whether the habitat is necessary to ensure the long-term future of the species or ecological community through reintroduction or re-colonisation g) any other way in which habitat may be critical to the survival the species (DAWE 2022a). There is insufficient data available for the regional Koala population to determine if the large expanse of forest within and surrounding the construction envelope may be considered critical habitat. For the purposes of this assessment, it has been assumed to constitute habitat critical to the survival of the species. The Project is therefore likely to adversely affect part of an area of habitat critical to the survival of the species.
Would the action disrupt the breeding cycle of a population?	The Project may disrupt the breeding cycle for a small proportion of the local population of the species that utilises habitat within and immediately adjacent to the construction envelope.
Would the action modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	The Project would reduce available habitat by up to 57 ha. This reduction in habitat could result in a small long-term reduction in the size of the local population of the species. The Project is unlikely to degrade remaining habitat or result in any further decline of the remaining population.

Table 13.19 Koala (Endangered)

Criteria	Discussion
Would the action result in invasive species that are harmful to an endangered species becoming established in the endangered species' habitat?	Site hygiene protocols will be in place during construction to minimise the risk of introduction of invasive species. The Project is unlikely facilitate further invasions of harmful species.
Would the action introduce disease that may cause the species to decline?	Koalas carry a range of diseases including chlamydial disease, Koala retrovirus, and Koala herpesvirus infections, and infestation of trypanosomes, and sarcoptic mange (DAWE 2022a). The Project is unlikely to introduce these or any other pathogens or parasites to the area.
Would the action interfere with the recovery of the species?	The National Recovery Plan for the Koala (DAWE 2022) lists four overarching objectives for the species' recovery: 1. The area of occupancy and estimated size of populations that are declining, suspected to be declining, or predicted to decline are instead stabilised then increased. 2. The area of occupancy and estimated size of populations that are suspected and predicted to be stable are maintained or increased. 3. Metapopulation processes are maintained or improved. 4. Partners, communities and individuals have a greater role and capability in listed Koala monitoring, conservation and management. The clearing of 57 ha of known and potential habitat for the species may detract from objective 1 or 2 due to a small reduction in the local Koala population.
Consideration of impacts from 2019-2020 bushfires.	Suitable habitat to support this species is considered to the widespread throughout the project area. The FESM severity mapped this area as unburnt to extreme severity classes. As large areas of suitable habitat to support this species will not be impacted as part of the Project, the Project is not considered to impact critical habitat for the survival of this species as part of impacts from the 2019–2020 bushfires.
Conclusion	Based on the above assessment, the Project is unlikely to significantly impact the Koala.

g Assessment of significance: Long-nosed Potoroo (Vulnerable)

Table 13.20 Long-nosed Potoroo (Vulnerable)

Criteria	Discussion
Would the action lead to a long-term decrease in the size of an important population of a species?	The Long-nosed Potoroo was recorded within the project area, above 750 m elevation at the upper reservoir and above 550 m at the transmission line. The Project would lead to a decrease in the habitat available for the species by up to 125 ha. The habitat affected consists of areas of PCTs where this species was recorded in that contain dense vegetation for cover and that are contiguous with recorded locations. 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. The conservation advice for the Long-nosed Potoroo lists nine important populations in NSW but states that the list is indicative rather than exhaustive and that there are likely important populations that have not been identified to date. The habitat of the project area is contiguous with several areas that are known to contain important populations in Oxley Wild Rivers National Park (DAWEb 2022). The Project may therefore affect an important population of the Long-nosed Potoroo. The reduction in important habitat by 125 ha may result in a small a long-term decrease in the size of an important population of a species.
Would the action reduce the area of occupancy of an important population?	The IUCN recommends standardization of estimates of area of occupancy by applying a 2 x 2 km grid to occurrence data, a method which is adopted in assessment of conservation status under the EPBC Act (TSSC 2015). The Project would reduce the area of occupancy of the species at a fine scale within the construction envelope but is unlikely to reduce the area of occupancy as defined by a 2 x 2 km grid as the complete loss of potential habitat from any individual grid cell is unlikely to occur.
Would the action fragment an existing important population into two or more populations?	Whilst the operation of the reservoirs will impede movement across the valleys around the inundation area, the Project would not prevent movement of animals between these areas as they would remain directly connected via large areas of continuous forest and woodland encircling the inundation areas of the proposed reservoirs. The narrow bands of clearing required for the access and transmission line are unlikely to interfere with Long-nosed Potoroo movement since Long-nosed Potoroo are capable of traversing narrow tracts of cleared land between forested areas. The Project will not create any major barriers to movement (such as large roads).
Would the action adversely affect habitat critical to the survival of a species?	No critical habitat has been listed for the species under the EPBC Act. Habitat critical to the survival of the species may also include areas not listed on the Register of Critical Habitat if they are necessary for: • activities such as foraging, breeding, roosting, or dispersal • 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 • the reintroduction of populations or recovery of the species or ecological community (DoE 2013a). Habitat critical for the survival of Long-nosed Potoroo includes a range of vegetation types such as rainforest, wet and dry woodland, scrubland and coastal heathlands often near creeks or gullies. 125 ha of habitat affected by the Project may be considered critical foraging habitat. The Project will have a minor adverse impact that affects part of an area of habitat critical to the survival of the species.
Would the action disrupt the breeding cycle of an important population?	The Project may disrupt the breeding cycle for a small proportion of the local population of the species that utilises habitat within and immediately adjacent to the construction envelope.

Table 13.20 Long-nosed Potoroo (Vulnerable)

Criteria	Discussion
Would the action modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	The Project would reduce available habitat by up to 125 ha. This reduction in habitat could result in a small long-term reduction in the size of the local population of the species. The Project is unlikely to degrade remaining habitat or result in any further decline of the remaining population.
Would the action result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat?	Site hygiene protocols will be in place during construction to minimise the risk of introduction of invasive species. The Project is unlikely facilitate further invasions of harmful species.
Would the action interfere substantially with the recovery of the species?	No recovery plan, threat abatement plan, or conservation advice is available for the Long-nosed Potoroo.
Consideration of impacts from 2019–2020 bushfires.	Suitable habitat to support this species is considered to the widespread throughout the project area. The FESM severity mapped this area as unburnt to extreme severity classes. As large areas of suitable habitat to support this species will not be impacted as part of the Project, the Project is not considered to impact critical habitat for the survival of this species as part of impacts from the 2019–2020 bushfires.
Conclusion	Based on the above assessment, the Project is unlikely to significantly impact the Long-nosed Potoroo.

h Assessment of significance: Grey-headed Flying-fox (Vulnerable)

Table 13.21 Grey-headed Flying-fox (Vulnerable)

Criteria	Discussion
Would the action lead to a long-term decrease in the size of an important population of a species?	The Grey-headed Flying-fox was recorded either feeding and/or commuting over the project area. The Project would lead to a decrease in the habitat available for the species by up to 328 ha. The habitat affected consists of treed areas of PCTs associated with the 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. The Grey-headed Flying-fox exists as a series of interconnected subpopulations with animals moving between widely dispersed roosting and breeding sites. The concept of an important population is not readily applicable to this species. For the purposes of this assessment important habitat has been used to assess whether or not an impact on an 'important population' is likely. Important habitat for the Grey-headed Flying-fox is likely to include camp sites used for roosting and breeding and extensive areas of forest and woodland, particularly those that contain tree species that flower or fruit in winter when food resources for the species are generally scarce. Potential roosting habitat exists in riparian vegetation adjacent to the Macleay River, however, no camp sites have been recorded in or adjacent to the project area. The nearest known camp site is at Bellbrook, approximately 30 km to the east but this camp has not been occupied during surveys undertaken since 2013 and the nearest recently occupied known sites are in Armidale and Kempsey (National Flying-fox monitoring viewer https://www.environment.gov.au/webgis-framework/apps/ffc-wide/ffc-wide.jsf). The project area is not near the limit of the species' distribution. Spring foraging resources are considered to be critical to the survival of the species and winter-flowering resources are also considered to be important (DECCW 2009). Part of the construction envelope is dominated by Spotted Gum (*Corymbia maculata*) and other areas are dominated or co-dominated by Forest Red Gum (*Eucalyptus tereticornis*). Spotted Gum typically flowers in winter and early spring and Forest Red Gum has a variable flowering season that sometimes often includes winter and spring. These areas may constitute important foraging habitat for the species (OEH 2016). The Project may therefore affect an important population of the Grey-headed Flying-fox. The reduction in important habitat by 328 ha may result in a small a long-term decrease in the size of an important population of a species.
Would the action reduce the area of occupancy of an important population?	The IUCN recommends standardization of estimates of area of occupancy by applying a 2 x 2 km grid to occurrence data, a method which is adopted in assessment of conservation status under the EPBC Act (TSSC 2015). The Project would reduce the area of occupancy of the species at a fine scale within the construction envelope but is unlikely to reduce the area of occupancy as defined by a 2 x 2 km grid as the complete loss of potential habitat from any individual grid cell is unlikely to occur.
Would the action fragment an existing important population into two or more populations?	Due to the mobility of this species, and its ability to traverse large areas of highly modified landscapes, the Project is unlikely to fragment an existing important population into two or more populations.

Table 13.21 Grey-headed Flying-fox (Vulnerable)

Criteria	Discussion
Would the action adversely affect habitat critical to the survival of a species?	No critical habitat has been listed for the species under the EPBC Act. Habitat critical to the survival of the species may also include areas not listed on the Register of Critical Habitat if they are necessary for: • activities such as foraging, breeding, roosting, or dispersal • 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 • the reintroduction of populations or recovery of the species or ecological community (DE 2013a). Spring foraging resources are considered to be critical to the survival of the species (SPRAT profile). The loss of roosting habitat has also been identified as a threat to Grey-headed Flying-foxes (DECCW 2009). Roosts are typically located near water, such as lakes, rivers or the coast in vegetation including rainforest patches, stands of Melaleuca, mangroves and riparian vegetation (DECCW 2009). No roosting habitat has been recorded in the project area however riparian vegetation along the Macleay River in the construction envelope has characteristics typical of roost sites for the species. 6 ha of riparian vegetation (PCT 1106) would be impacted by the Project. 6 ha of habitat affected by the Project may be considered critical foraging and roosting habitat. The Project will have a minor adverse impact that affects part of an area of habitat critical to the survival of the species.
Would the action disrupt the breeding cycle of an important population?	No camp sites (roosting and breeding habitat) for the Grey-headed Flying-fox were identified within or near to the construction envelope. The nearest known camp site is at Bellbrook, approximately 30 km to the east but this camp has not been occupied since 2013. The nearest roost sites known to be occupied recently are more than 50 km from the construction envelope. Due to the distance of the construction envelope from known roosting and breeding sites, it is unlikely to significantly disrupt the breeding cycle of an important population of the species.
Would the action modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	The Project would reduce available foraging habitat by up to 328 ha and could result in a small reduction in the size of the local population of the species. The Project is not likely to cause the species to decline significantly, due to the small proportion of available habitat likely to be impacted.
Would the action result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat?	The existing landscape contains invasive species that are directly or indirectly harmful to the species through predation, competition or alteration of habitat. Given the management measures proposed, it is unlikely that any further species invasions will be facilitated by the Project. Therefore, the proposed impacts are considered unlikely to facilitate the spread of invasive species or their adverse impacts to the survival of the Grey-headed Flying-fox (either directly or indirectly).

Table 13.21 Grey-headed Flying-fox (Vulnerable)

Criteria	Discussion
Would the action interfere substantially with the recovery of the species?	No recovery plan, threat abatement plan, or conservation advice is available for the Grey-headed Flying-fox. However, there is a Draft National Recovery Plan, which provides several actions (DECCW 2009). The following is a subset of these actions, targeting actions relevant to the Project which have not been specifically addressed above: • Enhance winter and spring foraging habitat for Grey-headed Flying-foxes. • Assess the impacts on Grey-headed Flying-foxes of electrocution on powerlines and entanglement in netting and barbed wire and implement strategies to reduce these impacts. 328 ha of the potential habitat for the species which would be impacted contains substantial winter and spring foraging habitat resources. Minimising collision and electrocution hazards to animals will be considered in the design of the overhead powerline, including the spacing and configuration of conductors. The resulting design is unlikely to pose a significant electrocution risk to Grey-headed Flying-foxes. The Project may detract from the recovery of the species due to the removal of winter and spring foraging habitat. Due to the small proportion of available habitat likely to be impacted, the Project is not considered to substantially interfere with the recovery of the Grey-headed Flying-fox.
Consideration of impacts from 2019–2020 bushfires.	Suitable habitat to support this species is considered to the widespread throughout the project area. The FESM severity mapped this area as unburnt to extreme severity classes. As large areas of suitable habitat to support this species will not be impacted as part of the Project, the Project is not considered to impact critical habitat for the survival of this species as part of impacts from the 2019–2020 bushfires.
Conclusion	Based on the above assessment, the Project is unlikely to cause a significant impact to the Grey-headed Flying-fox.

iv Migratory species

As for threatened species, migratory species predicted to occur by the PMST were assessed in terms of their likelihood of occurring in the disturbance footprint. Four listed migratory species under the EPBC Act were recorded within the project area, with four species that are likely to occur infrequently and sporadically, these are:

- Migratory species recorded within the project area:
  - Black-faced Monarch (*Monarcha melanopsis*)
  - Satin Flycatcher (*Myiagra cyanoleuca*)
  - Rufous Fantail (*Rhipidura rufifrons*)
  - White-throated Needletail *(Hirundapus caudacutus).*
- Migratory species likely to occur infrequently and sporadically:
  - Spectacled Monarch (*Monarcha trivirgatus*)
  - Fork-tailed Swift (*Apus pacificus*)
  - Latham's Snipe (*Gallinago hardwickii*)
  - Osprey (*Pandion haliaetus*).

An assessment of significance was prepared for the relevant species in accordance with the assessment criteria for migratory species (DoE 2013) is in Table 13.22. The Project is unlikely to result in a significant impact on migratory species as the disturbance footprint.

Table 13.22 Assessment of significance for migratory species

Criteria	Discussion
1. Substantially modify important habitat	An area of 'important habitat' for a migratory species is defined as: a) habitat utilised by a migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species, and/or b) habitat that is of critical importance to the species at particular life-cycle stages, and/or c) habitat utilised by a migratory species which is at the limit of the species range, and/or d) habitat within an area where the species is declining (DoE 2013). Important sites have not been identified for any of these species. The habitat in the project area was only observed to contain either low numbers or species migrating through the area. It is not located in a region likely to support an ecologically significant proportion of the population of any of the species. It is unlikely to contain any features of particular importance to these species and is not in an area where any of the species are known to be in decline. Therefore, the Project will not modify important habitat for migratory species.
2. Result in invasive species becoming established in an area of important habitat	The construction envelope is unlikely to contain important habitat for these species. The Project is therefore unlikely to result in invasive species becoming established in an area of important habitat. Vegetation clearing and topsoil stripping have potential to lead to weed invasion in surrounding habitat, unless adequately mitigated. Measures to control weeds in retained habitats of the construction envelope will be undertaken to prevent weed establishment in retained habitat. With the proposed mitigation measures, the impact of the Project on invasive species would be minimal.
3. Seriously disrupt the lifecycle of ecologically significant proportion of population	The construction envelope is unlikely to support an ecologically significant proportion of any population of the species. Therefore, the lifecycle of an ecologically significant proportion of the species will not be disrupted.
Conclusion	The Project is unlikely to result in a significant impact on migratory species as: • the area does not contain important habitat for the species • it will not disrupt the life cycle of an ecologically significant proportion of any population.

13.2 Biosecurity Act 2015

The list of priority weeds of the North Coast that were recorded within the project area and duty information is described in Table 13.23.

Table 13.23 Priority weeds

Weed	Duty
Blackberry (*Rubus fruticosus species aggregate*)	Prohibition on certain dealings. Must not be imported into the state, sold, bartered, exchanged or offered for sale. All species in the *Rubus fruiticosus* species aggregate have this requirement, except for the varietals Black Satin, Chehalem, Chester Thornless, Dirksen Thornless, Loch Ness, Murrindindi, Silvan, Smooth Stem, and Thornfree.

Table 13.23 Priority weeds

Weed	Duty
Blue Heliotrope (*Heliotropium amplexicaule*)	Regional Recommended Measure. Exclusion zone: whole region excluding the core infestation area of Clarence Valley Council and Port Macquarie-Hastings Council.
Cat's Claw Creeper (*Dolichandra unguis-cati*)	Prohibition on certain dealings. Must not be imported into the state, sold, bartered, exchanged or offered for sale.
Fireweed (*Senecio madagascariensis*)	Prohibition on certain dealings. Must not be imported into the state, sold, bartered, exchanged or offered for sale.
Lantana (*Lantana camara*)	Prohibition on certain dealings. Must not be imported into the state, sold, bartered, exchanged or offered for sale.
Madeira Vine (*Anredera cordifolia*)	Prohibition on certain dealings. Must not be imported into the state, sold, bartered, exchanged or offered for sale.
Tropical Soda Apple (*Solanum viarum*)	Control Order. Tropical Soda Apple Control Zone: Whole of NSW.

Tropical Soda Apple has a control order that requires landholders to notify the local control authority when this species is present on their land. Landowner are required to destroy the plant(s) and control any movement of plant material and/or seed outside of the infected area.

Blue Heliotrope has a regional recommended measure where plants should be eradicated from the land. Mitigation measures may be required for areas where this species occurs.

Blue Heliotrope, Blackberry, Cat's Claw Creeper, Fireweed, Lantana and Madeira Vine are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable. These species must not be imported into NSW or sold. In addition, there is a regional recommended measure for land managers in the central tablelands to mitigate the risk of new weeds being introduced to, and spread from, their land. These plants should not be bought, sold, grown, carrier or released into the environment. Conservation areas, natural environments and primary production lands should be protected that are free of priority weeds. The biodiversity management plan for the Project would directly address the control of these weed species.

14 Conclusion

This BDAR has been prepared in accordance with the BAM (DPIE 2020a) biodiversity-related SEARs issued by DPE and the associated agency-specific assessment requirements.

Biodiversity surveys within the disturbance footprint were undertaken during 2020, 2021, 2022 and 2023. These were carried out in parallel with and informed the evolution of the development footprint design. This process has ensured the avoidance and minimisation of biodiversity constraints as far as practicable.

The Project recorded five threatened ecological communities (BC Act), four threatened flora species and eleven threatened fauna species credit species within the development footprint. Four of the threatened fauna species credit species are assumed to be present where survey gaps exist, equivalent to 1% of the species credit species required.

The Project requires 8,055 ecosystem credits to compensate for impacts on native PCTs and ecosystem credit species. In addition to ecosystem credits, the Project also requires a total of 42,178 species credits. OMPS will compensate for these residual impacts through the implementation of a biodiversity offset strategy.

The BDAR has also considered impacts on species and ecological communities listed under the EPBC Act. The Project will have an adverse impact on critical habitat for this species, however, it is unlikely to significantly impact the local population of Brush-tailed Rock-wallabies. As the Project is being assessed in accordance with the bilateral agreement made between the NSW and the Commonwealth under Section 45 of the EPBC Act, impacts on this listed ecological community and species will be compensated through the implementation of the biodiversity offset strategy.

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Appendix A
BAM Plot data

EMM
creating opportunities

BAM Site – Field Survey Form

Plot ID:	EAR01	**Date:**	07/06/22	**Project number:**	J210465	**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	429,554	**Recorders:**	BS, SG		
Zone:	56	**Northing:**	6,599,964	**IBRA region:**		**Midline bearing:**	348
Plant Community Type:		762: Cabbage Gum open forest or woodland on flats of the North Coast		**Condition class:**	EG	**PCT confidence:**	
Vegetation Class:		Coastal Valley Grassy Woodlands		**EEC:**		**EEC confidence:**	

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:	0
	Grasses etc.:	5
	Forbs:	4
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	0.2
	Shrubs:	0
	Grasses etc.:	0.9
	Forbs:	1.3
	Ferns:	0
	Other:	0
High Threat Weed cover:		0.4

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	1
80 + cm:	0		
50 – 79 cm:	0		
30 – 49 cm:	0		
20 – 29 cm:	0	Tree hollow count	0
10 – 19 cm:	0		
5 – 9 cm:	0		
< 5 cm:	1		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	5	5	5	5	5
Average litter cover (%):	5				

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 and site features

Plot Disturbance

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, ...

Project name:	J210465				
Recorders:	BS, SG	**Plot ID:**	EAR01	**Date:**	07/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
	Paspalum notatum (Bahia Grass)	98	10000		E
	Cyperus brevifolius	10	500		E
	Sporobolus africanus (Parramatta Grass)	20	500		E
Forb (FG)	*Verbena spp.*	1	20		N
Grass & grasslike (GG)	*Juncus usitatus*	0.5	50		N
	Solanum viarum (Tropical Soda Apple)	0.1	1		E
	Melinis repens (Red Natal Grass)	1	30		E
	Sida rhombifolia (Paddy's Lucerne)	0.5	15		E
	Lantana camara (Lantana)	0.2	3		HTE
Grass & grasslike (GG)	*Bothriochloa spp. (Redgrass, Bluegrass)*	0.1	10		N
Forb (FG)	*Gonocarpus spp. (Raspwort)*	0.1	1		N
	Gomphocarpus physocarpus (Balloon Cotton Bush)	0.5	10		E
	Cyperus prolifer	0.1	1		E
Forb (FG)	*Oxalis perennans*	0.1	1		N
	Senecio madagascariensis (Fireweed)	0.1	5		HTE
Forb (FG)	*Alternanthera denticulata (Lesser Joyweed)*	0.1	1		N
Grass & grasslike (GG)	*Fimbristylis dichotoma (Common Fringe-sedge)*	0.1	10		N
	Solanum nigrum (Black-berry Nightshade)	0.1	1		E
	Paspalum dilatatum (Paspalum)	0.1	5		HTE
Tree (TG)	*Corymbia spp.*	0.2	0		N
Grass & grasslike (GG)	*Setaria spp.*	0.1	50		N
Grass & grasslike (GG)	*Aristida ramosa (Purple Wiregrass)*	0.1	20		N

BAM Site – Field Survey Form

Plot ID:	EAR02	**Date:**	07/06/22	**Project number:**	J210465	**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	429,673	**Recorders:**	BS, SG		
Zone:	56	**Northing:**	6,599,961	**IBRA region:**		**Midline bearing:**	7
Plant Community Type:		842: Forest Redgum - Broad-leaved Apple dry open forest of the gorges of NSW North Coast Bioregion		**Condition class:**	Poor	**PCT confidence:**	low
Vegetation Class:		Northern Gorge Dry Sclerophyll Forests		**EEC:**		**EEC confidence:**	

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:	2
	Shrubs:	0
	Grasses etc.:	6
	Forbs:	4
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	5.1
	Shrubs:	0
	Grasses etc.:	7.6
	Forbs:	3.4
	Ferns:	0
	Other:	0
High Threat Weed cover:		15.2

BAM Attribute (1000 m2 plot) DBH			
DBH	**Tree stem count**	**Length of logs (m) (≥10 cm diameter, >50 cm in length)**	50
80 + cm:	1		
50 – 79 cm:	0		
30 – 49 cm:	1		
20 – 29 cm:	1	**Tree hollow count**	1
10 – 19 cm:	0		
5 – 9 cm:	3		
< 5 cm:	6		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	**1**	**2**	**3**	**4**	**5**
Subplot score (%):	5	10	5	10	5
Average litter cover (%):	7				

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 and site features

Plot Disturbance

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, ...

Project name:	J210465				
Recorders:	BS, SG	**Plot ID:**	EAR02	**Date:**	07/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	*Corymbia intermedia (Pink Bloodwood)*	5	4		N
	Paspalum notatum (Bahia Grass)	85	8000		E
	Digitaria ischaemum	20	3000		E
	Lantana camara (Lantana)	15	40		HTE
	Gomphocarpus physocarpus (Balloon Cotton Bush)	1	20		E
Forb (FG)	*Verbena spp.*	0.2	15		N
	Cyperus brevifolius	5	200		E
Grass & grasslike (GG)	*Cyperus sphaeroideus*	5	200		N
Grass & grasslike (GG)	*Aristida ramosa (Purple Wiregrass)*	0.3	50		N
Grass & grasslike (GG)	*Juncus usitatus*	2	200		N
	Urochloa panicoides (Urochloa Grass)	1	20		E
Grass & grasslike (GG)	*Panicum effusum (Hairy Panic)*	0.1	1		N
Forb (FG)	*Commelina cyanea (Native Wandering Jew)*	0.1	1		N
	Solanum viarum (Tropical Soda Apple)	0.2	2		E
	Solanum mauritianum (Wild Tobacco Bush)	0.2	1		E
	Solanum seaforthianum (Climbing Nightshade)	0.1	1		HTE
Grass & grasslike (GG)	*Eragrostis leptostachya (Paddock Lovegrass)*	0.1	1		N
Grass & grasslike (GG)	*Cymbopogon refractus (Barbed Wire Grass)*	0.1	2		N
Forb (FG)	*Oxalis perennans*	0.1	1		N
Tree (TG)	*Eucalyptus caliginosa <--> laevopinea*	0.1	1		N
	Senecio madagascariensis (Fireweed)	0.1	7		HTE
	Sporobolus africanus (Parramatta Grass)	0.5	40		E
Forb (FG)	*Lobelia purpurascens (whiteroot)*	3	150		N
	Cirsium spp.	0.1	1	no	E

BAM Site – Field Survey Form

Plot ID:	EAR03	**Date:**	07/06/22	**Project number:**	J210465	**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	429,814	**Recorders:**	BS, SG		
Zone:	56	**Northing:**	6,599,830	**IBRA region:**		**Midline bearing:**	199
Plant Community Type:		762: Cabbage Gum open forest or woodland on flats of the North Coast		**Condition class:**	Moderate	**PCT confidence:**	
Vegetation Class:		Coastal Valley Grassy Woodlands		**EEC:**		**EEC confidence:**	

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:	2
	Shrubs:	5
	Grasses etc.:	12
	Forbs:	4
	Ferns:	1
	Other:	3
Sum of Cover of native vascular plants by growth form group	Trees:	31
	Shrubs:	0.6
	Grasses etc.:	87.3
	Forbs:	10.6
	Ferns:	0.1
	Other:	1.3
High Threat Weed cover:		40.5

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	4
80 + cm:	2		
50 – 79 cm:	1		
30 – 49 cm:	0		
20 – 29 cm:	6	Tree hollow count	0
10 – 19 cm:	19		
5 – 9 cm:	1		
< 5 cm:	0		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	20	25	40	30	30
Average litter cover (%):	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 and site features

Plot Disturbance

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, ...

Project name:	J210465				
Recorders:	BS, SG	**Plot ID:**	EAR03	**Date:**	07/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	*Eucalyptus tereticornis (Forest Red Gum)*	30	48		N
Forb (FG)	*Lobelia purpurascens (whiteroot)*	5	100		N
	Senecio madagascariensis (Fireweed)	0.1	3		HTE
Grass & grasslike (GG)	*Cymbopogon obtectus (Silky Heads)*	0.1	5		N
	Sida spinosa	0.5	30		E
	Lantana camara (Lantana)	40	200		HTE
Other (OG)	*Glycine clandestina (Twining glycine)*	1	100		N
Grass & grasslike (GG)	*Digitaria parviflora (Small-flowered Finger Grass)*	10	1000		N
Grass & grasslike (GG)	*Fimbristylis spp.*	1	50		N
	Cyperus brevifolius	1	500		E
Forb (FG)	*Dichondra repens (Kidney Weed)*	5	100		N
	Gomphocarpus physocarpus (Balloon Cotton Bush)	0.2	5		E
Tree (TG)	*Alphitonia excelsa (Red Ash)*	1	6		N
Fern (EG)	*Cheilanthes sieberi (Rock Fern)*	0.1	1		N
	Bidens pilosa (Cobbler's Pegs)	0.1	2		HTE
Forb (FG)	*Oxalis perennans*	0.1	2		N
Shrub (SG)	*Capparis arborea (Native Pomegranate)*	0.1	1		N
	Solanum seaforthianum (Climbing Nightshade)	0.2	7		HTE
Grass & grasslike (GG)	*Panicum effusum (Hairy Panic)*	2	50		N
	Ligustrum lucidum (Large-leaved Privet)	0.1	1		HTE
Grass & grasslike (GG)	*Lomandra micrantha subsp. tuberculata (Small-flowered Mat-rush)*	0.1	1		N
Other (OG)	*Passiflora spp.*	0.2	5		N
Shrub (SG)	*Acacia spp. (Wattle)*	0.2	6		N
Shrub (SG)	*Alchornea ilicifolia (Native Holly)*	0.1	1		N
Other (OG)	*Geitonoplesium cymosum (Scrambling Lily)*	0.1	1		N
Grass & grasslike (GG)	*Bothriochloa biloba (Lobed Bluegrass)*	5	100		N
Grass & grasslike (GG)	*Setaria spp.*	2	150		N
Grass & grasslike (GG)	*Aristida ramosa (Purple Wiregrass)*	5	100		N
Grass & grasslike (GG)	*Microlaena stipoides (Weeping Grass)*	50	100		N
Forb (FG)	*Commelina cyanea (Native Wandering Jew)*	0.5	20		N
Grass & grasslike (GG)	*Sporobolus creber (Slender Rat's Tail Grass)*	0.1	3		N
Shrub (SG)	*Pittosporum spinescens (Wallaby Apple)*	0.1	1		N
Grass & grasslike (GG)	*Oplismenus aemulus*	10	1000	no	N
Shrub (SG)	*Bursaria spinosa (Native Blackthorn)*	0.1	1	no	N
Grass & grasslike (GG)	*Eragrostis leptostachya (Paddock Lovegrass)*	2	50	no	N

BAM Site – Field Survey Form

Plot ID:	EAR04	**Date:**	07/06/22	**Project number:**	J210465		**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	429,967	**Recorders:**	BS, SG			
Zone:	56	**Northing:**	6,599,696	**IBRA region:**			**Midline bearing:**	3
Plant Community Type:		1106: River Oak riparian woodland of the NSW North Coast Bioregion and northern Sydney Basin Bioregion		**Condition class:**	PoorFP		**PCT confidence:**	
Vegetation Class:		Eastern Riverine Forests		**EEC:**			**EEC confidence:**	

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:	5
	Shrubs:	1
	Grasses etc.:	7
	Forbs:	10
	Ferns:	0
	Other:	2
Sum of Cover of native vascular plants by growth form group	Trees:	25.7
	Shrubs:	0.1
	Grasses etc.:	40.3
	Forbs:	2.7
	Ferns:	0
	Other:	0.2
High Threat Weed cover:		0.5

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	8
80 + cm:	0		
50 – 79 cm:	1		
30 – 49 cm:	2		
20 – 29 cm:	3	Tree hollow count	2
10 – 19 cm:	4		
5 – 9 cm:	2		
< 5 cm:	6		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	2	10	50	10	15
Average litter cover (%):	17.4				

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 and site features

Plot Disturbance

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, ...

Project name:	J210465				
Recorders:	BS, SG	**Plot ID:**	EAR04	**Date:**	07/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	*Grevillea robusta (Silky Oak)*	0.5	1		N
Tree (TG)	*Casuarina cunninghamiana subsp. cunninghamiana (River Oak)*	15	8		N
Tree (TG)	*Callistemon viminalis (Weeping Bottlebrush)*	10	0		N
Forb (FG)	*Persicaria hydropiper (Water Pepper)*	0.2	40		N
Forb (FG)	*Verbena spp.*	1	60		N
Grass & grasslike (GG)	*Lomandra longifolia (Spiny-headed Mat-rush)*	1	25		N
Grass & grasslike (GG)	*Fimbristylis spp.*	0.1	20		N
Forb (FG)	*Oxalis perennans*	0.1	40		N
Grass & grasslike (GG)	*Cynodon dactylon (Common Couch)*	30	100		N
Forb (FG)	*Alternanthera denticulata (Lesser Joyweed)*	0.1	30		N
Forb (FG)	*Dichondra repens (Kidney Weed)*	0.1	1		N
Tree (TG)	*Waterhousea spp.*	0.1	1		N
Grass & grasslike (GG)	*Microlaena stipoides (Weeping Grass)*	0.1	20		N
Forb (FG)	*Wahlenbergia spp. (Bluebell)*	0.1	7		N
Forb (FG)	*Ajuga spp.*	0.4	13		N
	Bidens pilosa (Cobbler's Pegs)	0.1	5		HTE
Grass & grasslike (GG)	*Cyperus gracilis (Slender Flat-sedge)*	2	500		N
	Sida spinosa	0.1	1		E
Other (OG)	*Geitonoplesium cymosum (Scrambling Lily)*	0.1	1		N
	Silybum marianum (Variegated Thistle)	0.1	1		E
Forb (FG)	*Rumex brownii (Swamp Dock)*	0.1	3		N
Shrub (SG)	*Ficus coronata (Creek Sandpaper Fig)*	0.1	1		N
	Senecio madagascariensis (Fireweed)	0.1	2		HTE
Other (OG)	*Glycine clandestina (Twining glycine)*	0.1	3		N
Forb (FG)	*Sonchus spp. (Sowthistle)*	0.1	1		N
	Cuphea carthagenensis	0.1	2		E
Tree (TG)	*Melia azedarach (White Cedar)*	0.1	1		N
	Stellaria media (Common Chickweed)	0.1	30		E
	Daucus carota (Wild Carrot)	0.1	4		E
	Macfadyena unguis-cati	0.2	0		HTE
	Lantana camara (Lantana)	0.1	1		HTE
Grass & grasslike (GG)	*Cyperus sphaeroideus*	7	100		N
Grass & grasslike (GG)	*Oplismenus aemulus*	0.1	10	no	N
	Euphorbia peplus (Petty Spurge)	0.1	50	no	E
Forb (FG)	*Commelina cyanea (Native Wandering Jew)*	0.5	50	no	N
	Urtica dioica (Giant Nettle)	0.1	1		E

BAM Site – Field Survey Form

Plot ID:	EAR05	**Date:**	07/06/22	**Project number:**	J210465	**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	429,911	**Recorders:**	BS, SG		
Zone:	56	**Northing:**	6,599,756	**IBRA region:**		**Midline bearing:**	357
Plant Community Type:		762: Cabbage Gum open forest or woodland on flats of the North Coast		**Condition class:**	EG	**PCT confidence:**	
Vegetation Class:		Coastal Valley Grassy Woodlands		**EEC:**		**EEC confidence:**	

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:	0
	Grasses etc.:	2
	Forbs:	6
	Ferns:	1
	Other:	1
Sum of Cover of native vascular plants by growth form group	Trees:	0.1
	Shrubs:	0
	Grasses etc.:	4
	Forbs:	0.6
	Ferns:	0.1
	Other:	0.5
High Threat Weed cover:		16.1

BAM Attribute (1000 m2 plot) DBH			
DBH	**Tree stem count**	**Length of logs (m) (≥10 cm diameter, >50 cm in length)**	0
80 + cm:	0		
50 – 79 cm:	0		
30 – 49 cm:	0		
20 – 29 cm:	0	**Tree hollow count**	0
10 – 19 cm:	0		
5 – 9 cm:	0		
< 5 cm:	1		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	**1**	**2**	**3**	**4**	**5**
Subplot score (%):	5	5	5	5	5
Average litter cover (%):	5				

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 and site features

Plot Disturbance

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, ...

Project name:	J210465				
Recorders:	BS, SG	**Plot ID:**	EAR05	**Date:**	07/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	*Eucalyptus microcarpa (Western Grey Box)*	0.1	1		N
	Paspalum notatum (Bahia Grass)	100	10000		E
	Senecio madagascariensis (Fireweed)	1	90		HTE
Other (OG)	*Glycine tomentella (Woolly Glycine)*	0.5	50		N
Grass & grasslike (GG)	*Bothriochloa biloba (Lobed Bluegrass)*	1	100		N
Grass & grasslike (GG)	*Panicum effusum (Hairy Panic)*	3	500		N
	Paspalum dilatatum (Paspalum)	15	500		HTE
	Sporobolus africanus (Parramatta Grass)	0.1	50		E
	Stellaria media (Common Chickweed)	0.1	1		E
Fern (EG)	*Cheilanthes sieberi (Rock Fern)*	0.1	5		N
Forb (FG)	*Oxalis perennans*	0.1	1		N
Forb (FG)	*Rumex brownii (Swamp Dock)*	0.1	1		N
	Bryophyllum spp.	0.2	10		E
	Lantana camara (Lantana)	0.1	2		HTE
	Sida rhombifolia (Paddy's Lucerne)	0.1	2		E
Forb (FG)	*Verbena spp.*	0.1	2		N
	Conyza spp. (A Fleabane)	0.5	60		E
Forb (FG)	*Gonocarpus humilis*	0.1	1	no	N
Forb (FG)	*Crotalaria montana var. angustifolia*	0.1	2	no	N
Forb (FG)	*Rostellularia adscendens (Pink Tongues)*	0.1	1	no	N

BAM Site – Field Survey Form

Plot ID:	EAR06	**Date:**	07/06/22	**Project number:**	J210465		**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	430,008	**Recorders:**	BS, SG			
Zone:	56	**Northing:**	6,599,946	**IBRA region:**			**Midline bearing:**	201
Plant Community Type:		1106: River Oak riparian woodland of the NSW North Coast Bioregion and northern Sydney Basin Bioregion		**Condition class:**	PoorFP		**PCT confidence:**	
Vegetation Class:		Eastern Riverine Forests		**EEC:**			**EEC confidence:**	

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:	0
	Grasses etc.:	4
	Forbs:	8
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	25
	Shrubs:	0
	Grasses etc.:	31.1
	Forbs:	9.6
	Ferns:	0
	Other:	0
High Threat Weed cover:		51.1

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	20
80 + cm:	1		
50 – 79 cm:	0		
30 – 49 cm:	5		
20 – 29 cm:	5	Tree hollow count	2
10 – 19 cm:	3		
5 – 9 cm:	0		
< 5 cm:	0		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	60	20	80	10	20
Average litter cover (%):	38				

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 and site features

Plot Disturbance

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, ...

Project name:	J210465				
Recorders:	BS, SG	**Plot ID:**	EAR06	**Date:**	07/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	*Casuarina cunninghamiana subsp. cunninghamiana (River Oak)*	25	5		N
	Lantana camara (Lantana)	50	30		HTE
Forb (FG)	*Persicaria hydropiper (Water Pepper)*	2	40		N
Forb (FG)	*Rumex brownii (Swamp Dock)*	0.2	20		N
Grass & grasslike (GG)	*Cyperus sphaeroideus*	5	500		N
Forb (FG)	*Commelina cyanea (Native Wandering Jew)*	2	50		N
	Stellaria media (Common Chickweed)	1	1000		E
Grass & grasslike (GG)	*Cynodon dactylon (Common Couch)*	25	200		N
	Amaranthus spinosus (Needle Burr)	2	20		E
Forb (FG)	*Oxalis perennans*	0.1	1		N
Forb (FG)	*Erodium spp. (Crowfoot)*	0.1	2		N
	Euphorbia peplus (Petty Spurge)	0.1	75		E
Grass & grasslike (GG)	*Panicum effusum (Hairy Panic)*	0.1	3		N
	Hypochaeris radicata (Catsear)	0.1	1		E
Forb (FG)	*Alternanthera denticulata (Lesser Joyweed)*	0.1	2		N
	Conium maculatum (Hemlock)	0.1	15		E
	Paspalum dilatatum (Paspalum)	0.1	1		HTE
	Daucus carota (Wild Carrot)	0.1	10		E
	Drymaria cordata subsp. cordata	0.2	40		E
Forb (FG)	*Verbena spp.*	0.1	10		N
Forb (FG)	*Cardamine spp.*	5	2000	no	N
	Macfadyena unguis-cati	1	2	no	HTE
Grass & grasslike (GG)	*Oplismenus aemulus*	1	20	no	N

BAM Site – Field Survey Form

Plot ID:	EAR07	**Date:**	08/06/22	**Project number:**	J210465	**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	432,299	**Recorders:**	BS, SG		
Zone:	56	**Northing:**	6,597,106	**IBRA region:**		**Midline bearing:**	46
Plant Community Type:		1106: River Oak riparian woodland of the NSW North Coast Bioregion and northern Sydney Basin Bioregion		**Condition class:**	ModerateFP	**PCT confidence:**	
Vegetation Class:		Eastern Riverine Forests		**EEC:**		**EEC confidence:**	

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:	3
	Shrubs:	4
	Grasses etc.:	5
	Forbs:	9
	Ferns:	1
	Other:	2
Sum of Cover of native vascular plants by growth form group	Trees:	40.1
	Shrubs:	40.3
	Grasses etc.:	54.1
	Forbs:	1.4
	Ferns:	0.1
	Other:	0.2
High Threat Weed cover:		50.1

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	17
80 + cm:	0		
50 – 79 cm:	4		
30 – 49 cm:	5		
20 – 29 cm:	0	Tree hollow count	0
10 – 19 cm:	2		
5 – 9 cm:	0		
< 5 cm:	0		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	35	25	20	20	50
Average litter cover (%):	30				

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 and site features

Plot Disturbance

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, ...

Project name:	J210465				
Recorders:	BS, SG	**Plot ID:**	EAR07	**Date:**	08/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	*Eucalyptus tereticornis (Forest Red Gum)*	15	1		N
Tree (TG)	*Casuarina cunninghamiana subsp. cunninghamiana (River Oak)*	25	6		N
	Lantana camara (Lantana)	45	80		HTE
	Sida rhombifolia (Paddy's Lucerne)	1	60		E
Forb (FG)	*Oxalis perennans*	0.5	100		N
	Bidens pilosa (Cobbler's Pegs)	0.1	15		HTE
Other (OG)	*Geitonoplesium cymosum (Scrambling Lily)*	0.1	2		N
Tree (TG)	*Melia azedarach (White Cedar)*	0.1	2		N
Shrub (SG)	*Alchornea ilicifolia (Native Holly)*	0.1	1		N
	Solanum mauritianum (Wild Tobacco Bush)	0.1	2		E
Grass & grasslike (GG)	*Cynodon dactylon (Common Couch)*	2	50		N
Grass & grasslike (GG)	*Panicum effusum (Hairy Panic)*	0.1	4		N
	Amaranthus spinosus (Needle Burr)	0.2	7		E
Forb (FG)	*Rumex brownii (Swamp Dock)*	0.1	3		N
Other (OG)	*Legnephora moorei (Round-leaf Vine)*	0.1	2		N
Forb (FG)	*Ranunculus spp.*	0.1	1		N
Shrub (SG)	*Chenopodium spp. (Goosefoot, Crumbweed)*	0.1	2		N
	Malvastrum americanum (Spiked Malvastrum)	0.1	1		E
Fern (EG)	*Pyrrosia confluens var. confluens (Horseshoe Felt Fern)*	0.1	1		N
Grass & grasslike (GG)	*Cyperus spp.*	1	70		N
Shrub (SG)	*Solanum parvifolium subsp. parvifolium (Nightshade)*	0.1	4		N
Forb (FG)	*Lobelia purpurascens (whiteroot)*	0.1	2		N
	Macfadyena unguis-cati	5	100	no	HTE
Grass & grasslike (GG)	*Oplismenus aemulus*	50	1000	no	N
Grass & grasslike (GG)	*Microlaena stipoides (Weeping Grass)*	1	30	no	N
Shrub (SG)	*Commersonia spp.*	40	300	no	N
	Sporobolus africanus (Parramatta Grass)	0.1	2	no	E
	Stellaria media (Common Chickweed)	0.1	50	no	E
Forb (FG)	*Persicaria hydropiper (Water Pepper)*	0.2	10	no	N
Forb (FG)	*Cardamine spp.*	0.1	40	no	N
Forb (FG)	*Einadia nutans (Climbing Saltbush)*	0.1	1	no	N
Forb (FG)	*Oreomyrrhis eriopoda (Australian Carraway)*	0.1	30	no	N
Forb (FG)	*Viola hederacea (Ivy-leaved Violet)*	0.1	1	no	N
	Urochloa panicoides (Urochloa Grass)	0.5	50	no	E

BAM Site – Field Survey Form

Plot ID:	EAR08	**Date:**	08/06/22	**Project number:**	J210465		**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	432,128	**Recorders:**	BS, SG			
Zone:	56	**Northing:**	6,597,578	**IBRA region:**			**Midline bearing:**	45
Plant Community Type:		762: Cabbage Gum open forest or woodland on flats of the North Coast		**Condition class:**	DNGModerateFP		**PCT confidence:**	low
Vegetation Class:		Coastal Valley Grassy Woodlands		**EEC:**			**EEC confidence:**	

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:	0
	Grasses etc.:	5
	Forbs:	1
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	10
	Shrubs:	0
	Grasses etc.:	3.2
	Forbs:	0.1
	Ferns:	0
	Other:	0
High Threat Weed cover:		0.4

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	6
80 + cm:	1		
50 – 79 cm:	0		
30 – 49 cm:	0		
20 – 29 cm:	0	Tree hollow count	0
10 – 19 cm:	0		
5 – 9 cm:	0		
< 5 cm:	48		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	5	10	10	10	5
Average litter cover (%):	8				

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 and site features

Plot Disturbance

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, ...

Project name:	J210465				
Recorders:	BS, SG	**Plot ID:**	EAR08	**Date:**	08/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	*Eucalyptus tereticornis (Forest Red Gum)*	10	17		N
	Digitaria ischaemum	95	10000		E
	Paspalum notatum (Bahia Grass)	15	500		E
Grass & grasslike (GG)	*Setaria spp.*	1	300		N
Grass & grasslike (GG)	*Fimbristylis dichotoma (Common Fringe-sedge)*	1	200		N
Grass & grasslike (GG)	*Cyperus polystachyos*	1	200		N
	Cenchrus clandestinus (Kikuyu Grass)	0.3	4		HTE
Grass & grasslike (GG)	*Panicum effusum (Hairy Panic)*	0.1	2		N
Grass & grasslike (GG)	*Cyperus sphaeroideus*	0.1	10		N
	Senecio madagascariensis (Fireweed)	0.1	2		HTE
Forb (FG)	*Verbena spp.*	0.1	3		N
	Sporobolus africanus (Parramatta Grass)	2	100		E

BAM Site – Field Survey Form

Plot ID:	EAR09	**Date:**	08/06/22	**Project number:**	J210465	**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	431,694	**Recorders:**	BS, SG		
Zone:	56	**Northing:**	6,597,731	**IBRA region:**		**Midline bearing:**	260
Plant Community Type:		1215: Spotted Gum - Grey Ironbark open forest of the Macleay Valley lowlands of the NSW North Coast Bioregion		**Condition class:**	High	**PCT confidence:**	
Vegetation Class:		Hunter-Macleay Dry Sclerophyll Forests		**EEC:**		**EEC confidence:**	

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:	4
	Shrubs:	2
	Grasses etc.:	9
	Forbs:	8
	Ferns:	0
	Other:	2
Sum of Cover of native vascular plants by growth form group	Trees:	42.2
	Shrubs:	0.2
	Grasses etc.:	6.8
	Forbs:	1.7
	Ferns:	0
	Other:	0.2
High Threat Weed cover:		0.3

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	45
80 + cm:	0		
50 – 79 cm:	5		
30 – 49 cm:	9		
20 – 29 cm:	5	Tree hollow count	0
10 – 19 cm:	6		
5 – 9 cm:	0		
< 5 cm:	5		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	90	50	90	35	70
Average litter cover (%):	67				

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 and site features

Plot Disturbance

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, ...

Project name:	J210465				
Recorders:	BS, SG	**Plot ID:**	EAR09	**Date:**	08/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	*Corymbia maculata (Spotted Gum)*	40	14		N
Forb (FG)	*Euchiton spp. (A Cudweed)*	0.1	1		N
Other (OG)	*Glycine clandestina (Twining glycine)*	0.1	20		N
Grass & grasslike (GG)	*Eragrostis brownii (Brown's Lovegrass)*	0.1	2		N
Grass & grasslike (GG)	*Entolasia stricta (Wiry Panic)*	5	400		N
Grass & grasslike (GG)	*Cyperus gracilis (Slender Flat-sedge)*	0.1	50		N
Forb (FG)	*Wahlenbergia spp. (Bluebell)*	0.1	1		N
Grass & grasslike (GG)	*Sporobolus creber (Slender Rat's Tail Grass)*	0.1	2		N
	Gomphrena celosioides (Gomphrena Weed)	0.1	20		E
Forb (FG)	*Desmodium rhytidophyllum*	1	40		N
	Sida rhombifolia (Paddy's Lucerne)	0.1	1		E
Grass & grasslike (GG)	*Aristida ramosa (Purple Wiregrass)*	0.2	30		N
Shrub (SG)	*Acacia implexa (Hickory Wattle)*	0.1	1		N
	Lantana camara (Lantana)	0.1	1		HTE
Forb (FG)	*Gonocarpus humilis*	0.1	20		N
Grass & grasslike (GG)	*Aristida vagans (Threeawn Speargrass)*	0.1	5		N
Grass & grasslike (GG)	*Lomandra filiformis (Wattle Matt-rush)*	0.1	2		N
	Cenchrus clandestinus (Kikuyu Grass)	0.1	1		HTE
	Senecio madagascariensis (Fireweed)	0.1	4		HTE
Grass & grasslike (GG)	*Panicum effusum (Hairy Panic)*	0.1	1		N
Forb (FG)	*Goodenia hederacea (Ivy Goodenia)*	0.1	4		N
Forb (FG)	*Lobelia purpurascens (whiteroot)*	0.1	1		N
Forb (FG)	*Dianella caerulea (Blue Flax-lily)*	0.1	1		N
Shrub (SG)	*Eremophila debilis (Amulla)*	0.1	2		N
Tree (TG)	*Clerodendrum tomentosum (Hairy Clerodendrum)*	0.1	1		N
Tree (TG)	*Glochidion ferdinandi (Cheese Tree)*	0.1	1		N
Tree (TG)	*Eucalyptus carnea (Thick-leaved Mahogany)*	2	3		N
	Conyza spp. (A Fleabane)	0.1	2		E
Grass & grasslike (GG)	*Digitaria spp. (A Finger Grass)*	1	50		N
Forb (FG)	*Sonchus spp. (Sowthistle)*	0.1	1	no	N
Other (OG)	*Hardenbergia violacea (False Sarsaparilla)*	0.1	1	no	N

BAM Site – Field Survey Form

Plot ID:	EAR10	**Date:**	08/06/22	**Project number:**	J210465	**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	431,448	**Recorders:**	BS, SG		
Zone:	56	**Northing:**	6,597,797	**IBRA region:**		**Midline bearing:**	244
Plant Community Type:		762: Cabbage Gum open forest or woodland on flats of the North Coast		**Condition class:**	DNGModerate	**PCT confidence:**	
Vegetation Class:		Coastal Valley Grassy Woodlands		**EEC:**		**EEC confidence:**	

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:	1
	Grasses etc.:	8
	Forbs:	2
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	15
	Shrubs:	0.1
	Grasses etc.:	4.5
	Forbs:	0.2
	Ferns:	0
	Other:	0
High Threat Weed cover:		6.5

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	5
80 + cm:	1		
50 – 79 cm:	0		
30 – 49 cm:	0		
20 – 29 cm:	0	Tree hollow count	1
10 – 19 cm:	0		
5 – 9 cm:	0		
< 5 cm:	30		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	5	5	2	10	10
Average litter cover (%):	6.4				

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 and site features

Plot Disturbance

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, ...

Project name:	J210465				
Recorders:	BS, SG	**Plot ID:**	EAR10	**Date:**	08/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	*Eucalyptus tereticornis (Forest Red Gum)*	15	7		N
	Lantana camara (Lantana)	0.5	7		HTE
Grass & grasslike (GG)	*Bothriochloa biloba (Lobed Bluegrass)*	0.5	30		N
	Paspalum notatum (Bahia Grass)	99	10000		E
Grass & grasslike (GG)	*Aristida ramosa (Purple Wiregrass)*	2	200		N
	Senecio madagascariensis (Fireweed)	5	300		HTE
	Solanum mauritianum (Wild Tobacco Bush)	0.1	2		E
Grass & grasslike (GG)	*Bothriochloa decipiens var. decipiens (Pitted Bluegrass)*	0.1	1		N
	Solanum viarum (Tropical Soda Apple)	0.1	2		E
Forb (FG)	*Dichondra repens (Kidney Weed)*	0.1	1		N
Grass & grasslike (GG)	*Sporobolus creber (Slender Rat's Tail Grass)*	0.1	1		N
Grass & grasslike (GG)	*Eragrostis leptostachya (Paddock Lovegrass)*	1.5	150		N
	Digitaria ischaemum	1	20		E
	Cenchrus clandestinus (Kikuyu Grass)	1	10		HTE
Grass & grasslike (GG)	*Cyperus sphaeroideus*	0.1	10		N
Grass & grasslike (GG)	*Panicum effusum (Hairy Panic)*	0.1	1		N
	Sida rhombifolia (Paddy's Lucerne)	0.1	1		E
Grass & grasslike (GG)	*Fimbristylis spp.*	0.1	2		N
	Sporobolus africanus (Parramatta Grass)	0.1	40		E
Forb (FG)	*Verbena spp.*	0.1	7		N
Shrub (SG)	*Eremophila debilis (Amulla)*	0.1	1	no	N

BAM Site – Field Survey Form

Plot ID:	EAR11	**Date:**	08/06/22	**Project number:**	J210465	**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	431,320	**Recorders:**	BS, SG		
Zone:	56	**Northing:**	6,597,709	**IBRA region:**		**Midline bearing:**	257
Plant Community Type:		842: Forest Redgum - Broad-leaved Apple dry open forest of the gorges of NSW North Coast Bioregion		**Condition class:**	High	**PCT confidence:**	low
Vegetation Class:		Northern Gorge Dry Sclerophyll Forests		**EEC:**		**EEC confidence:**	

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:	2
	Shrubs:	0
	Grasses etc.:	10
	Forbs:	10
	Ferns:	0
	Other:	2
Sum of Cover of native vascular plants by growth form group	Trees:	25
	Shrubs:	0
	Grasses etc.:	5.2
	Forbs:	2.9
	Ferns:	0
	Other:	3
High Threat Weed cover:		1.5

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	70
80 + cm:	1		
50 – 79 cm:	2		
30 – 49 cm:	1		
20 – 29 cm:	0	Tree hollow count	2
10 – 19 cm:	6		
5 – 9 cm:	1		
< 5 cm:	44		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	15	10	10	25	10
Average litter cover (%):	14				

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 and site features

Plot Disturbance

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, ...

Project name:	J210465				
Recorders:	BS, SG	**Plot ID:**	EAR11	**Date:**	08/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	*Eucalyptus tereticornis (Forest Red Gum)*	20	15		N
Tree (TG)	*Eucalyptus moluccana (Grey Box)*	5	9		N
	Sida spinosa	0.1	21		E
Grass & grasslike (GG)	*Cymbopogon obtectus (Silky Heads)*	0.1	2		N
Other (OG)	*Polymeria spp.*	2	20		N
Grass & grasslike (GG)	*Cyperus sphaeroideus*	2	200		N
	Senecio madagascariensis (Fireweed)	0.5	40		HTE
Forb (FG)	*Dichondra repens (Kidney Weed)*	2	50		N
Grass & grasslike (GG)	*Cyperus gracilis (Slender Flat-sedge)*	1	200		N
Other (OG)	*Glycine clandestina (Twining glycine)*	1	100		N
	Cenchrus clandestinus (Kikuyu Grass)	1	20		HTE
Forb (FG)	*Euchiton spp. (A Cudweed)*	0.1	2		N
	Cyperus brevifolius	0.2	100		E
Grass & grasslike (GG)	*Cyperus spp.*	0.1	2		N
Grass & grasslike (GG)	*Sporobolus spp. (Rat's Tail Couch)*	0.1	2		N
Forb (FG)	*Alternanthera denticulata (Lesser Joyweed)*	0.1	30		N
	Gomphocarpus physocarpus (Balloon Cotton Bush)	0.1	2		E
	Daucus carota (Wild Carrot)	0.1	1		E
Forb (FG)	*Hydrocotyle sibthorpioides*	0.1	2		N
Grass & grasslike (GG)	*Cyperus polystachyos*	0.2	40		N
Grass & grasslike (GG)	*Bothriochloa biloba (Lobed Bluegrass)*	0.1	20		N
	Paspalum notatum (Bahia Grass)	60	400		E
	Solanum mauritianum (Wild Tobacco Bush)	0.1	2		E
Forb (FG)	*Lobelia purpurascens (whiteroot)*	0.1	5		N
	Sporobolus africanus (Parramatta Grass)	1	80		E
Forb (FG)	*Verbena spp.*	0.1	1		N
Grass & grasslike (GG)	*Cynodon dactylon (Common Couch)*	0.5	10		N
Forb (FG)	*Einadia nutans (Climbing Saltbush)*	0.1	1	no	N
Grass & grasslike (GG)	*Eragrostis brownii (Brown's Lovegrass)*	0.1	10	no	N
Forb (FG)	*Plantago gaudichaudii (Narrow Plantain)*	0.1	1	no	N
Forb (FG)	*Oxalis perennans*	0.1	30	no	N
Forb (FG)	*Viola hederacea (Ivy-leaved Violet)*	0.1	1	no	N
	Amaranthus spinosus (Needle Burr)	0.1	4	no	E
	Chamaesyce hirta (Asthma Plant)	0.1	20	no	E
	Urochloa panicoides (Urochloa Grass)	2	100	no	E
Grass & grasslike (GG)	*Oplismenus aemulus*	1	10	no	N

BAM Site – Field Survey Form

Plot ID:	EAR12	**Date:**	08/06/22	**Project number:**	J210465	**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	431,260	**Recorders:**	BS, SG		
Zone:	56	**Northing:**	6,597,796	**IBRA region:**		**Midline bearing:**	326
Plant Community Type:		762: Cabbage Gum open forest or woodland on flats of the North Coast		**Condition class:**	EG	**PCT confidence:**	high
Vegetation Class:		Coastal Valley Grassy Woodlands		**EEC:**		**EEC confidence:**	

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:	0
	Grasses etc.:	7
	Forbs:	2
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	0.1
	Shrubs:	0
	Grasses etc.:	12.3
	Forbs:	0.2
	Ferns:	0
	Other:	0
High Threat Weed cover:		1.1

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	0
80 + cm:	0		
50 – 79 cm:	0		
30 – 49 cm:	0		
20 – 29 cm:	0	Tree hollow count	0
10 – 19 cm:	0		
5 – 9 cm:	0		
< 5 cm:	5		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	10	15	10	10	15
Average litter cover (%):	12				

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 and site features

Plot Disturbance

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, ...

Project name:	J210465				
Recorders:	BS, SG	**Plot ID:**	EAR12	**Date:**	08/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
	Paspalum notatum (Bahia Grass)	100	1000		E
	Digitaria ischaemum	10	100		E
Grass & grasslike (GG)	*Cyperus sphaeroideus*	10	800		N
Grass & grasslike (GG)	*Fimbristylis dichotoma (Common Fringe-sedge)*	1	100		N
	Sporobolus africanus (Parramatta Grass)	3	100		E
Grass & grasslike (GG)	*Cyperus polystachyos*	0.1	50		N
Grass & grasslike (GG)	*Eragrostis leptostachya (Paddock Lovegrass)*	0.5	100		N
	Senecio madagascariensis (Fireweed)	0.1	5		HTE
Tree (TG)	*Eucalyptus tereticornis (Forest Red Gum)*	0.1	5		N
	Paspalum dilatatum (Paspalum)	1	10		HTE
Grass & grasslike (GG)	*Dichanthium sericeum (Queensland Bluegrass)*	0.1	2		N
	Sida spinosa	0.1	1		E
Grass & grasslike (GG)	*Setaria spp.*	0.5	100		N
Grass & grasslike (GG)	*Bothriochloa biloba (Lobed Bluegrass)*	0.1	2		N
Forb (FG)	*Haloragis heterophylla (Variable Raspwort)*	0.1	1		N
Forb (FG)	*Verbena spp.*	0.1	2		N
	Cuphea carthagenensis	0.1	2	no	E

BAM Site – Field Survey Form

Plot ID:	EAR13	**Date:**	08/06/22	**Project number:**	J210465	**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	428,409	**Recorders:**	BS, SG		
Zone:	56	**Northing:**	6,598,402	**IBRA region:**		**Midline bearing:**	113
Plant Community Type:		762: Cabbage Gum open forest or woodland on flats of the North Coast		**Condition class:**	EG	**PCT confidence:**	
Vegetation Class:		Coastal Valley Grassy Woodlands		**EEC:**		**EEC confidence:**	

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:	0
	Shrubs:	0
	Grasses etc.:	0
	Forbs:	6
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	0
	Shrubs:	0
	Grasses etc.:	0
	Forbs:	0.6
	Ferns:	0
	Other:	0
High Threat Weed cover:		100.8

BAM Attribute (1000 m2 plot) DBH			
DBH	**Tree stem count**	**Length of logs (m) (≥10 cm diameter, >50 cm in length)**	0
80 + cm:	0		
50 – 79 cm:	0		
30 – 49 cm:	0		
20 – 29 cm:	0	**Tree hollow count**	0
10 – 19 cm:	0		
5 – 9 cm:	0		
< 5 cm:	0		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	**1**	**2**	**3**	**4**	**5**
Subplot score (%):	2	10	5	5	50
Average litter cover (%):	14.4				

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 and site features

Plot Disturbance

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, ...

Project name:	J210465				
Recorders:	BS, SG	**Plot ID:**	EAR13	**Date:**	08/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
	Cenchrus clandestinus (Kikuyu Grass)	100	10000		HTE
	Senecio madagascariensis (Fireweed)	0.5	4		HTE
	Solanum viarum (Tropical Soda Apple)	0.5	2		E
Forb (FG)	*Rumex brownii (Swamp Dock)*	0.1	1		N
	Bidens pilosa (Cobbler's Pegs)	0.1	1		HTE
	Xanthium spinosum (Bathurst Burr)	0.1	1		HTE
	Gomphocarpus physocarpus (Balloon Cotton Bush)	0.5	22		E
Forb (FG)	*Nicotiana suaveolens (Native Tobacco)*	0.1	1		N
Forb (FG)	*Ranunculus sessiliflorus (Small-flowered Buttercup)*	0.1	1		N
Forb (FG)	*Verbena spp.*	0.1	4		N
	Sporobolus africanus (Parramatta Grass)	0.1	1		E
	Paspalum dilatatum (Paspalum)	0.1	1		HTE
	Cirsium spp.	0.1	1	no	E
Forb (FG)	*Persicaria hydropiper (Water Pepper)*	0.1	2	no	N
	Urtica dioica (Giant Nettle)	0.1	1	no	E
Forb (FG)	*Einadia nutans (Climbing Saltbush)*	0.1	1	no	N

BAM Site – Field Survey Form

Plot ID:	EAR14	**Date:**	09/06/22	**Project number:**	J210465	**Plot dimensions:**	100x10
Datum:	GDA94	**Easting:**	428,144	**Recorders:**	BS, SG		
Zone:	56	**Northing:**	6,598,212	**IBRA region:**		**Midline bearing:**	218
Plant Community Type:		762: Cabbage Gum open forest or woodland on flats of the North Coast		**Condition class:**	PoorFP	**PCT confidence:**	
Vegetation Class:		Coastal Valley Grassy Woodlands		**EEC:**		**EEC confidence:**	

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:	2
	Shrubs:	1
	Grasses etc.:	8
	Forbs:	4
	Ferns:	1
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	20.1
	Shrubs:	0.1
	Grasses etc.:	1
	Forbs:	0.4
	Ferns:	0.1
	Other:	0
High Threat Weed cover:		30.3

BAM Attribute (1000 m2 plot) DBH			
DBH	**Tree stem count**		
80 + cm:	1	**Length of logs (m) (≥10 cm diameter, >50 cm in length)**	0
50 – 79 cm:	1		
30 – 49 cm:	3		
20 – 29 cm:	0	**Tree hollow count**	0
10 – 19 cm:	5		
5 – 9 cm:	1		
< 5 cm:	6		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	**1**	**2**	**3**	**4**	**5**
Subplot score (%):	10	10	10	10	0
Average litter cover (%):	8				

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 and site features

Plot Disturbance

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, ...

Project name:	J210465				
Recorders:	BS, SG	**Plot ID:**	EAR14	**Date:**	09/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	*Eucalyptus tereticornis (Forest Red Gum)*	20	8		N
	Lantana camara (Lantana)	20	50		HTE
	Sporobolus africanus (Parramatta Grass)	0.5	20		E
Forb (FG)	*Geranium solanderi (Native Geranium)*	0.1	5		N
Tree (TG)	*Melia azedarach (White Cedar)*	0.1	1		N
	Bidens pilosa (Cobbler's Pegs)	0.1	1		HTE
	Sida spinosa	0.1	15		E
Grass & grasslike (GG)	*Setaria spp.*	0.1	2		N
	Amaranthus spinosus (Needle Burr)	0.1	1		E
	Opuntia spp.	0.1	1		HTE
	Cenchrus clandestinus (Kikuyu Grass)	10	1000		HTE
Forb (FG)	*Commelina cyanea (Native Wandering Jew)*	0.1	2		N
	Paspalum dilatatum (Paspalum)	0.1	1		HTE
Grass & grasslike (GG)	*Dichanthium sericeum (Queensland Bluegrass)*	0.1	3		N
	Paspalum notatum (Bahia Grass)	70	1000		E
Shrub (SG)	*Breynia spp.*	0.1	1		N
Grass & grasslike (GG)	*Bothriochloa bladhii subsp. bladhii (Forest Bluegrass)*	0.2	5		N
Grass & grasslike (GG)	*Heteropogon contortus (Bunch Speargrass)*	0.1	1		N
Grass & grasslike (GG)	*Cymbopogon refractus (Barbed Wire Grass)*	0.2	15		N
Grass & grasslike (GG)	*Aristida ramosa (Purple Wiregrass)*	0.1	1		N
Grass & grasslike (GG)	*Austrostipa scabra (Speargrass)*	0.1	2		N
	Rubus anglocandicans (Blackberry)	5	1		E
	Urochloa panicoides (Urochloa Grass)	0.2	10		E
Grass & grasslike (GG)	*Bothriochloa decipiens var. decipiens (Pitted Bluegrass)*	0.1	3		N
Forb (FG)	*Verbena spp.*	0.1	3		N
Forb (FG)	*Hydrocotyle sibthorpioides*	0.1	1	no	N
Fern (EG)	*Cheilanthes sieberi (Rock Fern)*	0.1	1	no	N

BAM Site – Field Survey Form

Plot ID:	EAR15	**Date:**	09/06/22	**Project number:**	J210465	**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	427,841	**Recorders:**	BS, SG		
Zone:	56	**Northing:**	6,597,684	**IBRA region:**		**Midline bearing:**	90
Plant Community Type:		1215: Spotted Gum - Grey Ironbark open forest of the Macleay Valley lowlands of the NSW North Coast Bioregion		**Condition class:**	High	**PCT confidence:**	
Vegetation Class:		Hunter-Macleay Dry Sclerophyll Forests		**EEC:**		**EEC confidence:**	

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:	2
	Shrubs:	1
	Grasses etc.:	11
	Forbs:	6
	Ferns:	1
	Other:	2
Sum of Cover of native vascular plants by growth form group	Trees:	25
	Shrubs:	0.1
	Grasses etc.:	15.4
	Forbs:	1
	Ferns:	0.1
	Other:	65
High Threat Weed cover:		0.2

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	21
80 + cm:	0		
50 – 79 cm:	1		
30 – 49 cm:	10		
20 – 29 cm:	7	Tree hollow count	1
10 – 19 cm:	15		
5 – 9 cm:	4		
< 5 cm:	18		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	50	70	85	45	80
Average litter cover (%):	66				

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 and site features

Plot Disturbance

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, ...

Project name:	J210465				
Recorders:	BS, SG	**Plot ID:**	EAR15	**Date:**	09/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	*Corymbia maculata (Spotted Gum)*	10	4		N
Forb (FG)	*Desmodium rhytidophyllum*	0.5	9		N
Grass & grasslike (GG)	*Entolasia stricta (Wiry Panic)*	10	200		N
Grass & grasslike (GG)	*Eragrostis leptostachya (Paddock Lovegrass)*	0.5	50		N
Grass & grasslike (GG)	*Heteropogon contortus (Bunch Speargrass)*	3	60		N
Grass & grasslike (GG)	*Panicum effusum (Hairy Panic)*	1	100		N
	Senecio madagascariensis (Fireweed)	0.1	2		HTE
	Lantana camara (Lantana)	0.1	1		HTE
	Sida spinosa	0.1	30		E
Grass & grasslike (GG)	*Sporobolus creber (Slender Rat's Tail Grass)*	0.1	5		N
Forb (FG)	*Veronica spp.*	0.1	1		N
Grass & grasslike (GG)	*Dichelachne crinita (Longhair Plumegrass)*	0.1	2		N
Shrub (SG)	*Acacia fimbriata (Fringed Wattle)*	0.1	1		N
	Digitaria ischaemum	1	100		E
Grass & grasslike (GG)	*Cymbopogon obtectus (Silky Heads)*	0.1	4		N
Grass & grasslike (GG)	*Aristida vagans (Threeawn Speargrass)*	0.1	5		N
Grass & grasslike (GG)	*Aristida ramosa (Purple Wiregrass)*	0.2	15		N
Forb (FG)	*Dichondra repens (Kidney Weed)*	0.1	3		N
Grass & grasslike (GG)	*Dichanthium sericeum (Queensland Bluegrass)*	0.1	1		N
Forb (FG)	*Lespedeza juncea subsp. sericea*	0.1	4		N
Other (OG)	*Desmodium varians (Slender Tick-trefoil)*	45	200		N
Tree (TG)	*Eucalyptus carnea (Thick-leaved Mahogany)*	15	8	no	N
Other (OG)	*Hardenbergia violacea (False Sarsaparilla)*	20	50		N
Grass & grasslike (GG)	*Lomandra filiformis (Wattle Matt-rush)*	0.2	20	no	N
Forb (FG)	*Wahlenbergia spp. (Bluebell)*	0.1	40	no	N
Fern (EG)	*Cheilanthes sieberi (Rock Fern)*	0.1	11	no	N
Forb (FG)	*Dianella caerulea (Blue Flax-lily)*	0.1	5	no	N
	Urochloa panicoides (Urochloa Grass)	0.1	1	no	E

BAM Site – Field Survey Form

Plot ID:	EAR16	**Date:**	09/06/22	**Project number:**	J210465	**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	427,723	**Recorders:**	BS, SG		
Zone:	56	**Northing:**	6,597,712	**IBRA region:**		**Midline bearing:**	33
Plant Community Type:		1215: Spotted Gum - Grey Ironbark open forest of the Macleay Valley lowlands of the NSW North Coast Bioregion		**Condition class:**	High	**PCT confidence:**	
Vegetation Class:		Hunter-Macleay Dry Sclerophyll Forests		**EEC:**		**EEC confidence:**	

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.:	9
	Forbs:	6
	Ferns:	1
	Other:	3
Sum of Cover of native vascular plants by growth form group	Trees:	10
	Shrubs:	0.6
	Grasses etc.:	37.1
	Forbs:	7.5
	Ferns:	0.5
	Other:	8.1
High Threat Weed cover:		0.2

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	14
80 + cm:	0		
50 – 79 cm:	2		
30 – 49 cm:	4		
20 – 29 cm:	6	Tree hollow count	1
10 – 19 cm:	10		
5 – 9 cm:	1		
< 5 cm:	22		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	30	90	60	30	45
Average litter cover (%):	51				

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 and site features

Plot Disturbance

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, ...

Project name:	J210465				
Recorders:	BS, SG	**Plot ID:**	EAR16	**Date:**	09/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	*Corymbia maculata (Spotted Gum)*	10	1		N
Forb (FG)	*Caladenia carnea (Pink Fingers)*	7	11		N
Grass & grasslike (GG)	*Entolasia stricta (Wiry Panic)*	5	50		N
Grass & grasslike (GG)	*Heteropogon contortus (Bunch Speargrass)*	25	500		N
Grass & grasslike (GG)	*Eragrostis leptocarpa (Drooping Lovegrass)*	5	100		N
Other (OG)	*Desmodium varians (Slender Tick-trefoil)*	3	80		N
Grass & grasslike (GG)	*Eragrostis brownii (Brown's Lovegrass)*	0.3	40		N
Grass & grasslike (GG)	*Lomandra filiformis (Wattle Matt-rush)*	0.5	50		N
	Melinis repens (Red Natal Grass)	0.1	6		E
	Sida spinosa	0.1	2		E
Other (OG)	*Glycine clandestina (Twining glycine)*	0.1	10		N
	Senecio madagascariensis (Fireweed)	0.1	2		HTE
Forb (FG)	*Desmodium rhytidophyllum*	0.1	3		N
Shrub (SG)	*Acacia falcata*	0.5	8		N
Grass & grasslike (GG)	*Fimbristylis dichotoma (Common Fringe-sedge)*	0.1	1		N
	Hypochaeris radicata (Catsear)	0.1	1		E
Grass & grasslike (GG)	*Aristida vagans (Threeawn Speargrass)*	0.2	20		N
Forb (FG)	*Wahlenbergia spp. (Bluebell)*	0.1	50		N
Shrub (SG)	*Acacia fimbriata (Fringed Wattle)*	0.1	2		N
	Gomphocarpus physocarpus (Balloon Cotton Bush)	0.1	2		E
	Lantana camara (Lantana)	0.1	1		HTE
Grass & grasslike (GG)	*Panicum effusum (Hairy Panic)*	0.5	50		N
Grass & grasslike (GG)	*Cymbopogon obtectus (Silky Heads)*	0.5	10		N
Forb (FG)	*Sida trichopoda (High Sida)*	0.1	1		N
Forb (FG)	*Rostellularia adscendens (Pink Tongues)*	0.1	4		N
Fern (EG)	*Cheilanthes sieberi (Rock Fern)*	0.5	40	no	N
Other (OG)	*Hardenbergia violacea (False Sarsaparilla)*	5	20	no	N
Forb (FG)	*Dianella caerulea (Blue Flax-lily)*	0.1	6	no	N

BAM Site – Field Survey Form

Plot ID:	EAR17	**Date:**	09/06/22	**Project number:**	J210465	**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	427,702	**Recorders:**	BS, SG		
Zone:	56	**Northing:**	6,597,746	**IBRA region:**		**Midline bearing:**	40
Plant Community Type:		842: Forest Redgum - Broad-leaved Apple dry open forest of the gorges of NSW North Coast Bioregion		**Condition class:**	DNGModerate	**PCT confidence:**	
Vegetation Class:		Northern Gorge Dry Sclerophyll Forests		**EEC:**		**EEC confidence:**	

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.:	4
	Forbs:	2
	Ferns:	0
	Other:	1
Sum of Cover of native vascular plants by growth form group	Trees:	0.1
	Shrubs:	0.2
	Grasses etc.:	96.1
	Forbs:	20.1
	Ferns:	0
	Other:	0.1
High Threat Weed cover:		0.1

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	0
80 + cm:	0		
50 – 79 cm:	0		
30 – 49 cm:	0		
20 – 29 cm:	0	Tree hollow count	0
10 – 19 cm:	0		
5 – 9 cm:	0		
< 5 cm:	47		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	10	30	10	50	20
Average litter cover (%):	24				

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 and site features

Plot Disturbance

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, ...

Project name:	J210465				
Recorders:	BS, SG	**Plot ID:**	EAR17	**Date:**	09/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Grass & grasslike (GG)	*Bothriochloa decipiens var. decipiens (Pitted Bluegrass)*	95	10000		N
	Paspalum notatum (Bahia Grass)	5	250		E
Grass & grasslike (GG)	*Cymbopogon obtectus (Silky Heads)*	0.5	40		N
Forb (FG)	*Caladenia carnea (Pink Fingers)*	20	1		N
	Gomphocarpus physocarpus (Balloon Cotton Bush)	0.1	10		E
	Lantana camara (Lantana)	0.1	3		HTE
Shrub (SG)	*Acacia falcata*	0.1	1		N
Grass & grasslike (GG)	*Panicum effusum (Hairy Panic)*	0.1	10		N
Grass & grasslike (GG)	*Dichanthium sericeum (Queensland Bluegrass)*	0.5	50		N
Other (OG)	*Glycine clandestina (broad leaf form) (Scott's Head Broad-Leaved Glycine)*	0.1	10		N
	Melinis repens (Red Natal Grass)	10	500		E
	Digitaria ischaemum	0.1	5		E
	Chamaesyce hirta (Asthma Plant)	0.1	1		E
	Sida spinosa	0.1	1		E
Shrub (SG)	*Acacia fimbriata (Fringed Wattle)*	0.1	1		N
Forb (FG)	*Verbena spp.*	0.1	5		N
Tree (TG)	*Allocasuarina spp.*	0.1	2	no	N

BAM Site – Field Survey Form

Plot ID:	EAR18	**Date:**	09/06/22	**Project number:**	J210465	**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	427,221	**Recorders:**	BS, SG		
Zone:	56	**Northing:**	6,597,313	**IBRA region:**		**Midline bearing:**	201
Plant Community Type:		842: Forest Redgum - Broad-leaved Apple dry open forest of the gorges of NSW North Coast Bioregion		**Condition class:**	High	**PCT confidence:**	
Vegetation Class:		Northern Gorge Dry Sclerophyll Forests		**EEC:**		**EEC confidence:**	

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.:	9
	Forbs:	4
	Ferns:	1
	Other:	3
Sum of Cover of native vascular plants by growth form group	Trees:	45
	Shrubs:	0.2
	Grasses etc.:	105.3
	Forbs:	0.4
	Ferns:	0.5
	Other:	5.2
High Threat Weed cover:		6.3

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	51
80 + cm:	0		
50 – 79 cm:	1		
30 – 49 cm:	9		
20 – 29 cm:	7	Tree hollow count	0
10 – 19 cm:	2		
5 – 9 cm:	0		
< 5 cm:	5		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	20	30	25	15	45
Average litter cover (%):	27				

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 and site features

Plot Disturbance

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, ...

Project name:	J210465				
Recorders:	BS, SG	**Plot ID:**	EAR18	**Date:**	09/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	*Eucalyptus tereticornis (Forest Red Gum)*	45	8		N
Grass & grasslike (GG)	*Heteropogon contortus (Bunch Speargrass)*	10	60		N
	Digitaria ischaemum	10	100		E
Other (OG)	*Desmodium varians (Slender Tick-trefoil)*	5	60		N
Grass & grasslike (GG)	*Bothriochloa decipiens var. decipiens (Pitted Bluegrass)*	5	40		N
	Lantana camara (Lantana)	5	15		HTE
	Gomphocarpus physocarpus (Balloon Cotton Bush)	1	17		E
	Sida spinosa	0.1	30		E
	Bidens pilosa (Cobbler's Pegs)	0.1	10		HTE
Grass & grasslike (GG)	*Cymbopogon obtectus (Silky Heads)*	10	60		N
Grass & grasslike (GG)	*Eragrostis leptostachya (Paddock Lovegrass)*	5	100		N
Forb (FG)	*Desmodium rhytidophyllum*	0.1	2		N
Grass & grasslike (GG)	*Setaria spp.*	0.1	5		N
Grass & grasslike (GG)	*Entolasia stricta (Wiry Panic)*	50	500		N
Grass & grasslike (GG)	*Panicum effusum (Hairy Panic)*	15	200		N
	Senecio madagascariensis (Fireweed)	0.1	2		HTE
Grass & grasslike (GG)	*Lomandra filiformis (Wattle Matt-rush)*	0.2	20		N
Forb (FG)	*Rostellularia adscendens (Pink Tongues)*	0.1	2		N
Forb (FG)	*Dichondra repens (Kidney Weed)*	0.1	2		N
Other (OG)	*Glycine clandestina (Twining glycine)*	0.1	1		N
	Hypochaeris radicata (Catsear)	0.1	30		E
Shrub (SG)	*Acacia fimbriata (Fringed Wattle)*	0.1	2		N
	Tagetes minuta (Stinking Roger)	0.1	1		E
	Sida rhombifolia (Paddy's Lucerne)	0.1	2		E
Other (OG)	*Geitonoplesium cymosum (Scrambling Lily)*	0.1	1		N
	Cenchrus clandestinus (Kikuyu Grass)	1	3		HTE
Forb (FG)	*Lobelia purpurascens (whiteroot)*	0.1	1		N
	Solanum mauritianum (Wild Tobacco Bush)	0.1	1		E
	Solanum seaforthianum (Climbing Nightshade)	0.1	1		HTE
	Melinis repens (Red Natal Grass)	5	30	no	E
Fern (EG)	*Cheilanthes sieberi (Rock Fern)*	0.5	30	no	N
Shrub (SG)	*Breynia oblongifolia (Coffee Bush)*	0.1	4	no	N
Grass & grasslike (GG)	*Sporobolus creber (Slender Rat's Tail Grass)*	10	70	no	N

BAM Site – Field Survey Form

Plot ID:	EAR19	**Date:**	09/06/22	**Project number:**	J210465	**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	427,242	**Recorders:**	BS, SG		
Zone:	56	**Northing:**	6,597,205	**IBRA region:**		**Midline bearing:**	252
Plant Community Type:		842: Forest Redgum - Broad-leaved Apple dry open forest of the gorges of NSW North Coast Bioregion		**Condition class:**	High	**PCT confidence:**	
Vegetation Class:		Northern Gorge Dry Sclerophyll Forests		**EEC:**		**EEC confidence:**	

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:	4
	Shrubs:	1
	Grasses etc.:	11
	Forbs:	2
	Ferns:	1
	Other:	2
Sum of Cover of native vascular plants by growth form group	Trees:	18.1
	Shrubs:	0.2
	Grasses etc.:	120.1
	Forbs:	0.2
	Ferns:	0.1
	Other:	3.1
High Threat Weed cover:		0.1

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	5
80 + cm:	0		
50 – 79 cm:	1		
30 – 49 cm:	3		
20 – 29 cm:	6	Tree hollow count	0
10 – 19 cm:	10		
5 – 9 cm:	7		
< 5 cm:	16		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	15	25	20	30	60
Average litter cover (%):	30				

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 and site features

Plot Disturbance

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, ...

Project name:	J210465				
Recorders:	BS, SG	**Plot ID:**	EAR19	**Date:**	09/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	*Eucalyptus tereticornis (Forest Red Gum)*	10	14		N
Tree (TG)	*Corymbia intermedia (Pink Bloodwood)*	3	2		N
Tree (TG)	*Eucalyptus caliginosa (Broad-leaved Stringybark)*	5	12		N
Grass & grasslike (GG)	*Heteropogon contortus (Bunch Speargrass)*	15	80		N
Grass & grasslike (GG)	*Aristida ramosa (Purple Wiregrass)*	7	70		N
Grass & grasslike (GG)	*Sporobolus creber (Slender Rat's Tail Grass)*	3	50		N
Grass & grasslike (GG)	*Eragrostis leptostachya (Paddock Lovegrass)*	4	50		N
Other (OG)	*Desmodium varians (Slender Tick-trefoil)*	3	40		N
Grass & grasslike (GG)	*Panicum effusum (Hairy Panic)*	15	100		N
Grass & grasslike (GG)	*Lomandra filiformis (Wattle Matt-rush)*	1	10		N
Tree (TG)	*Alphitonia excelsa (Red Ash)*	0.1	1		N
	Paspalum notatum (Bahia Grass)	5	15		E
Grass & grasslike (GG)	*Entolasia stricta (Wiry Panic)*	70	100		N
Grass & grasslike (GG)	*Bothriochloa decipiens var. decipiens (Pitted Bluegrass)*	1	20		N
Grass & grasslike (GG)	*Dichelachne crinita (Longhair Plumegrass)*	0.1	1		N
	Sida spinosa	0.1	20		E
Forb (FG)	*Wahlenbergia spp. (Bluebell)*	0.1	1		N
Other (OG)	*Glycine clandestina (Twining glycine)*	0.1	3		N
	Bidens pilosa (Cobbler's Pegs)	0.1	1		HTE
Grass & grasslike (GG)	*Cymbopogon obtectus (Silky Heads)*	3	30		N
Shrub (SG)	*Breynia oblongifolia (Coffee Bush)*	0.2	7	no	N
Fern (EG)	*Cheilanthes sieberi (Rock Fern)*	0.1	30	no	N
Forb (FG)	*Haloragis heterophylla (Variable Raspwort)*	0.1	1	no	N
Grass & grasslike (GG)	*Eragrostis falcata (Sickle Lovegrass)*	1	30	no	N
	Melinis repens (Red Natal Grass)	1	10	no	E

BAM Site – Field Survey Form

Plot ID:	EAR20	**Date:**	09/06/22	**Project number:**	J210465	**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	426,828	**Recorders:**	BS,SG		
Zone:	56	**Northing:**	6,596,759	**IBRA region:**		**Midline bearing:**	349
Plant Community Type:		842: Forest Redgum - Broad-leaved Apple dry open forest of the gorges of NSW North Coast Bioregion		**Condition class:**	DNGModerate	**PCT confidence:**	
Vegetation Class:		Northern Gorge Dry Sclerophyll Forests		**EEC:**		**EEC confidence:**	

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:	0
	Shrubs:	0
	Grasses etc.:	4
	Forbs:	2
	Ferns:	0
	Other:	2
Sum of Cover of native vascular plants by growth form group	Trees:	0
	Shrubs:	0
	Grasses etc.:	27.6
	Forbs:	0.2
	Ferns:	0
	Other:	0.6
High Threat Weed cover:		0.1

BAM Attribute (1000 m2 plot) DBH			
DBH	**Tree stem count**	**Length of logs (m) (≥10 cm diameter, >50 cm in length)**	0
80 + cm:	0		
50 – 79 cm:	0		
30 – 49 cm:	0		
20 – 29 cm:	0	**Tree hollow count**	0
10 – 19 cm:	0		
5 – 9 cm:	0		
< 5 cm:	0		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	**1**	**2**	**3**	**4**	**5**
Subplot score (%):	20	10	5	15	5
Average litter cover (%):	11				

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 and site features

Plot Disturbance

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, ...

Project name:	J210465				
Recorders:	BS,SG	**Plot ID:**	EAR20	**Date:**	09/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
	Paspalum notatum (Bahia Grass)	100	1000		E
Grass & grasslike (GG)	*Heteropogon contortus (Bunch Speargrass)*	25	200		N
Grass & grasslike (GG)	*Cymbopogon obtectus (Silky Heads)*	0.5	5		N
	Sida rhombifolia (Paddy's Lucerne)	0.1	1		E
Other (OG)	*Glycine clandestina (Twining glycine)*	0.5	50		N
Grass & grasslike (GG)	*Panicum effusum (Hairy Panic)*	2	50		N
	Senecio madagascariensis (Fireweed)	0.1	5		HTE
	Digitaria ischaemum	0.1	10		E
Forb (FG)	*Rumex brownii (Swamp Dock)*	0.1	1		N
	Gomphocarpus physocarpus (Balloon Cotton Bush)	0.1	1		E
Grass & grasslike (GG)	*Aristida leptopoda (White Speargrass)*	0.1	10		N
Other (OG)	*Desmodium varians (Slender Tick-trefoil)*	0.1	1		N
	Gomphrena celosioides (Gomphrena Weed)	0.1	1		E
Forb (FG)	*Verbena spp.*	0.1	20		N

BAM Site – Field Survey Form

Plot ID:	EAR21	**Date:**	09/06/22	**Project number:**	J210465	**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	426,677	**Recorders:**	BS, SG		
Zone:	56	**Northing:**	6,596,936	**IBRA region:**		**Midline bearing:**	54
Plant Community Type:		842: Forest Redgum - Broad-leaved Apple dry open forest of the gorges of NSW North Coast Bioregion		**Condition class:**	EG	**PCT confidence:**	
Vegetation Class:		Northern Gorge Dry Sclerophyll Forests		**EEC:**		**EEC confidence:**	

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:	0
	Shrubs:	0
	Grasses etc.:	1
	Forbs:	3
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	0
	Shrubs:	0
	Grasses etc.:	0.1
	Forbs:	0.3
	Ferns:	0
	Other:	0
High Threat Weed cover:		101.2

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	0
80 + cm:	0		
50 – 79 cm:	0		
30 – 49 cm:	0		
20 – 29 cm:	0	Tree hollow count	0
10 – 19 cm:	0		
5 – 9 cm:	0		
< 5 cm:	0		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	30	10	15	10	20
Average litter cover (%):	17				

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 and site features

Plot Disturbance

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, ...

Project name:	J210465				
Recorders:	BS, SG	**Plot ID:**	EAR21	**Date:**	09/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
	Cenchrus clandestinus (Kikuyu Grass)	100	10000		HTE
	Xanthium spinosum (Bathurst Burr)	0.1	1		HTE
	Amaranthus spinosus (Needle Burr)	0.1	2		E
	Sida rhombifolia (Paddy's Lucerne)	0.5	40		E
	Lantana camara (Lantana)	1	3		HTE
	Solanum viarum (Tropical Soda Apple)	0.1	2		E
	Gomphocarpus physocarpus (Balloon Cotton Bush)	0.2	40		E
Forb (FG)	*Solanum americanum (Glossy Nightshade)*	0.1	1		N
Grass & grasslike (GG)	*Panicum effusum (Hairy Panic)*	0.1	1		N
	Senecio madagascariensis (Fireweed)	0.1	1		HTE
Forb (FG)	*Verbena spp.*	0.1	4		N
Forb (FG)	*Verbena spp.*	0.1	5		N

BAM Site – Field Survey Form

Plot ID:	EAR22	**Date:**	10/06/22	**Project number:**	J210465	**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	426,565	**Recorders:**	BS, SG		
Zone:	56	**Northing:**	6,596,941	**IBRA region:**		**Midline bearing:**	258
Plant Community Type:		1106: River Oak riparian woodland of the NSW North Coast Bioregion and northern Sydney Basin Bioregion		**Condition class:**	PoorRF	**PCT confidence:**	
Vegetation Class:		Eastern Riverine Forests		**EEC:**		**EEC confidence:**	

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:	5
	Shrubs:	4
	Grasses etc.:	4
	Forbs:	6
	Ferns:	4
	Other:	2
Sum of Cover of native vascular plants by growth form group	Trees:	61.1
	Shrubs:	34
	Grasses etc.:	13
	Forbs:	11.4
	Ferns:	0.4
	Other:	4.5
High Threat Weed cover:		27

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	84
80 + cm:	0		
50 – 79 cm:	3		
30 – 49 cm:	7		
20 – 29 cm:	8	Tree hollow count	1
10 – 19 cm:	7		
5 – 9 cm:	3		
< 5 cm:	3		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	60	30	50	90	20
Average litter cover (%):	50				

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 and site features

Plot Disturbance

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, ...

Project name:	J210465				
Recorders:	BS, SG	**Plot ID:**	EAR22	**Date:**	10/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Shrub (SG)	*Melaleuca bracteata (Black Tea-tree)*	20	5		N
Shrub (SG)	*Ficus coronata (Creek Sandpaper Fig)*	10	4		N
Shrub (SG)	*Alchornea ilicifolia (Native Holly)*	3	2		N
Tree (TG)	*Mallotus philippensis (Red Kamala)*	15	9		N
	Lantana camara (Lantana)	25	4		HTE
	Drymaria cordata subsp. cordata	1	200		E
	Solanum seaforthianum (Climbing Nightshade)	1	30		HTE
	Pavonia hastata	0.1	1		E
Grass & grasslike (GG)	*Cynodon dactylon (Common Couch)*	3	4		N
Forb (FG)	*Hydrocotyle sibthorpioides*	0.1	30		N
	Euphorbia peplus (Petty Spurge)	0.1	50		E
Forb (FG)	*Oxalis perennans*	0.1	5		N
Other (OG)	*Maclura cochinchinensis (Cockspur Thorn)*	0.5	1		N
Fern (EG)	*Cyclosorus dentatus (Binung)*	0.1	2		N
Fern (EG)	*Pyrrosia confluens var. confluens (Horseshoe Felt Fern)*	0.1	1		N
Grass & grasslike (GG)	*Cyperus gracilis (Slender Flat-sedge)*	1	200		N
Tree (TG)	*Ficus superba var. henneana (Deciduous Fig)*	1	1		N
	Ageratina adenophora (Crofton Weed)	1	10		HTE
	Argemone ochroleuca subsp. ochroleuca (Mexican Poppy)	0.1	30		E
Tree (TG)	*Callistemon viminalis (Weeping Bottlebrush)*	20	3		N
Forb (FG)	*Rumex brownii (Swamp Dock)*	0.1	2		N
Other (OG)	*Legnephora moorei (Round-leaf Vine)*	4	1		N
	Paspalum notatum (Bahia Grass)	1	7		E
Tree (TG)	*Waterhousea floribunda (Weeping Lilly Pilly)*	0.1	1		N
Tree (TG)	*Casuarina cunninghamiana subsp. cunninghamiana (River Oak)*	25	2	no	N
Grass & grasslike (GG)	*Oplismenus aemulus*	5	100	no	N
Forb (FG)	*Commelina cyanea (Native Wandering Jew)*	10	40	no	N
	Cyperus brevifolius	10	1000	no	E
Shrub (SG)	*Citrus spp.*	1	2	no	N
Forb (FG)	*Persicaria decipiens (Slender Knotweed)*	0.1	130	no	N
Grass & grasslike (GG)	*Juncus australis (Rush)*	4	30	no	N
Fern (EG)	*Doodia spp.*	0.1	4	no	N
Fern (EG)	*Adiantum formosum (Giant Maidenhair)*	0.1	1	no	N
Forb (FG)	*Hydrocotyle acutiloba*	1	30	no	N

BAM Site – Field Survey Form

Plot ID:	EAR23	**Date:**	10/06/22	**Project number:**	J210465	**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	424,359	**Recorders:**	BS,SG		
Zone:	56	**Northing:**	6,597,156	**IBRA region:**		**Midline bearing:**	153
Plant Community Type:		842: Forest Redgum - Broad-leaved Apple dry open forest of the gorges of NSW North Coast Bioregion		**Condition class:**	High	**PCT confidence:**	
Vegetation Class:		Northern Gorge Dry Sclerophyll Forests		**EEC:**		**EEC confidence:**	

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:	2
	Shrubs:	3
	Grasses etc.:	10
	Forbs:	6
	Ferns:	1
	Other:	2
Sum of Cover of native vascular plants by growth form group	Trees:	15
	Shrubs:	1.2
	Grasses etc.:	112.2
	Forbs:	0.6
	Ferns:	0.1
	Other:	6
High Threat Weed cover:		0.5

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	27
80 + cm:	0		
50 – 79 cm:	3		
30 – 49 cm:	4		
20 – 29 cm:	3	Tree hollow count	0
10 – 19 cm:	7		
5 – 9 cm:	6		
< 5 cm:	75		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	20	15	25	20	40
Average litter cover (%):	24				

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 and site features

Plot Disturbance

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, ...

Project name:	J210465				
Recorders:	BS,SG	**Plot ID:**	EAR23	**Date:**	10/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	*Eucalyptus tereticornis (Forest Red Gum)*	9	15		N
Tree (TG)	*Eucalyptus caliginosa (Broad-leaved Stringybark)*	6	11		N
	Paspalum notatum (Bahia Grass)	5	50		E
Grass & grasslike (GG)	*Bothriochloa decipiens var. decipiens (Pitted Bluegrass)*	1	20		N
Grass & grasslike (GG)	*Panicum effusum (Hairy Panic)*	20	400		N
Other (OG)	*Glycine tomentella (Woolly Glycine)*	1	20		N
	Lantana camara (Lantana)	0.5	7		HTE
Grass & grasslike (GG)	*Sporobolus creber (Slender Rat's Tail Grass)*	5	50		N
Grass & grasslike (GG)	*Heteropogon contortus (Bunch Speargrass)*	10	200		N
Shrub (SG)	*Acacia fimbriata (Fringed Wattle)*	0.1	1		N
	Solanum mauritianum (Wild Tobacco Bush)	0.1	1		E
Grass & grasslike (GG)	*Setaria spp.*	0.1	10		N
	Sida spinosa	0.1	1		E
Forb (FG)	*Oxalis perennans*	0.1	30		N
	Conyza spp. (A Fleabane)	0.1	10		E
Shrub (SG)	*Crotalaria mitchellii (Yellow Rattlepod)*	0.1	1		N
	Gomphocarpus physocarpus (Balloon Cotton Bush)	0.1	1		E
Forb (FG)	*Dianella caerulea (Blue Flax-lily)*	0.1	2		N
Forb (FG)	*Wahlenbergia spp. (Bluebell)*	0.1	6		N
Grass & grasslike (GG)	*Cymbopogon obtectus (Silky Heads)*	1	20		N
Other (OG)	*Glycine clandestina (Twining glycine)*	5	40		N
Forb (FG)	*Laxmannia gracilis (Slender Wire Lily)*	0.1	2		N
Grass & grasslike (GG)	*Digitaria spp. (A Finger Grass)*	0.1	10		N
Grass & grasslike (GG)	*Dichanthium sericeum (Queensland Bluegrass)*	20	400	no	N
Grass & grasslike (GG)	*Eragrostis leptostachya (Paddock Lovegrass)*	5	50	no	N
Shrub (SG)	*Breynia oblongifolia (Coffee Bush)*	1	40	no	N
	Melinis repens (Red Natal Grass)	0.1	3	no	E
Fern (EG)	*Cheilanthes sieberi (Rock Fern)*	0.1	20	no	N
Grass & grasslike (GG)	*Microlaena stipoides (Weeping Grass)*	50	800	no	N
Forb (FG)	*Hydrocotyle tripartita (Pennywort)*	0.1	1	no	N
	Urochloa panicoides (Urochloa Grass)	0.5	10	no	E
Forb (FG)	*Rostellularia adscendens (Pink Tongues)*	0.1	1	no	N

BAM Site – Field Survey Form

Plot ID:	EAR24	**Date:**	10/06/22	**Project number:**	J210465	**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	423,135	**Recorders:**	BS, SG		
Zone:	56	**Northing:**	6,597,150	**IBRA region:**		**Midline bearing:**	233
Plant Community Type:		842: Forest Redgum - Broad-leaved Apple dry open forest of the gorges of NSW North Coast Bioregion		**Condition class:**	DNGModerate	**PCT confidence:**	
Vegetation Class:		Northern Gorge Dry Sclerophyll Forests		**EEC:**		**EEC confidence:**	

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:	0
	Shrubs:	0
	Grasses etc.:	4
	Forbs:	2
	Ferns:	1
	Other:	1
Sum of Cover of native vascular plants by growth form group	Trees:	0
	Shrubs:	0
	Grasses etc.:	36.5
	Forbs:	0.2
	Ferns:	0.1
	Other:	0.2
High Threat Weed cover:		0

BAM Attribute (1000 m2 plot) DBH			
DBH	**Tree stem count**	**Length of logs (m) (≥10 cm diameter, >50 cm in length)**	0
80 + cm:	0		
50 – 79 cm:	0		
30 – 49 cm:	0		
20 – 29 cm:	0	**Tree hollow count**	0
10 – 19 cm:	0		
5 – 9 cm:	0		
< 5 cm:	0		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	**1**	**2**	**3**	**4**	**5**
Subplot score (%):	5	10	10	15	20
Average litter cover (%):	12				

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 and site features

Plot Disturbance

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, ...

Project name:	J210465				
Recorders:	BS, SG	**Plot ID:**	EAR24	**Date:**	10/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
	Paspalum notatum (Bahia Grass)	70	1000		E
Grass & grasslike (GG)	*Cymbopogon obtectus (Silky Heads)*	0.5	20		N
	Sida spinosa	0.1	2		E
	Gomphocarpus physocarpus (Balloon Cotton Bush)	1	80		E
Grass & grasslike (GG)	*Panicum effusum (Hairy Panic)*	25	200		N
Other (OG)	*Glycine tomentella (Woolly Glycine)*	0.2	20		N
Fern (EG)	*Cheilanthes spp. (Cloak Fern, Mulga Fern, Rock Fern)*	0.1	3		N
	Sporobolus africanus (Parramatta Grass)	0.5	20		E
Forb (FG)	*Rostellularia adscendens (Pink Tongues)*	0.1	1		N
Forb (FG)	*Rumex brownii (Swamp Dock)*	0.1	1		N
	Pavonia hastata	0.1	1		E
Grass & grasslike (GG)	*Setaria spp.*	1	30		N
Grass & grasslike (GG)	*Eragrostis leptostachya (Paddock Lovegrass)*	10	200	no	N

BAM Site – Field Survey Form

Plot ID:	EAR25	**Date:**	10/06/22	**Project number:**	J210465		**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	422,461	**Recorders:**	BS, SG			
Zone:	56	**Northing:**	6,596,442	**IBRA region:**			**Midline bearing:**	203
Plant Community Type:		1106: River Oak riparian woodland of the NSW North Coast Bioregion and northern Sydney Basin Bioregion		**Condition class:**	ModerateFP		**PCT confidence:**	
Vegetation Class:		Eastern Riverine Forests		**EEC:**			**EEC confidence:**	

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:	2
	Shrubs:	2
	Grasses etc.:	8
	Forbs:	14
	Ferns:	2
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	32
	Shrubs:	5.1
	Grasses etc.:	66.8
	Forbs:	3.7
	Ferns:	4.1
	Other:	0
High Threat Weed cover:		0.2

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	19
80 + cm:	1		
50 – 79 cm:	2		
30 – 49 cm:	2		
20 – 29 cm:	6	Tree hollow count	1
10 – 19 cm:	10		
5 – 9 cm:	1		
< 5 cm:	3		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	10	15	10	40	15
Average litter cover (%):	18				

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 and site features

Plot Disturbance

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, ...

Project name:	J210465				
Recorders:	BS, SG	**Plot ID:**	EAR25	**Date:**	10/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Shrub (SG)	*Melaleuca bracteata (Black Tea-tree)*	5	4		N
Tree (TG)	*Callistemon viminalis (Weeping Bottlebrush)*	2	3		N
	Paspalum notatum (Bahia Grass)	30	400		E
	Araujia sericifera (Moth Vine)	0.1	2		HTE
	Lantana camara (Lantana)	0.1	3		HTE
Forb (FG)	*Oxalis perennans*	0.1	5		N
Grass & grasslike (GG)	*Cyperus gracilis (Slender Flat-sedge)*	1	200		N
	Senna occidentalis (Coffee Senna)	0.1	1		E
	Drymaria cordata subsp. cordata	0.1	30		E
	Malvastrum americanum (Spiked Malvastrum)	0.1	1		E
Grass & grasslike (GG)	*Sporobolus creber (Slender Rat's Tail Grass)*	0.1	10		N
Forb (FG)	*Dichondra repens (Kidney Weed)*	0.1	3		N
Shrub (SG)	*Ficus coronata (Creek Sandpaper Fig)*	0.1	1		N
Forb (FG)	*Rumex brownii (Swamp Dock)*	0.1	5		N
	Eleusine indica (Crowsfoot Grass)	0.1	1		E
Forb (FG)	*Hydrocotyle spp.*	0.1	1		N
	Pavonia hastata	0.1	1		E
Grass & grasslike (GG)	*Juncus spp. (A Rush)*	0.1	2		N
Forb (FG)	*Crinum spp.*	0.1	1		N
Forb (FG)	*Lobelia purpurascens (whiteroot)*	0.1	10		N
Forb (FG)	*Verbena spp.*	0.1	1		N
Forb (FG)	*Ajuga spp.*	0.1	1		N
Tree (TG)	*Casuarina cunninghamiana subsp. cunninghamiana (River Oak)*	30	4	no	N
Forb (FG)	*Persicaria spp. (Knotweed)*	0.1	10	no	N
Grass & grasslike (GG)	*Austrostipa verticillata (Slender Bamboo Grass)*	3	25	no	N
Forb (FG)	*Sonchus spp. (Sowthistle)*	0.1	40	no	N
Grass & grasslike (GG)	*Oplismenus aemulus*	2	70	no	N
Forb (FG)	*Cardamine spp.*	0.5	300	no	N
Grass & grasslike (GG)	*Carex spp.*	0.5	20	no	N
Forb (FG)	*Commelina cyanea (Native Wandering Jew)*	2	50	no	N
Fern (EG)	*Cheilanthes sieberi (Rock Fern)*	4	1000	no	N
	Urochloa panicoides (Urochloa Grass)	0.1	4	no	E
Grass & grasslike (GG)	*Aristida ramosa (Purple Wiregrass)*	0.1	10	no	N
Forb (FG)	*Hydrocotyle sibthorpioides*	0.1	5	no	N
Fern (EG)	*Pyrrosia confluens var. confluens (Horseshoe Felt Fern)*	0.1	1	no	N
Forb (FG)	*Daucus glochidiatus (Native Carrot)*	0.1	40	no	N
Grass & grasslike (GG)	*Microlaena stipoides (Weeping Grass)*	60	1000	no	N
	Amaranthus spinosus (Needle Burr)	0.1	3	no	E
	Euphorbia peplus (Petty Spurge)	0.1	20	no	E

BAM Site – Field Survey Form

Plot ID:	EAR26	**Date:**	10/06/22	**Project number:**	J210465			**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	422,496	**Recorders:**	BS, SG				
Zone:	56	**Northing:**	6,597,318	**IBRA region:**				**Midline bearing:**	15
Plant Community Type:			1106: River Oak riparian woodland of the NSW North Coast Bioregion and northern Sydney Basin Bioregion			**Condition class:**	ModerateRF	**PCT confidence:**	
Vegetation Class:			Eastern Riverine Forests			**EEC:**		**EEC confidence:**	

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:	6
	Shrubs:	4
	Grasses etc.:	5
	Forbs:	2
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	71
	Shrubs:	28.2
	Grasses etc.:	40.3
	Forbs:	0.2
	Ferns:	0
	Other:	0
High Threat Weed cover:		3.5

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	100
80 + cm:	3		
50 – 79 cm:	1		
30 – 49 cm:	5		
20 – 29 cm:	7	Tree hollow count	1
10 – 19 cm:	14		
5 – 9 cm:	2		
< 5 cm:	6		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	90	50	85	95	30
Average litter cover (%):	70				

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 and site features

Plot Disturbance

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, ...

Project name:	J210465				
Recorders:	BS, SG	**Plot ID:**	EAR26	**Date:**	10/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	*Waterhousea floribunda (Weeping Lilly Pilly)*	4	3		N
Tree (TG)	*Callistemon viminalis (Weeping Bottlebrush)*	30	9		N
Shrub (SG)	*Melaleuca bracteata (Black Tea-tree)*	1	1		N
Shrub (SG)	*Rubus spp.*	0.2	1		N
Shrub (SG)	*Ficus coronata (Creek Sandpaper Fig)*	25	5		N
Tree (TG)	*Euroschinus falcatus var. falcatus (Ribbonwood)*	15	23		N
Tree (TG)	*Eucalyptus tereticornis (Forest Red Gum)*	2	1		N
	Lantana camara (Lantana)	3	10		HTE
	Solanum mauritianum (Wild Tobacco Bush)	0.5	2		E
	Pavonia hastata	0.1	1		E
	Solanum viarum (Tropical Soda Apple)	0.1	2		E
Tree (TG)	*Melia azedarach (White Cedar)*	5	1		N
Grass & grasslike (GG)	*Austrostipa verticillata (Slender Bamboo Grass)*	0.1	2		N
	Stellaria media (Common Chickweed)	0.1	2		E
	Araujia sericifera (Moth Vine)	0.5	1		HTE
	Paspalum notatum (Bahia Grass)	1	20		E
Grass & grasslike (GG)	*Cyperus gracilis (Slender Flat-sedge)*	0.1	3		N
Grass & grasslike (GG)	*Juncus spp. (A Rush)*	0.1	3		N
Forb (FG)	*Persicaria hydropiper (Water Pepper)*	0.1	5		N
	Solanum nigrum (Black-berry Nightshade)	0.1	4		E
Tree (TG)	*Casuarina cunninghamiana subsp. cunninghamiana (River Oak)*	15	2	no	N
Grass & grasslike (GG)	*Oplismenus aemulus*	25	100	no	N
Shrub (SG)	*Citrus spp.*	2	1	no	N
Grass & grasslike (GG)	*Microlaena stipoides (Weeping Grass)*	15	100	no	N
Forb (FG)	*Urtica incisa (Stinging Nettle)*	0.1	10	no	N

BAM Site – Field Survey Form

Plot ID:	EAR27	**Date:**	21/06/22	**Project number:**	J210465	**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	428,444	**Recorders:**	BS, SG		
Zone:	56	**Northing:**	6,598,314	**IBRA region:**		**Midline bearing:**	220
Plant Community Type:		762: Cabbage Gum open forest or woodland on flats of the North Coast		**Condition class:**	Swamp	**PCT confidence:**	
Vegetation Class:		Coastal Valley Grassy Woodlands		**EEC:**		**EEC confidence:**	

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:	0
	Shrubs:	0
	Grasses etc.:	6
	Forbs:	2
	Ferns:	1
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	0
	Shrubs:	0
	Grasses etc.:	2.4
	Forbs:	32
	Ferns:	5
	Other:	0
High Threat Weed cover:		5.1

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	0
80 + cm:	0		
50 – 79 cm:	0		
30 – 49 cm:	0		
20 – 29 cm:	0	Tree hollow count	0
10 – 19 cm:	0		
5 – 9 cm:	0		
< 5 cm:	0		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	5	15	50	60	80
Average litter cover (%):	42				

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 and site features

Plot Disturbance

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, ...

Project name:	J210465				
Recorders:	BS, SG	**Plot ID:**	EAR27	**Date:**	21/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Grass & grasslike (GG)	*Juncus usitatus*	0.1	1	no	N
Forb (FG)	*Persicaria orientalis (Princes Feathers)*	30	5000	no	N
Grass & grasslike (GG)	*Cyperus polystachyos*	1	20	no	N
	Cenchrus clandestinus (Kikuyu Grass)	5	30	no	HTE
Fern (EG)	*Marsilea spp. (A Nardoo)*	5	1000	no	N
	Eleusine tristachya (Goose Grass)	1	30	no	E
Forb (FG)	*Alternanthera denticulata (Lesser Joyweed)*	2	400	no	N
	Conyza spp. (A Fleabane)	0.2	10	no	E
	Sida rhombifolia (Paddy's Lucerne)	0.1	1	no	E
Grass & grasslike (GG)	*Cynodon dactylon (Common Couch)*	1	20	no	N
	Paspalum dilatatum (Paspalum)	0.1	2	no	HTE
Grass & grasslike (GG)	*Panicum simile (Two-colour Panic)*	0.1	2	no	N
Grass & grasslike (GG)	*Juncus spp. (A Rush)*	0.1	1	no	N
Grass & grasslike (GG)	*Schoenoplectus mucronatus*	0.1	1	no	N

BAM Site – Field Survey Form

Plot ID:	EAR28	**Date:**	21/06/22	**Project number:**	J210465	**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	429,370	**Recorders:**	BS, SG		
Zone:	56	**Northing:**	6,599,237	**IBRA region:**		**Midline bearing:**	84
Plant Community Type:		1215: Spotted Gum - Grey Ironbark open forest of the Macleay Valley lowlands of the NSW North Coast Bioregion		**Condition class:**	High	**PCT confidence:**	
Vegetation Class:		Hunter-Macleay Dry Sclerophyll Forests		**EEC:**		**EEC confidence:**	

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:	6
	Shrubs:	9
	Grasses etc.:	5
	Forbs:	7
	Ferns:	5
	Other:	6
Sum of Cover of native vascular plants by growth form group	Trees:	17.5
	Shrubs:	17.6
	Grasses etc.:	55.3
	Forbs:	52.5
	Ferns:	0.9
	Other:	3.9
High Threat Weed cover:		0.6

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	11
80 + cm:	0		
50 – 79 cm:	3		
30 – 49 cm:	4		
20 – 29 cm:	4	Tree hollow count	0
10 – 19 cm:	22		
5 – 9 cm:	4		
< 5 cm:	13		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	20	20	15	50	10
Average litter cover (%):	23				

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 and site features

Plot Disturbance

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, ...

Project name:	J210465				
Recorders:	BS, SG	**Plot ID:**	EAR28	**Date:**	21/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	*Eucalyptus carnea (Thick-leaved Mahogany)*	10	4	no	N
Tree (TG)	*Allocasuarina torulosa (Forest Oak)*	7	14	no	N
Shrub (SG)	*Acacia falcata*	15	60	no	N
Grass & grasslike (GG)	*Imperata cylindrica (Blady Grass)*	40	500	no	N
Fern (EG)	*Pteridium esculentum (Bracken)*	0.5	20	no	N
Other (OG)	*Eustrephus latifolius (Wombat Berry)*	2	50	no	N
	Lantana camara (Lantana)	0.5	4	no	HTE
Tree (TG)	*Alphitonia excelsa (Red Ash)*	0.2	5	no	N
	Digitaria ischaemum	50	1000	no	E
Forb (FG)	*Lobelia purpurascens (whiteroot)*	50	1000	no	N
Grass & grasslike (GG)	*Oplismenus aemulus*	15	400	no	N
Forb (FG)	*Dianella caerulea var. cinerascens*	0.1	3	no	N
Tree (TG)	*Melia azedarach (White Cedar)*	0.1	2	no	N
Forb (FG)	*Rostellularia adscendens (Pink Tongues)*	0.1	30	no	N
Shrub (SG)	*Cassinia spp.*	0.1	2	no	N
Shrub (SG)	*Pittosporum revolutum (Rough Fruit Pittosporum)*	1	15	no	N
Other (OG)	*Glycine tomentella (Woolly Glycine)*	0.5	40	no	N
	Verbena caracasana (Shore Verbain)	0.1	3	no	E
Forb (FG)	*Geranium solanderi (Native Geranium)*	2	70	no	N
Shrub (SG)	*Rubus parvifolius (Native Raspberry)*	1	30	no	N
Fern (EG)	*Doodia spp.*	0.1	1	no	N
Fern (EG)	*Adiantum formosum (Giant Maidenhair)*	0.1	1	no	N
Forb (FG)	*Hydrocotyle tripartita (Pennywort)*	0.1	30	no	N
Other (OG)	*Geitonoplesium cymosum (Scrambling Lily)*	1	40	no	N
Fern (EG)	*Blechnum minus (Soft Water Fern)*	0.1	1	no	N
Other (OG)	*Glycine clandestina (Twining glycine)*	0.2	30	no	N
Forb (FG)	*Geranium gardneri (Rough Cranes-bill)*	0.1	10	no	N
Tree (TG)	*Mallotus philippensis (Red Kamala)*	0.1	4	no	N
Grass & grasslike (GG)	*Lomandra filiformis (Wattle Matt-rush)*	0.1	1	no	N
Fern (EG)	*Cheilanthes sieberi (Rock Fern)*	0.1	2	no	N
	Passiflora subpeltata (White Passionflower)	0.5	5	no	E
Grass & grasslike (GG)	*Dichelachne spp. (A Plumegrass)*	0.1	1	no	N
Other (OG)	*Hardenbergia violacea (False Sarsaparilla)*	0.1	2	no	N
Shrub (SG)	*Acacia longissima (Long-leaf Wattle)*	0.1	3	no	N
	Ageratina adenophora (Crofton Weed)	0.1	1	no	HTE
Shrub (SG)	*Bursaria spinosa (Native Blackthorn)*	0.1	2	no	N
	Solanum mauritianum (Wild Tobacco Bush)	0.1	2	no	E
Tree (TG)	*Glochidion ferdinandi (Cheese Tree)*	0.1	1	no	N
Other (OG)	*Passiflora spp.*	0.1	1	no	N
Shrub (SG)	*Trema tomentosa var. aspera (Native Peach)*	0.1	1	no	N
Shrub (SG)	*Leucopogon spp. (A Beard-heath)*	0.1	1	no	N
Grass & grasslike (GG)	*Aristida spp. (A Wiregrass)*	0.1	10	no	N
Forb (FG)	*Lespedeza juncea subsp. sericea*	0.1	2	no	N

Project name:	J210465				
Recorders:	BS, SG	Plot ID:	EAR28	Date:	21/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Shrub (SG)	*Breynia spp.*	0.1	1	no	N

BAM Site – Field Survey Form

Plot ID:	EAR29	**Date:**	21/06/22	**Project number:**	J210465	**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	429,059	**Recorders:**	BS, SG		
Zone:	56	**Northing:**	6,598,588	**IBRA region:**		**Midline bearing:**	160
Plant Community Type:		1215: Spotted Gum - Grey Ironbark open forest of the Macleay Valley lowlands of the NSW North Coast Bioregion		**Condition class:**	High	**PCT confidence:**	
Vegetation Class:		Hunter-Macleay Dry Sclerophyll Forests		**EEC:**		**EEC confidence:**	

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:	3
	Shrubs:	2
	Grasses etc.:	4
	Forbs:	8
	Ferns:	1
	Other:	3
Sum of Cover of native vascular plants by growth form group	Trees:	40
	Shrubs:	55
	Grasses etc.:	9.2
	Forbs:	7.2
	Ferns:	0.1
	Other:	5.6
High Threat Weed cover:		0.2

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	32
80 + cm:	0		
50 – 79 cm:	0		
30 – 49 cm:	5		
20 – 29 cm:	10	Tree hollow count	0
10 – 19 cm:	28		
5 – 9 cm:	6		
< 5 cm:	49		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	50	95	80	95	95
Average litter cover (%):	83				

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 and site features

Plot Disturbance

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, ...

Project name:	J210465				
Recorders:	BS, SG	**Plot ID:**	EAR29	**Date:**	21/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	*Corymbia maculata (Spotted Gum)*	20	12	no	N
Tree (TG)	*Eucalyptus carnea (Thick-leaved Mahogany)*	15	13	no	N
Shrub (SG)	*Acacia falcata*	45	500	no	N
Shrub (SG)	*Pultenaea spinosa (A Bush Pea)*	10	100	no	N
Forb (FG)	*Dianella caerulea var. cinerascens*	0.5	20	no	N
Grass & grasslike (GG)	*Lomandra filiformis (Wattle Matt-rush)*	2	200	no	N
Forb (FG)	*Pomax umbellata (Pomax)*	0.1	3	no	N
Grass & grasslike (GG)	*Aristida ramosa (Purple Wiregrass)*	0.1	4	no	N
Forb (FG)	*Goodenia hederacea (Ivy Goodenia)*	1	50	no	N
Forb (FG)	*Alternanthera denticulata (Lesser Joyweed)*	0.2	50	no	N
Forb (FG)	*Dichondra repens (Kidney Weed)*	0.1	20	no	N
Other (OG)	*Glycine clandestina (Twining glycine)*	0.5	40	no	N
Other (OG)	*Hardenbergia violacea (False Sarsaparilla)*	5	100	no	N
Forb (FG)	*Lobelia purpurascens (whiteroot)*	0.2	20	no	N
Other (OG)	*Desmodium varians (Slender Tick-trefoil)*	0.1	10	no	N
	Senecio madagascariensis (Fireweed)	0.1	1	no	HTE
	Conyza spp. (A Fleabane)	0.1	2	no	E
Forb (FG)	*Hydrocotyle sibthorpioides*	0.1	4	no	N
Fern (EG)	*Cheilanthes sieberi (Rock Fern)*	0.1	1	no	N
	Bidens pilosa (Cobbler's Pegs)	0.1	6	no	HTE
Grass & grasslike (GG)	*Eragrostis leptostachya (Paddock Lovegrass)*	0.1	10	no	N
	Verbena caracasana (Shore Verbain)	0.1	2	no	E
Forb (FG)	*Laxmannia gracilis (Slender Wire Lily)*	5	400	no	N
Grass & grasslike (GG)	*Entolasia stricta (Wiry Panic)*	7	200	no	N
Tree (TG)	*Eucalyptus moluccana (Grey Box)*	5	3	no	N

BAM Site – Field Survey Form

Plot ID:	EAR30	**Date:**	21/06/22	**Project number:**	J210465	**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	429,761	**Recorders:**	BS, SG		
Zone:	56	**Northing:**	6,598,204	**IBRA region:**		**Midline bearing:**	139
Plant Community Type:		1215: Spotted Gum - Grey Ironbark open forest of the Macleay Valley lowlands of the NSW North Coast Bioregion		**Condition class:**	High	**PCT confidence:**	
Vegetation Class:		Hunter-Macleay Dry Sclerophyll Forests		**EEC:**		**EEC confidence:**	

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:	2
	Shrubs:	4
	Grasses etc.:	5
	Forbs:	9
	Ferns:	1
	Other:	2
Sum of Cover of native vascular plants by growth form group	Trees:	25
	Shrubs:	52
	Grasses etc.:	52.1
	Forbs:	3.1
	Ferns:	0.1
	Other:	10.1
High Threat Weed cover:		0

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	11
80 + cm:	0		
50 – 79 cm:	0		
30 – 49 cm:	9		
20 – 29 cm:	8	Tree hollow count	0
10 – 19 cm:	8		
5 – 9 cm:	5		
< 5 cm:	14		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	95	90	70	90	70
Average litter cover (%):	83				

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 and site features

Plot Disturbance

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, ...

Project name:	J210465				
Recorders:	BS, SG	**Plot ID:**	EAR30	**Date:**	21/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	*Corymbia maculata (Spotted Gum)*	20	10	no	N
Tree (TG)	*Eucalyptus moluccana (Grey Box)*	5	7	no	N
Shrub (SG)	*Acacia falcata*	20	250	no	N
Shrub (SG)	*Pultenaea spinosa (A Bush Pea)*	10	50	no	N
Other (OG)	*Hardenbergia violacea (False Sarsaparilla)*	10	50	no	N
Grass & grasslike (GG)	*Lomandra filiformis (Wattle Matt-rush)*	7	200	no	N
Grass & grasslike (GG)	*Aristida jerichoensis (Jericho Wiregrass)*	35	500	no	N
Grass & grasslike (GG)	*Entolasia stricta (Wiry Panic)*	5	70	no	N
Shrub (SG)	*Cassinia spp.*	2	7	no	N
Forb (FG)	*Laxmannia gracilis (Slender Wire Lily)*	1	100	no	N
Forb (FG)	*Alternanthera denticulata (Lesser Joyweed)*	0.1	20	no	N
Forb (FG)	*Goodenia hederacea (Ivy Goodenia)*	0.5	20	no	N
Forb (FG)	*Lobelia purpurascens (whiteroot)*	1	40	no	N
Forb (FG)	*Vernonia cinerea*	0.1	10	no	N
Other (OG)	*Desmodium varians (Slender Tick-trefoil)*	0.1	10	no	N
	Digitaria ischaemum	10	100	no	E
Shrub (SG)	*Acacia leiocalyx subsp. leiocalyx (Curracabah)*	20	200	no	N
Forb (FG)	*Desmodium rhytidophyllum*	0.1	2	no	N
Forb (FG)	*Euchiton sphaericus (Star Cudweed)*	0.1	1	no	N
Fern (EG)	*Cheilanthes sieberi (Rock Fern)*	0.1	1	no	N
	Gomphocarpus physocarpus (Balloon Cotton Bush)	0.1	1	no	E
Forb (FG)	*Pomax umbellata (Pomax)*	0.1	1	no	N
Forb (FG)	*Dianella caerulea var. cinerascens*	0.1	10	no	N
Grass & grasslike (GG)	*Eragrostis leptostachya (Paddock Lovegrass)*	5	50	no	N
Grass & grasslike (GG)	*Oplismenus aemulus*	0.1	1	no	N
	Solanum mauritianum (Wild Tobacco Bush)	0.1	2	no	E

BAM Site – Field Survey Form

Plot ID:	EAR31	**Date:**	22/06/22	**Project number:**	J210465	**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	428,681	**Recorders:**	RD, GS		
Zone:	56	**Northing:**	6,598,514	**IBRA region:**		**Midline bearing:**	42
Plant Community Type:		762: Cabbage Gum open forest or woodland on flats of the North Coast		**Condition class:**	ModerateFP	**PCT confidence:**	high
Vegetation Class:		Coastal Valley Grassy Woodlands		**EEC:**	yes	**EEC confidence:**	low

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:	4
	Shrubs:	4
	Grasses etc.:	6
	Forbs:	9
	Ferns:	2
	Other:	3
Sum of Cover of native vascular plants by growth form group	Trees:	65.6
	Shrubs:	0.8
	Grasses etc.:	1.7
	Forbs:	1.1
	Ferns:	0.6
	Other:	0.3
High Threat Weed cover:		30.4

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	84
80 + cm:	3		
50 – 79 cm:	1		
30 – 49 cm:	1		
20 – 29 cm:	1	Tree hollow count	2
10 – 19 cm:	1		
5 – 9 cm:	1		
< 5 cm:	1		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	30	50	25	15	35
Average litter cover (%):	31				

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 and site features

Creek running through the edge of the 20x20. Clay soils. Land gently sloping to the NW.

Plot Disturbance

Weedy mid and groundcover. Cattle disturbance.

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, ...

Project name:	J210465				
Recorders:	RD, GS	**Plot ID:**	EAR31	**Date:**	22/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	*Eucalyptus amplifolia subsp. amplifolia*	50	18	yes	N
	Lantana camara (Lantana)	30	50	no	HTE
Tree (TG)	*Mallotus philippensis (Red Kamala)*	15	50	yes	N
	Verbena bonariensis (Purpletop)	0.1	20	yes	E
Forb (FG)	*Lobelia purpurascens (whiteroot)*	0.1	20	no	N
Forb (FG)	*Centella asiatica (Indian Pennywort)*	0.1	30	yes	N
	Paspalum notatum (Bahia Grass)	30	200	no	E
Grass & grasslike (GG)	*Capillipedium parviflorum (Scented-top Grass)*	0.5	50	yes	N
Grass & grasslike (GG)	*Dichanthium sericeum (Queensland Bluegrass)*	0.5	150	no	N
	Pavonia hastata	0.2	40	yes	E
	Senecio madagascariensis (Fireweed)	0.1	20	no	HTE
Fern (EG)	*Pteridium esculentum (Bracken)*	0.5	30	no	N
	Sida spinosa	0.1	30	yes	E
Other (OG)	*Desmodium varians (Slender Tick-trefoil)*	0.1	20	yes	N
	Trifolium spp. (A Clover)	0.1	40	yes	E
Forb (FG)	*Oxalis perennans*	0.1	30	yes	N
	Sida rhombifolia (Paddy's Lucerne)	0.2	15	no	E
Grass & grasslike (GG)	*Sporobolus elongatus (Slender Rat's Tail Grass)*	0.3	50	yes	N
Fern (EG)	*Cheilanthes sieberi (Rock Fern)*	0.1	20	no	N
Forb (FG)	*Cotula australis (Common Cotula)*	0.2	60	yes	N
Forb (FG)	*Physalis spp.*	0.1	10	yes	N
Grass & grasslike (GG)	*Eragrostis leptostachya (Paddock Lovegrass)*	0.1	50	yes	N
Forb (FG)	*Dichondra repens (Kidney Weed)*	0.1	50	no	N
Forb (FG)	*Vernonia cinerea*	0.1	10	yes	N
Grass & grasslike (GG)	*Oplismenus aemulus*	0.2	40	yes	N
Grass & grasslike (GG)	*Microlaena stipoides (Weeping Grass)*	0.1	30	yes	N
Forb (FG)	*Geranium solanderi (Native Geranium)*	0.2	40	yes	N
Shrub (SG)	*Acacia longifolia*	0.5	5	no	N
Shrub (SG)	*Trema tomentosa var. aspera (Native Peach)*	0.1	2	no	N
Shrub (SG)	*Acacia longissima (Long-leaf Wattle)*	0.1	3	yes	N
Tree (TG)	*Alphitonia excelsa (Red Ash)*	0.5	10	no	N
	Passiflora subpeltata (White Passionflower)	0.2	5	yes	E
	Dolichandra unguis-cati	0.1	5	yes	HTE
Other (OG)	*Geitonoplesium cymosum (Scrambling Lily)*	0.1	10	no	N
	Bidens pilosa (Cobbler's Pegs)	0.1	10	no	HTE
Other (OG)	*Stephania japonica (Snake vine)*	0.1	5	no	N
	Solanum mauritianum (Wild Tobacco Bush)	0.1	3	no	E
Tree (TG)	*Glochidion ferdinandi (Cheese Tree)*	0.1	3		N
Shrub (SG)	*Breynia oblongifolia (Coffee Bush)*	0.1	10	yes	N
Forb (FG)	*Sida hackettiana (Golden Rod, Spiked Sida, Queensland Hemp)*	0.1	10	yes	N
	Rubus fruticosus sp. agg. (Blackberry complex)	0.1	5	no	HTE

BAM Site – Field Survey Form

Plot ID:	EAR32	**Date:**	22/06/22	**Project number:**	J210465	**Plot dimensions:**	20 x 50
Datum:	GDA94	**Easting:**	428,031	**Recorders:**	GS RD		
Zone:	56	**Northing:**	6,598,028	**IBRA region:**		**Midline bearing:**	98
Plant Community Type:		762: Cabbage Gum open forest or woodland on flats of the North Coast		**Condition class:**	Moderate	**PCT confidence:**	medium
Vegetation Class:		Coastal Valley Grassy Woodlands		**EEC:**	yes	**EEC confidence:**	low

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:	1
	Grasses etc.:	3
	Forbs:	11
	Ferns:	2
	Other:	1
Sum of Cover of native vascular plants by growth form group	Trees:	38
	Shrubs:	0.1
	Grasses etc.:	13
	Forbs:	3.3
	Ferns:	1.1
	Other:	0.5
High Threat Weed cover:		6.7

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	47
80 + cm:	2		
50 – 79 cm:	1		
30 – 49 cm:	1		
20 – 29 cm:	1	Tree hollow count	3
10 – 19 cm:	1		
5 – 9 cm:	1		
< 5 cm:	1		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	20	10	10	15	15
Average litter cover (%):	14				

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 and site features

Flat / high flood terrace in river valley. Foothills. Gravel loam.

Plot Disturbance

Moderate to high disturbance. Moderate grazing, high weeds, partially cleared

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, ...

Project name:	J210465				
Recorders:	GS RD	**Plot ID:**	EAR32	**Date:**	22/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	*Eucalyptus moluccana (Grey Box)*	38	5	no	N
	Lantana camara (Lantana)	5	45	no	HTE
	Senecio madagascariensis (Fireweed)	1.5	220	no	HTE
Forb (FG)	*Oxalis perennans*	0.1	30	no	N
	Urochloa mosambicensis (Sabi Grass)	4	400	no	E
Other (OG)	*Desmodium varians (Slender Tick-trefoil)*	0.5	20	no	N
Forb (FG)	*Rostellularia adscendens (Pink Tongues)*	0.1	14	no	N
	Sporobolus africanus (Parramatta Grass)	5	150	no	E
Grass & grasslike (GG)	*Cynodon dactylon (Common Couch)*	2	180	no	N
Forb (FG)	*Dichondra repens (Kidney Weed)*	1	1000	no	N
	Dolichandra unguis-cati	0.1	3	no	HTE
Shrub (SG)	*Cassinia spp.*	0.1	8	no	N
Forb (FG)	*Sida hackettiana (Golden Rod, Spiked Sida, Queensland Hemp)*	1	40	no	N
Fern (EG)	*Cheilanthes sieberi (Rock Fern)*	0.1	25	no	N
	Paspalum notatum (Bahia Grass)	45	10000	no	E
	Sida rhombifolia (Paddy's Lucerne)	0.5	23	no	E
Forb (FG)	*Alternanthera denticulata (Lesser Joyweed)*	0.1	5	no	N
	Verbena caracasana (Shore Verbain)	0.5	80	no	E
	Solanum mauritianum (Wild Tobacco Bush)	4	10	no	E
Forb (FG)	*Plectranthus suaveolens*	0.1	2	no	N
	Amaranthus spinosus (Needle Burr)	0.1	1	no	E
Forb (FG)	*Commelina cyanea (Native Wandering Jew)*	0.1	10	no	N
	Bidens pilosa (Cobbler's Pegs)	0.1	30	no	HTE
	Solanum nigrum (Black-berry Nightshade)	0.1	1	no	E
Fern (EG)	*Pteridium esculentum (Bracken)*	1	25	no	N
Forb (FG)	*Verbena spp.*	0.1	1	no	N
Grass & grasslike (GG)	*Dichanthium sericeum (Queensland Bluegrass)*	6	1500	no	N
Forb (FG)	*Wahlenbergia spp. (Bluebell)*	0.1	1	no	N
Forb (FG)	*Lobelia purpurascens (whiteroot)*	0.1	6	no	N
Grass & grasslike (GG)	*Eragrostis leptostachya (Paddock Lovegrass)*	5	600	no	N
Forb (FG)	*Centella asiatica (Indian Pennywort)*	0.5	100	no	N

BAM Site – Field Survey Form

Plot ID:	EAR33	**Date:**	22/06/22	**Project number:**	J210465	**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	427,907	**Recorders:**	RD, GS		
Zone:	56	**Northing:**	6,597,931	**IBRA region:**		**Midline bearing:**	50
Plant Community Type:		762: Cabbage Gum open forest or woodland on flats of the North Coast		**Condition class:**	EG	**PCT confidence:**	high
Vegetation Class:		Coastal Valley Grassy Woodlands		**EEC:**	no	**EEC confidence:**	medium

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:	0
	Shrubs:	0
	Grasses etc.:	1
	Forbs:	0
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	0
	Shrubs:	0
	Grasses etc.:	1
	Forbs:	0
	Ferns:	0
	Other:	0
High Threat Weed cover:		7

BAM Attribute (1000 m2 plot) DBH			
DBH	**Tree stem count**	**Length of logs (m) (≥10 cm diameter, >50 cm in length)**	0
80 + cm:	0		
50 – 79 cm:	0		
30 – 49 cm:	0		
20 – 29 cm:	0	**Tree hollow count**	0
10 – 19 cm:	0		
5 – 9 cm:	0		
< 5 cm:	0		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	**1**	**2**	**3**	**4**	**5**
Subplot score (%):	30	20	30	40	20
Average litter cover (%):	28				

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 and site features

Clay soils. Gently sloping to the N. Well drained.

Plot Disturbance

Cleared paddock, paspalum dominated, treeless. Evidence of cattle.

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, ...

Project name:	J210465				
Recorders:	RD, GS	**Plot ID:**	EAR33	**Date:**	22/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
	Paspalum notatum (Bahia Grass)	80	500	no	E
	Sporobolus africanus (Parramatta Grass)	1	20	yes	E
	Sida rhombifolia (Paddy's Lucerne)	0.1	20	yes	E
	Lantana camara (Lantana)	2	10	no	HTE
	Gomphocarpus spp.	0.5	25	yes	E
	Sida spinosa	1	15	yes	E
	Solanum viarum (Tropical Soda Apple)	0.5	10	no	E
	Verbena bonariensis (Purpletop)	0.2	15	yes	E
	Cenchrus clandestinus (Kikuyu Grass)	5	200	no	HTE
Grass & grasslike (GG)	*Capillipedium spp.*	1	30	no	N

BAM Site – Field Survey Form

Plot ID:	EAR35	**Date:**	22/06/22	**Project number:**	J210465	**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	427,011	**Recorders:**	BS, SG		
Zone:	56	**Northing:**	6,596,936	**IBRA region:**		**Midline bearing:**	325
Plant Community Type:		842: Forest Redgum - Broad-leaved Apple dry open forest of the gorges of NSW North Coast Bioregion		**Condition class:**	Poor	**PCT confidence:**	low
Vegetation Class:		Northern Gorge Dry Sclerophyll Forests		**EEC:**		**EEC confidence:**	

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:	5
	Shrubs:	3
	Grasses etc.:	12
	Forbs:	5
	Ferns:	3
	Other:	3
Sum of Cover of native vascular plants by growth form group	Trees:	50.4
	Shrubs:	1.4
	Grasses etc.:	20
	Forbs:	3.4
	Ferns:	0.4
	Other:	0.3
High Threat Weed cover:		10.4

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	15
80 + cm:	2		
50 – 79 cm:	1		
30 – 49 cm:	2		
20 – 29 cm:	3	Tree hollow count	1
10 – 19 cm:	3		
5 – 9 cm:	3		
< 5 cm:	20		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	60	70	20	30	15
Average litter cover (%):	39				

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 and site features

Plot Disturbance

Pct tba-see fieldmap note

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, ...

Project name:	J210465				
Recorders:	BS, SG	**Plot ID:**	EAR35	**Date:**	22/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	*Eucalyptus eugenioides (Thin-leaved Stringybark)*	15	1	no	N
Tree (TG)	*Corymbia intermedia (Pink Bloodwood)*	30	5	no	N
Tree (TG)	*Eucalyptus carnea (Thick-leaved Mahogany)*	5	5	no	N
Grass & grasslike (GG)	*Imperata cylindrica (Blady Grass)*	0.1	1	no	N
	Lantana camara (Lantana)	10	20	no	HTE
Grass & grasslike (GG)	*Dichanthium sericeum (Queensland Bluegrass)*	3	50	no	N
Shrub (SG)	*Breynia oblongifolia (Coffee Bush)*	0.3	10	no	N
Forb (FG)	*Lobelia purpurascens (whiteroot)*	3	40	no	N
Other (OG)	*Glycine clandestina (Twining glycine)*	0.1	30	no	N
Grass & grasslike (GG)	*Oplismenus spp.*	1	10	no	N
Grass & grasslike (GG)	*Scleria spp.*	0.5	50	no	N
Grass & grasslike (GG)	*Eragrostis leptostachya (Paddock Lovegrass)*	1	50	no	N
Grass & grasslike (GG)	*Microlaena stipoides (Weeping Grass)*	0.1	10	no	N
Fern (EG)	*Cheilanthes sieberi (Rock Fern)*	0.1	30	no	N
Shrub (SG)	*Acacia longissima (Long-leaf Wattle)*	0.1	2	no	N
	Senecio madagascariensis (Fireweed)	0.3	30	no	HTE
Shrub (SG)	*Rubus parvifolius (Native Raspberry)*	1	4	no	N
	Urochloa panicoides (Urochloa Grass)	10.5	20	no	E
Tree (TG)	*Glochidion ferdinandi (Cheese Tree)*	0.1	4	no	N
Fern (EG)	*Adiantum formosum (Giant Maidenhair)*	0.1	10	no	N
Grass & grasslike (GG)	*Cyperus spp.*	0.1	1	no	N
Forb (FG)	*Plectranthus parviflorus*	0.1	20	no	N
Grass & grasslike (GG)	*Panicum simile (Two-colour Panic)*	10	70	no	N
	Sporobolus africanus (Parramatta Grass)	0.1	1	no	E
Forb (FG)	*Dichondra repens (Kidney Weed)*	0.1	1	no	N
Tree (TG)	*Mallotus philippensis (Red Kamala)*	0.3	6	no	N
Grass & grasslike (GG)	*Heteropogon contortus (Bunch Speargrass)*	3	60	no	N
Grass & grasslike (GG)	*Aristida ramosa (Purple Wiregrass)*	1	30	no	N
Grass & grasslike (GG)	*Eragrostis brownii (Brown's Lovegrass)*	0.1	2		N
Other (OG)	*Stephania japonica (Snake vine)*	0.1	1	no	N
	Sida rhombifolia (Paddy's Lucerne)	0.1	4	no	E
	Gomphocarpus physocarpus (Balloon Cotton Bush)	0.1	1	no	E
	Bidens pilosa (Cobbler's Pegs)	0.1	2	no	HTE
Fern (EG)	*Pteridium esculentum (Bracken)*	0.2	3	no	N
	Paspalum notatum (Bahia Grass)	20	200	no	E
Grass & grasslike (GG)	*Lomandra filiformis (Wattle Matt-rush)*	0.1	1	no	N
Forb (FG)	*Rostellularia adscendens (Pink Tongues)*	0.1	1	no	N
Forb (FG)	*Crotalaria spp.*	0.1	1	no	N
Other (OG)	*Eustrephus latifolius (Wombat Berry)*	0.1	1	no	N
	Conyza spp. (A Fleabane)	0.1	20	no	E

BAM Site – Field Survey Form

Plot ID:	EAR36	**Date:**	22/06/22	**Project number:**	J210465	**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	426,631	**Recorders:**	BS, SG		
Zone:	56	**Northing:**	6,596,713	**IBRA region:**		**Midline bearing:**	33
Plant Community Type:		842: Forest Redgum - Broad-leaved Apple dry open forest of the gorges of NSW North Coast Bioregion		**Condition class:**	High	**PCT confidence:**	
Vegetation Class:		Northern Gorge Dry Sclerophyll Forests		**EEC:**		**EEC confidence:**	

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:	4
	Shrubs:	3
	Grasses etc.:	9
	Forbs:	3
	Ferns:	1
	Other:	2
Sum of Cover of native vascular plants by growth form group	Trees:	49.4
	Shrubs:	0.8
	Grasses etc.:	63.5
	Forbs:	0.3
	Ferns:	0.1
	Other:	0.2
High Threat Weed cover:		20.1

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	4
80 + cm:	0		
50 – 79 cm:	3		
30 – 49 cm:	4		
20 – 29 cm:	4	Tree hollow count	0
10 – 19 cm:	15		
5 – 9 cm:	15		
< 5 cm:	15		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	10	10	15	5	20
Average litter cover (%):	12				

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 and site features

Plot Disturbance

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, ...

Project name:	J210465				
Recorders:	BS, SG	**Plot ID:**	EAR36	**Date:**	22/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	*Eucalyptus tereticornis (Forest Red Gum)*	45	10	no	N
Tree (TG)	*Corymbia intermedia (Pink Bloodwood)*	3	3	no	N
Tree (TG)	*Eucalyptus caliginosa (Broad-leaved Stringybark)*	1	1	no	N
Tree (TG)	*Glochidion ferdinandi (Cheese Tree)*	0.4	6	no	N
	Lantana camara (Lantana)	20	70	no	HTE
Shrub (SG)	*Breynia oblongifolia (Coffee Bush)*	0.5	5	no	N
Grass & grasslike (GG)	*Cymbopogon refractus (Barbed Wire Grass)*	0.3	10	no	N
Grass & grasslike (GG)	*Dichanthium sericeum (Queensland Bluegrass)*	2	50	no	N
Grass & grasslike (GG)	*Heteropogon contortus (Bunch Speargrass)*	25	200	no	N
Grass & grasslike (GG)	*Sporobolus creber (Slender Rat's Tail Grass)*	0.1	3	no	N
	Digitaria ischaemum	0.1	10	no	E
Grass & grasslike (GG)	*Panicum simile (Two-colour Panic)*	15	200	no	N
Grass & grasslike (GG)	*Aristida ramosa (Purple Wiregrass)*	1	20	no	N
	Solanum mauritianum (Wild Tobacco Bush)	0.1	1	no	E
	Paspalum notatum (Bahia Grass)	50	500	no	E
Grass & grasslike (GG)	*Microlaena stipoides (Weeping Grass)*	10	100	no	N
Other (OG)	*Glycine clandestina (Twining glycine)*	0.1	30	no	N
	Setaria parviflora	0.1	10	no	E
Shrub (SG)	*Acacia longissima (Long-leaf Wattle)*	0.2	4	no	N
Grass & grasslike (GG)	*Eragrostis leptostachya (Paddock Lovegrass)*	10	100	no	N
	Bidens pilosa (Cobbler's Pegs)	0.1	1	no	HTE
	Sida rhombifolia (Paddy's Lucerne)	0.1	2	no	E
Forb (FG)	*Vernonia cinerea*	0.1	3	no	N
Shrub (SG)	*Phyllanthus spp.*	0.1	1	no	N
Forb (FG)	*Haloragis heterophylla (Variable Raspwort)*	0.1	5	no	N
Fern (EG)	*Cheilanthes sieberi (Rock Fern)*	0.1	10	no	N
Forb (FG)	*Mitrasacme alsinoides*	0.1	1	no	N
	Cyperus brevifolius	0.1	1	no	E
Grass & grasslike (GG)	*Cyperus sphaeroideus*	0.1	1	no	N
Other (OG)	*Desmodium varians (Slender Tick-trefoil)*	0.1	10	no	N
	Gomphocarpus physocarpus (Balloon Cotton Bush)	0.1	1	no	E
	Sida spinosa	0.1	1	no	E
	Urochloa panicoides (Urochloa Grass)	0.1	2	no	E

BAM Site – Field Survey Form

Plot ID:	EAR37	**Date:**	22/06/22	**Project number:**	J210465	**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	426,337	**Recorders:**	BS, SG		
Zone:	56	**Northing:**	6,596,869	**IBRA region:**		**Midline bearing:**	84
Plant Community Type:		842: Forest Redgum - Broad-leaved Apple dry open forest of the gorges of NSW North Coast Bioregion		**Condition class:**	EG	**PCT confidence:**	
Vegetation Class:		Northern Gorge Dry Sclerophyll Forests		**EEC:**		**EEC confidence:**	

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:	0
	Shrubs:	0
	Grasses etc.:	3
	Forbs:	1
	Ferns:	0
	Other:	1
Sum of Cover of native vascular plants by growth form group	Trees:	0
	Shrubs:	0
	Grasses etc.:	1.2
	Forbs:	0.1
	Ferns:	0
	Other:	0.1
High Threat Weed cover:		0

BAM Attribute (1000 m2 plot) DBH			
DBH	**Tree stem count**	**Length of logs (m) (≥10 cm diameter, >50 cm in length)**	0
80 + cm:	0		
50 – 79 cm:	0		
30 – 49 cm:	0		
20 – 29 cm:	0	**Tree hollow count**	0
10 – 19 cm:	0		
5 – 9 cm:	0		
< 5 cm:	1		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	**1**	**2**	**3**	**4**	**5**
Subplot score (%):	10	5	10	15	10
Average litter cover (%):	10				

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 and site features

Plot Disturbance

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, ...

Project name:	J210465				
Recorders:	BS, SG	**Plot ID:**	EAR37	**Date:**	22/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
	Paspalum notatum (Bahia Grass)	100	10000	no	E
	Sida rhombifolia (Paddy's Lucerne)	0.3	8	no	E
	Solanum viarum (Tropical Soda Apple)	0.5	2	no	E
	Sporobolus africanus (Parramatta Grass)	0.1	1	no	E
Grass & grasslike (GG)	*Panicum simile (Two-colour Panic)*	1	100	no	N
Grass & grasslike (GG)	*Heteropogon contortus (Bunch Speargrass)*	0.1	10	no	N
Other (OG)	*Desmodium varians (Slender Tick-trefoil)*	0.1	4	no	N
Forb (FG)	*Verbena spp.*	0.1	2	no	N
	Chamaesyce hirta (Asthma Plant)	0.1	2	no	E
	Solanum nigrum (Black-berry Nightshade)	0.1	1	no	E
	Melinis repens (Red Natal Grass)	0.1	4	no	E
	Gomphocarpus physocarpus (Balloon Cotton Bush)	0.1	2	no	E
Grass & grasslike (GG)	*Cymbopogon refractus (Barbed Wire Grass)*	0.1	5	no	N
	Pavonia hastata	0.1	1	no	E

BAM Site – Field Survey Form

Plot ID:	EAR38	**Date:**	22/06/22	**Project number:**	J210465			**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	426,299	**Recorders:**	BS, SG				
Zone:	56	**Northing:**	6,596,921	**IBRA region:**				**Midline bearing:**	100
Plant Community Type:			1106: River Oak riparian woodland of the NSW North Coast Bioregion and northern Sydney Basin Bioregion			**Condition class:**	ModerateRF	**PCT confidence:**	
Vegetation Class:			Eastern Riverine Forests			**EEC:**		**EEC confidence:**	

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:	2
	Shrubs:	2
	Grasses etc.:	4
	Forbs:	5
	Ferns:	1
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	6.3
	Shrubs:	51
	Grasses etc.:	0.4
	Forbs:	1
	Ferns:	0.1
	Other:	0
High Threat Weed cover:		5.2

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	79
80 + cm:	0		
50 – 79 cm:	1		
30 – 49 cm:	2		
20 – 29 cm:	9	Tree hollow count	0
10 – 19 cm:	12		
5 – 9 cm:	4		
< 5 cm:	11		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	10	5	20	10	25
Average litter cover (%):	14				

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 and site features

Plot Disturbance

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, ...

Project name:	J210465				
Recorders:	BS, SG	**Plot ID:**	EAR38	**Date:**	22/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	*Callistemon viminalis (Weeping Bottlebrush)*	6	6	no	N
Shrub (SG)	*Ficus coronata (Creek Sandpaper Fig)*	50	9	no	N
Shrub (SG)	*Melaleuca bracteata (Black Tea-tree)*	1	1	no	N
	Sida rhombifolia (Paddy's Lucerne)	0.1	10	no	E
Grass & grasslike (GG)	*Cyperus gracilis (Slender Flat-sedge)*	0.1	1	no	N
	Argemone ochroleuca subsp. ochroleuca (Mexican Poppy)	0.1	50		E
	Euphorbia peplus (Petty Spurge)	0.1	100	no	E
	Urtica urens (Small Nettle)	0.1	30	no	E
	Paspalum notatum (Bahia Grass)	2	60	no	E
	Lantana camara (Lantana)	5	5	no	HTE
Forb (FG)	*Rumex brownii (Swamp Dock)*	0.2	30	no	N
Forb (FG)	*Cardamine spp.*	0.1	50	no	N
	Solanum seaforthianum (Climbing Nightshade)	0.1	2	no	HTE
Forb (FG)	*Commelina cyanea (Native Wandering Jew)*	0.5	10	no	N
Grass & grasslike (GG)	*Juncus spp. (A Rush)*	0.1	4	no	N
Tree (TG)	*Mallotus philippensis (Red Kamala)*	0.3	1	no	N
	Cyperus brevifolius	1	100	no	E
Forb (FG)	*Persicaria hydropiper (Water Pepper)*	0.1	2	no	N
	Hypochaeris spp. (A Catsear)	0.1	10	no	E
Forb (FG)	*Hydrocotyle tripartita (Pennywort)*	0.1	20	no	N
Fern (EG)	*Doodia spp.*	0.1	1	no	N
	Araujia sericifera (Moth Vine)	0.1	2	no	HTE
Grass & grasslike (GG)	*Cynodon dactylon (Common Couch)*	0.1	2	no	N
Grass & grasslike (GG)	*Oplismenus aemulus*	0.1	1	no	N

BAM Site – Field Survey Form

Plot ID:	EAR39	**Date:**	22/06/22	**Project number:**	J210465	**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	426,058	**Recorders:**	BS, SG		
Zone:	56	**Northing:**	6,596,809	**IBRA region:**		**Midline bearing:**	316
Plant Community Type:		842: Forest Redgum - Broad-leaved Apple dry open forest of the gorges of NSW North Coast Bioregion		**Condition class:**	High	**PCT confidence:**	
Vegetation Class:		Northern Gorge Dry Sclerophyll Forests		**EEC:**		**EEC confidence:**	

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:	5
	Shrubs:	4
	Grasses etc.:	11
	Forbs:	4
	Ferns:	1
	Other:	3
Sum of Cover of native vascular plants by growth form group	Trees:	24.7
	Shrubs:	1.5
	Grasses etc.:	60.4
	Forbs:	0.4
	Ferns:	0.1
	Other:	1.1
High Threat Weed cover:		25.2

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	18
80 + cm:	1		
50 – 79 cm:	3		
30 – 49 cm:	6		
20 – 29 cm:	2	Tree hollow count	0
10 – 19 cm:	11		
5 – 9 cm:	6		
< 5 cm:	2		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	50	70	30	65	60
Average litter cover (%):	55				

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 and site features

Plot Disturbance

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, ...

Project name:	J210465				
Recorders:	BS, SG	**Plot ID:**	EAR39	**Date:**	22/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	*Eucalyptus tereticornis (Forest Red Gum)*	20	12	no	N
	Lantana camara (Lantana)	25	50	no	HTE
Other (OG)	*Cymbidium canaliculatum (Tiger Orchid)*	0.1	1	no	N
Tree (TG)	*Ficus rubiginosa (Port Jackson Fig)*	0.1	1	no	N
Forb (FG)	*Dichondra repens (Kidney Weed)*	0.1	10	no	N
Grass & grasslike (GG)	*Bothriochloa decipiens var. decipiens (Pitted Bluegrass)*	0.1	10	no	N
	Paspalum notatum (Bahia Grass)	25	200	no	E
Grass & grasslike (GG)	*Eragrostis leptostachya (Paddock Lovegrass)*	10	100	no	N
Grass & grasslike (GG)	*Heteropogon contortus (Bunch Speargrass)*	30	300	no	N
Other (OG)	*Glycine clandestina (Twining glycine)*	0.5	30	no	N
Grass & grasslike (GG)	*Bothriochloa spp. (Redgrass, Bluegrass)*	10	100	no	N
	Solanum seaforthianum (Climbing Nightshade)	0.1	1	no	HTE
Shrub (SG)	*Acacia falcata*	1	16	no	N
	Setaria parviflora	0.5	50	no	E
	Gomphrena celosioides (Gomphrena Weed)	0.1	1	no	E
Shrub (SG)	*Exocarpos strictus (Dwarf Cherry)*	0.1	1	no	N
Shrub (SG)	*Breynia oblongifolia (Coffee Bush)*	0.3	20	no	N
Forb (FG)	*Rostellularia adscendens (Pink Tongues)*	0.1	2	no	N
Grass & grasslike (GG)	*Lomandra filiformis (Wattle Matt-rush)*	0.1	1	no	N
Grass & grasslike (GG)	*Eragrostis spp. (A Lovegrass)*	1	10	no	N
Grass & grasslike (GG)	*Paspalidium spp.*	3	50	no	N
Other (OG)	*Desmodium varians (Slender Tick-trefoil)*	0.5	30	no	N
Tree (TG)	*Melia azedarach (White Cedar)*	0.1	1	no	N
	Melinis repens (Red Natal Grass)	10	100	no	E
Grass & grasslike (GG)	*Cymbopogon refractus (Barbed Wire Grass)*	1	20	no	N
Tree (TG)	*Glochidion ferdinandi (Cheese Tree)*	0.5	6	no	N
Fern (EG)	*Cheilanthes sieberi (Rock Fern)*	0.1	10	no	N
Grass & grasslike (GG)	*Cyperus spp.*	0.1	5	no	N
Shrub (SG)	*Trema tomentosa var. aspera (Native Peach)*	0.1	1	no	N
	Urochloa panicoides (Urochloa Grass)	0.1	1	no	E
Tree (TG)	*Eucalyptus carnea (Thick-leaved Mahogany)*	4	5	no	N
Grass & grasslike (GG)	*Aristida ramosa (Purple Wiregrass)*	5	50	no	N
Forb (FG)	*Lobelia purpurascens (whiteroot)*	0.1	3	no	N
	Digitaria ischaemum	0.1	2	no	E
	Senecio madagascariensis (Fireweed)	0.1	10	no	HTE
Grass & grasslike (GG)	*Cyperus gracilis (Slender Flat-sedge)*	0.1	1	no	N
Forb (FG)	*Plectranthus spp.*	0.1	1	no	N

BAM Site – Field Survey Form

Plot ID:	EAR40	**Date:**	23/06/22	**Project number:**	J210465	**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	422,771	**Recorders:**	BS,SG		
Zone:	56	**Northing:**	6,597,060	**IBRA region:**		**Midline bearing:**	20
Plant Community Type:		842: Forest Redgum - Broad-leaved Apple dry open forest of the gorges of NSW North Coast Bioregion		**Condition class:**	High	**PCT confidence:**	
Vegetation Class:		Northern Gorge Dry Sclerophyll Forests		**EEC:**		**EEC confidence:**	

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:	6
	Shrubs:	7
	Grasses etc.:	9
	Forbs:	7
	Ferns:	2
	Other:	2
Sum of Cover of native vascular plants by growth form group	Trees:	47.7
	Shrubs:	1.9
	Grasses etc.:	72.2
	Forbs:	2
	Ferns:	0.4
	Other:	1.5
High Threat Weed cover:		0.2

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	25
80 + cm:	1		
50 – 79 cm:	1		
30 – 49 cm:	3		
20 – 29 cm:	5	Tree hollow count	0
10 – 19 cm:	3		
5 – 9 cm:	3		
< 5 cm:	22		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	60	75	95	25	40
Average litter cover (%):	59				

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 and site features

Plot Disturbance

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, ...

Project name:	J210465				
Recorders:	BS,SG	**Plot ID:**	EAR40	**Date:**	23/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	*Eucalyptus tereticornis (Forest Red Gum)*	35	2	no	N
Tree (TG)	*Corymbia intermedia (Pink Bloodwood)*	5	2	no	N
Tree (TG)	*Eucalyptus carnea (Thick-leaved Mahogany)*	7	9	no	N
Shrub (SG)	*Jacksonia scoparia (Dogwood)*	1	21	no	N
Grass & grasslike (GG)	*Heteropogon contortus (Bunch Speargrass)*	40	400	no	N
Grass & grasslike (GG)	*Lomandra filiformis (Wattle Matt-rush)*	1	50	no	N
Forb (FG)	*Swainsona parviflora*	0.1	10	no	N
Fern (EG)	*Cheilanthes sieberi (Rock Fern)*	0.3	50	no	N
Grass & grasslike (GG)	*Eragrostis leptostachya (Paddock Lovegrass)*	5	50	no	N
Grass & grasslike (GG)	*Aristida jerichoensis (Jericho Wiregrass)*	1	10	no	N
Grass & grasslike (GG)	*Panicum simile (Two-colour Panic)*	15	150	no	N
Forb (FG)	*Desmodium rhytidophyllum*	1	10	no	N
Forb (FG)	*Zornia dyctiocarpa var. dyctiocarpa (Zornia)*	0.1	3	no	N
Other (OG)	*Glycine clandestina (Twining glycine)*	0.5	30	no	N
	Sida spinosa	0.1	1	no	E
Grass & grasslike (GG)	*Eragrostis brownii (Brown's Lovegrass)*	5	60	no	N
Shrub (SG)	*Crotalaria mitchellii (Yellow Rattlepod)*	0.1	1	no	N
Forb (FG)	*Dianella caerulea (Blue Flax-lily)*	0.5	20	no	N
Tree (TG)	*Ficus rubiginosa (Port Jackson Fig)*	0.1	1	no	N
Shrub (SG)	*Leucopogon lanceolatus*	0.3	4	no	N
	Melinis repens (Red Natal Grass)	0.5	2	no	E
Fern (EG)	*Cheilanthes distans (Bristly Cloak Fern)*	0.1	2	no	N
Grass & grasslike (GG)	*Lomandra longifolia (Spiny-headed Mat-rush)*	0.2	5	no	N
Shrub (SG)	*Breynia oblongifolia (Coffee Bush)*	0.1	3	no	N
Tree (TG)	*Alphitonia excelsa (Red Ash)*	0.5	4	no	N
Shrub (SG)	*Trema tomentosa var. aspera (Native Peach)*	0.1	2	no	N
Shrub (SG)	*Acacia longissima (Long-leaf Wattle)*	0.2	2	no	N
	Lantana camara (Lantana)	0.1	1	no	HTE
Grass & grasslike (GG)	*Dichanthium sericeum (Queensland Bluegrass)*	3	30	no	N
Forb (FG)	*Dichondra repens (Kidney Weed)*	0.1	2	no	N
	Conyza spp. (A Fleabane)	0.1	1	no	E
Other (OG)	*Hardenbergia violacea (False Sarsaparilla)*	1	10	no	N
Shrub (SG)	*Persoonia sericea*	0.1	4	no	N
Grass & grasslike (GG)	*Imperata cylindrica (Blady Grass)*	2	20	no	N
	Digitaria ischaemum	2	20	no	E
	Paspalum notatum (Bahia Grass)	0.5	1	no	E
Forb (FG)	*Tricoryne elatior (Yellow Autumn-lily)*	0.1	2	no	N
Tree (TG)	*Allocasuarina torulosa (Forest Oak)*	0.1	3	no	N
	Sporobolus africanus (Parramatta Grass)	0.1	1	no	E
	Senecio madagascariensis (Fireweed)	0.1	1	no	HTE
	Chamaesyce hirta (Asthma Plant)	0.1	1	no	E
	Gomphrena celosioides (Gomphrena Weed)	0.1	1	no	E
Forb (FG)	*Lobelia purpurascens (whiteroot)*	0.1	1	no	N

Project name:	J210465				
Recorders:	BS,SG	Plot ID:	EAR40	Date:	23/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE

BAM Site – Field Survey Form

Plot ID:	EAR42	**Date:**	22/06/22	**Project number:**	J210465	**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	425,154	**Recorders:**	BS, SG		
Zone:	56	**Northing:**	6,597,035	**IBRA region:**		**Midline bearing:**	81
Plant Community Type:		842: Forest Redgum - Broad-leaved Apple dry open forest of the gorges of NSW North Coast Bioregion		**Condition class:**	DNGModerate	**PCT confidence:**	
Vegetation Class:		Northern Gorge Dry Sclerophyll Forests		**EEC:**		**EEC confidence:**	

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:	0
	Shrubs:	0
	Grasses etc.:	4
	Forbs:	0
	Ferns:	1
	Other:	1
Sum of Cover of native vascular plants by growth form group	Trees:	0
	Shrubs:	0
	Grasses etc.:	55
	Forbs:	0
	Ferns:	1
	Other:	5
High Threat Weed cover:		1

BAM Attribute (1000 m2 plot) DBH			
DBH	**Tree stem count**	**Length of logs (m) (≥10 cm diameter, >50 cm in length)**	0
80 + cm:	0		
50 – 79 cm:	0		
30 – 49 cm:	0		
20 – 29 cm:	0	**Tree hollow count**	0
10 – 19 cm:	0		
5 – 9 cm:	0		
< 5 cm:	0		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	**1**	**2**	**3**	**4**	**5**
Subplot score (%):	5	10	5	10	15
Average litter cover (%):	9				

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 and site features

Plot Disturbance

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, ...

Project name:	J210465				
Recorders:	BS, SG	**Plot ID:**	EAR42	**Date:**	22/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
	Melinis repens (Red Natal Grass)	30	1000	no	E
	Paspalum notatum (Bahia Grass)	30	1000	no	E
Other (OG)	*Desmodium varians (Slender Tick-trefoil)*	5	50	no	N
Grass & grasslike (GG)	*Cymbopogon refractus (Barbed Wire Grass)*	10	40	no	N
Grass & grasslike (GG)	*Heteropogon contortus (Bunch Speargrass)*	25	800	no	N
	Senecio madagascariensis (Fireweed)	1	5	no	HTE
Grass & grasslike (GG)	*Setaria spp.*	10	40	no	N
Grass & grasslike (GG)	*Panicum simile (Two-colour Panic)*	10	40	no	N
Fern (EG)	*Cheilanthes sieberi (Rock Fern)*	1	50	no	N

BAM Site – Field Survey Form

Plot ID:	EAR43	**Date:**	23/06/22	**Project number:**	J210465			**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	422,580	**Recorders:**	BS,SG				
Zone:	56	**Northing:**	6,597,160	**IBRA region:**				**Midline bearing:**	182
Plant Community Type:			1106: River Oak riparian woodland of the NSW North Coast Bioregion and northern Sydney Basin Bioregion			**Condition class:**	ModerateFP	**PCT confidence:**	
Vegetation Class:			Eastern Riverine Forests			**EEC:**		**EEC confidence:**	

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:	4
	Shrubs:	1
	Grasses etc.:	5
	Forbs:	10
	Ferns:	1
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	45.6
	Shrubs:	1
	Grasses etc.:	68.2
	Forbs:	6
	Ferns:	0.1
	Other:	0
High Threat Weed cover:		0.1

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	45
80 + cm:	1		
50 – 79 cm:	5		
30 – 49 cm:	4		
20 – 29 cm:	1	Tree hollow count	2
10 – 19 cm:	0		
5 – 9 cm:	0		
< 5 cm:	4		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	30	60	35	70	20
Average litter cover (%):	43				

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 and site features

Plot Disturbance

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, ...

Project name:	J210465				
Recorders:	BS,SG	**Plot ID:**	EAR43	**Date:**	23/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	*Casuarina cunninghamiana subsp. cunninghamiana (River Oak)*	45	3	no	N
Grass & grasslike (GG)	*Austrostipa verticillata (Slender Bamboo Grass)*	3	40	no	N
Grass & grasslike (GG)	*Microlaena stipoides (Weeping Grass)*	60	1000	no	N
Shrub (SG)	*Melaleuca bracteata (Black Tea-tree)*	1	3	no	N
	Sida rhombifolia (Paddy's Lucerne)	0.5	30	no	E
Forb (FG)	*Urtica incisa (Stinging Nettle)*	2	20	no	N
Forb (FG)	*Verbena spp.*	0.1	5	no	N
Grass & grasslike (GG)	*Oplismenus spp.*	5	20	no	N
	Amaranthus spinosus (Needle Burr)	0.5	2	no	E
	Cyperus brevifolius	5	200	no	E
Forb (FG)	*Commelina cyanea (Native Wandering Jew)*	2	50	no	N
	Bidens pilosa (Cobbler's Pegs)	0.1	3	no	HTE
Forb (FG)	*Rumex brownii (Swamp Dock)*	1	120	no	N
	Ambrosia spp.	0.1	2	no	E
	Solanum viarum (Tropical Soda Apple)	0.2	2	no	E
Forb (FG)	*Tetragonia tetragonioides (New Zealand Spinach)*	0.3	10	no	N
Forb (FG)	*Geranium solanderi (Native Geranium)*	0.1	1	no	N
	Drymaria cordata subsp. cordata	0.5	30	no	E
Forb (FG)	*Cardamine spp.*	0.2	40	no	N
Grass & grasslike (GG)	*Urochloa spp.*	0.1	2	no	N
	Paspalum notatum (Bahia Grass)	40	100	no	E
Forb (FG)	*Desmodium rhytidophyllum*	0.1	3	no	N
Tree (TG)	*Mallotus philippensis (Red Kamala)*	0.1	1	no	N
Forb (FG)	*Hydrocotyle tripartita (Pennywort)*	0.1	1	no	N
	Cyclospermum leptophyllum (Slender Celery)	0.1	1	no	E
Tree (TG)	*Glochidion ferdinandi (Cheese Tree)*	0.3	1	no	N
Forb (FG)	*Einadia nutans (Climbing Saltbush)*	0.1	1	no	N
Tree (TG)	*Eucalyptus tereticornis (Forest Red Gum)*	0.2	2	no	N
Fern (EG)	*Pteridium esculentum (Bracken)*	0.1	2	no	N
Grass & grasslike (GG)	*Juncus australis (Rush)*	0.1	1	no	N
	Raphanus raphanistrum (Wild Radish)	0.1	10	no	E
	Euphorbia peplus (Petty Spurge)	0.1	50	no	E

BAM Site – Field Survey Form

Plot ID:	EAR44	**Date:**	22/06/22	**Project number:**	J210465		**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	426,379	**Recorders:**	BS, SG			
Zone:	56	**Northing:**	6,596,899	**IBRA region:**			**Midline bearing:**	258
Plant Community Type:		1106: River Oak riparian woodland of the NSW North Coast Bioregion and northern Sydney Basin Bioregion		**Condition class:**	PoorRF		**PCT confidence:**	
Vegetation Class:		Eastern Riverine Forests		**EEC:**			**EEC confidence:**	

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.:	1
	Forbs:	5
	Ferns:	1
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	0.1
	Shrubs:	0.6
	Grasses etc.:	1
	Forbs:	6.5
	Ferns:	0.1
	Other:	0
High Threat Weed cover:		25.2

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	24
80 + cm:	0		
50 – 79 cm:	0		
30 – 49 cm:	0		
20 – 29 cm:	0	Tree hollow count	0
10 – 19 cm:	2		
5 – 9 cm:	2		
< 5 cm:	3		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	20	80	20	50	30
Average litter cover (%):	40				

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 and site features

Plot Disturbance

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, ...

Project name:	J210465				
Recorders:	BS, SG	**Plot ID:**	EAR44	**Date:**	22/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	*Callistemon viminalis (Weeping Bottlebrush)*	0.1	1	no	N
	Sida rhombifolia (Paddy's Lucerne)	2	100	no	E
	Paspalum notatum (Bahia Grass)	0.1	1	no	E
Forb (FG)	*Persicaria hydropiper (Water Pepper)*	1	40	no	N
Forb (FG)	*Cardamine spp.*	0.5	100	no	N
	Gomphrena celosioides (Gomphrena Weed)	0.1	1	no	E
	Lantana camara (Lantana)	25	40	no	HTE
	Cyperus brevifolius	25	400	no	E
Forb (FG)	*Commelina cyanea (Native Wandering Jew)*	2	30	no	N
Forb (FG)	*Rumex brownii (Swamp Dock)*	1	50	no	N
Grass & grasslike (GG)	*Cynodon dactylon (Common Couch)*	1	1	no	N
Shrub (SG)	*Ficus coronata (Creek Sandpaper Fig)*	0.5	1	no	N
	Solanum mauritianum (Wild Tobacco Bush)	0.5	2	no	E
	Argemone ochroleuca subsp. ochroleuca (Mexican Poppy)	0.2	30	no	E
Forb (FG)	*Urtica incisa (Stinging Nettle)*	2	20	no	N
Shrub (SG)	*Trema tomentosa var. aspera (Native Peach)*	0.1	1	no	N
	Raphanus raphanistrum (Wild Radish)	0.1	10	no	E
	Pavonia hastata	0.5	2	no	E
Fern (EG)	*Pteridium esculentum (Bracken)*	0.1	1	no	N
	Amaranthus spinosus (Needle Burr)	1	7	no	E
	Araujia sericifera (Moth Vine)	0.1	2	no	HTE
	Bidens pilosa (Cobbler's Pegs)	0.1	1	no	HTE

BAM Site – Field Survey Form

Plot ID:	EAR45	**Date:**	23/06/22	**Project number:**	J210465	**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	425,224	**Recorders:**	BS, SG		
Zone:	56	**Northing:**	6,596,901	**IBRA region:**		**Midline bearing:**	43
Plant Community Type:		842: Forest Redgum - Broad-leaved Apple dry open forest of the gorges of NSW North Coast Bioregion		**Condition class:**	DNGModerate	**PCT confidence:**	
Vegetation Class:		Northern Gorge Dry Sclerophyll Forests		**EEC:**		**EEC confidence:**	

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:	0
	Shrubs:	0
	Grasses etc.:	9
	Forbs:	0
	Ferns:	1
	Other:	1
Sum of Cover of native vascular plants by growth form group	Trees:	0
	Shrubs:	0
	Grasses etc.:	91.2
	Forbs:	0
	Ferns:	0.2
	Other:	1
High Threat Weed cover:		0.1

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	0
80 + cm:	0		
50 – 79 cm:	0		
30 – 49 cm:	0		
20 – 29 cm:	0	Tree hollow count	0
10 – 19 cm:	0		
5 – 9 cm:	0		
< 5 cm:	1		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	5	15	10	15	5
Average litter cover (%):	10				

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 and site features

Plot Disturbance

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, ...

Project name:	J210465				
Recorders:	BS, SG	**Plot ID:**	EAR45	**Date:**	23/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Grass & grasslike (GG)	*Heteropogon contortus (Bunch Speargrass)*	70	1000	no	N
	Melinis repens (Red Natal Grass)	5	100	no	E
Grass & grasslike (GG)	*Cymbopogon refractus (Barbed Wire Grass)*	5	100	no	N
Grass & grasslike (GG)	*Panicum simile (Two-colour Panic)*	5	100	no	N
Other (OG)	*Glycine microphylla (Small-leaf Glycine)*	1	50	no	N
Grass & grasslike (GG)	*Dichanthium sericeum (Queensland Bluegrass)*	5	100	no	N
	Chamaesyce hirta (Asthma Plant)	0.1	1	no	E
	Verbena caracasana (Shore Verbain)	0.1	5	no	E
	Senecio madagascariensis (Fireweed)	0.1	2	no	HTE
Fern (EG)	*Cheilanthes sieberi (Rock Fern)*	0.2	50	no	N
Grass & grasslike (GG)	*Eragrostis leptostachya (Paddock Lovegrass)*	1	40	no	N
	Paspalum notatum (Bahia Grass)	5	20	no	E
Grass & grasslike (GG)	*Eragrostis brownii (Brown's Lovegrass)*	2	60	no	N
Grass & grasslike (GG)	*Aristida ramosa (Purple Wiregrass)*	3	50	no	N
	Digitaria ischaemum	3	50	no	E
	Sida spinosa	0.1	1	no	E
	Conyza spp. (A Fleabane)	0.1	1	no	E
Grass & grasslike (GG)	*Austrostipa spp. (A Speargrass)*	0.1	1	no	N
Grass & grasslike (GG)	*Digitaria brownii (Cotton Panic Grass)*	0.1	1	no	N
	Sporobolus africanus (Parramatta Grass)	0.3	12	no	E

BAM Site – Field Survey Form

Plot ID:	EAR46	**Date:**	23/06/22	**Project number:**	J210465	**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	423,270	**Recorders:**	BS, SG		
Zone:	56	**Northing:**	6,597,334	**IBRA region:**		**Midline bearing:**	98
Plant Community Type:		842: Forest Redgum - Broad-leaved Apple dry open forest of the gorges of NSW North Coast Bioregion		**Condition class:**	High	**PCT confidence:**	
Vegetation Class:		Northern Gorge Dry Sclerophyll Forests		**EEC:**		**EEC confidence:**	

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:	6
	Shrubs:	6
	Grasses etc.:	13
	Forbs:	8
	Ferns:	1
	Other:	3
Sum of Cover of native vascular plants by growth form group	Trees:	25.3
	Shrubs:	5.5
	Grasses etc.:	41
	Forbs:	1.3
	Ferns:	0.5
	Other:	10.6
High Threat Weed cover:		0.1

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	17
80 + cm:	0		
50 – 79 cm:	0		
30 – 49 cm:	5		
20 – 29 cm:	14	Tree hollow count	1
10 – 19 cm:	21		
5 – 9 cm:	3		
< 5 cm:	121		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	80	85	60	25	70
Average litter cover (%):	64				

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 and site features

Plot Disturbance

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, ...

Project name:	J210465				
Recorders:	BS, SG	**Plot ID:**	EAR46	**Date:**	23/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	*Corymbia intermedia (Pink Bloodwood)*	7	2	no	N
Tree (TG)	*Eucalyptus carnea (Thick-leaved Mahogany)*	10	22	no	N
Tree (TG)	*Eucalyptus tereticornis (Forest Red Gum)*	4	1	no	N
Tree (TG)	*Eucalyptus eugenioides (Thin-leaved Stringybark)*	4	6	no	N
Shrub (SG)	*Acacia fimbriata (Fringed Wattle)*	1	5	no	N
Shrub (SG)	*Acacia longifolia*	3	9	no	N
Shrub (SG)	*Acacia ulicifolia (Prickly Moses)*	0.2	1	no	N
Other (OG)	*Hardenbergia violacea (False Sarsaparilla)*	10	20	no	N
Shrub (SG)	*Leucopogon lanceolatus*	1	15	no	N
Grass & grasslike (GG)	*Panicum simile (Two-colour Panic)*	15	300	no	N
Grass & grasslike (GG)	*Lomandra filiformis (Wattle Matt-rush)*	1	50	no	N
Forb (FG)	*Mitrasacme alsinoides*	0.5	40	no	N
Grass & grasslike (GG)	*Cymbopogon refractus (Barbed Wire Grass)*	0.1	4	no	N
Other (OG)	*Desmodium varians (Slender Tick-trefoil)*	0.5	50	no	N
Fern (EG)	*Cheilanthes sieberi (Rock Fern)*	0.5	150	no	N
Tree (TG)	*Allocasuarina torulosa (Forest Oak)*	0.2	8	no	N
Forb (FG)	*Vernonia cinerea*	0.1	30	no	N
Other (OG)	*Glycine clandestina (Twining glycine)*	0.1	10	no	N
Grass & grasslike (GG)	*Eragrostis brownii (Brown's Lovegrass)*	7	200	no	N
Grass & grasslike (GG)	*Paspalidium spp.*	0.1	10	no	N
Forb (FG)	*Tricoryne elatior (Yellow Autumn-lily)*	0.1	10	no	N
Forb (FG)	*Dianella caerulea (Blue Flax-lily)*	0.2	30	no	N
Grass & grasslike (GG)	*Entolasia stricta (Wiry Panic)*	7	150	no	N
Shrub (SG)	*Alchornea ilicifolia (Native Holly)*	0.1	1	no	N
	Senecio madagascariensis (Fireweed)	0.1	20	no	HTE
Grass & grasslike (GG)	*Eragrostis leptostachya (Paddock Lovegrass)*	7	150	no	N
Grass & grasslike (GG)	*Sporobolus creber (Slender Rat's Tail Grass)*	0.1	10	no	N
Grass & grasslike (GG)	*Dichelachne spp. (A Plumegrass)*	0.2	15	no	N
Forb (FG)	*Laxmannia gracilis (Slender Wire Lily)*	0.1	40	no	N
Grass & grasslike (GG)	*Aristida jerichoensis (Jericho Wiregrass)*	0.2	20	no	N
Forb (FG)	*Zornia dyctiocarpa var. dyctiocarpa (Zornia)*	0.1	2	no	N
Forb (FG)	*Desmodium rhytidophyllum*	0.1	7	no	N
	Gamochaeta coarctata	0.2	100	no	E
Grass & grasslike (GG)	*Heteropogon contortus (Bunch Speargrass)*	3	50	no	N
Grass & grasslike (GG)	*Cyperus cyperoides*	0.1	1	no	N
Shrub (SG)	*Breynia oblongifolia (Coffee Bush)*	0.2	10	no	N
	Crassocephalum crepidioides (Thickhead)	0.1	1	no	E
Tree (TG)	*Glochidion ferdinandi (Cheese Tree)*	0.1	1	no	N
	Conyza spp. (A Fleabane)	0.2	100	no	E
Forb (FG)	*Hydrocotyle sibthorpioides*	0.1	1	no	N
Grass & grasslike (GG)	*Cynodon dactylon (Common Couch)*	0.2	2	no	N

BAM Site – Field Survey Form

Plot ID:	EAR47	**Date:**	23/06/22	**Project number:**	J210465	**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	424,798	**Recorders:**	BS, SG		
Zone:	56	**Northing:**	6,596,981	**IBRA region:**		**Midline bearing:**	245
Plant Community Type:		842: Forest Redgum - Broad-leaved Apple dry open forest of the gorges of NSW North Coast Bioregion		**Condition class:**	DNGModerate	**PCT confidence:**	
Vegetation Class:		Northern Gorge Dry Sclerophyll Forests		**EEC:**		**EEC confidence:**	

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:	0
	Shrubs:	0
	Grasses etc.:	4
	Forbs:	0
	Ferns:	0
	Other:	1
Sum of Cover of native vascular plants by growth form group	Trees:	0
	Shrubs:	0
	Grasses etc.:	13.1
	Forbs:	0
	Ferns:	0
	Other:	1
High Threat Weed cover:		0.6

BAM Attribute (1000 m2 plot) DBH			
DBH	**Tree stem count**	**Length of logs (m) (≥10 cm diameter, >50 cm in length)**	2
80 + cm:	0		
50 – 79 cm:	0		
30 – 49 cm:	0		
20 – 29 cm:	0	**Tree hollow count**	0
10 – 19 cm:	0		
5 – 9 cm:	0		
< 5 cm:	0		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	**1**	**2**	**3**	**4**	**5**
Subplot score (%):	15	20	20	20	10
Average litter cover (%):	17				

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 and site features

Plot Disturbance

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, ...

Project name:	J210465				
Recorders:	BS, SG	**Plot ID:**	EAR47	**Date:**	23/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
	Paspalum notatum (Bahia Grass)	80	1000	no	E
	Melinis repens (Red Natal Grass)	0.1	1	no	E
Grass & grasslike (GG)	*Heteropogon contortus (Bunch Speargrass)*	0.1	1	no	N
Other (OG)	*Glycine microphylla (Small-leaf Glycine)*	1	50	no	N
Grass & grasslike (GG)	*Cymbopogon refractus (Barbed Wire Grass)*	5	60	no	N
	Opuntia spp.	0.5	7	no	HTE
Grass & grasslike (GG)	*Panicum effusum (Hairy Panic)*	3	100	no	N
	Chamaesyce hirta (Asthma Plant)	0.1	4	no	E
Grass & grasslike (GG)	*Eragrostis spp. (A Lovegrass)*	5	50	no	N
	Sida rhombifolia (Paddy's Lucerne)	0.1	1	no	E
	Sida spinosa	0.1	2	no	E
	Verbena caracasana (Shore Verbain)	0.1	3	no	E
	Senecio madagascariensis (Fireweed)	0.1	10	no	HTE
	Conyza spp. (A Fleabane)	0.1	10	no	E

BAM Site – Field Survey Form

Plot ID:	EAR48	**Date:**	25/06/22	**Project number:**	J210465	**Plot dimensions:**	20 x 50
Datum:	GDA94	**Easting:**	430,264	**Recorders:**	GS RD		
Zone:	56	**Northing:**	6,600,072	**IBRA region:**		**Midline bearing:**	188
Plant Community Type:		1549: Tallowwood - Spotted Gum - Grey Gum grassy tall open forest of the lower North Coast		**Condition class:**	High	**PCT confidence:**	medium
Vegetation Class:		Northern Hinterland Wet Sclerophyll Forests		**EEC:**	no	**EEC confidence:**	medium

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:	5
	Shrubs:	3
	Grasses etc.:	8
	Forbs:	6
	Ferns:	1
	Other:	4
Sum of Cover of native vascular plants by growth form group	Trees:	51
	Shrubs:	36.5
	Grasses etc.:	40.5
	Forbs:	2.3
	Ferns:	0.1
	Other:	7.6
High Threat Weed cover:		0.4

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	30
80 + cm:	0		
50 – 79 cm:	2		
30 – 49 cm:	1		
20 – 29 cm:	1	Tree hollow count	2
10 – 19 cm:	1		
5 – 9 cm:	1		
< 5 cm:	1		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	0	0	0	0	0
Average litter cover (%):	0				

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 and site features

Narrow ridge line, very high gradient. Shallow gravel soil.

Plot Disturbance

Track adjacent, cleared adjacent. Some weeds.

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, ...

Project name:	J210465				
Recorders:	GS RD	**Plot ID:**	EAR48	**Date:**	25/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Shrub (SG)	*Pultenaea spinosa (A Bush Pea)*	35	50	no	N
Forb (FG)	*Goodenia hederacea (Ivy Goodenia)*	0.5	60	no	N
Tree (TG)	*Corymbia intermedia (Pink Bloodwood)*	14	8	no	N
Tree (TG)	*Eucalyptus carnea (Thick-leaved Mahogany)*	18	10	no	N
Tree (TG)	*Eucalyptus microcorys (Tallowwood)*	10	3	no	N
Tree (TG)	*Eucalyptus moluccana (Grey Box)*	6	2	no	N
Tree (TG)	*Corymbia maculata (Spotted Gum)*	3	1	no	N
Other (OG)	*Cymbidium suave (Snake Orchid)*	0.5	1	no	N
Fern (EG)	*Cheilanthes distans (Bristly Cloak Fern)*	0.1	6	no	N
Other (OG)	*Kennedia rubicunda (Dusky Coral Pea)*	3	40	no	N
	Lantana camara (Lantana)	0.2	4	no	HTE
Forb (FG)	*Pomax umbellata (Pomax)*	0.5	50	no	N
Forb (FG)	*Rostellularia adscendens (Pink Tongues)*	0.1	4	no	N
	Melinis repens (Red Natal Grass)	8	200	no	E
Forb (FG)	*Alternanthera denticulata (Lesser Joyweed)*	0.1	8	no	N
Grass & grasslike (GG)	*Lomandra filiformis (Wattle Matt-rush)*	2.5	80	no	N
Forb (FG)	*Verbena spp.*	0.1	20	no	N
	Conyza bonariensis (Flaxleaf Fleabane)	0.4	30	no	E
Grass & grasslike (GG)	*Sporobolus creber (Slender Rat's Tail Grass)*	7	160	no	N
Grass & grasslike (GG)	*Cymbopogon refractus (Barbed Wire Grass)*	8	180	no	N
Grass & grasslike (GG)	*Themeda triandra*	5	70	no	N
	Senecio madagascariensis (Fireweed)	0.1	14	no	HTE
Grass & grasslike (GG)	*Aristida ramosa (Purple Wiregrass)*	8	320	no	N
Forb (FG)	*Dianella caerulea (Blue Flax-lily)*	1	35	no	N
Grass & grasslike (GG)	*Eragrostis brownii (Brown's Lovegrass)*	4	60	no	N
Shrub (SG)	*Myoporum boninense subsp. australe*	0.5	6	no	N
Grass & grasslike (GG)	*Entolasia stricta (Wiry Panic)*	4	100	no	N
Other (OG)	*Glycine clandestina (Twining glycine)*	0.1	20	no	N
Grass & grasslike (GG)	*Oplismenus aemulus*	2	50	no	N
	Bidens pilosa (Cobbler's Pegs)	0.1	8	no	HTE
Shrub (SG)	*Acacia longissima (Long-leaf Wattle)*	1	14	no	N
Other (OG)	*Hardenbergia violacea (False Sarsaparilla)*	4	25	no	N

BAM Site – Field Survey Form

Plot ID:	EAR49	**Date:**	25/06/22	**Project number:**	J210465			**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	430,285	**Recorders:**	BS,SG				
Zone:	56	**Northing:**	6,599,915	**IBRA region:**				**Midline bearing:**	0
Plant Community Type:			1549: Tallowwood - Spotted Gum - Grey Gum grassy tall open forest of the lower North Coast			**Condition class:**	High	**PCT confidence:**	
Vegetation Class:			Northern Hinterland Wet Sclerophyll Forests			**EEC:**		**EEC confidence:**	

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:	5
	Shrubs:	4
	Grasses etc.:	12
	Forbs:	13
	Ferns:	1
	Other:	3
Sum of Cover of native vascular plants by growth form group	Trees:	46.2
	Shrubs:	6.3
	Grasses etc.:	6.3
	Forbs:	2.1
	Ferns:	0.1
	Other:	2.4
High Threat Weed cover:		10.6

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	14
80 + cm:	0		
50 – 79 cm:	1		
30 – 49 cm:	5		
20 – 29 cm:	3	Tree hollow count	3
10 – 19 cm:	11		
5 – 9 cm:	11		
< 5 cm:	20		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	0	0	0	0	0
Average litter cover (%):	0				

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 and site features

Plot Disturbance

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, ...

Project name:	J210465				
Recorders:	BS,SG	**Plot ID:**	EAR49	**Date:**	25/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	*Corymbia intermedia (Pink Bloodwood)*	5	10	no	N
Tree (TG)	*Eucalyptus carnea (Thick-leaved Mahogany)*	30	10	no	N
Tree (TG)	*Eucalyptus microcorys (Tallowwood)*	10	3	no	N
Shrub (SG)	*Pultenaea spinosa (A Bush Pea)*	5	10	no	N
Tree (TG)	*Eucalyptus moluccana (Grey Box)*	1	1	no	N
	Senecio madagascariensis (Fireweed)	0.5	20	no	HTE
	Lantana camara (Lantana)	10	30	no	HTE
Forb (FG)	*Pomax umbellata (Pomax)*	0.5	20	no	N
Grass & grasslike (GG)	*Dichelachne crinita (Longhair Plumegrass)*	0.2	10	no	N
Grass & grasslike (GG)	*Cymbopogon refractus (Barbed Wire Grass)*	0.5	20	no	N
Shrub (SG)	*Acacia fimbriata (Fringed Wattle)*	0.2	2	no	N
Forb (FG)	*Lobelia purpurascens (whiteroot)*	0.1	20	no	N
Forb (FG)	*Dichondra repens (Kidney Weed)*	0.1	20	no	N
Grass & grasslike (GG)	*Entolasia stricta (Wiry Panic)*	3	20	no	N
Forb (FG)	*Dianella caerulea (Blue Flax-lily)*	0.1	5	no	N
Grass & grasslike (GG)	*Eragrostis leptostachya (Paddock Lovegrass)*	0.5	20	no	N
Other (OG)	*Hardenbergia violacea (False Sarsaparilla)*	2	5	no	N
	Melinis repens (Red Natal Grass)	0.1	10	no	E
Forb (FG)	*Sida trichopoda (High Sida)*	0.1	3	no	N
Grass & grasslike (GG)	*Sporobolus creber (Slender Rat's Tail Grass)*	0.1	10	no	N
Grass & grasslike (GG)	*Dichanthium sericeum (Queensland Bluegrass)*	0.1	1	no	N
Forb (FG)	*Lespedeza spp.*	0.1	2	no	N
Grass & grasslike (GG)	*Oplismenus aemulus*	1	10	no	N
Other (OG)	*Glycine clandestina (Twining glycine)*	0.3	5	no	N
Forb (FG)	*Desmodium rhytidophyllum*	0.5	15	no	N
Grass & grasslike (GG)	*Cyperus gracilis (Slender Flat-sedge)*	0.1	2	no	N
	Conyza spp. (A Fleabane)	0.1	10	no	E
Forb (FG)	*Plectranthus spp.*	0.1	5	no	N
Forb (FG)	*Calotis lappulacea (Yellow Burr-daisy)*	0.1	4	no	N
	Gomphocarpus physocarpus (Balloon Cotton Bush)	0.1	2	no	E
Tree (TG)	*Alphitonia excelsa (Red Ash)*	0.2	3	no	N
Grass & grasslike (GG)	*Panicum simile (Two-colour Panic)*	0.5	20	no	N
Fern (EG)	*Cheilanthes sieberi subsp. sieberi (Rock Fern)*	0.1	2	no	N
Forb (FG)	*Sigesbeckia australiensis*	0.1	10	no	N
Grass & grasslike (GG)	*Lomandra filiformis (Wattle Matt-rush)*	0.1	2	no	N
	Bidens pilosa (Cobbler's Pegs)	0.1	1	no	HTE
Forb (FG)	*Rostellularia adscendens (Pink Tongues)*	0.1	1	no	N
Other (OG)	*Desmodium varians (Slender Tick-trefoil)*	0.1	2	no	N
Shrub (SG)	*Myoporum boninense subsp. australe*	1	2	no	N
Grass & grasslike (GG)	*Fimbristylis spp.*	0.1	1	no	N
Forb (FG)	*Verbena spp.*	0.1	1	no	N
Grass & grasslike (GG)	*Cyperus spp.*	0.1	2	no	N
Shrub (SG)	*Eremophila debilis (Amulla)*	0.1	1	no	N

Project name:	J210465				
Recorders:	BS,SG	Plot ID:	EAR49	Date:	25/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Forb (FG)	*Veronica spp.*	0.1	1	no	N

BAM Site – Field Survey Form

Plot ID:	EAR50	**Date:**	25/06/22	**Project number:**	J210465		**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	430,321	**Recorders:**	RD, GS			
Zone:	56	**Northing:**	6,600,088	**IBRA region:**			**Midline bearing:**	170
Plant Community Type:		1549: Tallowwood - Spotted Gum - Grey Gum grassy tall open forest of the lower North Coast		**Condition class:**	DNGModerate		**PCT confidence:**	high
Vegetation Class:		Northern Hinterland Wet Sclerophyll Forests		**EEC:**	no		**EEC confidence:**	high

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:	0
	Shrubs:	0
	Grasses etc.:	6
	Forbs:	4
	Ferns:	1
	Other:	1
Sum of Cover of native vascular plants by growth form group	Trees:	0
	Shrubs:	0
	Grasses etc.:	71.1
	Forbs:	0.4
	Ferns:	3
	Other:	0.1
High Threat Weed cover:		0.5

BAM Attribute (1000 m2 plot) DBH			
DBH	**Tree stem count**	**Length of logs (m) (≥10 cm diameter, >50 cm in length)**	12
80 + cm:	0		
50 – 79 cm:	0		
30 – 49 cm:	0		
20 – 29 cm:	0	**Tree hollow count**	0
10 – 19 cm:	0		
5 – 9 cm:	0		
< 5 cm:	0		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	**1**	**2**	**3**	**4**	**5**
Subplot score (%):	35	25	20	15	30
Average litter cover (%):	25				

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 and site features

Cleared paddock. Clay loam soil. Steeply sloping to the east. Well drained. On a ridge heading to the east.

Plot Disturbance

Cleared farmland. Grazing land.

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, ...

Project name:	J210465				
Recorders:	RD, GS	**Plot ID:**	EAR50	**Date:**	25/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Grass & grasslike (GG)	*Cymbopogon refractus (Barbed Wire Grass)*	35	800	no	N
Grass & grasslike (GG)	*Capillipedium parviflorum (Scented-top Grass)*	20	750	no	N
	Sporobolus africanus (Parramatta Grass)	15	500	no	E
Grass & grasslike (GG)	*Dichanthium sericeum (Queensland Bluegrass)*	3	100		N
Grass & grasslike (GG)	*Heteropogon contortus (Bunch Speargrass)*	8	400	yes	N
Grass & grasslike (GG)	*Panicum simile (Two-colour Panic)*	5	250	yes	N
Forb (FG)	*Euchiton sphaericus (Star Cudweed)*	0.1	20	yes	N
	Stellaria media (Common Chickweed)	0.1	30	no	E
	Senecio madagascariensis (Fireweed)	0.5	20	no	HTE
Forb (FG)	*Centella asiatica (Indian Pennywort)*	0.1	30	no	N
Forb (FG)	*Cotula australis (Common Cotula)*	0.1	20	no	N
	Chamaesyce hirta (Asthma Plant)	0.1	15	yes	E
	Trifolium spp. (A Clover)	0.1	50	no	E
Other (OG)	*Glycine clandestina (Twining glycine)*	0.1	30	no	N
Fern (EG)	*Pteridium esculentum (Bracken)*	3	40	no	N
	Digitaria ischaemum	0.1	30	yes	E
Forb (FG)	*Verbena spp.*	0.1	20	no	N
Grass & grasslike (GG)	*Fimbristylis dichotoma (Common Fringe-sedge)*	0.1	30	yes	N

BAM Site – Field Survey Form

Plot ID:	EAR51	**Date:**	25/06/22	**Project number:**	J210465		**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	430,336	**Recorders:**	BS, SG			
Zone:	56	**Northing:**	6,599,959	**IBRA region:**			**Midline bearing:**	70
Plant Community Type:		1549: Tallowwood - Spotted Gum - Grey Gum grassy tall open forest of the lower North Coast		**Condition class:**	DNGModerate		**PCT confidence:**	
Vegetation Class:		Northern Hinterland Wet Sclerophyll Forests		**EEC:**			**EEC confidence:**	

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:	0
	Grasses etc.:	13
	Forbs:	6
	Ferns:	1
	Other:	2
Sum of Cover of native vascular plants by growth form group	Trees:	0.1
	Shrubs:	0
	Grasses etc.:	61.4
	Forbs:	0.6
	Ferns:	10
	Other:	2.1
High Threat Weed cover:		0.6

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	2
80 + cm:	0		
50 – 79 cm:	0		
30 – 49 cm:	0		
20 – 29 cm:	0	Tree hollow count	0
10 – 19 cm:	0		
5 – 9 cm:	0		
< 5 cm:	3		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	10	20	40	30	20
Average litter cover (%):	24				

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 and site features

Plot Disturbance

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, ...

Project name:	J210465				
Recorders:	BS, SG	**Plot ID:**	EAR51	**Date:**	25/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Grass & grasslike (GG)	*Capillipedium parviflorum (Scented-top Grass)*	10	500	no	N
	Sporobolus africanus (Parramatta Grass)	5	200	no	E
Grass & grasslike (GG)	*Aristida jerichoensis (Jericho Wiregrass)*	5	200	no	N
Grass & grasslike (GG)	*Cymbopogon refractus (Barbed Wire Grass)*	5	150	no	N
Other (OG)	*Desmodium varians (Slender Tick-trefoil)*	2	50	no	N
Forb (FG)	*Lespedeza juncea subsp. sericea*	0.1	3	no	N
	Senecio madagascariensis (Fireweed)	0.2	60	no	HTE
	Verbena caracasana (Shore Verbain)	0.1	7	no	E
Grass & grasslike (GG)	*Dichanthium sericeum (Queensland Bluegrass)*	10	300	no	N
Grass & grasslike (GG)	*Panicum simile (Two-colour Panic)*	10	300	no	N
Fern (EG)	*Pteridium esculentum (Bracken)*	10	40	no	N
	Gomphocarpus physocarpus (Balloon Cotton Bush)	0.1	2	no	E
Tree (TG)	*Eucalyptus spp.*	0.1	2	no	N
	Paspalum notatum (Bahia Grass)	40	1000	no	E
	Lantana camara (Lantana)	0.3	3	no	HTE
Grass & grasslike (GG)	*Imperata cylindrica (Blady Grass)*	0.1	1	no	N
	Conyza spp. (A Fleabane)	0.1	30	no	E
Grass & grasslike (GG)	*Fimbristylis spp.*	0.1	5	no	N
Grass & grasslike (GG)	*Heteropogon contortus (Bunch Speargrass)*	5	100	no	N
	Chamaesyce hirta (Asthma Plant)	0.1	10	no	E
Grass & grasslike (GG)	*Lomandra filiformis (Wattle Matt-rush)*	0.1	2	no	N
	Hypochaeris radicata (Catsear)	0.1	20	no	E
Grass & grasslike (GG)	*Bothriochloa biloba (Lobed Bluegrass)*	10	300	no	N
Grass & grasslike (GG)	*Eragrostis brownii (Brown's Lovegrass)*	1	50	no	N
	Sida spinosa	0.1	2	no	E
Forb (FG)	*Euchiton sphaericus (Star Cudweed)*	0.1	1	no	N
Grass & grasslike (GG)	*Panicum effusum (Hairy Panic)*	0.1	1	no	N
	Melinis repens (Red Natal Grass)	0.5	10	no	E
Forb (FG)	*Geranium solanderi (Native Geranium)*	0.1	1	no	N
Forb (FG)	*Lobelia purpurascens (whiteroot)*	0.1	3	no	N
Forb (FG)	*Dichondra repens (Kidney Weed)*	0.1	3	no	N
	Digitaria ischaemum	10	200	no	E
	Bidens pilosa (Cobbler's Pegs)	0.1	1	no	HTE
Forb (FG)	*Oxalis perennans*	0.1	1	no	N
	Setaria parviflora	0.5	50	no	E
Grass & grasslike (GG)	*Bothriochloa bladhii subsp. bladhii (Forest Bluegrass)*	5	200	no	N
Other (OG)	*Glycine clandestina (Twining glycine)*	0.1	2	no	N
	Richardia stellaris	0.1	10	no	E

BAM Site – Field Survey Form

Plot ID:	EAR52	**Date:**	25/06/22	**Project number:**	J210465	**Plot dimensions:**	20 x 50
Datum:	GDA94	**Easting:**	432,498	**Recorders:**	GS RD		
Zone:	56	**Northing:**	6,597,349	**IBRA region:**		**Midline bearing:**	187
Plant Community Type:		1106: River Oak riparian woodland of the NSW North Coast Bioregion and northern Sydney Basin Bioregion		**Condition class:**	ModerateRF	**PCT confidence:**	medium
Vegetation Class:		Eastern Riverine Forests		**EEC:**	yes	**EEC confidence:**	medium

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:	4
	Shrubs:	0
	Grasses etc.:	6
	Forbs:	0
	Ferns:	1
	Other:	2
Sum of Cover of native vascular plants by growth form group	Trees:	96
	Shrubs:	0
	Grasses etc.:	19
	Forbs:	0
	Ferns:	0.1
	Other:	9
High Threat Weed cover:		66.6

BAM Attribute (1000 m2 plot) DBH			
DBH	**Tree stem count**	**Length of logs (m) (≥10 cm diameter, >50 cm in length)**	0
80 + cm:	0		
50 – 79 cm:	2		
30 – 49 cm:	1		
20 – 29 cm:	1	**Tree hollow count**	1
10 – 19 cm:	1		
5 – 9 cm:	1		
< 5 cm:	1		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	**1**	**2**	**3**	**4**	**5**
Subplot score (%):	0	0	0	0	0
Average litter cover (%):	0				

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 and site features

Steep slope river escarpment. Very high gradient. Shallow gravel loam.

Plot Disturbance

Road adjacent, low to moderate weeds.

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, ...

Project name:	J210465				
Recorders:	GS RD	**Plot ID:**	EAR52	**Date:**	25/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	*Angophora subvelutina (Broad-leaved Apple)*	25	14	no	N
	Lantana camara (Lantana)	38	100	no	HTE
Tree (TG)	*Corymbia intermedia (Pink Bloodwood)*	18	5	no	N
Tree (TG)	*Ficus rubiginosa (Port Jackson Fig)*	45	16	no	N
Tree (TG)	*Mallotus philippensis (Red Kamala)*	8	7	no	N
	Senecio madagascariensis (Fireweed)	0.5	30	no	HTE
Other (OG)	*Kennedia rubicunda (Dusky Coral Pea)*	4	60	no	N
	Solanum seaforthianum (Climbing Nightshade)	8	40	no	HTE
	Macfadyena unguis-cati	20	80	no	HTE
	Solanum mauritianum (Wild Tobacco Bush)	0.5	3	no	E
Fern (EG)	*Cheilanthes distans (Bristly Cloak Fern)*	0.1	30	no	N
	Melinis repens (Red Natal Grass)	6	150	no	E
	Passiflora subpeltata (White Passionflower)	0.5	3	no	E
Grass & grasslike (GG)	*Oplismenus aemulus*	8	400	no	N
	Bidens pilosa (Cobbler's Pegs)	0.1	8	no	HTE
	Conyza bonariensis (Flaxleaf Fleabane)	0.1	10	no	E
Other (OG)	*Geitonoplesium cymosum (Scrambling Lily)*	5	70	no	N
	Macroptilium atropurpureum (Siratro)	2	30	no	E
	Solanum nigrum (Black-berry Nightshade)	0.1	5	no	E
Grass & grasslike (GG)	*Entolasia stricta (Wiry Panic)*	3	90	no	N
Grass & grasslike (GG)	*Capillipedium parviflorum (Scented-top Grass)*	1	40	no	N
	Sporobolus africanus (Parramatta Grass)	4	100	no	E
Grass & grasslike (GG)	*Themeda triandra*	3	80	no	N
Grass & grasslike (GG)	*Panicum queenslandicum (Yadbila Grass)*	3	80	no	N
Grass & grasslike (GG)	*Lomandra longifolia (Spiny-headed Mat-rush)*	1	20	no	N

BAM Site – Field Survey Form

Plot ID:	EAR53	**Date:**	25/06/22	**Project number:**	J210465			**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	430,145	**Recorders:**	BS, SG				
Zone:	56	**Northing:**	6,599,667	**IBRA region:**				**Midline bearing:**	180
Plant Community Type:			1106: River Oak riparian woodland of the NSW North Coast Bioregion and northern Sydney Basin Bioregion			**Condition class:**	ModerateRF	**PCT confidence:**	
Vegetation Class:			Eastern Riverine Forests			**EEC:**		**EEC confidence:**	

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:	9
	Shrubs:	2
	Grasses etc.:	6
	Forbs:	7
	Ferns:	0
	Other:	2
Sum of Cover of native vascular plants by growth form group	Trees:	63
	Shrubs:	0.6
	Grasses etc.:	67.1
	Forbs:	2.8
	Ferns:	0
	Other:	2
High Threat Weed cover:		32.1

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	20
80 + cm:	0		
50 – 79 cm:	4		
30 – 49 cm:	2		
20 – 29 cm:	2	Tree hollow count	0
10 – 19 cm:	0		
5 – 9 cm:	0		
< 5 cm:	0		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	0	0	0	0	0
Average litter cover (%):	0				

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 and site features

Plot Disturbance

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, ...

Project name:	J210465				
Recorders:	BS, SG	**Plot ID:**	EAR53	**Date:**	25/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	*Eucalyptus tereticornis (Forest Red Gum)*	7	2	no	N
Tree (TG)	*Casuarina cunninghamiana subsp. cunninghamiana (River Oak)*	1	1	no	N
Tree (TG)	*Mallotus philippensis (Red Kamala)*	20	7	no	N
Tree (TG)	*Eucalyptus microcorys (Tallowwood)*	10	1	no	N
Tree (TG)	*Eucalyptus carnea (Thick-leaved Mahogany)*	5	2	no	N
Tree (TG)	*Corymbia intermedia (Pink Bloodwood)*	4	1	no	N
	Lantana camara (Lantana)	20	30	no	HTE
	Verbena caracasana (Shore Verbain)	1	20	no	E
	Solanum mauritianum (Wild Tobacco Bush)	2	4	no	E
	Lactuca spp.	0.1	1	no	E
	Senecio madagascariensis (Fireweed)	0.1	5	no	HTE
Grass & grasslike (GG)	*Paspalum distichum (Water Couch)*	2	20	no	N
	Urochloa panicoides (Urochloa Grass)	0.5	3	no	E
	Melinis repens (Red Natal Grass)	0.5	10	no	E
	Cyclospermum leptophyllum (Slender Celery)	0.1	2	no	E
Other (OG)	*Eustrephus latifolius (Wombat Berry)*	1	20	no	N
	Macfadyena unguis-cati	10	100	no	HTE
Forb (FG)	*Crinum spp.*	1	1		N
Forb (FG)	*Rumex brownii (Swamp Dock)*	0.5	10	no	N
	Araujia sericifera (Moth Vine)	2	5	no	HTE
Tree (TG)	*Waterhousea floribunda (Weeping Lilly Pilly)*	15	5	no	N
Forb (FG)	*Vernonia cinerea*	0.5	20	no	N
	Passiflora subpeltata (White Passionflower)	2	5	no	E
Grass & grasslike (GG)	*Cynodon dactylon (Common Couch)*	5	30	no	N
Grass & grasslike (GG)	*Carex spp.*	10	400	no	N
Grass & grasslike (GG)	*Oplismenus aemulus*	40	50	no	N
Forb (FG)	*Cardamine spp.*	0.5	50	no	N
Forb (FG)	*Oxalis perennans*	0.1	1	no	N
Forb (FG)	*Einadia nutans (Climbing Saltbush)*	0.1	1	no	N
	Sporobolus africanus (Parramatta Grass)	0.1	1	no	E
	Tagetes minuta (Stinking Roger)	0.1	10	no	E
Grass & grasslike (GG)	*Bothriochloa bladhii subsp. bladhii (Forest Bluegrass)*	0.1	1	no	N
	Digitaria ischaemum	1	20	no	E
	Eleusine spp.	0.1	3	no	E
Shrub (SG)	*Rubus parvifolius (Native Raspberry)*	0.1	1	no	N
	Malvastrum americanum (Spiked Malvastrum)	0.1	1	no	E
Tree (TG)	*Melia azedarach (White Cedar)*	0.5	1	no	N
Forb (FG)	*Desmodium rhytidophyllum*	0.1	1	no	N
	Conyza spp. (A Fleabane)	0.1	1	no	E
Tree (TG)	*Alphitonia excelsa (Red Ash)*	0.5	1	no	N
Grass & grasslike (GG)	*Microlaena stipoides (Weeping Grass)*	10	100	no	N
Other (OG)	*Legnephora moorei (Round-leaf Vine)*	1	1	no	N
Shrub (SG)	*Alchornea ilicifolia (Native Holly)*	0.5	2	no	N

Project name:	J210465				
Recorders:	BS, SG	Plot ID:	EAR53	Date:	25/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE

BAM Site – Field Survey Form

Plot ID:	EAR54	**Date:**	25/06/22	**Project number:**	J210465	**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	432,470	**Recorders:**	RD, GS		
Zone:	56	**Northing:**	6,597,085	**IBRA region:**		**Midline bearing:**	182
Plant Community Type:		1106: River Oak riparian woodland of the NSW North Coast Bioregion and northern Sydney Basin Bioregion		**Condition class:**	PoorFP	**PCT confidence:**	high
Vegetation Class:		Eastern Riverine Forests		**EEC:**	yes	**EEC confidence:**	low

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:	2
	Shrubs:	0
	Grasses etc.:	4
	Forbs:	7
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	40
	Shrubs:	0
	Grasses etc.:	21.6
	Forbs:	4.3
	Ferns:	0
	Other:	0
High Threat Weed cover:		5.5

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	46
80 + cm:			
50 – 79 cm:	1		
30 – 49 cm:	1		
20 – 29 cm:		Tree hollow count	
10 – 19 cm:	1		
5 – 9 cm:			
< 5 cm:			

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	55	60	20	50	35
Average litter cover (%):	44				

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 and site features

Clay loam soils, next to Macleay River, gently sloping to the west,

Plot Disturbance

Trampled by cattle, weedy, frequently inundated by floods.

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, ...

Project name:	J210465				
Recorders:	RD, GS	**Plot ID:**	EAR54	**Date:**	25/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	*Casuarina cunninghamiana subsp. cunninghamiana (River Oak)*	10	2	no	N
Tree (TG)	*Callistemon viminalis (Weeping Bottlebrush)*	30	20	yes	N
	Sida rhombifolia (Paddy's Lucerne)	20	100	no	E
	Paspalum notatum (Bahia Grass)	40	4000	no	E
	Raphanus spp.	1	50	yes	E
Forb (FG)	*Rumex brownii (Swamp Dock)*	1	50	yes	N
	Cardamine hirsuta (Common Bittercress)	20	3000	yes	E
Forb (FG)	*Persicaria hydropiper (Water Pepper)*	1	30	yes	N
Grass & grasslike (GG)	*Schoenoplectus mucronatus*	1	20	yes	N
	Dolichandra unguis-cati	5	100	no	HTE
Forb (FG)	*Euphorbia spp.*	0.5	25	yes	N
	Conium maculatum (Hemlock)	0.1	20	yes	E
Forb (FG)	*Cotula australis (Common Cotula)*	0.1	20	no	N
Forb (FG)	*Hydrocotyle tripartita (Pennywort)*	0.2	50	yes	N
Forb (FG)	*Commelina cyanea (Native Wandering Jew)*	1	100	no	N
	Stellaria media (Common Chickweed)	0.5	100	no	E
Grass & grasslike (GG)	*Oplismenus aemulus*	0.5	100	yes	N
Forb (FG)	*Sida hackettiana (Golden Rod, Spiked Sida, Queensland Hemp)*	0.5	20	no	N
Grass & grasslike (GG)	*Cynodon dactylon (Common Couch)*	20	1000	no	N
	Tradescantia fluminensis (Wandering Jew)	0.2	100	no	HTE
Grass & grasslike (GG)	*Capillipedium parviflorum (Scented-top Grass)*	0.1	15	no	N
	Anredera cordifolia (Madeira Vine)	0.1	20	yes	HTE
	Sporobolus africanus (Parramatta Grass)	0.1	20	no	E
	Euphorbia peplus (Petty Spurge)	0.1	5	no	E
	Lantana camara (Lantana)	0.2	1	no	HTE

BAM Site – Field Survey Form

Plot ID:	EAR55	**Date:**	25/06/22	**Project number:**	J210465		**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	430,025	**Recorders:**	BS, SG			
Zone:	56	**Northing:**	6,599,562	**IBRA region:**			**Midline bearing:**	110
Plant Community Type:		1106: River Oak riparian woodland of the NSW North Coast Bioregion and northern Sydney Basin Bioregion		**Condition class:**	ModerateFP		**PCT confidence:**	
Vegetation Class:		Eastern Riverine Forests		**EEC:**			**EEC confidence:**	

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:	4
	Shrubs:	0
	Grasses etc.:	8
	Forbs:	9
	Ferns:	1
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	17.2
	Shrubs:	0
	Grasses etc.:	92.8
	Forbs:	0.9
	Ferns:	1
	Other:	0
High Threat Weed cover:		0.9

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	2
80 + cm:	0		
50 – 79 cm:	1		
30 – 49 cm:	0		
20 – 29 cm:	0	Tree hollow count	0
10 – 19 cm:	0		
5 – 9 cm:	0		
< 5 cm:	0		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	5	40	10	15	15
Average litter cover (%):	17				

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 and site features

Plot Disturbance

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, ...

Project name:	J210465				
Recorders:	BS, SG	**Plot ID:**	EAR55	**Date:**	25/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
	Paspalum notatum (Bahia Grass)	7	200	no	E
Tree (TG)	*Casuarina cunninghamiana subsp. cunninghamiana (River Oak)*	7	1	no	N
Tree (TG)	*Callistemon viminalis (Weeping Bottlebrush)*	10	5	no	N
	Lantana camara (Lantana)	0.3	2	no	HTE
Grass & grasslike (GG)	*Cynodon dactylon (Common Couch)*	92	1000	no	N
Forb (FG)	*Verbena spp.*	0.1	5	no	N
	Chamaesyce hirta (Asthma Plant)	0.1	1	no	E
Grass & grasslike (GG)	*Oplismenus aemulus*	0.1	2	no	N
Forb (FG)	*Oxalis perennans*	0.1	1	no	N
	Sida rhombifolia (Paddy's Lucerne)	0.1	2	no	E
Forb (FG)	*Hydrocotyle tripartita (Pennywort)*	0.1	10	no	N
Grass & grasslike (GG)	*Paspalum distichum (Water Couch)*	0.1	1	no	N
	Urochloa panicoides (Urochloa Grass)	0.2	5	no	E
	Stellaria media (Common Chickweed)	0.1	30	no	E
Forb (FG)	*Geranium solanderi (Native Geranium)*	0.1	1	no	N
	Cyperus brevifolius	0.1	10	no	E
	Macfadyena unguis-cati	0.5	2	no	HTE
Fern (EG)	*Adiantum spp.*	1	30	no	N
	Ambrosia spp.	0.1	2	no	E
Grass & grasslike (GG)	*Aristida jerichoensis (Jericho Wiregrass)*	0.1	2	no	N
	Gomphrena celosioides (Gomphrena Weed)	0.1	1	no	E
Grass & grasslike (GG)	*Cyperus gracilis (Slender Flat-sedge)*	0.1	50	no	N
Forb (FG)	*Solanum spp.*	0.1	1	no	N
	Eleusine spp.	0.5	10	no	E
	Sporobolus africanus (Parramatta Grass)	0.1	2	no	E
	Euphorbia peplus (Petty Spurge)	0.1	1	no	E
Forb (FG)	*Cardamine spp.*	0.1	10	no	N
Forb (FG)	*Daucus glochidiatus (Native Carrot)*	0.1	5	no	N
	Bidens pilosa (Cobbler's Pegs)	0.1	1	no	HTE
Grass & grasslike (GG)	*Sporobolus creber (Slender Rat's Tail Grass)*	0.1	1	no	N
Forb (FG)	*Persicaria hydropiper (Water Pepper)*	0.1	5	no	N
Forb (FG)	*Sonchus spp. (Sowthistle)*	0.1	1	no	N
Tree (TG)	*Mallotus philippensis (Red Kamala)*	0.1	1	no	N
Tree (TG)	*Grevillea robusta (Silky Oak)*	0.1	1	no	N
	Melinis repens (Red Natal Grass)	0.1	2	no	E
Grass & grasslike (GG)	*Bothriochloa bladhii subsp. bladhii (Forest Bluegrass)*	0.2	5	no	N
Grass & grasslike (GG)	*Chloris truncata (Windmill Grass)*	0.1	2	no	N

BAM Site – Field Survey Form

Plot ID:	NTL01	**Date:**	23/06/22	**Project number:**	J210465	**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	422,443	**Recorders:**	BS,SG		
Zone:	56	**Northing:**	6,598,308	**IBRA region:**		**Midline bearing:**	95
Plant Community Type:		762: Cabbage Gum open forest or woodland on flats of the North Coast		**Condition class:**	EG	**PCT confidence:**	
Vegetation Class:		Coastal Valley Grassy Woodlands		**EEC:**		**EEC confidence:**	

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:	0
	Shrubs:	0
	Grasses etc.:	5
	Forbs:	1
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	0
	Shrubs:	0
	Grasses etc.:	0.5
	Forbs:	0.1
	Ferns:	0
	Other:	0
High Threat Weed cover:		0.1

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	0
80 + cm:	0		
50 – 79 cm:	0		
30 – 49 cm:	0		
20 – 29 cm:	0	Tree hollow count	0
10 – 19 cm:	0		
5 – 9 cm:	0		
< 5 cm:	0		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	15	10	5	10	5
Average litter cover (%):	9				

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 and site features

Plot Disturbance

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, ...

Project name:	J210465				
Recorders:	BS,SG	**Plot ID:**	NTL01	**Date:**	23/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
	Paspalum notatum (Bahia Grass)	99	1000	no	E
	Senecio madagascariensis (Fireweed)	0.1	2	no	HTE
	Gomphocarpus physocarpus (Balloon Cotton Bush)	0.1	2	no	E
Forb (FG)	*Verbena spp.*	0.1	1	no	N
Grass & grasslike (GG)	*Sporobolus creber (Slender Rat's Tail Grass)*	0.1	5	no	N
Grass & grasslike (GG)	*Aristida ramosa (Purple Wiregrass)*	0.1	2	no	N
Grass & grasslike (GG)	*Heteropogon contortus (Bunch Speargrass)*	0.1	4	no	N
Grass & grasslike (GG)	*Eragrostis leptostachya (Paddock Lovegrass)*	0.1	1	no	N
Grass & grasslike (GG)	*Fimbristylis dichotoma (Common Fringe-sedge)*	0.1	2	no	N

BAM Site – Field Survey Form

Plot ID:	NTL02	**Date:**	23/06/22	**Project number:**	J210465	**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	422,398	**Recorders:**	BS,SG		
Zone:	56	**Northing:**	6,598,329	**IBRA region:**		**Midline bearing:**	155
Plant Community Type:		762: Cabbage Gum open forest or woodland on flats of the North Coast		**Condition class:**	Poor	**PCT confidence:**	
Vegetation Class:		Coastal Valley Grassy Woodlands		**EEC:**		**EEC confidence:**	

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:	2
	Shrubs:	1
	Grasses etc.:	7
	Forbs:	2
	Ferns:	1
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	15.5
	Shrubs:	1
	Grasses etc.:	8.7
	Forbs:	0.2
	Ferns:	0.1
	Other:	0
High Threat Weed cover:		0.3

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	6
80 + cm:	1		
50 – 79 cm:	0		
30 – 49 cm:	5		
20 – 29 cm:	1	Tree hollow count	1
10 – 19 cm:	1		
5 – 9 cm:	0		
< 5 cm:	5		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	25	40	15	40	60
Average litter cover (%):	36				

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 and site features

Plot Disturbance

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, ...

Project name:	J210465				
Recorders:	BS,SG	**Plot ID:**	NTL02	**Date:**	23/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	*Eucalyptus tereticornis (Forest Red Gum)*	15	1	no	N
	Gomphocarpus physocarpus (Balloon Cotton Bush)	0.1	7	no	E
	Senecio madagascariensis (Fireweed)	0.3	10	no	HTE
	Sporobolus africanus (Parramatta Grass)	1	30	no	E
Grass & grasslike (GG)	*Aristida ramosa (Purple Wiregrass)*	3	50	no	N
Shrub (SG)	*Rubus spp.*	1	5		N
Forb (FG)	*Verbena spp.*	0.1	4	no	N
Grass & grasslike (GG)	*Eragrostis leptostachya (Paddock Lovegrass)*	1	30	no	N
Grass & grasslike (GG)	*Panicum effusum (Hairy Panic)*	2	30	no	N
Grass & grasslike (GG)	*Heteropogon contortus (Bunch Speargrass)*	0.5	6	no	N
Grass & grasslike (GG)	*Cymbopogon refractus (Barbed Wire Grass)*	0.1	2	no	N
Forb (FG)	*Oxalis perennans*	0.1	3	no	N
Fern (EG)	*Cheilanthes sieberi (Rock Fern)*	0.1	2	no	N
	Verbascum spp.	0.1	2	no	E
Tree (TG)	*Eucalyptus eugenioides (Thin-leaved Stringybark)*	0.5	2	no	N
	Drymaria cordata subsp. cordata	0.1	1	no	E
	Paspalum notatum (Bahia Grass)	85	1000	no	E
Grass & grasslike (GG)	*Dichanthium sericeum (Queensland Bluegrass)*	2	30	no	N
Grass & grasslike (GG)	*Sporobolus creber (Slender Rat's Tail Grass)*	0.1	10	no	N

BAM Site – Field Survey Form

Plot ID:	NTL03	**Date:**	23/06/22	**Project number:**	J210465	**Plot dimensions:**	20 x 50
Datum:	GDA94	**Easting:**	424,302	**Recorders:**	GS RD		
Zone:	56	**Northing:**	6,598,325	**IBRA region:**		**Midline bearing:**	93
Plant Community Type:		868: Grey gum - stringybark open forest of the gorges of the NSW North Coast Bioregion and New England Tableland Bioregion		**Condition class:**	High	**PCT confidence:**	medium
Vegetation Class:		Northern Gorge Dry Sclerophyll Forests		**EEC:**	no	**EEC confidence:**	low

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:	3
	Shrubs:	5
	Grasses etc.:	5
	Forbs:	8
	Ferns:	0
	Other:	6
Sum of Cover of native vascular plants by growth form group	Trees:	58
	Shrubs:	7.6
	Grasses etc.:	11
	Forbs:	3.1
	Ferns:	0
	Other:	37
High Threat Weed cover:		0.1

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	36
80 + cm:	0		
50 – 79 cm:	8		
30 – 49 cm:	1		
20 – 29 cm:	1	Tree hollow count	5
10 – 19 cm:	0		
5 – 9 cm:	1		
< 5 cm:	1		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	80	90	40	60	40
Average litter cover (%):	62				

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 and site features

High narrow ridge line/steep hill slopes

Plot Disturbance

High intensity fire in recent years, regeneration still occuring. Low impact, disused track traversing ridge line.

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, ...

Project name:	J210465				
Recorders:	GS RD	**Plot ID:**	NTL03	**Date:**	23/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Other (OG)	*Hardenbergia violacea (False Sarsaparilla)*	30	1200	no	N
Shrub (SG)	*Indigofera australis (Australian Indigo)*	1	30	no	N
Tree (TG)	*Eucalyptus biturbinata (Grey Gum)*	35	30	no	N
Tree (TG)	*Eucalyptus carnea (Thick-leaved Mahogany)*	20	15	no	N
	Digitaria ischaemum	35	3000	no	E
Tree (TG)	*Allocasuarina torulosa (Forest Oak)*	3	14	no	N
Forb (FG)	*Dichondra repens (Kidney Weed)*	0.1	200	no	N
Forb (FG)	*Sigesbeckia orientalis subsp. orientalis (Indian Weed)*	0.1	2	no	N
	Bidens pilosa (Cobbler's Pegs)	0.1	3	no	HTE
Forb (FG)	*Centella asiatica (Indian Pennywort)*	0.5	130	no	N
Other (OG)	*Desmodium varians (Slender Tick-trefoil)*	3	400	no	N
Grass & grasslike (GG)	*Panicum queenslandicum (Yadbila Grass)*	4	600	no	N
Forb (FG)	*Rostellularia adscendens (Pink Tongues)*	0.1	5	no	N
Shrub (SG)	*Acacia falcata*	3	45	no	N
Forb (FG)	*Verbena spp.*	0.1	12	no	N
Grass & grasslike (GG)	*Imperata cylindrica (Blady Grass)*	1	80	no	N
Shrub (SG)	*Ozothamnus diosmifolius (White Dogwood)*	0.5	20	no	N
Grass & grasslike (GG)	*Oplismenus aemulus*	2	200	no	N
Grass & grasslike (GG)	*Lomandra filiformis (Wattle Matt-rush)*	2	40	no	N
Shrub (SG)	*Cassinia compacta*	3	25	no	N
Other (OG)	*Billardiera scandens (Hairy Apple Berry)*	0.5	60	no	N
Other (OG)	*Clematis aristata (Old Man's Beard)*	0.5	25	no	N
Forb (FG)	*Viola hederacea (Ivy-leaved Violet)*	0.1	50	no	N
Forb (FG)	*Geranium solanderi (Native Geranium)*	0.1	16	no	N
Other (OG)	*Geitonoplesium cymosum (Scrambling Lily)*	2	40	no	N
Forb (FG)	*Dianella caerulea (Blue Flax-lily)*	2	80	no	N
Other (OG)	*Pandorea pandorana (Wonga Wonga Vine)*	1	45	no	N
Shrub (SG)	*Breynia oblongifolia (Coffee Bush)*	0.1	2	no	N
Grass & grasslike (GG)	*Entolasia stricta (Wiry Panic)*	2	40	no	N

BAM Site – Field Survey Form

Plot ID:	NTL04	**Date:**	23/06/22	**Project number:**	J210465	**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	424,118	**Recorders:**	RD,GS		
Zone:	56	**Northing:**	6,598,390	**IBRA region:**		**Midline bearing:**	122
Plant Community Type:		868: Grey gum - stringybark open forest of the gorges of the NSW North Coast Bioregion and New England Tableland Bioregion		**Condition class:**	High	**PCT confidence:**	high
Vegetation Class:		Northern Gorge Dry Sclerophyll Forests		**EEC:**	no	**EEC confidence:**	high

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:	3
	Shrubs:	5
	Grasses etc.:	6
	Forbs:	6
	Ferns:	0
	Other:	5
Sum of Cover of native vascular plants by growth form group	Trees:	40.1
	Shrubs:	31
	Grasses etc.:	47.1
	Forbs:	5.6
	Ferns:	0
	Other:	20.3
High Threat Weed cover:		0.1

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	45
80 + cm:	0		
50 – 79 cm:	4		
30 – 49 cm:	1		
20 – 29 cm:	1	Tree hollow count	4
10 – 19 cm:	1		
5 – 9 cm:	1		
< 5 cm:	1		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	30	60	65	70	70
Average litter cover (%):	59				

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 and site features

On a Ridge top, sloping to the SE. Loamy soil. Well drained.

Plot Disturbance

Access track through middle of plot. No other disturbance except a recent fire. Lots of regrowth. Minimal weediness.

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, ...

Project name:	J210465				
Recorders:	RD,GS	**Plot ID:**	NTL04	**Date:**	23/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	*Eucalyptus carnea (Thick-leaved Mahogany)*	20	20	yes	N
Tree (TG)	*Eucalyptus biturbinata (Grey Gum)*	20	20	yes	N
Shrub (SG)	*Acacia filicifolia (Fern-leaved Wattle)*	30	120	yes	N
Other (OG)	*Hardenbergia violacea (False Sarsaparilla)*	15	200	no	N
Forb (FG)	*Verbena spp.*	0.1	20	yes	N
Grass & grasslike (GG)	*Imperata cylindrica (Blady Grass)*	35	1000	no	N
Forb (FG)	*Geranium solanderi (Native Geranium)*	0.1	30	no	N
Forb (FG)	*Centella asiatica (Indian Pennywort)*	0.1	30	no	N
Forb (FG)	*Dianella caerulea (Blue Flax-lily)*	5	200	no	N
	Digitaria ischaemum	5	1000	yes	E
Grass & grasslike (GG)	*Panicum queenslandicum (Yadbila Grass)*	6	1200	yes	N
Forb (FG)	*Dichondra repens (Kidney Weed)*	0.2	50	no	N
Forb (FG)	*Veronica spp.*	0.1	10	yes	N
Grass & grasslike (GG)	*Entolasia stricta (Wiry Panic)*	5	1000	yes	N
Other (OG)	*Macrozamia montana*	5	40	yes	N
Grass & grasslike (GG)	*Oplismenus aemulus*	0.5	100	no	N
Other (OG)	*Desmodium varians (Slender Tick-trefoil)*	0.1	50	no	N
	Bidens pilosa (Cobbler's Pegs)	0.1	20	no	HTE
Other (OG)	*Billardiera scandens (Hairy Apple Berry)*	0.1	50	no	N
Shrub (SG)	*Trema tomentosa var. aspera (Native Peach)*	0.2	5	no	N
Shrub (SG)	*Ozothamnus diosmifolius (White Dogwood)*	0.5	20	no	N
Grass & grasslike (GG)	*Lomandra filiformis (Wattle Matt-rush)*	0.5	30	no	N
Tree (TG)	*Allocasuarina torulosa (Forest Oak)*	0.1	5	no	N
Shrub (SG)	*Cassinia compacta*	0.2	20	no	N
Grass & grasslike (GG)	*Schoenoplectus spp.*	0.1	10	yes	N
Shrub (SG)	*Indigofera australis (Australian Indigo)*	0.1	10	no	N
	Solanum mauritianum (Wild Tobacco Bush)	0.1	10	no	E
	Conyza spp. (A Fleabane)	0.1	10	no	E
Other (OG)	*Pandorea pandorana (Wonga Wonga Vine)*	0.1	5	no	N

BAM Site – Field Survey Form

Plot ID:	NTL05	**Date:**	23/06/22	**Project number:**	J210465	**Plot dimensions:**	20 x 50
Datum:	GDA94	**Easting:**	423,751	**Recorders:**	GS RD		
Zone:	56	**Northing:**	6,598,333	**IBRA region:**		**Midline bearing:**	203
Plant Community Type:		868: Grey gum - stringybark open forest of the gorges of the NSW North Coast Bioregion and New England Tableland Bioregion		**Condition class:**	High	**PCT confidence:**	medium
Vegetation Class:		Northern Gorge Dry Sclerophyll Forests		**EEC:**	no	**EEC confidence:**	medium

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:	5
	Shrubs:	6
	Grasses etc.:	8
	Forbs:	11
	Ferns:	0
	Other:	3
Sum of Cover of native vascular plants by growth form group	Trees:	45.1
	Shrubs:	4.6
	Grasses etc.:	36.5
	Forbs:	12.9
	Ferns:	0
	Other:	9.5
High Threat Weed cover:		0

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	79
80 + cm:	0		
50 – 79 cm:	3		
30 – 49 cm:	1		
20 – 29 cm:	1	Tree hollow count	6
10 – 19 cm:	1		
5 – 9 cm:	1		
< 5 cm:	1		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	25	90	10	15	20
Average litter cover (%):	32				

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 and site features

Narrow steep ridge line / hillslope. North-west aspect. Brown loam, shale gravel

Plot Disturbance

Recent low intensity fire, moderate to small impact. Regenerating. Ridge track adjacent, low impact.

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, ...

Project name:	J210465				
Recorders:	GS RD	**Plot ID:**	NTL05	**Date:**	23/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	*Corymbia intermedia (Pink Bloodwood)*	8	6	no	N
Forb (FG)	*Goodenia hederacea (Ivy Goodenia)*	10	2500	no	N
Forb (FG)	*Veronica spp.*	0.1	1	no	N
Grass & grasslike (GG)	*Aristida jerichoensis (Jericho Wiregrass)*	11	700	no	N
Shrub (SG)	*Cassinia compacta*	0.1	3	no	N
Other (OG)	*Hardenbergia violacea (False Sarsaparilla)*	7	30	no	N
Other (OG)	*Desmodium varians (Slender Tick-trefoil)*	2	45	no	N
Shrub (SG)	*Exocarpos strictus (Dwarf Cherry)*	0.2	8	no	N
	Digitaria ischaemum	5	300	no	E
Grass & grasslike (GG)	*Sporobolus creber (Slender Rat's Tail Grass)*	3	90	no	N
Grass & grasslike (GG)	*Lomandra filiformis (Wattle Matt-rush)*	4	60	no	N
Grass & grasslike (GG)	*Panicum queenslandicum (Yadbila Grass)*	4	120	no	N
Forb (FG)	*Lobelia purpurascens (whiteroot)*	0.5	60	no	N
Grass & grasslike (GG)	*Cymbopogon refractus (Barbed Wire Grass)*	3	110	no	N
Forb (FG)	*Vittadinia spp. (Fuzzweed)*	0.3	45	no	N
Other (OG)	*Billardiera scandens (Hairy Apple Berry)*	0.5	14	no	N
Tree (TG)	*Allocasuarina torulosa (Forest Oak)*	0.1	3	no	N
	Crassocephalum crepidioides (Thickhead)	0.1	1	no	E
Forb (FG)	*Euchiton spp. (A Cudweed)*	0.1	4	no	N
Forb (FG)	*Dianella caerulea (Blue Flax-lily)*	1	30	no	N
Shrub (SG)	*Eremophila debilis (Amulla)*	0.1	5	no	N
Shrub (SG)	*Acacia falcata*	4	11	no	N
Tree (TG)	*Eucalyptus caliginosa (Broad-leaved Stringybark)*	25	20	no	N
Grass & grasslike (GG)	*Eragrostis brownii (Brown's Lovegrass)*	3	350	no	N
Shrub (SG)	*Ozothamnus diosmifolius (White Dogwood)*	0.1	1	no	N
Grass & grasslike (GG)	*Imperata cylindrica (Blady Grass)*	6	400	no	N
Tree (TG)	*Eucalyptus moluccana (Grey Box)*	4	3	no	N
Tree (TG)	*Eucalyptus biturbinata (Grey Gum)*	8	9	no	N
Forb (FG)	*Solanum spp.*	0.1	1	no	N
Forb (FG)	*Chrysocephalum apiculatum (Common Everlasting)*	0.1	9	no	N
Grass & grasslike (GG)	*Austrostipa densiflora (Foxtail Speargrass)*	2.5	25	no	N
Shrub (SG)	*Persoonia sericea*	0.1	6	no	N
Forb (FG)	*Senecio quadridentatus (Cotton Fireweed)*	0.5	13	no	N
Forb (FG)	*Lotus australis (Australian Trefoil)*	0.1	4	no	N
Forb (FG)	*Rostellularia adscendens (Pink Tongues)*	0.1	1	no	N

BAM Site – Field Survey Form

Plot ID:	NTL06	**Date:**	23/06/22	**Project number:**	J210465	**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	423,406	**Recorders:**	RD, GS		
Zone:	56	**Northing:**	6,598,200	**IBRA region:**		**Midline bearing:**	274
Plant Community Type:		868: Grey gum - stringybark open forest of the gorges of the NSW North Coast Bioregion and New England Tableland Bioregion		**Condition class:**	High	**PCT confidence:**	high
Vegetation Class:		Northern Gorge Dry Sclerophyll Forests		**EEC:**	no	**EEC confidence:**	high

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:	5
	Shrubs:	4
	Grasses etc.:	4
	Forbs:	6
	Ferns:	0
	Other:	4
Sum of Cover of native vascular plants by growth form group	Trees:	62
	Shrubs:	0.9
	Grasses etc.:	2.6
	Forbs:	0.8
	Ferns:	0
	Other:	5.4
High Threat Weed cover:		0.1

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	47
80 + cm:			
50 – 79 cm:	2		
30 – 49 cm:	1		
20 – 29 cm:	1	Tree hollow count	4
10 – 19 cm:	1		
5 – 9 cm:	1		
< 5 cm:	1		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	70	45	50	80	40
Average litter cover (%):	57				

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 and site features

Side of a Ridgetop. Sloping to the N. Dry loam, shale as well. Well drained.

Plot Disturbance

Evidence of fire. Access road adjacent to the southern boundary of the plot.

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, ...

Project name:	J210465				
Recorders:	RD, GS	**Plot ID:**	NTL06	**Date:**	23/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	*Eucalyptus carnea (Thick-leaved Mahogany)*	2	2	yes	N
Tree (TG)	*Eucalyptus biturbinata (Grey Gum)*	25	5	yes	N
Tree (TG)	*Eucalyptus microcorys (Tallowwood)*	20	1	no	N
Tree (TG)	*Corymbia intermedia (Pink Bloodwood)*	10	1	no	N
Tree (TG)	*Allocasuarina torulosa (Forest Oak)*	5	2	yes	N
Shrub (SG)	*Acacia longifolia*	0.2	5	yes	N
Shrub (SG)	*Acacia longissima (Long-leaf Wattle)*	0.1	1	yes	N
Other (OG)	*Hardenbergia violacea (False Sarsaparilla)*	5	50	no	N
Shrub (SG)	*Cassinia compacta*	0.1	5	no	N
Forb (FG)	*Verbena spp.*	0.1	15	no	N
	Conyza spp. (A Fleabane)	1	50	no	E
Other (OG)	*Billardiera scandens (Hairy Apple Berry)*	0.1	15	no	N
Other (OG)	*Desmodium varians (Slender Tick-trefoil)*	0.1	20	no	N
Grass & grasslike (GG)	*Entolasia stricta (Wiry Panic)*	1	50	yes	N
Grass & grasslike (GG)	*Panicum queenslandicum (Yadbila Grass)*	1	100	yes	N
Other (OG)	*Desmodium spp. (Tick-trefoil)*	0.2	30	yes	N
Grass & grasslike (GG)	*Lomandra filiformis (Wattle Matt-rush)*	0.5	40	no	N
Forb (FG)	*Euchiton sphaericus (Star Cudweed)*	0.1	10	yes	N
	Physalis peruviana (Cape Gooseberry)	0.1	20	yes	E
Shrub (SG)	*Ozothamnus diosmifolius (White Dogwood)*	0.5	30	no	N
	Senecio madagascariensis (Fireweed)	0.1	10	no	HTE
	Solanum nigrum (Black-berry Nightshade)	0.1	15	no	E
Forb (FG)	*Sigesbeckia orientalis subsp. orientalis (Indian Weed)*	0.2	20	no	N
Forb (FG)	*Veronica spp.*	0.2	30	yes	N
	Crepis spp.	0.1	15	yes	E
	Passiflora subpeltata (White Passionflower)	0.1	10	no	E
Forb (FG)	*Chrysocephalum spp.*	0.1	5	yes	N
Grass & grasslike (GG)	*Poa spp.*	0.1	20	no	N
Forb (FG)	*Lobelia purpurascens (whiteroot)*	0.1	20	no	N

BAM Site – Field Survey Form

Plot ID:	NTL07	**Date:**	24/06/22	**Project number:**	J210465	**Plot dimensions:**	20 x 50
Datum:	GDA94	**Easting:**	424,266	**Recorders:**	GS RD		
Zone:	56	**Northing:**	6,599,686	**IBRA region:**		**Midline bearing:**	21
Plant Community Type:		1268: Tallowwood open forest of the coastal ranges of the NSW North Coast Bioregion		**Condition class:**	High	**PCT confidence:**	medium
Vegetation Class:		Northern Hinterland Wet Sclerophyll Forests		**EEC:**	no	**EEC confidence:**	medium

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:	3
	Shrubs:	4
	Grasses etc.:	7
	Forbs:	10
	Ferns:	3
	Other:	10
Sum of Cover of native vascular plants by growth form group	Trees:	50
	Shrubs:	7.5
	Grasses etc.:	41.1
	Forbs:	23.3
	Ferns:	3.2
	Other:	32
High Threat Weed cover:		0

BAM Attribute (1000 m2 plot) DBH			
DBH	**Tree stem count**		
80 + cm:	1	**Length of logs (m) (≥10 cm diameter, >50 cm in length)**	37
50 – 79 cm:	2		
30 – 49 cm:	1		
20 – 29 cm:	1	**Tree hollow count**	1
10 – 19 cm:	1		
5 – 9 cm:	0		
< 5 cm:	1		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	**1**	**2**	**3**	**4**	**5**
Subplot score (%):	60	90	80	95	50
Average litter cover (%):	75				

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 and site features

Steep ridge / hillslope. East aspect. Black loam gravel soils.

Plot Disturbance

Recent fire impacts, some canopy clearance, regenerating.

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, ...

Project name:	J210465				
Recorders:	GS RD	**Plot ID:**	NTL07	**Date:**	24/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	*Eucalyptus microcorys (Tallowwood)*	35	25	no	N
Tree (TG)	*Eucalyptus biturbinata (Grey Gum)*	12	15	no	N
Tree (TG)	*Allocasuarina torulosa (Forest Oak)*	3	20	no	N
Forb (FG)	*Geranium solanderi (Native Geranium)*	5	6000	no	N
Other (OG)	*Geitonoplesium cymosum (Scrambling Lily)*	3	150	no	N
Grass & grasslike (GG)	*Oplismenus aemulus*	14	6000	no	N
Other (OG)	*Pandorea pandorana (Wonga Wonga Vine)*	3	200	no	N
Other (OG)	*Cissus antarctica (Water Vine)*	0.5	20	no	N
Other (OG)	*Macrozamia montana*	10	20	no	N
Shrub (SG)	*Rubus parvifolius (Native Raspberry)*	3	300	no	N
Forb (FG)	*Plectranthus parviflorus*	12	5000	no	N
Other (OG)	*Kennedia rubicunda (Dusky Coral Pea)*	4	75	no	N
Forb (FG)	*Lobelia purpurascens (whiteroot)*	0.5	400	no	N
Forb (FG)	*Dichondra repens (Kidney Weed)*	0.1	300	no	N
Fern (EG)	*Blechnum neohollandicum*	0.1	8	no	N
	S3	0.1	25	no	
Forb (FG)	*Oxalis perennans*	0.5	600	no	N
Forb (FG)	*Solanum spp.*	0.1	3	no	N
Grass & grasslike (GG)	*Entolasia stricta (Wiry Panic)*	12	4000	no	N
Forb (FG)	*Xerochrysum spp.*	0.5	60	no	N
Shrub (SG)	*Solanum stelligerum (Devil's Needles)*	0.5	16	no	N
Fern (EG)	*Pteridium esculentum (Bracken)*	3	80	no	N
Other (OG)	*Billardiera scandens (Hairy Apple Berry)*	3	45	no	N
Other (OG)	*Hardenbergia violacea (False Sarsaparilla)*	2	30	no	N
Forb (FG)	*Dianella caerulea (Blue Flax-lily)*	1.5	40	no	N
Grass & grasslike (GG)	*Echinopogon spp. (A Hedgehog Grass)*	6	400	no	N
Forb (FG)	*Vernonia cinerea*	0.1	5	no	N
Forb (FG)	*Centella asiatica (Indian Pennywort)*	3	1000	no	N
Shrub (SG)	*Denhamia silvestris (Narrow-leaved Orangebark)*	1	4	no	N
Shrub (SG)	*Indigofera australis (Australian Indigo)*	3	12	no	N
	Crepis foetida subsp. vulgaris (Stinking Hawksbeard)	1	25	no	E
Grass & grasslike (GG)	*Lepidosperma laterale (Variable Sword-sedge)*	0.1	6	no	N
Grass & grasslike (GG)	*Lomandra longifolia (Spiny-headed Mat-rush)*	3	18	no	N
Grass & grasslike (GG)	*Lomandra filiformis (Wattle Matt-rush)*	3	90	no	N
Grass & grasslike (GG)	*Poa sieberiana (Snowgrass)*	3	40	no	N
Other (OG)	*Hibbertia scandens (Climbing Guinea Flower)*	4	60	no	N
Other (OG)	*Marsdenia lloydii (Corky Marsdenia)*	2	50	no	N
Other (OG)	*Smilax australis (Lawyer Vine)*	0.5	17	no	N
	Rubus alceifolius (Giant Bramble, Asian Bramble, Bramble, Wild Raspberry)	1	25	no	E
Fern (EG)	*Adiantum formosum (Giant Maidenhair)*	0.1	16	no	N

BAM Site – Field Survey Form

Plot ID:	NTL08	**Date:**	24/06/22	**Project number:**	J210465	**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	424,400	**Recorders:**	RD, GS		
Zone:	56	**Northing:**	6,599,642	**IBRA region:**		**Midline bearing:**	40
Plant Community Type:		1268: Tallowwood open forest of the coastal ranges of the NSW North Coast Bioregion		**Condition class:**	High	**PCT confidence:**	high
Vegetation Class:		Northern Hinterland Wet Sclerophyll Forests		**EEC:**	no	**EEC confidence:**	high

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:	5
	Shrubs:	6
	Grasses etc.:	6
	Forbs:	4
	Ferns:	0
	Other:	6
Sum of Cover of native vascular plants by growth form group	Trees:	42.5
	Shrubs:	8.4
	Grasses etc.:	24.2
	Forbs:	1.3
	Ferns:	0
	Other:	33.3
High Threat Weed cover:		0

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	33
80 + cm:	0		
50 – 79 cm:	4		
30 – 49 cm:	1		
20 – 29 cm:	1	Tree hollow count	6
10 – 19 cm:	1		
5 – 9 cm:	1		
< 5 cm:	1		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	35	40	60	90	65
Average litter cover (%):	58				

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 and site features

Ridge top location. Steeply sloping to the SE. Well drained, a drier version of the previous plot in this PCT. Shale,gravel, and dry loam soils. PCT 868 located around 100 m SE of this plot.

Plot Disturbance

No disturbance recorded other than fire. Lots of epicormic growth and juvenile eucalyptus.

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, ...

Project name:	J210465				
Recorders:	RD, GS	**Plot ID:**	NTL08	**Date:**	24/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	*Eucalyptus microcorys (Tallowwood)*	30	30	no	N
Tree (TG)	*Eucalyptus acmenoides (White Mahogany)*	7	15	yes	N
Tree (TG)	*Eucalyptus biturbinata (Grey Gum)*	3	10	yes	N
Tree (TG)	*Allocasuarina torulosa (Forest Oak)*	2	4	yes	N
Other (OG)	*Kennedia rubicunda (Dusky Coral Pea)*	30	100	yes	N
Grass & grasslike (GG)	*Oplismenus aemulus*	7	500	yes	N
Grass & grasslike (GG)	*Entolasia stricta (Wiry Panic)*	1	150	yes	N
Grass & grasslike (GG)	*Poa sieberiana (Snowgrass)*	8	500	no	N
Grass & grasslike (GG)	*Lomandra filiformis (Wattle Matt-rush)*	3	50	no	N
Shrub (SG)	*Indigofera australis (Australian Indigo)*	5	50	no	N
Other (OG)	*Macrozamia montana*	2	30	no	N
Shrub (SG)	*Jacksonia scoparia (Dogwood)*	1	20	no	N
Other (OG)	*Hardenbergia violacea (False Sarsaparilla)*	1	50	no	N
Forb (FG)	*Plectranthus parviflorus*	0.5	20	no	N
Forb (FG)	*Dianella caerulea (Blue Flax-lily)*	0.2	15	yes	N
Grass & grasslike (GG)	*Lomandra longifolia (Spiny-headed Mat-rush)*	0.2	20	no	N
Shrub (SG)	*Myrsine variabilis*	0.1	10	yes	N
Shrub (SG)	*Podolobium ilicifolium (Prickly Shaggy Pea)*	2	30	no	N
Other (OG)	*Pandorea pandorana (Wonga Wonga Vine)*	0.1	15	no	N
Shrub (SG)	*Pittosporum revolutum (Rough Fruit Pittosporum)*	0.2	20	yes	N
Tree (TG)	*Acacia maidenii (Maiden's Wattle)*	0.5	3	yes	N
Forb (FG)	*Vernonia cinerea*	0.1	15	yes	N
Other (OG)	*Desmodium varians (Slender Tick-trefoil)*	0.1	20	no	N
Other (OG)	*Billardiera scandens (Hairy Apple Berry)*	0.1	20	no	N
Forb (FG)	*Veronica spp.*	0.5	20	no	N
Grass & grasslike (GG)	*Themeda triandra*	5	100	no	N
Shrub (SG)	*Ozothamnus diosmifolius (White Dogwood)*	0.1	5	yes	N

BAM Site – Field Survey Form

Plot ID:	NTL09	**Date:**	24/06/22	**Project number:**	J210465	**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	426,163	**Recorders:**	BS,SG		
Zone:	56	**Northing:**	6,603,366	**IBRA region:**		**Midline bearing:**	16
Plant Community Type:		1215: Spotted Gum - Grey Ironbark open forest of the Macleay Valley lowlands of the NSW North Coast Bioregion		**Condition class:**	DNGModerate	**PCT confidence:**	
Vegetation Class:		Hunter-Macleay Dry Sclerophyll Forests		**EEC:**		**EEC confidence:**	

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:	2
	Shrubs:	6
	Grasses etc.:	7
	Forbs:	8
	Ferns:	2
	Other:	3
Sum of Cover of native vascular plants by growth form group	Trees:	3
	Shrubs:	7.3
	Grasses etc.:	83.1
	Forbs:	0.9
	Ferns:	1.1
	Other:	20.5
High Threat Weed cover:		0.4

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	0
80 + cm:	0		
50 – 79 cm:	0		
30 – 49 cm:	0		
20 – 29 cm:	0	Tree hollow count	0
10 – 19 cm:	0		
5 – 9 cm:	0		
< 5 cm:	69		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	20	30	50	40	50
Average litter cover (%):	38				

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 and site features

Plot Disturbance

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, ...

Project name:	J210465				
Recorders:	BS,SG	**Plot ID:**	NTL09	**Date:**	24/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Shrub (SG)	*Exocarpos strictus (Dwarf Cherry)*	2	6	no	N
Tree (TG)	*Allocasuarina torulosa (Forest Oak)*	1	3	no	N
Tree (TG)	*Eucalyptus spp.*	2	24	no	N
Shrub (SG)	*Alectryon spp.*	3	30	no	N
Grass & grasslike (GG)	*Themeda triandra*	70	1000	no	N
Grass & grasslike (GG)	*Eragrostis leptostachya (Paddock Lovegrass)*	5	70	no	N
Grass & grasslike (GG)	*Cymbopogon refractus (Barbed Wire Grass)*	0.5	5	no	N
Forb (FG)	*Pomax umbellata (Pomax)*	0.2	40	no	N
Grass & grasslike (GG)	*Lomandra longifolia (Spiny-headed Mat-rush)*	4	60	no	N
	Sporobolus africanus (Parramatta Grass)	1	20	no	E
Other (OG)	*Hardenbergia violacea (False Sarsaparilla)*	10	40	no	N
Forb (FG)	*Desmodium nemorosum*	0.1	3	no	N
Grass & grasslike (GG)	*Panicum simile (Two-colour Panic)*	3	30	no	N
Grass & grasslike (GG)	*Eragrostis brownii (Brown's Lovegrass)*	0.5	20	no	N
Forb (FG)	*Senecio spp. (Groundsel, Fireweed)*	0.1	1	no	N
Forb (FG)	*Rostellularia spp.*	0.1	5	no	N
Forb (FG)	*Verbena spp.*	0.1	10	no	N
Fern (EG)	*Pteridium esculentum (Bracken)*	1	20	no	N
	Sida rhombifolia (Paddy's Lucerne)	0.1	1	no	E
Grass & grasslike (GG)	*Dichelachne spp. (A Plumegrass)*	0.1	4	no	N
Other (OG)	*Pandorea pandorana (Wonga Wonga Vine)*	0.5	5	no	N
	Andropogon virginicus (Whisky Grass)	0.2	10	no	HTE
Fern (EG)	*Cheilanthes sieberi (Rock Fern)*	0.1	40	no	N
	Senecio madagascariensis (Fireweed)	0.1	1	no	HTE
Forb (FG)	*Rumex brownii (Swamp Dock)*	0.1	1	no	N
	Bidens pilosa (Cobbler's Pegs)	0.1	1	no	HTE
Forb (FG)	*Euchiton sphaericus (Star Cudweed)*	0.1	40	no	N
Other (OG)	*Kennedia rubicunda (Dusky Coral Pea)*	10	30	no	N
Shrub (SG)	*Rubus parvifolius (Native Raspberry)*	1	2	no	N
Shrub (SG)	*Indigofera australis (Australian Indigo)*	1	3	no	N
Shrub (SG)	*Acacia falcata*	0.1	1	no	N
Shrub (SG)	*Pittosporum revolutum (Rough Fruit Pittosporum)*	0.2	4	no	N
Forb (FG)	*Stylidium graminifolium (Grass Triggerplant)*	0.1	4	no	N

BAM Site – Field Survey Form

Plot ID:	NTL10	**Date:**	24/06/22	**Project number:**	J210465	**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	426,151	**Recorders:**	BS, SG		
Zone:	56	**Northing:**	6,603,298	**IBRA region:**		**Midline bearing:**	159
Plant Community Type:		1215: Spotted Gum - Grey Ironbark open forest of the Macleay Valley lowlands of the NSW North Coast Bioregion		**Condition class:**	High	**PCT confidence:**	
Vegetation Class:		Hunter-Macleay Dry Sclerophyll Forests		**EEC:**		**EEC confidence:**	

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:	4
	Shrubs:	7
	Grasses etc.:	4
	Forbs:	11
	Ferns:	2
	Other:	8
Sum of Cover of native vascular plants by growth form group	Trees:	72.1
	Shrubs:	4.4
	Grasses etc.:	23
	Forbs:	7.8
	Ferns:	0.6
	Other:	23.6
High Threat Weed cover:		0.1

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	52
80 + cm:	2		
50 – 79 cm:	2		
30 – 49 cm:	2		
20 – 29 cm:	9	Tree hollow count	2
10 – 19 cm:	30		
5 – 9 cm:	9		
< 5 cm:	16		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	95	95	90	100	95
Average litter cover (%):	95				

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 and site features

Plot Disturbance

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, ...

Project name:	J210465				
Recorders:	BS, SG	**Plot ID:**	NTL10	**Date:**	24/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	*Corymbia maculata (Spotted Gum)*	50	15	no	N
Tree (TG)	*Eucalyptus carnea (Thick-leaved Mahogany)*	20	6	no	N
Other (OG)	*Hibbertia scandens (Climbing Guinea Flower)*	5	40	no	N
Tree (TG)	*Allocasuarina torulosa (Forest Oak)*	2	7	no	N
Other (OG)	*Hardenbergia violacea (False Sarsaparilla)*	5	50	no	N
Grass & grasslike (GG)	*Poa spp.*	15	200	no	N
Shrub (SG)	*Breynia oblongifolia (Coffee Bush)*	1	30	no	N
Other (OG)	*Glycine clandestina (Twining glycine)*	0.5	40	no	N
Other (OG)	*Jasminum spp.*	2	50	no	N
Grass & grasslike (GG)	*Oplismenus spp.*	3	20	no	N
Forb (FG)	*Dianella caerulea (Blue Flax-lily)*	3	50	no	N
Other (OG)	*Geitonoplesium cymosum (Scrambling Lily)*	2	40	no	N
Forb (FG)	*Lobelia purpurascens (whiteroot)*	3	50	no	N
Other (OG)	*Macrozamia montana*	4	20	no	N
Other (OG)	*Kennedia spp.*	5	20	no	N
Grass & grasslike (GG)	*Lomandra longifolia (Spiny-headed Mat-rush)*	2	30	no	N
	Passiflora subpeltata (White Passionflower)	0.2	2	no	E
Forb (FG)	*Gonocarpus hirtus*	0.5	15	no	N
Forb (FG)	*Senecio spp. (Groundsel, Fireweed)*	0.1	20	no	N
	Bidens pilosa (Cobbler's Pegs)	0.1	1	no	HTE
Forb (FG)	*Vernonia cinerea*	0.1	10	no	N
	Aster spp.	0.1	10	no	E
Shrub (SG)	*Rubus parvifolius (Native Raspberry)*	0.5	5	no	N
	Solanum mauritianum (Wild Tobacco Bush)	0.2	4	no	E
Shrub (SG)	*Indigofera australis (Australian Indigo)*	2	30	no	N
Tree (TG)	*Clerodendrum tomentosum (Hairy Clerodendrum)*	0.1	1	no	N
Forb (FG)	*Plectranthus parviflorus*	0.1	2	no	N
Fern (EG)	*Doodia spp.*	0.5	20	no	N
Shrub (SG)	*Persoonia oleoides*	0.1	1	no	N
Forb (FG)	*Hydrocotyle tripartita (Pennywort)*	0.2	2	no	N
Forb (FG)	*Viola banksii*	0.1	1	no	N
Forb (FG)	*Sigesbeckia australiensis*	0.5	40	no	N
	Onopordum spp.	0.1	3	no	E
Forb (FG)	*Geranium solanderi (Native Geranium)*	0.1	20	no	N
Forb (FG)	*Oxalis perennans*	0.1	3	no	N
Other (OG)	*Eustrephus latifolius (Wombat Berry)*	0.1	4	no	N
Fern (EG)	*Adiantum formosum (Giant Maidenhair)*	0.1	10	no	N
Shrub (SG)	*Solanum densevestitum*	0.1	10	no	N
Shrub (SG)	*Myrsine variabilis*	0.2	5	no	N
Shrub (SG)	*Acacia spp. (Wattle)*	0.5	5	no	N
Grass & grasslike (GG)	*Entolasia stricta (Wiry Panic)*	3	100	no	N

BAM Site – Field Survey Form

Plot ID:	NTL11	**Date:**	24/06/22	**Project number:**	J210465	**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	426,704	**Recorders:**	BS, SG		
Zone:	56	**Northing:**	6,602,978	**IBRA region:**		**Midline bearing:**	70
Plant Community Type:		1215: Spotted Gum - Grey Ironbark open forest of the Macleay Valley lowlands of the NSW North Coast Bioregion		**Condition class:**	DNGModerate	**PCT confidence:**	
Vegetation Class:		Hunter-Macleay Dry Sclerophyll Forests		**EEC:**		**EEC confidence:**	

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:	3
	Shrubs:	1
	Grasses etc.:	7
	Forbs:	4
	Ferns:	0
	Other:	2
Sum of Cover of native vascular plants by growth form group	Trees:	2.1
	Shrubs:	0.1
	Grasses etc.:	101.7
	Forbs:	0.8
	Ferns:	0
	Other:	0.2
High Threat Weed cover:		2.1

BAM Attribute (1000 m2 plot) DBH			
DBH	**Tree stem count**		
80 + cm:	0	**Length of logs (m) (≥10 cm diameter, >50 cm in length)**	0
50 – 79 cm:	0		
30 – 49 cm:	0		
20 – 29 cm:	0	**Tree hollow count**	0
10 – 19 cm:	0		
5 – 9 cm:	1		
< 5 cm:	71		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	**1**	**2**	**3**	**4**	**5**
Subplot score (%):	30	60	30	60	20
Average litter cover (%):	40				

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 and site features

Plot Disturbance

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, ...

Project name:	J210465				
Recorders:	BS, SG	**Plot ID:**	NTL11	**Date:**	24/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Forb (FG)	*Lespedeza spp.*	0.1	10	no	N
Grass & grasslike (GG)	*Lomandra longifolia (Spiny-headed Mat-rush)*	0.1	1	no	N
Grass & grasslike (GG)	*Themeda triandra*	75	1000	no	N
Tree (TG)	*Eucalyptus eugenioides (Thin-leaved Stringybark)*	1	6	no	N
Forb (FG)	*Rostellularia adscendens (Pink Tongues)*	0.1	3	no	N
	Setaria parviflora	5	50	no	E
	Sporobolus africanus (Parramatta Grass)	1	30	no	E
Other (OG)	*Desmodium spp. (Tick-trefoil)*	0.1	10	no	N
	Gomphocarpus physocarpus (Balloon Cotton Bush)	0.1	1	no	E
Grass & grasslike (GG)	*Panicum simile (Two-colour Panic)*	1	50	no	N
Grass & grasslike (GG)	*Eragrostis leptostachya (Paddock Lovegrass)*	0.5	20	no	N
	Sida spinosa	0.1	2	no	E
	Chloris gayana (Rhodes Grass)	2	20	no	HTE
	Bidens pilosa (Cobbler's Pegs)	0.1	1	no	HTE
	Sida rhombifolia (Paddy's Lucerne)	0.1	1	no	E
	Solanum viarum (Tropical Soda Apple)	0.1	1	no	E
	Paspalum notatum (Bahia Grass)	1	20	no	E
Grass & grasslike (GG)	*Bothriochloa decipiens var. decipiens (Pitted Bluegrass)*	20	300	no	N
Tree (TG)	*Allocasuarina torulosa (Forest Oak)*	0.1	2	no	N
Grass & grasslike (GG)	*Dichanthium sericeum (Queensland Bluegrass)*	5	200	no	N
Tree (TG)	*Eucalyptus spp.*	1	23	no	N
Forb (FG)	*Verbena spp.*	0.5	10	no	N
Grass & grasslike (GG)	*Cyperus polystachyos*	0.1	1	no	N
Other (OG)	*Glycine tomentella (Woolly Glycine)*	0.1	5	no	N
Forb (FG)	*Dianella caerulea (Blue Flax-lily)*	0.1	1	no	N
Shrub (SG)	*Exocarpos cupressiformis (Cherry Ballart)*	0.1	1	no	N

BAM Site – Field Survey Form

Plot ID:	URAT 01	**Date:**	07/06/22	**Project number:**	J210465	**Plot dimensions:**	20 x 50
Datum:	GDA94	**Easting:**	422,147	**Recorders:**	GS RD		
Zone:	56	**Northing:**	6,591,328	**IBRA region:**		**Midline bearing:**	16
Plant Community Type:		822: Eurabbie tall open forest of the escarpment ranges of the NSW North Coast Bioregion		**Condition class:**	High	**PCT confidence:**	medium
Vegetation Class:		Northern Escarpment Dry Sclerophyll Forests		**EEC:**	no	**EEC confidence:**	medium

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:	3
	Shrubs:	8
	Grasses etc.:	8
	Forbs:	8
	Ferns:	1
	Other:	4
Sum of Cover of native vascular plants by growth form group	Trees:	35
	Shrubs:	8.2
	Grasses etc.:	48.4
	Forbs:	9.6
	Ferns:	6
	Other:	13
High Threat Weed cover:		0

BAM Attribute (1000 m2 plot) DBH			
DBH	**Tree stem count**	**Length of logs (m) (≥10 cm diameter, >50 cm in length)**	43
80 + cm:	1		
50 – 79 cm:	4		
30 – 49 cm:	1		
20 – 29 cm:	1	**Tree hollow count**	1
10 – 19 cm:	1		
5 – 9 cm:	1		
< 5 cm:	1		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	**1**	**2**	**3**	**4**	**5**
Subplot score (%):	90	80	95	80	90
Average litter cover (%):	87				

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 and site features

Black to brown sandy loam. Ridge / saddle hillslope, low gradient.

Plot Disturbance

Track adjacent, little to no weeds. Recovering from recent fire 2 - 5 years old.

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, ...

Project name:	J210465				
Recorders:	GS RD	**Plot ID:**	URAT 01	**Date:**	07/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	*Eucalyptus andrewsii (Gum-topped Peppermint)*	10	6	no	N
Tree (TG)	*Eucalyptus cameronii (Diehard Stringybark)*	20	3	no	N
Tree (TG)	*Allocasuarina littoralis (Black She-Oak)*	5	30	no	N
Grass & grasslike (GG)	*Lomandra longifolia (Spiny-headed Mat-rush)*	30	3000	no	N
	Cyperaceae indeterminate (Sedges)	0.5	15	no	E
Shrub (SG)	*Lomatia silaifolia (Crinkle Bush)*	1.5	14	no	N
Shrub (SG)	*Persoonia linearis (Narrow-leaved Geebung)*	1	8	no	N
Other (OG)	*Billardiera scandens (Hairy Apple Berry)*	4	60	no	N
Forb (FG)	*Gonocarpus spp. (Raspwort)*	0.1	18	no	N
Shrub (SG)	*Acacia ulicifolia (Prickly Moses)*	1	22	no	N
Shrub (SG)	*Leucopogon lanceolatus*	3	50	no	N
Fern (EG)	*Pteridium esculentum (Bracken)*	6	140	no	N
Other (OG)	*Kennedia rubicunda (Dusky Coral Pea)*	4	200	no	N
Other (OG)	*Hardenbergia violacea (False Sarsaparilla)*	4	120	no	N
Forb (FG)	*Dianella caerulea (Blue Flax-lily)*	8	1500	no	N
Shrub (SG)	*Leucopogon trichostylus (Daphne Heath)*	0.5	13	no	N
Grass & grasslike (GG)	*Entolasia marginata (Bordered Panic)*	0.1	5	no	N
Grass & grasslike (GG)	*Themeda triandra*	8	800	no	N
Grass & grasslike (GG)	*Imperata cylindrica (Blady Grass)*	3	100	no	N
Other (OG)	*Glycine clandestina (Twining glycine)*	1	40	no	N
Shrub (SG)	*Bossiaea spp.*	0.1	5	no	N
Shrub (SG)	*Hibbertia villosa*	1	30	no	N
Forb (FG)	*Opercularia diphylla (Stinkweed)*	0.1	1	no	N
Forb (FG)	*Goodenia hederacea (Ivy Goodenia)*	0.1	6	no	N
Grass & grasslike (GG)	*Entolasia stricta (Wiry Panic)*	0.1	3	no	N
Shrub (SG)	*Polyscias sambucifolia (Elderberry Panax)*	0.1	1	no	N
Grass & grasslike (GG)	*Poa sieberiana (Snowgrass)*	7	120	no	N
Forb (FG)	*Lobelia purpurascens (whiteroot)*	1	300	no	N
Forb (FG)	*Pomax umbellata (Pomax)*	0.1	17	no	N
Grass & grasslike (GG)	*Microlaena stipoides (Weeping Grass)*	0.1	8	no	N
Forb (FG)	*Poranthera microphylla (Small Poranthera)*	0.1	1	no	N
Forb (FG)	*Acianthus spp. (Mosquito Orchid)*	0.1	30	no	N
Grass & grasslike (GG)	*Lomandra multiflora subsp. multiflora (Many-flowered Mat-rush)*	0.1	22	no	N

BAM Site – Field Survey Form

Plot ID:	URAT02	**Date:**	07/06/22	**Project number:**	J210465	**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	422,195	**Recorders:**	RD, GS		
Zone:	56	**Northing:**	6,591,903	**IBRA region:**		**Midline bearing:**	29
Plant Community Type:		822: Eurabbie tall open forest of the escarpment ranges of the NSW North Coast Bioregion		**Condition class:**	High	**PCT confidence:**	high
Vegetation Class:		Northern Escarpment Dry Sclerophyll Forests		**EEC:**	no	**EEC confidence:**	high

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:	4
	Shrubs:	6
	Grasses etc.:	5
	Forbs:	8
	Ferns:	1
	Other:	5
Sum of Cover of native vascular plants by growth form group	Trees:	65
	Shrubs:	11.4
	Grasses etc.:	14.2
	Forbs:	0.8
	Ferns:	0.2
	Other:	1.1
High Threat Weed cover:		0

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	113
80 + cm:	1		
50 – 79 cm:	1		
30 – 49 cm:	1		
20 – 29 cm:	1	Tree hollow count	2
10 – 19 cm:	1		
5 – 9 cm:	1		
< 5 cm:	1		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	60	80	85	65	70
Average litter cover (%):	72				

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 and site features

Sloping to the west (moderate to low), sandy loam, granite outcropping,

Plot Disturbance

Fire 2019-20, no disturbance or weediness

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, ...

Project name:	J210465				
Recorders:	RD, GS	**Plot ID:**	URAT02	**Date:**	07/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	*Eucalyptus andrewsii (Gum-topped Peppermint)*	25	5	yes	N
Tree (TG)	*Eucalyptus biturbinata (Grey Gum)*	15	2	yes	N
Tree (TG)	*Eucalyptus cameronii (Diehard Stringybark)*	10	7	yes	N
Tree (TG)	*Allocasuarina torulosa (Forest Oak)*	15	30		N
Shrub (SG)	*Leucopogon lanceolatus*	5	15	no	N
Shrub (SG)	*Persoonia linearis (Narrow-leaved Geebung)*	5	12	no	N
Fern (EG)	*Pteridium esculentum (Bracken)*	0.2	20	no	N
Grass & grasslike (GG)	*Lomandra longifolia (Spiny-headed Mat-rush)*	10	100	no	N
Other (OG)	*Kennedia rubicunda (Dusky Coral Pea)*	0.5	50	no	N
Other (OG)	*Hardenbergia violacea (False Sarsaparilla)*	0.2	50	no	N
Grass & grasslike (GG)	*Themeda triandra*	2	50	no	N
Forb (FG)	*Lobelia purpurascens (whiteroot)*	0.1	100	no	N
Other (OG)	*Billardiera scandens (Hairy Apple Berry)*	0.2	30	no	N
Forb (FG)	*Pomax umbellata (Pomax)*	0.1	20	no	N
Other (OG)	*Glycine clandestina (Twining glycine)*	0.1	30	no	N
Forb (FG)	*Goodenia hederacea (Ivy Goodenia)*	0.1	30	no	N
Forb (FG)	*Dichondra repens (Kidney Weed)*	0.1	50	no	N
Shrub (SG)	*Ozothamnus diosmifolius (White Dogwood)*	0.1	15	yes	N
Forb (FG)	*Viola betonicifolia (Native Violet)*	0.1	10	yes	N
Forb (FG)	*Senecio spp. (Groundsel, Fireweed)*	0.1	10	yes	N
Forb (FG)	*Goodenia rotundifolia*	0.1	10	yes	N
Forb (FG)	*Euchiton sphaericus (Star Cudweed)*	0.1	5	yes	N
Shrub (SG)	*Acacia ulicifolia (Prickly Moses)*	1	10	no	N
Grass & grasslike (GG)	*Poa labillardierei var. labillardierei (Tussock)*	0.1	5	no	N
Grass & grasslike (GG)	*Echinopogon caespitosus (Bushy Hedgehog-grass)*	0.1	15	yes	N
Shrub (SG)	*Acacia falcata*	0.2	1	yes	N
Other (OG)	*Geitonoplesium cymosum (Scrambling Lily)*	0.1	10	yes	N
Shrub (SG)	*Rubus parvifolius (Native Raspberry)*	0.1	10	no	N
Grass & grasslike (GG)	*Imperata cylindrica (Blady Grass)*	2	20	no	N

BAM Site – Field Survey Form

Plot ID:	URAT 03	**Date:**	08/06/22	**Project number:**	J210465	**Plot dimensions:**	20 x 50
Datum:	GDA94	**Easting:**	422,428	**Recorders:**	GS RD		
Zone:	56	**Northing:**	6,591,989	**IBRA region:**		**Midline bearing:**	67
Plant Community Type:		822: Eurabbie tall open forest of the escarpment ranges of the NSW North Coast Bioregion		**Condition class:**	High	**PCT confidence:**	medium
Vegetation Class:		Northern Escarpment Dry Sclerophyll Forests		**EEC:**	no	**EEC confidence:**	low

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:	3
	Shrubs:	2
	Grasses etc.:	9
	Forbs:	9
	Ferns:	0
	Other:	1
Sum of Cover of native vascular plants by growth form group	Trees:	15
	Shrubs:	0.2
	Grasses etc.:	76.1
	Forbs:	0.9
	Ferns:	0
	Other:	0.1
High Threat Weed cover:		0

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	58
80 + cm:	0		
50 – 79 cm:	4		
30 – 49 cm:	1		
20 – 29 cm:	1	Tree hollow count	2
10 – 19 cm:	1		
5 – 9 cm:	1		
< 5 cm:	1		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	70	65	30	80	70
Average litter cover (%):	63				

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 and site features

Black to grey sandy loam. Very poor drainage, likely a spring. Low to moderate gradient, Northey aspect slope approaching hill crest.

Plot Disturbance

No weeds. Recent fire had significant impact, high survival rate of canopy however recovery is slow.

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, ...

Project name:	J210465				
Recorders:	GS RD	**Plot ID:**	URAT 03	**Date:**	08/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	*Allocasuarina littoralis (Black She-Oak)*	3	8	no	N
Grass & grasslike (GG)	*Lomandra longifolia (Spiny-headed Mat-rush)*	40	3500	no	N
Grass & grasslike (GG)	*Imperata cylindrica (Blady Grass)*	20	2600	no	N
Forb (FG)	*Gonocarpus micranthus*	0.1	6	no	N
Grass & grasslike (GG)	*Juncus spp. (A Rush)*	1	250	no	N
Forb (FG)	*Haloragis heterophylla (Variable Raspwort)*	0.1	30	no	N
Tree (TG)	*Eucalyptus deanei (Mountain Blue Gum)*	10	9	no	N
Forb (FG)	*Gonocarpus spp. (Raspwort)*	0.1	100	no	N
Grass & grasslike (GG)	*Themeda triandra*	3	140	no	N
Grass & grasslike (GG)	*Poa sieberiana (Snowgrass)*	4	60	no	N
	Centaurium tenuiflorum (Branched Centaury, Slender centaury)	0.1	20	no	E
Forb (FG)	*Goodenia hederacea (Ivy Goodenia)*	0.1	50	no	N
Forb (FG)	*Hydrocotyle laxiflora (Stinking Pennywort)*	0.1	600	no	N
Forb (FG)	*Euchiton sphaericus (Star Cudweed)*	0.1	18	no	N
Grass & grasslike (GG)	*Entolasia stricta (Wiry Panic)*	0.1	40	no	N
Shrub (SG)	*Leptospermum juniperinum (Prickly Tea-tree)*	0.1	7	no	N
Grass & grasslike (GG)	*Schoenus spp.*	1	40	no	N
Forb (FG)	*Lobelia purpurascens (whiteroot)*	0.1	35	no	N
Grass & grasslike (GG)	*Poa labillardierei var. labillardierei (Tussock)*	3	1200	no	N
Grass & grasslike (GG)	*Juncus prismatocarpus*	4	600	no	N
Forb (FG)	*Viola betonicifolia (Native Violet)*	0.1	6	no	N
	Conyza bonariensis (Flaxleaf Fleabane)	0.1	1	no	E
Other (OG)	*Hardenbergia violacea (False Sarsaparilla)*	0.1	3	no	N
Shrub (SG)	*Persoonia linearis (Narrow-leaved Geebung)*	0.1	7	no	N
	Cyperaceae indeterminate (Sedges)	3	400	no	E
Tree (TG)	*Eucalyptus cameronii (Diehard Stringybark)*	2	1	no	N
Forb (FG)	*Pterostylis nutans (Nodding Greenhood)*	0.1	3	no	N

BAM Site – Field Survey Form

Plot ID:	URAT04	**Date:**	08/06/22	**Project number:**	J210465	**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	422,531	**Recorders:**	RD, GS		
Zone:	56	**Northing:**	6,592,057	**IBRA region:**		**Midline bearing:**	115
Plant Community Type:		1287: Upland heath swamps of the New England Tableland Bioregion		**Condition class:**	High	**PCT confidence:**	high
Vegetation Class:		Montane Bogs and Fens		**EEC:**	yes	**EEC confidence:**	medium

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:	3
	Shrubs:	4
	Grasses etc.:	6
	Forbs:	2
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	28.2
	Shrubs:	8.1
	Grasses etc.:	6
	Forbs:	0.2
	Ferns:	0
	Other:	0
High Threat Weed cover:		0

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	24
80 + cm:	0		
50 – 79 cm:	0		
30 – 49 cm:	1		
20 – 29 cm:	1	Tree hollow count	0
10 – 19 cm:	1		
5 – 9 cm:	1		
< 5 cm:	1		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	50	20	30	5	10
Average litter cover (%):	23				

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 and site features

Sloping to the NW, waterlogged clay soils with areas of sandy soils.

Plot Disturbance

No evidence of disturbance other than fire.

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, ...

Project name:	J210465				
Recorders:	RD, GS	**Plot ID:**	URAT04	**Date:**	08/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	*Eucalyptus cameronii (Diehard Stringybark)*	25	9	yes	N
Grass & grasslike (GG)	*Gahnia spp.*	0.4	1	yes	N
Forb (FG)	*Gonocarpus micranthus*	0.1	20	yes	N
Shrub (SG)	*Baeckea omissa*	1	50	yes	N
Tree (TG)	*Allocasuarina littoralis (Black She-Oak)*	0.2	10	yes	N
Grass & grasslike (GG)	*Schoenus spp.*	0.2	20	yes	N
Grass & grasslike (GG)	*Juncus spp. (A Rush)*	0.2	20	yes	N
Shrub (SG)	*Leptospermum gregarium*	5	40	yes	N
Grass & grasslike (GG)	*Lepidosperma spp.*	5	150	yes	N
Tree (TG)	*Banksia integrifolia (Coast Banksia)*	3	10	yes	N
Shrub (SG)	*Leptospermum juniperinum (Prickly Tea-tree)*	2	15	yes	N
Grass & grasslike (GG)	*Lomandra longifolia (Spiny-headed Mat-rush)*	0.1	10	no	N
Grass & grasslike (GG)	*Poa sieberiana (Snowgrass)*	0.1	20	no	N
Shrub (SG)	*Epacris microphylla (Coral Heath)*	0.1	20	yes	N
Forb (FG)	*Gonocarpus spp. (Raspwort)*	0.1	25	no	N
	Sphagnum cristatum	0.4	20	yes	N

BAM Site – Field Survey Form

Plot ID:	URAT 05	**Date:**	08/06/22	**Project number:**	J210465	**Plot dimensions:**	20 x 50
Datum:	GDA94	**Easting:**	422,701	**Recorders:**	GS RD		
Zone:	56	**Northing:**	6,591,901	**IBRA region:**		**Midline bearing:**	116
Plant Community Type:		822: Eurabbie tall open forest of the escarpment ranges of the NSW North Coast Bioregion		**Condition class:**	High	**PCT confidence:**	medium
Vegetation Class:		Northern Escarpment Dry Sclerophyll Forests		**EEC:**	no	**EEC confidence:**	medium

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:	3
	Shrubs:	8
	Grasses etc.:	6
	Forbs:	7
	Ferns:	1
	Other:	4
Sum of Cover of native vascular plants by growth form group	Trees:	37.1
	Shrubs:	11.4
	Grasses etc.:	48.1
	Forbs:	5.6
	Ferns:	7
	Other:	12
High Threat Weed cover:		0

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	59
80 + cm:	2		
50 – 79 cm:	4		
30 – 49 cm:	1		
20 – 29 cm:	1	Tree hollow count	1
10 – 19 cm:	1		
5 – 9 cm:	1		
< 5 cm:	1		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	90	75	50	90	80
Average litter cover (%):	77				

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 and site features

Black sandy loam to loamy sand. Low ridge slope, low gradient. Northern aspect. Some small granite boulders.

Plot Disturbance

Recently burnt. No weeds

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, ...

Project name:	J210465				
Recorders:	GS RD	**Plot ID:**	URAT 05	**Date:**	08/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	*Eucalyptus andrewsii (Gum-topped Peppermint)*	25	3	no	N
Tree (TG)	*Allocasuarina littoralis (Black She-Oak)*	12	38	no	N
Shrub (SG)	*Leucopogon lanceolatus*	6	60	no	N
Fern (EG)	*Pteridium esculentum (Bracken)*	7	55	no	N
Shrub (SG)	*Lomatia silaifolia (Crinkle Bush)*	4	30	no	N
Other (OG)	*Kennedia rubicunda (Dusky Coral Pea)*	3	65	no	N
Other (OG)	*Hardenbergia violacea (False Sarsaparilla)*	6	120	no	N
Shrub (SG)	*Persoonia linearis (Narrow-leaved Geebung)*	0.5	4	no	N
Grass & grasslike (GG)	*Lomandra longifolia (Spiny-headed Mat-rush)*	18	3000	no	N
Grass & grasslike (GG)	*Poa labillardierei var. labillardierei (Tussock)*	3	150	no	N
Forb (FG)	*Gonocarpus spp. (Raspwort)*	0.1	40	no	N
Grass & grasslike (GG)	*Themeda triandra*	8	2000	no	N
Forb (FG)	*Lobelia purpurascens (whiteroot)*	0.1	130	no	N
Forb (FG)	*Dianella caerulea (Blue Flax-lily)*	5	160	no	N
Other (OG)	*Glycine clandestina (Twining glycine)*	2	50	no	N
Forb (FG)	*Goodenia hederacea (Ivy Goodenia)*	0.1	20	no	N
Forb (FG)	*Viola betonicifolia (Native Violet)*	0.1	140	no	N
Grass & grasslike (GG)	*Imperata cylindrica (Blady Grass)*	3	1000	no	N
Grass & grasslike (GG)	*Poa sieberiana (Snowgrass)*	16	3500	no	N
Shrub (SG)	*Acacia falcata*	0.5	3	no	N
Shrub (SG)	*Leucopogon trichostylus (Daphne Heath)*	0.1	8	no	N
Shrub (SG)	*Pultenaea retusa*	0.1	4	no	N
Shrub (SG)	*Hibbertia villosa*	0.1	1	no	N
Forb (FG)	*Poranthera microphylla (Small Poranthera)*	0.1	16	no	N
Shrub (SG)	*Podolobium ilicifolium (Prickly Shaggy Pea)*	0.1	7	no	N
Other (OG)	*Billardiera scandens (Hairy Apple Berry)*	1	40	no	N
Grass & grasslike (GG)	*Entolasia stricta (Wiry Panic)*	0.1	60	no	N
Tree (TG)	*Banksia integrifolia (Coast Banksia)*	0.1	1	no	N
Forb (FG)	*Pterostylis nutans (Nodding Greenhood)*	0.1	1	no	N

BAM Site – Field Survey Form

Plot ID:	URAT06	**Date:**	08/06/22	**Project number:**	J210465	**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	422,976	**Recorders:**	RD, GS		
Zone:	56	**Northing:**	6,591,570	**IBRA region:**		**Midline bearing:**	167
Plant Community Type:		822: Eurabbie tall open forest of the escarpment ranges of the NSW North Coast Bioregion		**Condition class:**	High	**PCT confidence:**	low
Vegetation Class:		Northern Escarpment Dry Sclerophyll Forests		**EEC:**	no	**EEC confidence:**	high

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:	3
	Shrubs:	9
	Grasses etc.:	3
	Forbs:	4
	Ferns:	1
	Other:	3
Sum of Cover of native vascular plants by growth form group	Trees:	22.2
	Shrubs:	13.6
	Grasses etc.:	2.3
	Forbs:	0.4
	Ferns:	15
	Other:	0.3
High Threat Weed cover:		0

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	87
80 + cm:	1		
50 – 79 cm:	3		
30 – 49 cm:	1		
20 – 29 cm:	1	Tree hollow count	2
10 – 19 cm:	1		
5 – 9 cm:	1		
< 5 cm:	1		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	90	65	65	50	30
Average litter cover (%):	60				

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 and site features

Gently undulating terrain, sandy to sandy loam, well drained, same as last plot.

Plot Disturbance

Evidence of fires, no evidence of disturbance

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, ...

Project name:	J210465				
Recorders:	RD, GS	**Plot ID:**	URAT06	**Date:**	08/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	*Eucalyptus andrewsii (Gum-topped Peppermint)*	15	9	yes	N
Tree (TG)	*Eucalyptus caliginosa (Broad-leaved Stringybark)*	7	35	yes	N
Shrub (SG)	*Podolobium ilicifolium (Prickly Shaggy Pea)*	5	30	no	N
Shrub (SG)	*Leucopogon lanceolatus*	5	30	no	N
Fern (EG)	*Pteridium esculentum (Bracken)*	15	50	no	N
Shrub (SG)	*Acacia obtusifolia*	1	5	yes	N
Shrub (SG)	*Lomatia silaifolia (Crinkle Bush)*	2	15	no	N
Grass & grasslike (GG)	*Imperata cylindrica (Blady Grass)*	2	50	no	N
Other (OG)	*Hardenbergia violacea (False Sarsaparilla)*	0.1	20	no	N
Forb (FG)	*Lobelia purpurascens (whiteroot)*	0.1	20	no	N
Other (OG)	*Billardiera scandens (Hairy Apple Berry)*	0.1	30	no	N
Shrub (SG)	*Persoonia linearis (Narrow-leaved Geebung)*	0.2	15	yes	N
Other (OG)	*Clematis glycinoides (Headache Vine)*	0.1	5	yes	N
Forb (FG)	*Gonocarpus spp. (Raspwort)*	0.1	10	no	N
Shrub (SG)	*Polyscias sambucifolia (Elderberry Panax)*	0.1	15	no	N
Grass & grasslike (GG)	*Entolasia stricta (Wiry Panic)*	0.1	20	no	N
Grass & grasslike (GG)	*Poa labillardierei var. labillardierei (Tussock)*	0.2	10	no	N
Forb (FG)	*Poranthera microphylla (Small Poranthera)*	0.1	10	no	N
Forb (FG)	*Acianthus spp. (Mosquito Orchid)*	0.1	15	no	N
Tree (TG)	*Allocasuarina torulosa (Forest Oak)*	0.2	5	yes	N
Shrub (SG)	*Leucopogon trichostylus (Daphne Heath)*	0.1	5	no	N
Shrub (SG)	*Bossiaea buxifolia*	0.1	10	yes	N
Shrub (SG)	*Jacksonia scoparia (Dogwood)*	0.1	5	yes	N

BAM Site – Field Survey Form

Plot ID:	URAT 07	**Date:**	08/06/22	**Project number:**	J210465	**Plot dimensions:**	20 x 50
Datum:	GDA94	**Easting:**	422,974	**Recorders:**	GS RD		
Zone:	56	**Northing:**	6,591,433	**IBRA region:**		**Midline bearing:**	117
Plant Community Type:		822: Eurabbie tall open forest of the escarpment ranges of the NSW North Coast Bioregion		**Condition class:**	High	**PCT confidence:**	medium
Vegetation Class:		Northern Escarpment Dry Sclerophyll Forests		**EEC:**	no	**EEC confidence:**	medium

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:	4
	Shrubs:	9
	Grasses etc.:	7
	Forbs:	6
	Ferns:	1
	Other:	5
Sum of Cover of native vascular plants by growth form group	Trees:	27.5
	Shrubs:	17.8
	Grasses etc.:	47.5
	Forbs:	1.5
	Ferns:	6
	Other:	5.6
High Threat Weed cover:		0

BAM Attribute (1000 m2 plot) DBH			
DBH	**Tree stem count**	**Length of logs (m) (≥10 cm diameter, >50 cm in length)**	42
80 + cm:	3		
50 – 79 cm:	2		
30 – 49 cm:	1		
20 – 29 cm:	0	**Tree hollow count**	5
10 – 19 cm:	1		
5 – 9 cm:	1		
< 5 cm:	1		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	**1**	**2**	**3**	**4**	**5**
Subplot score (%):	40	30	70	10	25
Average litter cover (%):	35				

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 and site features

Hillcrest / slope, low gradient, SW aspect. Black to brown sandy loam.

Plot Disturbance

Recent fire, still regenerating

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, ...

Project name:	J210465				
Recorders:	GS RD	**Plot ID:**	URAT 07	**Date:**	08/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	*Eucalyptus andrewsii (Gum-topped Peppermint)*	16	5	no	N
Tree (TG)	*Eucalyptus caliginosa (Broad-leaved Stringybark)*	5	4	no	N
Tree (TG)	*Allocasuarina littoralis (Black She-Oak)*	6	30	no	N
Tree (TG)	*Banksia integrifolia (Coast Banksia)*	0.5	5	no	N
Shrub (SG)	*Lomatia silaifolia (Crinkle Bush)*	4	22	no	N
Shrub (SG)	*Persoonia linearis (Narrow-leaved Geebung)*	3	8	no	N
Fern (EG)	*Pteridium esculentum (Bracken)*	6	50	no	N
Shrub (SG)	*Leucopogon lanceolatus*	4	35	no	N
Other (OG)	*Kennedia rubicunda (Dusky Coral Pea)*	2	20	no	N
Other (OG)	*Billardiera scandens (Hairy Apple Berry)*	1	60	no	N
Shrub (SG)	*Acacia longifolia*	4	40	no	N
Grass & grasslike (GG)	*Imperata cylindrica (Blady Grass)*	11	2800	no	N
Grass & grasslike (GG)	*Lomandra longifolia (Spiny-headed Mat-rush)*	13	3200	no	N
Grass & grasslike (GG)	*Themeda triandra*	19	5000	no	N
Other (OG)	*Hardenbergia violacea (False Sarsaparilla)*	2	55	no	N
Shrub (SG)	*Podolobium ilicifolium (Prickly Shaggy Pea)*	2	70	no	N
Forb (FG)	*Gonocarpus spp. (Raspwort)*	0.1	100	no	N
Shrub (SG)	*Leucopogon trichostylus (Daphne Heath)*	0.1	6	no	N
Other (OG)	*Glycine clandestina (Twining glycine)*	0.5	40	no	N
Forb (FG)	*Wahlenbergia stricta (Tall Bluebell)*	0.1	3	no	N
Shrub (SG)	*Hibbertia villosa*	0.1	4	no	N
Forb (FG)	*Dianella caerulea (Blue Flax-lily)*	1	35	no	N
Forb (FG)	*Pomax umbellata (Pomax)*	0.1	1	no	N
Forb (FG)	*Lobelia purpurascens (whiteroot)*	0.1	8	no	N
Grass & grasslike (GG)	*Entolasia stricta (Wiry Panic)*	0.5	30	no	N
Grass & grasslike (GG)	*Echinopogon caespitosus (Bushy Hedgehog-grass)*	0.5	20	no	N
Grass & grasslike (GG)	*Juncus spp. (A Rush)*	0.5	40	no	N
Forb (FG)	*Cryptostylis spp.*	0.1	5	no	N
Shrub (SG)	*Jacksonia scoparia (Dogwood)*	0.1	9	no	N
Grass & grasslike (GG)	*Poa sieberiana (Snowgrass)*	3	800	no	N
Other (OG)	*Hibbertia dentata (Twining Guinea Flower)*	0.1	2	no	N
Shrub (SG)	*Polyscias sambucifolia (Elderberry Panax)*	0.5	25	no	N
	Cyperaceae indeterminate (Sedges)	0.1	6	no	E

BAM Site – Field Survey Form

Plot ID:	URAT08	**Date:**	08/06/22	**Project number:**	J210465	**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	423,025	**Recorders:**	RD, GS		
Zone:	56	**Northing:**	6,591,304	**IBRA region:**		**Midline bearing:**	71
Plant Community Type:		1287: Upland heath swamps of the New England Tableland Bioregion		**Condition class:**	High	**PCT confidence:**	low
Vegetation Class:		Montane Bogs and Fens		**EEC:**	yes	**EEC confidence:**	medium

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:	3
	Shrubs:	3
	Grasses etc.:	9
	Forbs:	6
	Ferns:	1
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	16.5
	Shrubs:	5.6
	Grasses etc.:	20.6
	Forbs:	0.6
	Ferns:	0.5
	Other:	0
High Threat Weed cover:		0

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	12
80 + cm:			
50 – 79 cm:	2		
30 – 49 cm:	1		
20 – 29 cm:	1	Tree hollow count	1
10 – 19 cm:	1		
5 – 9 cm:	1		
< 5 cm:	1		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. 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 (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	15	25	30	50	85
Average litter cover (%):	41				

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 and site features

Clay soils, Waterlogged. Draining and sloping to the SW. Swampy shrubland.

Plot Disturbance

Evidence of fire and has been cleared within a year. Regeneration present. Almost all bare ground has been recolonise by native cover.

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, ...

Project name:	J210465				
Recorders:	RD, GS	**Plot ID:**	URAT08	**Date:**	08/06/22

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	*Eucalyptus caliginosa (Broad-leaved Stringybark)*	15	5	no	N
Tree (TG)	*Eucalyptus andrewsii (Gum-topped Peppermint)*	1	5	no	N
Shrub (SG)	*Leptospermum polygalifolium (Tantoon)*	5	15	yes	N
Grass & grasslike (GG)	*Gahnia spp.*	8	5	no	N
Fern (EG)	*Pteridium esculentum (Bracken)*	0.5	10	no	N
Grass & grasslike (GG)	*Lomandra longifolia (Spiny-headed Mat-rush)*	1	10	no	N
Grass & grasslike (GG)	*Entolasia stricta (Wiry Panic)*	0.1	10	yes	N
Forb (FG)	*Gonocarpus spp. (Raspwort)*	0.1	10	yes	N
Shrub (SG)	*Epacris microphylla (Coral Heath)*	0.1	15	yes	N
Grass & grasslike (GG)	*Empodisma minus*	0.2	20	yes	N
Forb (FG)	*Dichondra repens (Kidney Weed)*	0.1	25	no	N
Forb (FG)	*Lobelia purpurascens (whiteroot)*	0.1	10	no	N
Forb (FG)	*Gonocarpus micranthus*	0.1	10	yes	N
Forb (FG)	*Hydrocotyle spp.*	0.1	20	yes	N
Grass & grasslike (GG)	*Juncus spp. (A Rush)*	10	40	yes	N
Grass & grasslike (GG)	*Cyperus spp.*	0.1	20	yes	N
Shrub (SG)	*Callistemon pallidus (Lemon Bottlebrush)*	0.5	5	yes	N
Grass & grasslike (GG)	*Lepyrodia spp.*	0.2	15	yes	N
Grass & grasslike (GG)	*Poa sieberiana (Snowgrass)*	0.5	30	no	N
Tree (TG)	*Banksia integrifolia (Coast Banksia)*	0.5	3	no	N
Forb (FG)	*Lyperanthus suaveolens (Brown Beaks)*	0.1	1	yes	N
Grass & grasslike (GG)	*Themeda triandra*	0.5	10	no	N

BAM Site Field Survey								
Project:	OMPS	**Plot Identifier**	EE_OMPS_1	**Pic 20x20**		**Pic 20x50**		
Survey date:	27/10/2020		**Compass Orientation (head of 20x20 plot)**				225	
Recorders	EE CB		**PCT:**	822	High			
GPS Easting	422062	**GPS Northing**	6591135		**Datum**	GDA	**Zone**	56
Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance			
	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
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)

Additional information
Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for	EE_OMPS_1

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	Tree (TG)	2
	Shrub (SG)	7
	Forb (FG)	11
	Grass & grasslike (GG)	10
	Fern (EG)	2
	Other (OG)	6
	TOTAL	38

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of cover abundance (native vascular plants)	Tree (TG)	4
	Shrub (SG)	15.2
	Forb (FG)	6
	Grass & grasslike (GG)	53.1
	Fern (EG)	5.1
	Other (OG)	12.4
	TOTAL Native	95.8
	TOTAL 'HTE'	0

BAM Attribute (20 x 50m plot) Tree Stem Counts

DBH (cm)	Euc	Non Euc	Hollows
>80	4		3
50-79			
30-49	1		
20-29	1		
10-19	4	5	
5-9	7	9	
<5	13	91	N/A
Length of logs (m)		133	

0.1%=63x63cm
0.5%=1.4x1.4m
1%=2×2m
5%=4×5m
25%=10×10m

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %
Litter Cover	5m	15%	39.0%
	15m	20%	
	25m	20%	
	35m	70%	
	45m	70%	
Bare ground cover	5m	50%	22.0%
	15m	10%	
	25m	40%	
	35m	10%	
	45m	0%	
Cryptogam cover	5m	5%	14.2%
	15m	5%	
	25m	0%	
	35m	2%	
	45m	59%	
Rock Cover	5m	0%	20.4%
	15m	0%	
	25m	0%	
	35m	2%	
	45m	100%	

COMPOSITION & STRUCTURE

Species recorded for EE_OMPS_1

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?
Euca camp	*Eucalyptus campanulata*	New England Blackbutt	Myrtaceae	2	4		Tree (TG)	No
Pers line	*Persoonia linearis*	Narrow-leaved Geebung	Proteaceae	2	4		Shrub (SG)	No
Allo litt	*Allocasuarina littoralis*	Black She-Oak	Casuarinaceae	2	5		Tree (TG)	No
Leuc lanc	*Leucopogon lanceolatus*		Ericaceae	5	25		Shrub (SG)	No
Bill scan	*Billardiera scandens*	Hairy Apple Berry	Pittosporaceae	5	50		Other (OG)	No
kenn rubi	*Kennedia rubicunda*	Dusky Coral Pea	Fabaceae (Faboide	5	100		Other (OG)	No
Hard viol	*Hardenbergia violacea*	False Sarsaparilla	Fabaceae (Faboide	2	30		Other (OG)	No
Loma long	*Lomandra longifolia*	Spiny-headed Mat-rush	Lomandraceae	25	200		Grass & grasslike (GG)	No
Micr unif	*Microtis unifolia*	Common Onion Orchid	Orchidaceae	0.1	20		Forb (FG)	No
leuc tric	*Leucopogon trichostylus*	Daphne Heath	Ericaceae	2	20		Shrub (SG)	No
Ento marg	*Entolasia marginata*	Bordered Panic	Poaceae	10	100		Grass & grasslike (GG)	No
Prat purp	*Pratia purpurascens*	Whiteroot	Lobeliaceae	0.5	50		Forb (FG)	No
Poma umbe	*Pomax umbellata*	Pomax	Rubiaceae	0.1	10		Forb (FG)	No
Impe cyli	*Imperata cylindrica*	Blady Grass	Poaceae	5	100		Grass & grasslike (GG)	No
Pter escu	*Pteridium esculentum*	Bracken	Dennstaedtiaceae	5	20		Fern (EG)	No
wahl grac	*Wahlenbergia gracilenta*	Annual Bluebell	Campanulaceae	0.1	30		Forb (FG)	No
Oper diph	*Opercularia diphylla*	Stinkweed	Rubiaceae	1	30		Forb (FG)	No
Viol beto	*Viola betonicifolia*	Native Violet	Violaceae	0.1	5		Forb (FG)	No
Micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	2	100		Grass & grasslike (GG)	No
Loma sila	*Lomatia silaifolia*	Crinkle Bush	Proteaceae	5	10		Shrub (SG)	No
Echi caes	*Echinopogon caespitosu*	Bushy Hedgehog-grass	Poaceae	1	10		Grass & grasslike (GG)	No
Glyc micr	*Glycine microphylla*	Small-leaf Glycine	Fabaceae (Faboide	0.2	20		Other (OG)	No
vero caly	*Veronica calycina*	Hairy Speedwell	Plantaginaceae	0.5	200		Forb (FG)	No
Boss hete	*Bossiaea heterophylla*	Variable Bossiaea	Fabaceae (Faboide	1	50		Shrub (SG)	No
Dian revo	*Dianella revoluta*	Blueberry Lily	Phormiaceae	1	20		Forb (FG)	No
Jack scop	*Jacksonia scoparia*	Dogwood	Fabaceae (Faboide	0.1	5		Shrub (SG)	No
plan debi	*Plantago debilis*	Shade Plantain	Plantaginaceae	0.5	30		Forb (FG)	No
Dian caer	*Dianella caerulea*	Blue Flax-lily	Phormiaceae	2	50		Forb (FG)	No
Ento stri	*Entolasia stricta*	Wiry Panic	Poaceae	5	100		Grass & grasslike (GG)	No
Chei sieb	*Cheilanthes sieberi*	Rock Fern	Pteridaceae	0.1	5		Fern (EG)	No
Desm brac	*Desmodium brachypodu*	Large Tick-trefoil	Fabaceae (Faboide	0.1	20		Forb (FG)	No
Them tria	*Themeda triandra*		Poaceae	2	25		Grass & grasslike (GG)	No
Poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	1	30		Grass & grasslike (GG)	No
Loma mult mult	*Lomandra multiflora sul*	Many-flowered Mat-rush	Lomandraceae	2	50		Grass & grasslike (GG)	No
ryti tenu	*Rytidosperma tenuius*	A Wallaby Grass	Poaceae	0.1	5		Grass & grasslike (GG)	No
Desm vari	*Desmodium varians*	Slender Tick-trefoil	Fabaceae (Faboide	0.1	10		Other (OG)	No
acac	*Acacia spp.*	Wattle	Fabaceae (Mimoso	0.1	5		Shrub (SG)	No
geit cymo	*Geitonoplesium cymosu*	Scrambling Lily	Luzuriagaceae	0.1	5		Other (OG)	No
	#N/A	#N/A	#N/A			#N/A		FALSE

	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE

BAM Site Field Survey								
Project:	OMPS	**Plot Identifier**	EE_OMPS_2	**Pic 20x20**		**Pic 20x50**		
Survey date:	27/10/2020		**Compass Orientation (head of 20x20 plot)**				270	
Recorders	EE CB		**PCT:**	822	High			
GPS Easting	421969	**GPS Northing**	6591121		**Datum**	GDA	**Zone**	56
Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance			
	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
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)

Additional information
Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for	EE_OMPS_2

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	Tree (TG)	2
	Shrub (SG)	7
	Forb (FG)	16
	Grass & grasslike (GG)	11
	Fern (EG)	0
	Other (OG)	6
	TOTAL	42

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of cover abundance (native vascular plants)	Tree (TG)	60
	Shrub (SG)	0.9
	Forb (FG)	5.2
	Grass & grasslike (GG)	46.2
	Fern (EG)	0
	Other (OG)	6.8
	TOTAL Native	119.1
	TOTAL 'HTE'	0

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %
Litter Cover	5m	60%	38.0%
	15m	30%	
	25m	20%	
	35m	20%	
	45m	60%	
Bare ground cover	5m	15%	8.2%
	15m	20%	
	25m	0%	
	35m	5%	
	45m	1%	
Cryptogam cover	5m	0%	1.4%
	15m	2%	
	25m	5%	
	35m	0%	
	45m	0%	
Rock Cover	5m	0%	18.0%
	15m	20%	
	25m	30%	
	35m	40%	
	45m	0%	

BAM Attribute (20 x 50m plot) Tree Stem Counts

DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79	3		2
30-49	14	3	2
20-29	6	5	
10-19	4	10	
5-9	4	4	
<5	58	112	N/A
Length of logs (m)		110	

0.1%=63x63cm
0.5%=1.4x1.4m
1%=2×2m
5%=4×5m
25%=10×10m

COMPOSITION & STRUCTURE

Species recorded for EE_OMPS_2

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?
Euca camp	*Eucalyptus campanulata*	New England Blackbutt	Myrtaceae	40	35		Tree (TG)	No
Allo litt	*Allocasuarina littoralis*	Black She-Oak	Casuarinaceae	20	40		Tree (TG)	No
Hard viol	*Hardenbergia violacea*	False Sarsaparilla	Fabaceae (Faboideae)	5	50		Other (OG)	No
Bill scan	*Billardiera scandens*	Hairy Apple Berry	Pittosporaceae	0.5	20		Other (OG)	No
Loma long	*Lomandra longifolia*	Spiny-headed Mat-rush	Lomandraceae	30	200		Grass & grasslike (GG)	No
Loma mult mult	*Lomandra multiflora sul*	Many-flowered Mat-rush	Lomandraceae	1	20		Grass & grasslike (GG)	No
ento stri	*Entolasia stricta*	Wiry Panic	Poaceae	2	200		Grass & grasslike (GG)	No
Glyc taba	*Glycine tabacina*	Variable Glycine	Fabaceae (Faboideae)	0.2	20		Other (OG)	No
Desm vari	*Desmodium varians*	Slender Tick-trefoil	Fabaceae (Faboideae)	0.5	50		Other (OG)	No
Desm brac	*Desmodium brachypodu*	Large Tick-trefoil	Fabaceae (Faboideae)	0.1	5		Forb (FG)	No
Oper aspe	*Opercularia aspera*	Coarse Stinkweed	Rubiaceae	0.1	10		Forb (FG)	No
Prat purp	*Pratia purpurascens*	Whiteroot	Lobeliaceae	1	100		Forb (FG)	No
Poma umbe	*Pomax umbellata*	Pomax	Rubiaceae	1	100		Forb (FG)	No
Echi caes	*Echinopogon caespitosu*	Bushy Hedgehog-grass	Poaceae	2	30		Grass & grasslike (GG)	No
Dian revo	*Dianella revoluta*	Blueberry Lily	Phormiaceae	1	20		Forb (FG)	No
Them tria	*Themeda triandra*		Poaceae	2	25		Grass & grasslike (GG)	No
Impe cyli	*Imperata cylindrica*	Blady Grass	Poaceae	5	200		Grass & grasslike (GG)	No
Glyc micr	*Glycine microphylla*	Small-leaf Glycine	Fabaceae (Faboideae)	0.1	10		Other (OG)	No
Viol beto	*Viola betonicifolia*	Native Violet	Violaceae	0.1	5		Forb (FG)	No
Pers line	*Persoonia linearis*	Narrow-leaved Geebung	Proteaceae	0.1	1		Shrub (SG)	No
Micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	2	50		Grass & grasslike (GG)	No
Jack scop	*Jacksonia scoparia*	Dogwood	Fabaceae (Faboideae)	0.1	1		Shrub (SG)	No
Loma sila	*Lomatia silaifolia*	Crinkle Bush	Proteaceae	0.1	1		Shrub (SG)	No
Kenn rubi	*Kennedia rubicunda*	Dusky Coral Pea	Fabaceae (Faboideae)	0.5	10		Other (OG)	No
leuc tric	*Leucopogon trichostylus*	Daphne Heath	Ericaceae	0.1	1		Shrub (SG)	No
plan debi	*Plantago debilis*	Shade Plantain	Plantaginaceae	0.1	20		Forb (FG)	No
Cymb refr	*Cymbopogon refractus*	Barbed Wire Grass	Poaceae	1	20		Grass & grasslike (GG)	No
Good hede	*Goodenia hederacea*	Ivy Goodenia	Goodeniaceae	0.1	5		Forb (FG)	No
Brey oblo	*Breynia oblongifolia*	Coffee Bush	Phyllanthaceae	0.2	15		Shrub (SG)	No
Leuc lanc	*Leucopogon lanceolatus*		Ericaceae	0.2	5		Shrub (SG)	No
Sola nigr	*Solanum nigrum*	Black-berry Nightshade	Solanaceae	0.1	2	*		No
Oxal exil	*Oxalis exilis*		Oxalidaceae	0.1	2		Forb (FG)	No
Poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	1	15		Grass & grasslike (GG)	No
Dian caer	*Dianella caerulea*	Blue Flax-lily	Phormiaceae	1	25		Forb (FG)	No
Euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	0.1	2		Forb (FG)	No
diur sulp	*Diuris sulphurea*	Tiger Orchid	Orchidaceae	0.1	1		Forb (FG)	No
Ryti tenu	*Rytidosperma tenuius*	A Wallaby Grass	Poaceae	0.1	5		Grass & grasslike (GG)	No
Dich micr	*Dichelachne micrantha*	Shorthair Plumegrass	Poaceae	0.1	2		Grass & grasslike (GG)	No
Cony bona	*Conyza bonariensis*	Flaxleaf Fleabane	Asteraceae	0.1	1	*		No
Sola prin	*Solanum prinophyllum*	Forest Nightshade	Solanaceae	0.1	1		Forb (FG)	No

Micr unif	*Microtis unifolia*	Common Onion Orchid	Orchidaceae	0.1	20		Forb (FG)	No
Plec parv	*Plectranthus parviflorus*		Lamiaceae	0.1	10		Forb (FG)	No
Rubu parv	*Rubus parvifolius*	Native Raspberry	Rosaceae	0.1	10		Shrub (SG)	No
vero caly	*Veronica calycina*	Hairy Speedwell	Plantaginaceae	0.1	5		Forb (FG)	No
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE

BAM Site Field Survey								
Project:	OMPS	**Plot Identifier**	EE_OMPS_3	**Pic 20x20**		**Pic 20x50**		
Survey date:	28/10/2020		**Compass Orientation (head of 20x20 plot)**				270	
Recorders	EE CB		**PCT:**	868	High			
GPS Easting	421102	**GPS Northing**	6591046		**Datum**	GDA	**Zone**	56
Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance			
	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
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)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for		EE_OMPS_3
BAM Attribute (20x20m plot)		
Count of Native Richness	Stratum	Sum
	Tree (TG)	5
	Shrub (SG)	5
	Forb (FG)	8
	Grass & grasslike (GG)	6
	Fern (EG)	0
	Other (OG)	5
	TOTAL	29
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	80
	Shrub (SG)	2.5
	Forb (FG)	1.7
	Grass & grasslike (GG)	15.6
	Fern (EG)	0
	Other (OG)	2.4
	TOTAL Native	102.2
	TOTAL 'HTE'	0

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	1		1
50-79	2		2
30-49	7		2
20-29	3		1
10-19	2		
5-9	1	10	
<5	1	350	N/A
Length of logs (m)		21	

0.1%=63x63cm
0.5%=1.4x1.4m
1%=2×2m
5%=4×5m
25%=10×10m

BAM Attributes (1 x 1m Plots)			
	Tape length	% cover	Average %
Litter Cover	5m	40%	30.0%
	15m	40%	
	25m	20%	
	35m	20%	
	45m	30%	
Bare ground cover	5m	60%	35.0%
	15m	35%	
	25m	50%	
	35m	20%	
	45m	10%	
Cryptogam cover	5m	5%	5.0%
	15m	5%	
	25m	5%	
	35m	5%	
	45m	5%	
Rock Cover	5m	0%	10.0%
	15m	0%	
	25m	10%	
	35m	25%	
	45m	15%	

COMPOSITION & STRUCTURE

Species recorded for EE_OMPS_3

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?
Euca tere	*Eucalyptus tereticornis*	Forest Red Gum	Myrtaceae	15	2		Tree (TG)	No
Euca punc	*Eucalyptus punctata*	Grey Gum	Myrtaceae	25	2		Tree (TG)	No
Euca cali	*Eucalyptus caliginosa*	Broad-leaved Stringybark	Myrtaceae	5	2		Tree (TG)	No
Euca camp	*Eucalyptus campanulata*	New England Blackbutt	Myrtaceae	5	2		Tree (TG)	No
Allo litt	*Allocasuarina littoralis*	Black She-Oak	Casuarinaceae	30	200		Tree (TG)	No
Loma long	*Lomandra longifolia*	Spiny-headed Mat-rush	Lomandraceae	10	200		Grass & grasslike (GG)	No
Poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	2	20		Grass & grasslike (GG)	No
Oper aspe	*Opercularia aspera*	Coarse Stinkweed	Rubiaceae	0.1	10		Forb (FG)	No
Glyc taba	*Glycine tabacina*	Variable Glycine	Fabaceae (Faboideae)	0.2	20		Other (OG)	No
Hard viol	*Hardenbergia violacea*	False Sarsaparilla	Fabaceae (Faboideae)	1	20		Other (OG)	No
Kenn rubi	*Kennedia rubicunda*	Dusky Coral Pea	Fabaceae (Faboideae)	1	20		Other (OG)	No
Glyc micr	*Glycine microphylla*	Small-leaf Glycine	Fabaceae (Faboideae)	0.1	10		Other (OG)	No
Sola prin	*Solanum prinophyllum*	Forest Nightshade	Solanaceae	0.1	5		Forb (FG)	No
Opli aemu	*Oplismenus aemulus*	Basket Grass	Poaceae	0.1	10		Grass & grasslike (GG)	No
Impe cyli	*Imperata cylindrica*	Blady Grass	Poaceae	2	100		Grass & grasslike (GG)	No
ryti race	*Rytidosperma racemosu*	Wallaby Grass	Poaceae	0.1	1			No
Indi aust	*Indigofera australis*	Australian Indigo	Fabaceae (Faboideae)	0.2	5		Shrub (SG)	No
Dich repe	*Dichondra repens*	Kidney Weed	Convolvulaceae	0.1	10		Forb (FG)	No
Acac impl	*Acacia implexa*	Hickory Wattle	Fabaceae (Mimosoideae	2	50		Shrub (SG)	No
geit cymo	*Geitonoplesium cymosu*	Scrambling Lily	Luzuriagaceae	0.1	5		Other (OG)	No
wahl stri	*Wahlenbergia stricta*	Tall Bluebell	Campanulaceae	0.1	5		Forb (FG)	No
Rubu parv	*Rubus parvifolius*	Native Raspberry	Rosaceae	0.1	10		Shrub (SG)	No
Jack scop	*Jacksonia scoparia*	Dogwood	Fabaceae (Faboideae)	0.1	2		Shrub (SG)	No
Loma mult mult	*Lomandra multiflora sul*	Many-flowered Mat-rush	Lomandraceae	1	20		Grass & grasslike (GG)	No
Comm cyan	*Commelina cyanea*	Native Wandering Jew	Commelinaceae	0.1	5		Forb (FG)	No
Ento stri	*Entolasia stricta*	Wiry Panic	Poaceae	0.5	50		Grass & grasslike (GG)	No
Euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	0.1	20		Forb (FG)	No
Brun aust	*Brunonia australis*	Blue Pincushion	Goodeniaceae	0.1	20		Forb (FG)	No
erem debi	*Eremophila debilis*	Amulla	Myoporaceae	0.1	10		Shrub (SG)	No
Dian caer	*Dianella caerulea*	Blue Flax-lily	Phormiaceae	1	20		Forb (FG)	No
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE

	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE

BAM Site Field Survey								
Project:	OMPS	**Plot Identifier**	EE_OMPS_4	**Pic 20x20**		**Pic 20x50**		
Survey date:	28/10/2020		**Compass Orientation (head of 20x20 plot)**				80	
Recorders	EE CB		**PCT:**	868	Dry			
GPS Easting	421368	**GPS Northing**	6591019		**Datum**	GDA	**Zone**	56
Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance			
	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
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)

Additional information
Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for		EE_OMPS_4
BAM Attribute (20x20m plot)		
Count of Native Richness	Stratum	Sum
	Tree (TG)	3
	Shrub (SG)	2
	Forb (FG)	11
	Grass & grasslike (GG)	6
	Fern (EG)	1
	Other (OG)	3
	TOTAL	26
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	35
	Shrub (SG)	2.2
	Forb (FG)	7
	Grass & grasslike (GG)	58.5
	Fern (EG)	0.1
	Other (OG)	1.2
	TOTAL Native	104
	TOTAL 'HTE'	0

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %
Litter Cover	5m	30%	26.0%
	15m	20%	
	25m	15%	
	35m	25%	
	45m	40%	
Bare ground cover	5m	20%	37.0%
	15m	25%	
	25m	60%	
	35m	60%	
	45m	20%	
Cryptogam cover	5m	2%	3.2%
	15m	2%	
	25m	2%	
	35m	5%	
	45m	5%	
Rock Cover	5m	20%	13.0%
	15m	5%	
	25m	25%	
	35m	5%	
	45m	10%	

BAM Attribute (20 x 50m plot) Tree Stem Counts

DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79	1		1
30-49	7		3
20-29	10		1
10-19	5	3	
5-9	5		
<5	45		N/A
Length of logs (m)		26	

0.1%=63x63cm
0.5%=1.4x1.4m
1%=2×2m
5%=4×5m
25%=10×10m

COMPOSITION & STRUCTURE

Species recorded for		EE_OMPS_4						
Abbreviation	**Scientific Name**	**Common Name**	**Family**	**% Cover**	**Abundance**	**Exotic**	**Growth Form**	**High Threat?**
Euca punc	*Eucalyptus punctata*	Grey Gum	Myrtaceae	15	3		Tree (TG)	No
Euca cali	*Eucalyptus caliginosa*	Broad-leaved Stringybark	Myrtaceae	10	3		Tree (TG)	No
Cymb refr	*Cymbopogon refractus*	Barbed Wire Grass	Poaceae	2	10		Grass & grasslike (GG)	No
Them tria	*Themeda triandra*		Poaceae	20	25		Grass & grasslike (GG)	No
Loma long	*Lomandra longifolia*	Spiny-headed Mat-rush	Lomandraceae	20	200		Grass & grasslike (GG)	No
Poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	15	200		Grass & grasslike (GG)	No
Glyc taba	*Glycine tabacina*	Variable Glycine	Fabaceae (Faboidea	1	100		Other (OG)	No
Loma mult mult	*Lomandra multiflora sub*	Many-flowered Mat-rush	Lomandraceae	0.5	20		Grass & grasslike (GG)	No
Dich repe	*Dichondra repens*	Kidney Weed	Convolvulaceae	0.1	100		Forb (FG)	No
Micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	1	100		Grass & grasslike (GG)	No
Euca camp	*Eucalyptus campanulata*	New England Blackbutt	Myrtaceae	10	3		Tree (TG)	No
Sige orie orie	*Sigesbeckia orientalis su*	Indian Weed	Asteraceae	5	100		Forb (FG)	No
Plec parv	*Plectranthus parviflorus*		Lamiaceae	0.2	10		Forb (FG)	No
Kenn rubi	*Kennedia rubicunda*	Dusky Coral Pea	Fabaceae (Faboidea	0.1	5		Other (OG)	No
Rubu parv	*Rubus parvifolius*	Native Raspberry	Rosaceae	0.2	20		Shrub (SG)	No
Dian caer	*Dianella caerulea*	Blue Flax-lily	Phormiaceae	1	20		Forb (FG)	No
Prat purp	*Pratia purpurascens*	Whiteroot	Lobeliaceae	0.1	25		Forb (FG)	No
thys tube	*Thysanotus tuberosus*	Common Fringe-lily	Anthericaceae	0.1	2		Forb (FG)	No
Sola prin	*Solanum prinophyllum*	Forest Nightshade	Solanaceae	0.1	10		Forb (FG)	No
Hard viol	*Hardenbergia violacea*	False Sarsaparilla	Fabaceae (Faboidea	0.1	5		Other (OG)	No
euch invo	*Euchiton involucratus*	Star Cudweed	Asteraceae	0.1	20		Forb (FG)	No
oxal exil	*Oxalis exilis*		Oxalidaceae	0.1	5		Forb (FG)	No
Chei sieb	*Cheilanthes sieberi*	Rock Fern	Pteridaceae	0.1	20		Fern (EG)	No
Cymb laws	*Cymbonotus lawsonianu*	Bear's Ear	Asteraceae	0.1	10		Forb (FG)	No
acac impl	*Acacia implexa*	Hickory Wattle	Fabaceae (Mimosoid	2	20		Shrub (SG)	FALSE
Desm brac	*Desmodium brachypodu*	Large Tick-trefoil	Fabaceae (Faboidea	0.1	5		Forb (FG)	No
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE

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	#N/A	#N/A	#N/A			#N/A		FALSE

BAM Site Field Survey								
Project:	OMPS	**Plot Identifier**	EE_OMPS_5	**Pic 20x20**		**Pic 20x50**		
Survey date:	28/10/2020		**Compass Orientation (head of 20x20 plot)**				300	
Recorders	EE CB		**PCT:**	868	High			
GPS Easting	421735	**GPS Northing**	6591233		**Datum**	GDA	**Zone**	56
Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance			
	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
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)

Additional information
Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for	EE_OMPS_5

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	Tree (TG)	5
	Shrub (SG)	2
	Forb (FG)	6
	Grass & grasslike (GG)	9
	Fern (EG)	0
	Other (OG)	4
	TOTAL	26

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of cover abundance (native vascular plants)	Tree (TG)	43
	Shrub (SG)	3
	Forb (FG)	2.6
	Grass & grasslike (GG)	78.1
	Fern (EG)	0
	Other (OG)	1.4
	TOTAL Native	128.1
	TOTAL 'HTE'	0

BAM Attribute (20 x 50m plot) Tree Stem Counts

DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79	3		1
30-49	8	1	2
20-29	8		2
10-19	3		
5-9	1		
<5	7		N/A
Length of logs (m)		85	

0.1%=63x63cm
0.5%=1.4x1.4m
1%=2×2m
5%=4×5m
25%=10×10m

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %
Litter Cover	5m	20%	18.0%
	15m	30%	
	25m	20%	
	35m	10%	
	45m	10%	
Bare ground cover	5m	40%	46.0%
	15m	60%	
	25m	50%	
	35m	30%	
	45m	50%	
Cryptogam cover	5m	5%	3.4%
	15m	2%	
	25m	0%	
	35m	5%	
	45m	5%	
Rock Cover	5m	10%	3.0%
	15m	0%	
	25m	5%	
	35m	0%	
	45m	0%	

COMPOSITION & STRUCTURE

Species recorded for EE_OMPS_5

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?
Call endl	*Callitris endlicheri*	Black Cypress Pine, Woronora P	Cupressaceae	1	2		Tree (TG)	No
Euca punc	*Eucalyptus punctata*	Grey Gum	Myrtaceae	25	6		Tree (TG)	No
Euca camp	*Eucalyptus campanulata*	New England Blackbutt	Myrtaceae	10	5		Tree (TG)	No
Euca cali	*Eucalyptus caliginosa*	Broad-leaved Stringybark	Myrtaceae	5	2		Tree (TG)	No
Loma long	*Lomandra longifolia*	Spiny-headed Mat-rush	Lomandraceae	60	500		Grass & grasslike (GG)	No
Dian revo	*Dianella revoluta*	Blueberry Lily	Phormiaceae	2	20		Forb (FG)	No
Glyc taba	*Glycine tabacina*	Variable Glycine	Fabaceae (Faboideae)	0.2	20		Other (OG)	No
Them tria	*Themeda triandra*		Poaceae	5	50		Grass & grasslike (GG)	No
Hard viol	*Hardenbergia violacea*	False Sarsaparilla	Fabaceae (Faboideae)	1	2		Other (OG)	No
Cymb refr	*Cymbopogon refractus*	Barbed Wire Grass	Poaceae	2	25		Grass & grasslike (GG)	No
Dich micr	*Dichelachne micrantha*	Shorthair Plumegrass	Poaceae	1	10		Grass & grasslike (GG)	No
Glyc micr	*Glycine microphylla*	Small-leaf Glycine	Fabaceae (Faboideae)	0.1	20		Other (OG)	No
Desm vari	*Desmodium varians*	Slender Tick-trefoil	Fabaceae (Faboideae)	0.1	10		Other (OG)	No
Poma umbe	*Pomax umbellata*	Pomax	Rubiaceae	0.2	30		Forb (FG)	No
Aris vaga	*Aristida vagans*	Threeawn Speargrass	Poaceae	1	20		Grass & grasslike (GG)	No
Pers line	*Persoonia linearis*	Narrow-leaved Geebung	Proteaceae	1	4		Shrub (SG)	No
Prat purp	*Pratia purpurascens*	Whiteroot	Lobeliaceae	0.1	20		Forb (FG)	No
viol beto	*Viola betonicifolia*	Native Violet	Violaceae	0.1	5		Forb (FG)	No
Acac impl	*Acacia implexa*	Hickory Wattle	Fabaceae (Mimosoideae)	2	10		Shrub (SG)	FALSE
euch invo	*Euchiton involucratus*	Star Cudweed	Asteraceae	0.1	5		Forb (FG)	No
Oper aspe	*Opercularia aspera*	Coarse Stinkweed	Rubiaceae	0.1	10		Forb (FG)	No
Ango flor	*Angophora floribunda*	Rough-barked Apple	Myrtaceae	2	1		Tree (TG)	No
Poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	2	20		Grass & grasslike (GG)	No
Ryti tenu	*Rytidosperma tenuius*	A Wallaby Grass	Poaceae	0.1	2		Grass & grasslike (GG)	No
Impe cyli	*Imperata cylindrica*	Blady Grass	Poaceae	2	50		Grass & grasslike (GG)	No
Micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	5	50		Grass & grasslike (GG)	No
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
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	#N/A	#N/A	#N/A			#N/A		FALSE

BAM Site Field Survey									
Project:	OMPS	**Plot Identifier**	EE_OMPS_6	**Pic 20x20**		**Pic 20x50**			
Survey date:	28/10/2020		**Compass Orientation (head of 20x20 plot)**				0		
Recorders	EE CB		**PCT:**	868	High				
GPS Easting	421855	**GPS Northing**	6591649		**Datum**	GDA	**Zone**	56	
Landform			**Soils**			**Drainage & Slope**			
Morphology			**Soil Texture**			**Slope**			
LandF Element			**Soil Colour**			**Aspect**			
LandF Pattern			**Soil Depth**			**Drainage**			
Microrelief			**Geology**			**Watercourses**			
Plot Disturbance									
	Severity	**Age**	**Observational Evidence**						
Clearing									
Cultivation									
Soil erosion									
Firewood									
Grazing									
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)									
Additional information									
Current land use									
Age class of trees (DBH range) , Condition of Vegetation, Hollows									
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)									
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)									
Dominant Species outside Plot									

FUNCTION

Function attributes for	EE_OMPS_6

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	Tree (TG)	3
	Shrub (SG)	5
	Forb (FG)	8
	Grass & grasslike (GG)	9
	Fern (EG)	1
	Other (OG)	4
	TOTAL	30

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of cover abundance (native vascular plants)	Tree (TG)	25
	Shrub (SG)	6.3
	Forb (FG)	3.6
	Grass & grasslike (GG)	87.3
	Fern (EG)	0.1
	Other (OG)	2.2
	TOTAL Native	124.5
	TOTAL 'HTE'	0

BAM Attribute (20 x 50m plot) Tree Stem Counts

DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49	5		2
20-29	8		
10-19	2		
5-9	1		
<5	8		N/A
Length of logs (m)		7	

0.1%=63x63cm
0.5%=1.4x1.4m
1%=2×2m
5%=4×5m
25%=10×10m

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %
Litter Cover	5m	2%	4.4%
	15m	5%	
	25m	5%	
	35m	5%	
	45m	5%	
Bare ground cover	5m	60%	60.0%
	15m	70%	
	25m	70%	
	35m	30%	
	45m	70%	
Cryptogam cover	5m	0%	1.2%
	15m	0%	
	25m	2%	
	35m	2%	
	45m	2%	
Rock Cover	5m	0%	17.8%
	15m	0%	
	25m	25%	
	35m	59%	
	45m	5%	

COMPOSITION & STRUCTURE

Species recorded for	EE_OMPS_6							
Abbreviation	**Scientific Name**	**Common Name**	**Family**	**% Cover**	**Abundance**	**Exotic**	**Growth Form**	**High Threat?**
Euca camp	*Eucalyptus campanulata*	New England Blackbutt	Myrtaceae	5	2		Tree (TG)	No
Euca punc	*Eucalyptus punctata*	Grey Gum	Myrtaceae	15	2		Tree (TG)	No
Euca prop	*Eucalyptus propinqua*	Small-fruited Grey Gum	Myrtaceae	5	1		Tree (TG)	No
Loma long	*Lomandra longifolia*	Spiny-headed Mat-rush	Lomandracea	60	200		Grass & grasslike (GG)	No
Loma mult mult	*Lomandra multiflora sul*	Many-flowered Mat-rush	Lomandracea	5	50		Grass & grasslike (GG)	No
Dian long	*Dianella longifolia*	Blueberry Lily	Phormiaceae	2	20		Forb (FG)	No
Hard viol	*Hardenbergia violacea*	False Sarsaparilla	Fabaceae (Fal	1	20		Other (OG)	No
Oper hisp	*Opercularia hispida*	Hairy Stinkweed	Rubiaceae	0.5	50		Forb (FG)	No
ozot dios	*Ozothamnus diosmifoliu*	White Dogwood	Asteraceae	0.1	10		Shrub (SG)	No
Aris vaga	*Aristida vagans*	Threeawn Speargrass	Poaceae	10	100		Grass & grasslike (GG)	No
Glyc taba	*Glycine tabacina*	Variable Glycine	Fabaceae (Fal	1	100		Other (OG)	No
Jack scop	*Jacksonia scoparia*	Dogwood	Fabaceae (Fal	5	50		Shrub (SG)	No
leuc tric	*Leucopogon trichostylus*	Daphne Heath	Ericaceae	1	5		Shrub (SG)	No
thys tube	*Thysanotus tuberosus*	Common Fringe-lily	Anthericacea	0.1	5		Forb (FG)	No
Sene hisp	*Senecio hispidulus*	Hill Fireweed	Asteraceae	0.1	2		Forb (FG)	No
Them tria	*Themeda triandra*		Poaceae	5	25		Grass & grasslike (GG)	No
Chei sieb	*Cheilanthes sieberi*	Rock Fern	Pteridaceae	0.1	25		Fern (EG)	No
Desm vari	*Desmodium varians*	Slender Tick-trefoil	Fabaceae (Fal	0.1	5		Other (OG)	No
Ento stri	*Entolasia stricta*	Wiry Panic	Poaceae	1	20		Grass & grasslike (GG)	No
Good hede	*Goodenia hederacea*	Ivy Goodenia	Goodeniacea	0.1	5		Forb (FG)	No
Prat purp	*Pratia purpurascens*	Whiteroot	Lobeliaceae	0.1	20		Forb (FG)	No
Poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	5	50		Grass & grasslike (GG)	No
boss hete	*Bossiaea heterophylla*	Variable Bossiaea	Fabaceae (Fal	0.1	5		Shrub (SG)	No
Echi caes	*Echinopogon caespitosu*	Bushy Hedgehog-grass	Poaceae	0.2	10		Grass & grasslike (GG)	No
Bill scan	*Billardiera scandens*	Hairy Apple Berry	Pittosporacea	0.1	5		Other (OG)	No
cype grac	*Cyperus gracilis*	Slender Flat-sedge	Cyperaceae	0.1	10		Grass & grasslike (GG)	No
Loma fili	*Lomandra filiformis*	Wattle Matt-rush	Lomandracea	1	100		Grass & grasslike (GG)	No
Poma umbe	*Pomax umbellata*	Pomax	Rubiaceae	0.5	50		Forb (FG)	No
Oper aspe	*Opercularia aspera*	Coarse Stinkweed	Rubiaceae	0.2	20		Forb (FG)	No
Pers line	*Persoonia linearis*	Narrow-leaved Geebung	Proteaceae	0.1	1		Shrub (SG)	No
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
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	#N/A	#N/A	#N/A			#N/A		FALSE
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	#N/A	#N/A	#N/A			#N/A		FALSE

	#N/A	#N/A	#N/A			#N/A		FALSE

BAM Site Field Survey									
Project:	OMPS	**Plot Identifier**	EE_OMPS_7	**Pic 20x20**		**Pic 20x50**			
Survey date:	28/10/2020		**Compass Orientation (head of 20x20 plot)**				180		
Recorders	EE CB		**PCT:**	868	High				
GPS Easting	421530	**GPS Northing**	6591724		**Datum**	GDA	**Zone**	56	
Landform			**Soils**			**Drainage & Slope**			
Morphology			**Soil Texture**			**Slope**			
LandF Element			**Soil Colour**			**Aspect**			
LandF Pattern			**Soil Depth**			**Drainage**			
Microrelief			**Geology**			**Watercourses**			
Plot Disturbance									
	Severity	**Age**	**Observational Evidence**						
Clearing									
Cultivation									
Soil erosion									
Firewood									
Grazing									
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)									
Additional information									
Current land use									
Age class of trees (DBH range) , Condition of Vegetation, Hollows									
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)									
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)									
Dominant Species outside Plot									

FUNCTION

Function attributes for	EE_OMPS_7

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	Tree (TG)	6
	Shrub (SG)	4
	Forb (FG)	16
	Grass & grasslike (GG)	6
	Fern (EG)	1
	Other (OG)	4
	TOTAL	37

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of cover abundance (native vascular plants)	Tree (TG)	30
	Shrub (SG)	6.3
	Forb (FG)	4.8
	Grass & grasslike (GG)	85
	Fern (EG)	0.1
	Other (OG)	1.7
	TOTAL Native	127.9
	TOTAL 'HTE'	0

BAM Attribute (20 x 50m plot) Tree Stem Counts

DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79	2		2
30-49	5		2
20-29	10		
10-19	12	7	
5-9	6	4	
<5	42		N/A
Length of logs (m)		55	

0.1%=63x63cm
0.5%=1.4x1.4m
1%=2×2m
5%=4×5m
25%=10×10m

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %
Litter Cover	5m	10%	12.0%
	15m	20%	
	25m	15%	
	35m	5%	
	45m	10%	
Bare ground cover	5m	40%	20.0%
	15m	30%	
	25m	15%	
	35m	10%	
	45m	5%	
Cryptogam cover	5m	2%	3.2%
	15m	5%	
	25m	2%	
	35m	2%	
	45m	5%	
Rock Cover	5m	0%	39.0%
	15m	5%	
	25m	50%	
	35m	60%	
	45m	80%	

COMPOSITION & STRUCTURE

Species recorded for		EE_OMPS_7						
Abbreviation	**Scientific Name**	**Common Name**	**Family**	**% Cover**	**Abundance**	**Exotic**	**Growth Form**	**High Threat?**
Euca punc	*Eucalyptus punctata*	Grey Gum	Myrtaceae	15	2		Tree (TG)	No
Euca camp	*Eucalyptus campanulata*	New England Blackbutt	Myrtaceae	5	2		Tree (TG)	No
Euca obli	*Eucalyptus obliqua*	Messmate	Myrtaceae	2	1		Tree (TG)	No
euca micr	*Eucalyptus microcorys*	Tallowwood	Myrtaceae	2	1		Tree (TG)	No
Loma long	*Lomandra longifolia*	Spiny-headed Mat-rush	Lomandracea	10	200		Grass & grasslike (GG)	No
Acac impl	*Acacia implexa*	Hickory Wattle	Fabaceae (Mi	5	100		Shrub (SG)	FALSE
Loma mult mult	*Lomandra multiflora sul*	Many-flowered Mat-rush	Lomandracea	2	100		Grass & grasslike (GG)	No
Hard viol	*Hardenbergia violacea*	False Sarsaparilla	Fabaceae (Fal	0.5	25		Other (OG)	No
Them tria	*Themeda triandra*		Poaceae	30	200		Grass & grasslike (GG)	No
Poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	40	500		Grass & grasslike (GG)	No
Dian caer	*Dianella caerulea*	Blue Flax-lily	Phormiaceae	1	50		Forb (FG)	No
Dich repe	*Dichondra repens*	Kidney Weed	Convolvulace	0.1	100		Forb (FG)	No
Glyc taba	*Glycine tabacina*	Variable Glycine	Fabaceae (Fal	1	100		Other (OG)	No
Plec parv	*Plectranthus parviflorus*		Lamiaceae	0.1	20		Forb (FG)	No
Prat purp	*Pratia purpurascens*	Whiteroot	Lobeliaceae	0.2	50		Forb (FG)	No
Bill scan	*Billardiera scandens*	Hairy Apple Berry	Pittosporacea	0.1	10		Other (OG)	No
Wahl	*Wahlenbergia spp.*	Bluebell	Campanulace	0.1	5		Forb (FG)	No
Gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	1	50		Forb (FG)	No
Desm vari	*Desmodium varians*	Slender Tick-trefoil	Fabaceae (Fal	0.1	10		Other (OG)	No
Chei sieb	*Cheilanthes sieberi*	Rock Fern	Pteridaceae	0.1	50		Fern (EG)	No
Good hede	*Goodenia hederacea*	Ivy Goodenia	Goodeniacea	0.1	10		Forb (FG)	No
Plan debi	*Plantago debilis*	Shade Plantain	Plantaginacea	0.1	25		Forb (FG)	No
sene hisp	*Senecio hispidulus*	Hill Fireweed	Asteraceae	0.1	10		Forb (FG)	No
ozot dios	*Ozothamnus diosmifoliu*	White Dogwood	Asteraceae	0.1	2		Shrub (SG)	No
Jack scop	*Jacksonia scoparia*	Dogwood	Fabaceae (Fal	0.2	10		Shrub (SG)	No
loma fras	*Lomatia fraseri*	Silky Lomatia	Proteaceae	1	10		Shrub (SG)	No
sige orie orie	*Sigesbeckia orientalis su*	Indian Weed	Asteraceae	1	50		Forb (FG)	No
Cymb laws	*Cymbonotus lawsonianu*	Bear's Ear	Asteraceae	0.1	20		Forb (FG)	No
Micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	2	50		Grass & grasslike (GG)	No
Cymb refr	*Cymbopogon refractus*	Barbed Wire Grass	Poaceae	1	20		Grass & grasslike (GG)	No
Ajug aust	*Ajuga australis*	Austral Bugle	Lamiaceae	0.1	5		Forb (FG)	No
Desm brac	*Desmodium brachypodu*	Large Tick-trefoil	Fabaceae (Fal	0.1	2		Forb (FG)	No
Brun aust	*Brunonia australis*	Blue Pincushion	Goodeniacea	0.1	50		Forb (FG)	No
Euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	0.1	20		Forb (FG)	No
Oper aspe	*Opercularia aspera*	Coarse Stinkweed	Rubiaceae	0.5	100		Forb (FG)	No
Allo	*Allocasuarina spp.*		Casuarinacea	1	2		Tree (TG)	No
Euca ampl	*Eucalyptus amplifolia*	Cabbage Gum	Myrtaceae	5	1		Tree (TG)	No
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE

	#N/A	#N/A	#N/A			#N/A		FALSE

BAM Site Field Survey									
Project:	OMPS	**Plot Identifier**	EE_OMPS_8	**Pic 20x20**		**Pic 20x50**			
Survey date:	28/11/2020		**Compass Orientation (head of 20x20 plot)**						
Recorders	EE CB		**PCT:**	868	Dry				
GPS Easting	420534	**GPS Northing**	6592351		**Datum**	GDA	**Zone**	56	
Landform			**Soils**			**Drainage & Slope**			
Morphology			**Soil Texture**			**Slope**			
LandF Element			**Soil Colour**			**Aspect**			
LandF Pattern			**Soil Depth**			**Drainage**			
Microrelief			**Geology**			**Watercourses**			
Plot Disturbance									
	Severity	**Age**	**Observational Evidence**						
Clearing									
Cultivation									
Soil erosion									
Firewood									
Grazing									
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)									
Additional information									
Current land use									
Age class of trees (DBH range) , Condition of Vegetation, Hollows									
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)									
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)									
Dominant Species outside Plot									

FUNCTION

Function attributes for	EE_OMPS_8

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	Tree (TG)	6
	Shrub (SG)	5
	Forb (FG)	6
	Grass & grasslike (GG)	4
	Fern (EG)	1
	Other (OG)	6
	TOTAL	28

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of cover abundance (native vascular plants)	Tree (TG)	21
	Shrub (SG)	4.7
	Forb (FG)	0.7
	Grass & grasslike (GG)	17
	Fern (EG)	0.2
	Other (OG)	6
	TOTAL Native	49.6
	TOTAL 'HTE'	0

BAM Attribute (20 x 50m plot) Tree Stem Counts

DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79	1		
30-49	1		1
20-29	6	7	
10-19	6	4	
5-9	2		
<5	15		N/A
Length of logs (m)		32	

0.1%=63x63cm
0.5%=1.4x1.4m
1%=2×2m
5%=4×5m
25%=10×10m

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %
Litter Cover	5m	10%	6.6%
	15m	5%	
	25m	10%	
	35m	5%	
	45m	3%	
Bare ground cover	5m	50%	49.0%
	15m	70%	
	25m	70%	
	35m	15%	
	45m	40%	
Cryptogam cover	5m	0%	3.0%
	15m	1%	
	25m	2%	
	35m	2%	
	45m	10%	
Rock Cover	5m	40%	37.0%
	15m	20%	
	25m	15%	
	35m	80%	
	45m	30%	

COMPOSITION & STRUCTURE

Species recorded for	EE_OMPS_8							
Abbreviation	**Scientific Name**	**Common Name**	**Family**	**% Cover**	**Abundance**	**Exotic**	**Growth Form**	**High Threat?**
Euca ampl	*Eucalyptus amplifolia*	Cabbage Gum	Myrtaceae	2	1		Tree (TG)	No
Cory inte	*Corymbia intermedia*	Pink Bloodwood	Myrtaceae	10	3		Tree (TG)	No
Euca tere	*Eucalyptus tereticornis*	Forest Red Gum	Myrtaceae	5	1		Tree (TG)	No
Euca camp	*Eucalyptus campanulata*	New England Blackbutt	Myrtaceae	2	1		Tree (TG)	No
leuc tric	*Leucopogon trichostylus*	Daphne Heath	Ericaceae	0.1	1		Shrub (SG)	No
leuc lanc	*Leucopogon lanceolatus*		Ericaceae	2	20		Shrub (SG)	No
Hard viol	*Hardenbergia violacea*	False Sarsaparilla	Fabaceae (Fal	0.5	10		Other (OG)	No
Brey oblo	*Breynia oblongifolia*	Coffee Bush	Phyllanthacea	2	15		Shrub (SG)	No
Glyc taba	*Glycine tabacina*	Variable Glycine	Fabaceae (Fal	0.2	20		Other (OG)	No
Chei sieb	*Cheilanthes sieberi*	Rock Fern	Pteridaceae	0.2	50		Fern (EG)	No
Ento stri	*Entolasia stricta*	Wiry Panic	Poaceae	5	100		Grass & grasslike (GG)	No
Desm vari	*Desmodium varians*	Slender Tick-trefoil	Fabaceae (Fal	0.1	10		Other (OG)	No
Dich repe	*Dichondra repens*	Kidney Weed	Convolvulace	0.1	50		Forb (FG)	No
cayr clem	*Cayratia clematidea*	Native Grape	Vitaceae	0.1	2		Other (OG)	No
sene hisp	*Senecio hispidulus*	Hill Fireweed	Asteraceae	0.1	5		Forb (FG)	No
phyl virg	*Phyllanthus virgatus*	Wiry Spurge	Phyllanthacea	0.1	10		Forb (FG)	No
Glyc micr	*Glycine microphylla*	Small-leaf Glycine	Fabaceae (Fal	0.1	2		Other (OG)	No
Xant acau	*Xanthorrhoea australis*		Xanthorrhoea	5	5		Other (OG)	No
oper hisp	*Opercularia hispida*	Hairy Stinkweed	Rubiaceae	0.1	5		Forb (FG)	No
Desm brac	*Desmodium brachypodu*	Large Tick-trefoil	Fabaceae (Fal	0.1	5		Forb (FG)	No
Acac mela	*Acacia melanoxylon*	Blackwood	Fabaceae (Mi	1	10		Tree (TG)	No
Poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	5	100		Grass & grasslike (GG)	No
aust ramo	*Austrostipa ramosissima*	Stout Bamboo Grass	Poaceae	2	25		Grass & grasslike (GG)	No
brac popu	*Brachychiton populneus*	Kurrajong	Malvaceae	1	2		Tree (TG)	No
Micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	5	200		Grass & grasslike (GG)	No
Poma umbe	*Pomax umbellata*	Pomax	Rubiaceae	0.2	10		Forb (FG)	No
Jack scop	*Jacksonia scoparia*	Dogwood	Fabaceae (Fal	0.5	2		Shrub (SG)	No
pime curv	*Pimelea curviflora*	Rice Flower	Thymelaeace	0.1	25		Shrub (SG)	No
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE

	#N/A	#N/A	#N/A			#N/A		FALSE

BAM Site Field Survey									
Project:	OMPS	**Plot Identifier**	EE_OMPS_9	**Pic 20x20**		**Pic 20x50**			
Survey date:	29/10/2020		**Compass Orientation (head of 20x20 plot)**				90		
Recorders	EE CB		**PCT:**	842	High				
GPS Easting	420634	**GPS Northing**	6592274		**Datum**	GDA	**Zone**	56	
Landform			**Soils**			**Drainage & Slope**			
Morphology			**Soil Texture**			**Slope**			
LandF Element			**Soil Colour**			**Aspect**			
LandF Pattern			**Soil Depth**			**Drainage**			
Microrelief			**Geology**			**Watercourses**			
Plot Disturbance									
	Severity	**Age**	**Observational Evidence**						
Clearing									
Cultivation									
Soil erosion									
Firewood									
Grazing									
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)									
Additional information									
Current land use									
Age class of trees (DBH range) , Condition of Vegetation, Hollows									
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)									
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)									
Dominant Species outside Plot									

FUNCTION

Function attributes for	EE_OMPS_9

BAM Attribute (20x20m plot)		
Count of Native Richness	Stratum	Sum
	Tree (TG)	7
	Shrub (SG)	5
	Forb (FG)	10
	Grass & grasslike (GG)	6
	Fern (EG)	0
	Other (OG)	3
	TOTAL	31

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	44
	Shrub (SG)	10.7
	Forb (FG)	2.7
	Grass & grasslike (GG)	22.7
	Fern (EG)	0
	Other (OG)	0.3
	TOTAL Native	80.4
	TOTAL 'HTE'	0

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79	1		
30-49	6		
20-29	6	3	
10-19	6	6	
5-9	4	2	
<5	43		N/A
Length of logs (m)		38	

0.1%=63x63cm
0.5%=1.4x1.4m
1%=2×2m
5%=4×5m
25%=10×10m

BAM Attributes (1 x 1m Plots)			
	Tape length	% cover	Average %
Litter Cover	5m	25%	38.0%
	15m	60%	
	25m	30%	
	35m	50%	
	45m	25%	
Bare ground cover	5m	25%	20.0%
	15m	15%	
	25m	10%	
	35m	20%	
	45m	30%	
Cryptogam cover	5m	0%	2.4%
	15m	5%	
	25m	5%	
	35m	0%	
	45m	2%	
Rock Cover	5m	0%	13.0%
	15m	0%	
	25m	50%	
	35m	10%	
	45m	5%	

COMPOSITION & STRUCTURE

Species recorded for EE_OMPS_9

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?
Euca tere	*Eucalyptus tereticornis*	Forest Red Gum	Myrtaceae	20	5		Tree (TG)	No
Cory inte	*Corymbia intermedia*	Pink Bloodwood	Myrtaceae	5	3		Tree (TG)	No
Ango flor	*Angophora floribunda*	Rough-barked Apple	Myrtaceae	5	2		Tree (TG)	No
Euca prop	*Eucalyptus propinqua*	Small-fruited Grey Gum	Myrtaceae	10	1		Tree (TG)	No
Brey oblo	*Breynia oblongifolia*	Coffee Bush	Phyllanthacea	5	100		Shrub (SG)	No
Jack scop	*Jacksonia scoparia*	Dogwood	Fabaceae (Fal	5	20		Shrub (SG)	No
phyl virg	*Phyllanthus virgatus*	Wiry Spurge	Phyllanthacea	0.1	5		Forb (FG)	No
Loma long	*Lomandra longifolia*	Spiny-headed Mat-rush	Lomandracea	10	200		Grass & grasslike (GG)	No
Loma mult mult	*Lomandra multiflora sul*	Many-flowered Mat-rush	Lomandracea	5	100		Grass & grasslike (GG)	No
Glyc taba	*Glycine tabacina*	Variable Glycine	Fabaceae (Fal	0.1	25		Other (OG)	No
Desm vari	*Desmodium varians*	Slender Tick-trefoil	Fabaceae (Fal	0.1	25		Other (OG)	No
Desm brac	*Desmodium brachypodu*	Large Tick-trefoil	Fabaceae (Fal	0.1	20		Forb (FG)	No
Poly samb	*Polyscias sambucifolia*	Elderberry Panax	Araliaceae	0.1	5		Shrub (SG)	No
Micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	5	100		Grass & grasslike (GG)	No
Aust ramo	*Austrostipa ramosissima*	Stout Bamboo Grass	Poaceae	0.2	2		Grass & grasslike (GG)	No
trem tome aspe	*Trema tomentosa var. a*	Native Peach	Ulmaceae	0.1	1		Shrub (SG)	No
Comm cyan	*Commelina cyanea*	Native Wandering Jew	Commelinace	0.1	20		Forb (FG)	No
Ento stri	*Entolasia stricta*	Wiry Panic	Poaceae	2	100		Grass & grasslike (GG)	No
sige orie orie	*Sigesbeckia orientalis su*	Indian Weed	Asteraceae	0.5	50		Forb (FG)	No
Cony bona	*Conyza bonariensis*	Flaxleaf Fleabane	Asteraceae	0.1	2	*		No
Sola prin	*Solanum prinophyllum*	Forest Nightshade	Solanaceae	0.1	5		Forb (FG)	No
Poma umbe	*Pomax umbellata*	Pomax	Rubiaceae	0.5	50		Forb (FG)	No
Acac mela	*Acacia melanoxylon*	Blackwood	Fabaceae (Mi	1	10		Tree (TG)	No
leuc tric	*Leucopogon trichostylus*	Daphne Heath	Ericaceae	0.5	5		Shrub (SG)	No
Euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	0.1	2		Forb (FG)	No
Dian long	*Dianella longifolia*	Blueberry Lily	Phormiaceae	1	5		Forb (FG)	No
Plec parv	*Plectranthus parviflorus*		Lamiaceae	0.1	5		Forb (FG)	No
Pani simi	*Panicum simile*	Two-colour Panic	Poaceae	0.5	10		Grass & grasslike (GG)	No
Glyc micr	*Glycine microphylla*	Small-leaf Glycine	Fabaceae (Fal	0.1	2		Other (OG)	No
sene hisp	*Senecio hispidulus*	Hill Fireweed	Asteraceae	0.1	2		Forb (FG)	No
Allo	*Allocasuarina spp.*		Casuarinacea	2	2		Tree (TG)	No
Euca camp	*Eucalyptus campanulat*	New England Blackbutt	Myrtaceae	1	1		Tree (TG)	No
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE

	#N/A	#N/A	#N/A			#N/A		FALSE

BAM Site Field Survey								
Project:	OMPS	**Plot Identifier**	EE_OMPS_10	**Pic 20x20**		**Pic 20x50**		
Survey date:	29/10/2020		**Compass Orientation (head of 20x20 plot)**				90	
Recorders	EE CB		**PCT:**	842	High			
GPS Easting	420706	**GPS Northing**	6592248		**Datum**	GDA	**Zone**	56
Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance			
	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
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)

Additional information
Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for	EE_OMPS_10

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	Tree (TG)	5
	Shrub (SG)	4
	Forb (FG)	14
	Grass & grasslike (GG)	7
	Fern (EG)	1
	Other (OG)	3
	TOTAL	34

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of cover abundance (native vascular plants)	Tree (TG)	31
	Shrub (SG)	11.2
	Forb (FG)	6.9
	Grass & grasslike (GG)	21
	Fern (EG)	1
	Other (OG)	1.6
	TOTAL Native	72.7
	TOTAL 'HTE'	0

BAM Attribute (20 x 50m plot) Tree Stem Counts

DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79	2		2
30-49	5		1
20-29	10		
10-19	3	7	
5-9	2	2	
<5		6	N/A
Length of logs (m)		15	

0.1%=63x63cm
0.5%=1.4x1.4m
1%=2×2m
5%=4×5m
25%=10×10m

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %
Litter Cover	5m	30%	30.0%
	15m	20%	
	25m	40%	
	35m	20%	
	45m	40%	
Bare ground cover	5m	15%	21.0%
	15m	20%	
	25m	15%	
	35m	40%	
	45m	15%	
Cryptogam cover	5m	2%	3.2%
	15m	2%	
	25m	2%	
	35m	5%	
	45m	5%	
Rock Cover	5m	0%	2.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	10%	

COMPOSITION & STRUCTURE

Species recorded for		EE_OMPS_10						
Abbreviation	**Scientific Name**	**Common Name**	**Family**	**% Cover**	**Abundance**	**Exotic**	**Growth Form**	**High Threat?**
Euca tere	*Eucalyptus tereticornis*	Forest Red Gum	Myrtaceae	20	1		Tree (TG)	No
Cory inte	*Corymbia intermedia*	Pink Bloodwood	Myrtaceae	2	1		Tree (TG)	No
Allo toru	*Allocasuarina torulosa*	Forest Oak	Casuarinaceae	5	10		Tree (TG)	No
Ango flor	*Angophora floribunda*	Rough-barked Apple	Myrtaceae	2	4		Tree (TG)	No
Euca micr	*Eucalyptus microcorys*	Tallowwood	Myrtaceae	2	4		Tree (TG)	No
Brey oblo	*Breynia oblongifolia*	Coffee Bush	Phyllanthaceae	10	100		Shrub (SG)	No
Acac impl	*Acacia implexa*	Hickory Wattle	Fabaceae (Mimoso	1	10		Shrub (SG)	FALSE
Adia aeth	*Adiantum aethiopicum*	Common Maidenhair	Adiantaceae	1	50		Fern (EG)	No
pseu vari	*Pseuderanthemum varia*	Pastel Flower	Acanthaceae	0.1	20			No
Wahl comm	*Wahlenbergia communi*	Tufted Bluebell	Campanulaceae	0.1	20		Forb (FG)	No
Plec parv	*Plectranthus parviflorus*		Lamiaceae	1	100		Forb (FG)	No
sige orie orie	*Sigesbeckia orientalis su*	Indian Weed	Asteraceae	2	100		Forb (FG)	No
Loma mult mult	*Lomandra multiflora sub*	Many-flowered Mat-rush	Lomandraceae	5	20		Grass & grasslike (GG)	No
Loma long	*Lomandra longifolia*	Spiny-headed Mat-rush	Lomandraceae	2	5		Grass & grasslike (GG)	No
Impe cyli	*Imperata cylindrica*	Blady Grass	Poaceae	5	100		Grass & grasslike (GG)	No
Dian caer	*Dianella caerulea*	Blue Flax-lily	Phormiaceae	1	20		Forb (FG)	No
Desm brac	*Desmodium brachypodu*	Large Tick-trefoil	Fabaceae (Faboidea	1	100		Forb (FG)	No
Glyc taba	*Glycine tabacina*	Variable Glycine	Fabaceae (Faboidea	1	100		Other (OG)	No
Cony bona	*Conyza bonariensis*	Flaxleaf Fleabane	Asteraceae	0.1	5	*		No
Oper aspe	*Opercularia aspera*	Coarse Stinkweed	Rubiaceae	0.1	10		Forb (FG)	No
Micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	2	200		Grass & grasslike (GG)	No
Poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	5	200		Grass & grasslike (GG)	No
Euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	0.1	20		Forb (FG)	No
Opli aemu	*Oplismenus aemulus*		Poaceae	1	50		Grass & grasslike (GG)	No
Sene hisp	*Senecio hispidulus*	Hill Fireweed	Asteraceae	0.1	5		Forb (FG)	No
Prat purp	*Pratia purpurascens*	Whiteroot	Lobeliaceae	0.5	10		Forb (FG)	No
Dich repe	*Dichondra repens*	Kidney Weed	Convolvulaceae	0.2	20		Forb (FG)	No
Glyc micr	*Glycine microphylla*	Small-leaf Glycine	Fabaceae (Faboidea	0.5	50		Other (OG)	No
Plan debi	*Plantago debilis*	Shade Plantain	Plantaginaceae	0.1	5		Forb (FG)	No
Echi caes	*Echinopogon caespitosu*	Bushy Hedgehog-grass	Poaceae	1	10		Grass & grasslike (GG)	No
leuc tric	*Leucopogon trichostylus*	Daphne Heath	Ericaceae	0.1	5		Shrub (SG)	No
Bide pilo	*Bidens pilosa*	Cobbler's Pegs	Asteraceae	0.1	2	*		No
Oxal pere	*Oxalis perennans*		Oxalidaceae	0.1	5		Forb (FG)	No
geit cymo	*Geitonoplesium cymosu*	Scrambling Lily	Luzuriagaceae	0.1	2		Other (OG)	No
Ajug aust	*Ajuga australis*	Austral Bugle	Lamiaceae	0.1	10		Forb (FG)	No
pult	*Pultenaea spp.*		Fabaceae (Faboidea	0.1	1		Shrub (SG)	No
Dian long	*Dianella longifolia*	Blueberry Lily	Phormiaceae	0.5	5		Forb (FG)	No
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE

	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
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	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE

BAM Site Field Survey								
Project:	Omps	**Plot Identifier**	EE_OMPS_11	**Pic 20x20**		**Pic 20x50**		
Survey date:	29/10/2020		**Compass Orientation (head of 20x20 plot)**				130	
Recorders	EE CB		**PCT:**	842	High			
GPS Easting	420983	**GPS Northing**	6592166		**Datum**	GDA	**Zone**	56
Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance			
	Severity	**Age**	**Observational Evidence**
Clearing			Intended bam plot situated on cliff edge. Bam plot moved slightly. Veg same in bith zone 868.
Cultivation			
Soil erosion			
Firewood			
Grazing			
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)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for	EE_OMPS_11

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	Tree (TG)	5
	Shrub (SG)	1
	Forb (FG)	14
	Grass & grasslike (GG)	7
	Fern (EG)	0
	Other (OG)	7
	TOTAL	34

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of cover abundance (native vascular plants)	Tree (TG)	36
	Shrub (SG)	2
	Forb (FG)	8.8
	Grass & grasslike (GG)	24.1
	Fern (EG)	0
	Other (OG)	4.7
	TOTAL Native	75.6
	TOTAL 'HTE'	0

BAM Attribute (20 x 50m plot) Tree Stem Counts

DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79	1		
30-49	3		
20-29	1	2	
10-19	3	11	
5-9	4	9	
<5	2	105	N/A
Length of logs (m)		18	

0.1%=63x63cm
0.5%=1.4x1.4m
1%=2×2m
5%=4×5m
25%=10×10m

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %	Photos
Litter Cover	5m	70%	58.0%	
	15m	70%		
	25m	50%		
	35m	70%		
	45m	30%		
Bare ground cover	5m	10%	27.0%	
	15m	20%		
	25m	15%		
	35m	20%		
	45m	70%		
Cryptogam cover	5m	2%	1.6%	
	15m	2%		
	25m	2%		
	35m	2%		
	45m	0%		
Rock Cover	5m	0%	6.0%	
	15m	0%		
	25m	20%		
	35m	0%		
	45m	10%		

COMPOSITION & STRUCTURE

Species recorded for EE_OMPS_11

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
Euca tere	*Eucalyptus tereticornis*	Forest Red Gum	Myrtaceae	15	1		Tree (TG)	No	
Allo toru	*Allocasuarina torulosa*	Forest Oak	Casuarinacea	10	20		Tree (TG)	No	
Brey oblo	*Breynia oblongifolia*	Coffee Bush	Phyllanthacea	2	30		Shrub (SG)	No	
Loma long	*Lomandra longifolia*	Spiny-headed Mat-rush	Lomandracea	5	100		Grass & grasslike (GG)	No	
Loma mult mult	*Lomandra multiflora sul*	Many-flowered Mat-rush	Lomandracea	5	100		Grass & grasslike (GG)	No	
Impe cyli	*Imperata cylindrica*	Blady Grass	Poaceae	10	200		Grass & grasslike (GG)	No	
Sola pung	*Solanum pungetium*	Eastern Nightshade	Solanaceae	1	20		Forb (FG)	No	
Tylo pani	*Tylophora paniculata*	Thin-leaved Tylophora	Apocynaceae	0.1	5		Other (OG)	No	
Pars stra	*Parsonsia straminea*	Common Silkpod	Apocynaceae	0.5	20		Other (OG)	No	
Sige orie orie	*Sigesbeckia orientalis su*	Indian Weed	Asteraceae	2	200		Forb (FG)	No	
Glyc taba	*Glycine tabacina*	Variable Glycine	Fabaceae (Fal	1	100		Other (OG)	No	
Desm brac	*Desmodium brachypodu*	Large Tick-trefoil	Fabaceae (Fal	1	50		Forb (FG)	No	
Micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	2	100		Grass & grasslike (GG)	No	
Dich repe	*Dichondra repens*	Kidney Weed	Convolvulace	0.2	100		Forb (FG)	No	
Micr unif	*Microtis unifolia*	Common Onion Orchid	Orchidaceae	0.1	5		Forb (FG)	No	
Cony bona	*Conyza bonariensis*	Flaxleaf Fleabane	Asteraceae	0.1	5	*		No	
Sene hisp	*Senecio hispidulus*	Hill Fireweed	Asteraceae	0.1	10		Forb (FG)	No	
Euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	0.1	20		Forb (FG)	No	
Prat purp	*Pratia purpurascens*	Whiteroot	Lobeliaceae	0.5	100		Forb (FG)	No	
Brun aust	*Brunonia australis*	Blue Pincushion	Goodeniacea	0.5	50		Forb (FG)	No	
Ajug aust	*Ajuga australis*	Austral Bugle	Lamiaceae	0.2	20		Forb (FG)	No	
Desm vari	*Desmodium varians*	Slender Tick-trefoil	Fabaceae (Fal	1	50		Other (OG)	No	
Acac mela	*Acacia melanoxylon*	Blackwood	Fabaceae (Mi	1	10		Tree (TG)	No	
Wahl comm	*Wahlenbergia communi*	Tufted Bluebell	Campanulace	0.1	20		Forb (FG)	No	
Kenn rubi	*Kennedia rubicunda*	Dusky Coral Pea	Fabaceae (Fal	1	20		Other (OG)	No	
Care inve	*Carex inversa*	Knob Sedge	Cyperaceae	0.1	10		Grass & grasslike (GG)	No	
Hard viol	*Hardenbergia violacea*	False Sarsaparilla	Fabaceae (Fal	1	5		Other (OG)	No	
Glyc micr	*Glycine microphylla*	Small-leaf Glycine	Fabaceae (Fal	0.1	10		Other (OG)	No	
Dian caer	*Dianella caerulea*	Blue Flax-lily	Phormiaceae	1	20		Forb (FG)	No	
Dian long	*Dianella longifolia*	Blueberry Lily	Phormiaceae	1	20		Forb (FG)	No	
Comm cyan	*Commelina cyanea*	Native Wandering Jew	Commelinace	1	50		Forb (FG)	No	
Poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	1	25		Grass & grasslike (GG)	No	
Cyno dact	*Cynodon dactylon*	Common Couch	Poaceae	1	100		Grass & grasslike (GG)	No	
Sola nigr	*Solanum nigrum*	Black-berry Nightshade	Solanaceae	0.1	5	*		No	
Cory inte	*Corymbia intermedia*	Pink Bloodwood	Myrtaceae	5	1		Tree (TG)	No	
Euca ampl	*Eucalyptus amplifolia*	Cabbage Gum	Myrtaceae	5	1		Tree (TG)	No	
	#N/A	#N/A	#N/A			#N/A		FALSE	#N/A
	#N/A	#N/A	#N/A			#N/A		FALSE	#N/A
	#N/A	#N/A	#N/A			#N/A		FALSE	#N/A
	#N/A	#N/A	#N/A			#N/A		FALSE	#N/A

	#N/A	#N/A	#N/A			#N/A		FALSE	#N/A

BAM Site Field Survey									
Project:	Omps	**Plot Identifier**	EE_OMPS_12	**Pic 20x20**		**Pic 20x50**			
Survey date:	29/10/2020		**Compass Orientation (head of 20x20 plot)**						
Recorders	EE CB		**PCT:**	868	High				
GPS Easting	421157	**GPS Northing**	6592003		**Datum**	GDA	**Zone**	56	
Landform			**Soils**			**Drainage & Slope**			
Morphology			**Soil Texture**			**Slope**			
LandF Element			**Soil Colour**			**Aspect**			
LandF Pattern			**Soil Depth**			**Drainage**			
Microrelief			**Geology**			**Watercourses**			

Plot Disturbance			
	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
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)

Additional information
Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for	EE_OMPS_12

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	Tree (TG)	6
	Shrub (SG)	4
	Forb (FG)	12
	Grass & grasslike (GG)	13
	Fern (EG)	0
	Other (OG)	3
	TOTAL	38

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of cover abundance (native vascular plants)	Tree (TG)	67
	Shrub (SG)	1
	Forb (FG)	5.2
	Grass & grasslike (GG)	29.5
	Fern (EG)	0
	Other (OG)	0.8
	TOTAL Native	103.5
	TOTAL 'HTE'	0

BAM Attribute (20 x 50m plot) Tree Stem Counts

DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79	3		1
30-49	3		
20-29	10		
10-19	3		
5-9	5	1	
<5	28	10	N/A
Length of logs (m)			

0.1%=63x63cm
0.5%=1.4x1.4m
1%=2×2m
5%=4×5m
25%=10×10m

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %
Litter Cover	5m	40%	42.0%
	15m	60%	
	25m	30%	
	35m	30%	
	45m	50%	
Bare ground cover	5m	20%	16.0%
	15m	10%	
	25m	20%	
	35m	15%	
	45m	15%	
Cryptogam cover	5m	2%	3.4%
	15m	3%	
	25m	5%	
	35m	5%	
	45m	2%	
Rock Cover	5m	30%	24.0%
	15m	20%	
	25m	30%	
	35m	20%	
	45m	20%	

COMPOSITION & STRUCTURE

Species recorded for EE_OMPS_12

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?
Euca ampl	*Eucalyptus amplifolia*	Cabbage Gum	Myrtaceae	20	8		Tree (TG)	No
Ango flor	*Angophora floribunda*	Rough-barked Apple	Myrtaceae	5	1		Tree (TG)	No
Cory inte	*Corymbia intermedia*	Pink Bloodwood	Myrtaceae	5	3		Tree (TG)	No
Euca punc	*Eucalyptus punctata*	Grey Gum	Myrtaceae	30	6		Tree (TG)	No
Allo	*Allocasuarina spp.*		Casuarinacea	2	2		Tree (TG)	No
Brey oblo	*Breynia oblongifolia*	Coffee Bush	Phyllanthacea	0.5	5		Shrub (SG)	No
Sola prin	*Solanum prinophyllum*	Forest Nightshade	Solanaceae	0.5	10		Forb (FG)	No
Rubu parv	*Rubus parvifolius*	Native Raspberry	Rosaceae	0.2	20		Shrub (SG)	No
Sene hisp	*Senecio hispidulus*	Hill Fireweed	Asteraceae	0.1	10		Forb (FG)	No
Euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	0.1	20		Forb (FG)	No
Opli aemu	*Oplismenus aemulus*		Poaceae	2	100		Grass & grasslike (GG)	No
Plec parv	*Plectranthus parviflorus*		Lamiaceae	2	100		Forb (FG)	No
Prat purp	*Pratia purpurascens*	Whiteroot	Lobeliaceae	1	100		Forb (FG)	No
Oper aspe	*Opercularia aspera*	Coarse Stinkweed	Rubiaceae	0.1	5		Forb (FG)	No
Brun aust aust	*Brunoniella australis sub*	Blue Trumpet	Acanthaceae	0.2	25			No
Loma mult mult	*Lomandra multiflora sub*	Many-flowered Mat-rush	Lomandracea	5	30		Grass & grasslike (GG)	No
Loma long	*Lomandra longifolia*	Spiny-headed Mat-rush	Lomandracea	5	50		Grass & grasslike (GG)	No
Bide pilo	*Bidens pilosa*	Cobbler's Pegs	Asteraceae	0.1	2	*		No
Hard viol	*Hardenbergia violacea*	False Sarsaparilla	Fabaceae (Fal	0.2	10		Other (OG)	No
Wahl comm	*Wahlenbergia communi*	Tufted Bluebell	Campanulace	0.1	20		Forb (FG)	No
Dich repe	*Dichondra repens*	Kidney Weed	Convolvulace	0.1	100		Forb (FG)	No
sorg leio	*Sorghum leiocladum*	Wild Sorghum	Poaceae	0.5	5		Grass & grasslike (GG)	No
aust ramo	*Austrostipa ramosissima*	Stout Bamboo Grass	Poaceae	2	20		Grass & grasslike (GG)	No
Desm vari	*Desmodium varians*	Slender Tick-trefoil	Fabaceae (Fal	0.1	20		Other (OG)	No
Desm brac	*Desmodium brachypodu*	Large Tick-trefoil	Fabaceae (Fal	0.5	100		Forb (FG)	No
Glyc taba	*Glycine tabacina*	Variable Glycine	Fabaceae (Fal	0.5	100		Other (OG)	No
Ento stri	*Entolasia stricta*	Wiry Panic	Poaceae	2	100		Grass & grasslike (GG)	No
Poma umbe	*Pomax umbellata*	Pomax	Rubiaceae	0.1	20		Forb (FG)	No
Cyno dact	*Cynodon dactylon*	Common Couch	Poaceae	2	100		Grass & grasslike (GG)	No
Aris vaga	*Aristida vagans*	Threeawn Speargrass	Poaceae	2	50		Grass & grasslike (GG)	No
Cymb refr	*Cymbopogon refractus*	Barbed Wire Grass	Poaceae	2	25		Grass & grasslike (GG)	No
Echi caes	*Echinopogon caespitosu*	Bushy Hedgehog-grass	Poaceae	2	25		Grass & grasslike (GG)	No
Chei sieb	*Cheilanthes sieberi*	Rock Fern	Pteridaceae	0.2	50			No
Them tria	*Themeda triandra*		Poaceae	1	25		Grass & grasslike (GG)	No
Dian caer	*Dianella caerulea*	Blue Flax-lily	Phormiaceae	0.5	20		Forb (FG)	No
Poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	2	30		Grass & grasslike (GG)	No
Impe cyli	*Imperata cylindrica*	Blady Grass	Poaceae	2	100		Grass & grasslike (GG)	No
Sola nigr	*Solanum nigrum*	Black-berry Nightshade	Solanaceae	0.1	5	*		No
Euca camp	*Eucalyptus campanulato*	New England Blackbutt	Myrtaceae	5	1		Tree (TG)	No
Jack scop	*Jacksonia scoparia*	Dogwood	Fabaceae (Fal	0.2	2		Shrub (SG)	No

loma fras	*Lomatia fraseri*	Silky Lomatia	Proteaceae	0.1	2		Shrub (SG)	No
Dian long	*Dianella longifolia*	Blueberry Lily	Phormiaceae	0.1	2		Forb (FG)	No
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE

BAM Site Field Survey									
Project:	OMPS	**Plot Identifier**	EE_OMPS_13	**Pic 20x20**		**Pic 20x50**			
Survey date:	30/10/2020		**Compass Orientation (head of 20x20 plot)**				180		
Recorders	EE CB		**PCT:**	822	High				
GPS Easting	421985	**GPS Northing**	6591365		**Datum**	GDA	**Zone**	56	
Landform			**Soils**			**Drainage & Slope**			
Morphology			**Soil Texture**			**Slope**			
LandF Element			**Soil Colour**			**Aspect**			
LandF Pattern			**Soil Depth**			**Drainage**			
Microrelief			**Geology**			**Watercourses**			

Plot Disturbance			
	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
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)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for		EE_OMPS_13
BAM Attribute (20x20m plot)		
Count of Native Richness	Stratum	Sum
	Tree (TG)	6
	Shrub (SG)	4
	Forb (FG)	10
	Grass & grasslike (GG)	7
	Fern (EG)	0
	Other (OG)	4
	TOTAL	31
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	129
	Shrub (SG)	0.8
	Forb (FG)	3.9
	Grass & grasslike (GG)	20.1
	Fern (EG)	0
	Other (OG)	1.7
	TOTAL Native	155.5
	TOTAL 'HTE'	0

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	2		2
50-79	6		5
30-49	3		
20-29	4		
10-19	10	8	
5-9	10	52	
<5	24	80	N/A
Length of logs (m)		156	

0.1%=63x63cm
0.5%=1.4x1.4m
1%=2×2m
5%=4×5m
25%=10×10m

BAM Attributes (1 x 1m Plots)			
	Tape length	% cover	Average %
Litter Cover	5m	80%	85.0%
	15m	90%	
	25m	95%	
	35m	90%	
	45m	70%	
Bare ground cover	5m	5%	3.4%
	15m	0%	
	25m	0%	
	35m	2%	
	45m	10%	
Cryptogam cover	5m	2%	2.6%
	15m	2%	
	25m	2%	
	35m	5%	
	45m	2%	
Rock Cover	5m	10%	9.0%
	15m	10%	
	25m	5%	
	35m	5%	
	45m	15%	

COMPOSITION & STRUCTURE

Species recorded for EE_OMPS_13

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?
Euca cali	*Eucalyptus caliginosa*	Broad-leaved Stringybark	Myrtaceae	40	4		Tree (TG)	No
Euca micr	*Eucalyptus microcorys*	Tallowwood	Myrtaceae	40	4		Tree (TG)	No
Euca camp	*Eucalyptus campanulata*	New England Blackbutt	Myrtaceae	2	1		Tree (TG)	No
Allo litt	*Allocasuarina littoralis*	Black She-Oak	Casuarinacea	20	200		Tree (TG)	No
Allo toru	*Allocasuarina torulosa*	Forest Oak	Casuarinacea	25	200		Tree (TG)	No
Euca punc	*Eucalyptus punctata*	Grey Gum	Myrtaceae	2	1		Tree (TG)	No
Loma mult mult	*Lomandra multiflora sul*	Many-flowered Mat-rush	Lomandracea	5	10		Grass & grasslike (GG)	No
Loma long	*Lomandra longifolia*	Spiny-headed Mat-rush	Lomandracea	5	100		Grass & grasslike (GG)	No
Ento stri	*Entolasia stricta*	Wiry Panic	Poaceae	5	200		Grass & grasslike (GG)	No
Poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	2	20		Grass & grasslike (GG)	No
Micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	2	20		Grass & grasslike (GG)	No
Bill scan	*Billardiera scandens*	Hairy Apple Berry	Pittosporacea	1	50		Other (OG)	No
Oper aspe	*Opercularia aspera*	Coarse Stinkweed	Rubiaceae	0.2	100		Forb (FG)	No
Hard viol	*Hardenbergia violacea*	False Sarsaparilla	Fabaceae (Fal	0.1	10		Other (OG)	No
Poma umbe	*Pomax umbellata*	Pomax	Rubiaceae	1	200		Forb (FG)	No
Dich repe	*Dichondra repens*	Kidney Weed	Convolvulace	0.1	100		Forb (FG)	No
Sige orie orie	*Sigesbeckia orientalis su*	Indian Weed	Asteraceae	0.2	50		Forb (FG)	No
Adia aeth	*Adiantum aethiopicum*	Common Maidenhair	Adiantaceae	0.2	20			No
Sola prin	*Solanum prinophyllum*	Forest Nightshade	Solanaceae	0.1	1		Forb (FG)	No
Ozot	*Ozothamnus spp.*		Asteraceae	0.1	1		Shrub (SG)	No
Kenn rubi	*Kennedia rubicunda*	Dusky Coral Pea	Fabaceae (Fal	0.5	25		Other (OG)	No
Dian caer	*Dianella caerulea*	Blue Flax-lily	Phormiaceae	1	25		Forb (FG)	No
Prat purp	*Pratia purpurascens*	Whiteroot	Lobeliaceae	0.1	50		Forb (FG)	No
Plan debi	*Plantago debilis*	Shade Plantain	Plantaginacea	0.1	2		Forb (FG)	No
cayr clem	*Cayratia clematidea*	Native Grape	Vitaceae	0.1	10		Other (OG)	No
Euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	0.1	5		Forb (FG)	No
Pers line	*Persoonia linearis*	Narrow-leaved Geebung	Proteaceae	0.1	2		Shrub (SG)	No
Jack scop	*Jacksonia scoparia*	Dogwood	Fabaceae (Fal	0.5	15		Shrub (SG)	No
Them tria	*Themeda triandra*		Poaceae	1	20		Grass & grasslike (GG)	No
Dian long	*Dianella longifolia*	Blueberry Lily	Phormiaceae	1	25		Forb (FG)	No
Boss hete	*Bossiaea heterophylla*	Variable Bossiaea	Fabaceae (Fal	0.1	5		Shrub (SG)	No
Aris ramo	*Aristida ramosa*	Purple Wiregrass	Poaceae	0.1	2		Grass & grasslike (GG)	No
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE

	#N/A	#N/A	#N/A			#N/A		FALSE

BAM Site Field Survey									
Project:	OMPS	**Plot Identifier**	EE_OMPS_14	**Pic 20x20**		**Pic 20x50**			
Survey date:	30/11/2020		**Compass Orientation (head of 20x20 plot)**				200		
Recorders	EE CB		**PCT:**	822	High				
GPS Easting	421950	**GPS Northing**	6591234		**Datum**	GDA	**Zone**	56	
Landform			**Soils**			**Drainage & Slope**			
Morphology			**Soil Texture**			**Slope**			
LandF Element			**Soil Colour**			**Aspect**			
LandF Pattern			**Soil Depth**			**Drainage**			
Microrelief			**Geology**			**Watercourses**			

Plot Disturbance			
	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
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)

Additional information
Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for	EE_OMPS_14

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	Tree (TG)	5
	Shrub (SG)	5
	Forb (FG)	16
	Grass & grasslike (GG)	8
	Fern (EG)	0
	Other (OG)	6
	TOTAL	40

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of cover abundance (native vascular plants)	Tree (TG)	52
	Shrub (SG)	4.2
	Forb (FG)	18.4
	Grass & grasslike (GG)	90
	Fern (EG)	0
	Other (OG)	7.5
	TOTAL Native	172.1
	TOTAL 'HTE'	0

BAM Attribute (20 x 50m plot) Tree Stem Counts

DBH (cm)	Euc	Non Euc	Hollows
>80	2		2
50-79	6		4
30-49	6	1	
20-29	4	15	
10-19	1	3	
5-9	2	16	
<5	8	30	N/A
Length of logs (m)		38	

0.1%=63x63cm
0.5%=1.4x1.4m
1%=2×2m
5%=4×5m
25%=10×10m

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %
Litter Cover	5m	50%	68.0%
	15m	60%	
	25m	90%	
	35m	80%	
	45m	60%	
Bare ground cover	5m	10%	5.4%
	15m	5%	
	25m	0%	
	35m	2%	
	45m	10%	
Cryptogam cover	5m	0%	1.6%
	15m	2%	
	25m	2%	
	35m	2%	
	45m	2%	
Rock Cover	5m	10%	6.0%
	15m	5%	
	25m	10%	
	35m	5%	
	45m	0%	

COMPOSITION & STRUCTURE

Species recorded for EE_OMPS_14

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?
Euca camp	*Eucalyptus campanulata*	New England Blackbutt	Myrtaceae	15	2		Tree (TG)	No
Euca cali	*Eucalyptus caliginosa*	Broad-leaved Stringybark	Myrtaceae	5	1		Tree (TG)	No
Ango flor	*Angophora floribunda*	Rough-barked Apple	Myrtaceae	20	1		Tree (TG)	No
Allo litt	*Allocasuarina littoralis*	Black She-Oak	Casuarinacea	10	6		Tree (TG)	No
Pers line	*Persoonia linearis*	Narrow-leaved Geebung	Proteaceae	1	2		Shrub (SG)	No
Leuc lanc	*Leucopogon lanceolatus*		Ericaceae	2	20		Shrub (SG)	No
Euca punc	*Eucalyptus punctata*	Grey Gum	Myrtaceae	2	1		Tree (TG)	No
Dian caer	*Dianella caerulea*	Blue Flax-lily	Phormiaceae	1	20		Forb (FG)	No
Impe cyli	*Imperata cylindrica*	Blady Grass	Poaceae	70	500		Grass & grasslike (GG)	No
Loma long	*Lomandra longifolia*	Spiny-headed Mat-rush	Lomandracea	5	100		Grass & grasslike (GG)	No
Micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	2	50		Grass & grasslike (GG)	No
Sige orie orie	*Sigesbeckia orientalis su*	Indian Weed	Asteraceae	5	100		Forb (FG)	No
Sola pung	*Solanum pungetium*	Eastern Nightshade	Solanaceae	2	50		Forb (FG)	No
Bill scan	*Billardiera scandens*	Hairy Apple Berry	Pittosporacea	1	50		Other (OG)	No
Rubu parv	*Rubus parvifolius*	Native Raspberry	Rosaceae	1	50		Shrub (SG)	No
Hard viol	*Hardenbergia violacea*	False Sarsaparilla	Fabaceae (Fal	2	25		Other (OG)	No
Plec parv	*Plectranthus parviflorus*		Lamiaceae	2	100		Forb (FG)	No
Kenn rubi	*Kennedia rubicunda*	Dusky Coral Pea	Fabaceae (Fal	2	50		Other (OG)	No
Glyc taba	*Glycine tabacina*	Variable Glycine	Fabaceae (Fal	1	100		Other (OG)	No
Desm vari	*Desmodium varians*	Slender Tick-trefoil	Fabaceae (Fal	1	100		Other (OG)	No
Ento stri	*Entolasia stricta*	Wiry Panic	Poaceae	5	100		Grass & grasslike (GG)	No
Gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	2	100		Forb (FG)	No
Poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	2	10		Grass & grasslike (GG)	No
Sola nigr	*Solanum nigrum*	Black-berry Nightshade	Solanaceae	0.5	5	*		No
leuc tric	*Leucopogon trichostylus*	Daphne Heath	Ericaceae	0.1	5		Shrub (SG)	No
Brey oblo	*Breynia oblongifolia*	Coffee Bush	Phyllanthacea	0.1	2		Shrub (SG)	No
Prat purp	*Pratia purpurascens*	Whiteroot	Lobeliaceae	2	100		Forb (FG)	No
Dich repe	*Dichondra repens*	Kidney Weed	Convolvulace	1	100		Forb (FG)	No
Plan debi	*Plantago debilis*	Shade Plantain	Plantaginacea	0.1	25		Forb (FG)	No
Glyc micr	*Glycine microphylla*	Small-leaf Glycine	Fabaceae (Fal	0.5	50		Other (OG)	No
Desm brac	*Desmodium brachypodu*	Large Tick-trefoil	Fabaceae (Fal	1	100		Forb (FG)	No
Them tria	*Themeda triandra*		Poaceae	2	20		Grass & grasslike (GG)	No
Wahl comm	*Wahlenbergia communi*	Tufted Bluebell	Campanulace	0.2	50		Forb (FG)	No
Oper aspe	*Opercularia aspera*	Coarse Stinkweed	Rubiaceae	0.5	50		Forb (FG)	No
Sene hisp	*Senecio hispidulus*	Hill Fireweed	Asteraceae	0.1	2		Forb (FG)	No
Cymb laws	*Cymbonotus lawsonianu*	Bear's Ear	Asteraceae	0.2	50		Forb (FG)	No
Echi caes	*Echinopogon caespitosu*	Bushy Hedgehog-grass	Poaceae	2	50		Grass & grasslike (GG)	No
Poma umbe	*Pomax umbellata*	Pomax	Rubiaceae	1	100		Forb (FG)	No
Loma mult mult	*Lomandra multiflora sul*	Many-flowered Mat-rush	Lomandracea	2	50		Grass & grasslike (GG)	No
Euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	0.1	5		Forb (FG)	No

Viol beto	*Viola betonicifolia*	Native Violet	Violaceae	0.2	50		Forb (FG)	No
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE

BAM Site Field Survey									
Project:	OMPS	**Plot Identifier**	EE_OMPS_15	**Pic 20x20**		**Pic 20x50**			
Survey date:	30/11/2020		**Compass Orientation (head of 20x20 plot)**				0		
Recorders	EE CB		**PCT:**	868	Dry				
GPS Easting	422003	**GPS Northing**	6591579		**Datum**	GDA	**Zone**	56	
Landform			**Soils**			**Drainage & Slope**			
Morphology			**Soil Texture**			**Slope**			
LandF Element			**Soil Colour**			**Aspect**			
LandF Pattern			**Soil Depth**			**Drainage**			
Microrelief			**Geology**			**Watercourses**			
Plot Disturbance									
	Severity	**Age**	**Observational Evidence**						
Clearing									
Cultivation									
Soil erosion									
Firewood									
Grazing									
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)									
Additional information									
Current land use									
Age class of trees (DBH range) , Condition of Vegetation, Hollows									
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)									
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)									
Dominant Species outside Plot									

FUNCTION

Function attributes for	EE_OMPS_15

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	Tree (TG)	3
	Shrub (SG)	3
	Forb (FG)	13
	Grass & grasslike (GG)	8
	Fern (EG)	0
	Other (OG)	4
	TOTAL	31

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of cover abundance (native vascular plants)	Tree (TG)	65
	Shrub (SG)	2.5
	Forb (FG)	5.3
	Grass & grasslike (GG)	25.1
	Fern (EG)	0
	Other (OG)	4.1
	TOTAL Native	102
	TOTAL 'HTE'	0

BAM Attribute (20 x 50m plot) Tree Stem Counts

DBH (cm)	Euc	Non Euc	Hollows
>80	2		2
50-79	2		1
30-49	4	1	
20-29	3	7	
10-19	2	6	
5-9	2	3	
<5	8	28	N/A
Length of logs (m)		73	

0.1%=63x63cm
0.5%=1.4x1.4m
1%=2×2m
5%=4×5m
25%=10×10m

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %
Litter Cover	5m	50%	68.0%
	15m	90%	
	25m	70%	
	35m	70%	
	45m	60%	
Bare ground cover	5m	10%	8.0%
	15m	5%	
	25m	10%	
	35m	5%	
	45m	10%	
Cryptogam cover	5m	2%	0.8%
	15m	0%	
	25m	2%	
	35m	0%	
	45m	0%	
Rock Cover	5m	25%	15.0%
	15m	5%	
	25m	10%	
	35m	10%	
	45m	25%	

COMPOSITION & STRUCTURE

Species recorded for	EE_OMPS_15							
Abbreviation	**Scientific Name**	**Common Name**	**Family**	**% Cover**	**Abundance**	**Exotic**	**Growth Form**	**High Threat?**
Euca camp	*Eucalyptus campanulata*	New England Blackbutt	Myrtaceae	25	2		Tree (TG)	No
Euca cali	*Eucalyptus caliginosa*	Broad-leaved Stringybark	Myrtaceae	10	3		Tree (TG)	No
Allo toru	*Allocasuarina torulosa*	Forest Oak	Casuarinacea	30	10		Tree (TG)	No
Impe cyli	*Imperata cylindrica*	Blady Grass	Poaceae	10	500		Grass & grasslike (GG)	No
Euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	0.1	10		Forb (FG)	No
Bill scan	*Billardiera scandens*	Hairy Apple Berry	Pittosporacea	1	50		Other (OG)	No
Hard viol	*Hardenbergia violacea*	False Sarsaparilla	Fabaceae (Fal	2	50		Other (OG)	No
Sola prin	*Solanum prinophyllum*	Forest Nightshade	Solanaceae	0.5	10		Forb (FG)	No
Pers line	*Persoonia linearis*	Narrow-leaved Geebung	Proteaceae	1	2		Shrub (SG)	No
Ento stri	*Entolasia stricta*	Wiry Panic	Poaceae	1	50		Grass & grasslike (GG)	No
Plec parv	*Plectranthus parviflorus*		Lamiaceae	0.5	25		Forb (FG)	No
Comm cyan	*Commelina cyanea*	Native Wandering Jew	Commelinace	1	100		Forb (FG)	No
Loma mult mult	*Lomandra multiflora sul*	Many-flowered Mat-rush	Lomandracea	5	100		Grass & grasslike (GG)	No
Loma long	*Lomandra longifolia*	Spiny-headed Mat-rush	Lomandracea	5	100		Grass & grasslike (GG)	No
Oper diph	*Opercularia diphylla*	Stinkweed	Rubiaceae	0.1	20		Forb (FG)	No
Oper aspe	*Opercularia aspera*	Coarse Stinkweed	Rubiaceae	0.1	10		Forb (FG)	No
Kenn rubi	*Kennedia rubicunda*	Dusky Coral Pea	Fabaceae (Fal	1	20		Other (OG)	No
Dian long	*Dianella longifolia*	Blueberry Lily	Phormiaceae	0.5	20		Forb (FG)	No
Loma sila	*Lomatia silaifolia*	Crinkle Bush	Proteaceae	1	5		Shrub (SG)	No
Viol beto	*Viola betonicifolia*	Native Violet	Violaceae	0.1	50		Forb (FG)	No
Dian caer	*Dianella caerulea*	Blue Flax-lily	Phormiaceae	1	50		Forb (FG)	No
Aris ramo	*Aristida ramosa*	Purple Wiregrass	Poaceae	1	20		Grass & grasslike (GG)	No
Poma umbe	*Pomax umbellata*	Pomax	Rubiaceae	1	100		Forb (FG)	No
Plan debi	*Plantago debilis*	Shade Plantain	Plantaginacea	0.1	20		Forb (FG)	No
tylo pani	*Tylophora paniculata*	Thin-leaved Tylophora	Apocynaceae	0.1	1		Other (OG)	No
Dich micr	*Dichelachne micrantha*	Shorthair Plumegrass	Poaceae	0.1	2		Grass & grasslike (GG)	No
Prat purp	*Pratia purpurascens*	Whiteroot	Lobeliaceae	0.2	50		Forb (FG)	No
Ento marg	*Entolasia marginata*	Bordered Panic	Poaceae	1	20		Grass & grasslike (GG)	No
diur sulp	*Diuris sulphurea*	Tiger Orchid	Orchidaceae	0.1	1		Forb (FG)	No
Ryti race	*Rytidosperma racemosu*	Wallaby Grass	Poaceae	0.1	1			No
Brey oblo	*Breynia oblongifolia*	Coffee Bush	Phyllanthacea	0.5	10		Shrub (SG)	No
Them tria	*Themeda triandra*		Poaceae	2	30		Grass & grasslike (GG)	No
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE

	#N/A	#N/A	#N/A			#N/A		FALSE

BAM Site Field Survey								
Project:	Omps	**Plot Identifier**	EE_OMPS_16	**Pic 20x20**		**Pic 20x50**		
Survey date:	30/10/2020		**Compass Orientation (head of 20x20 plot)**				180	
Recorders	EE CB		**PCT:**	822	High			
GPS Easting	422031	**GPS Northing**	6591451		**Datum**	GDA	**Zone**	56
Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance			
	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
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)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for		EE_OMPS_16
BAM Attribute (20x20m plot)		
Count of Native Richness	Stratum	Sum
	Tree (TG)	2
	Shrub (SG)	4
	Forb (FG)	7
	Grass & grasslike (GG)	4
	Fern (EG)	1
	Other (OG)	4
	TOTAL	22
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	25
	Shrub (SG)	0.9
	Forb (FG)	1.7
	Grass & grasslike (GG)	18
	Fern (EG)	0.2
	Other (OG)	0.8
	TOTAL Native	46.6
	TOTAL 'HTE'	0

BAM Attributes (1 x 1m Plots)			
	Tape length	% cover	Average %
Litter Cover	5m	15%	42.0%
	15m	80%	
	25m	20%	
	35m	25%	
	45m	70%	
Bare ground cover	5m	60%	17.4%
	15m	2%	
	25m	20%	
	35m	5%	
	45m	0%	
Cryptogam cover	5m	0%	4.0%
	15m	0%	
	25m	0%	
	35m	5%	
	45m	15%	
Rock Cover	5m	25%	46.0%
	15m	15%	
	25m	60%	
	35m	60%	
	45m	70%	

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	2		2
50-79	2		1
30-49	1		1
20-29	1		
10-19	2	1	
5-9	1	10	
<5	2	60	N/A
Length of logs (m)		162	

0.1%=63x63cm
0.5%=1.4x1.4m
1%=2×2m
5%=4×5m
25%=10×10m

COMPOSITION & STRUCTURE

Species recorded for	EE_OMPS_16							
Abbreviation	**Scientific Name**	**Common Name**	**Family**	**% Cover**	**Abundance**	**Exotic**	**Growth Form**	**High Threat?**
Euca camp	*Eucalyptus campanulata*	New England Blackbutt	Myrtaceae	20	4		Tree (TG)	No
Allo litt	*Allocasuarina littoralis*	Black She-Oak	Casuarinaceae	5	12		Tree (TG)	No
Loma long	*Lomandra longifolia*	Spiny-headed Mat-rush	Lomandraceae	2	20		Grass & grasslike (GG)	No
Loma mult mult	*Lomandra multiflora sul*	Many-flowered Mat-rush	Lomandraceae	5	50		Grass & grasslike (GG)	No
Loma fili	*Lomandra filiformis*	Wattle Matt-rush	Lomandraceae	10	100		Grass & grasslike (GG)	No
jack scop	*Jacksonia scoparia*	Dogwood	Fabaceae (Faboideae)	0.2	50		Shrub (SG)	No
ryti proc	*Rhytidosporum procumb*		Poaceae	0.1	30		Shrub (SG)	No
zier cyti	*Zieria cytisoides*	Downy Zieria	Rutaceae	0.1	5		Shrub (SG)	No
Hard viol	*Hardenbergia violacea*	False Sarsaparilla	Fabaceae (Faboideae)	0.1	10		Other (OG)	No
Smil aust	*Smilax australis*	Lawyer Vine	Smilacaceae	0.5	1		Other (OG)	No
Poma umbe	*Pomax umbellata*	Pomax	Rubiaceae	1	100		Forb (FG)	No
Ento stri	*Entolasia stricta*	Wiry Panic	Poaceae	1	50		Grass & grasslike (GG)	No
Dian long	*Dianella longifolia*	Blueberry Lily	Phormiaceae	0.1	1		Forb (FG)	No
Plec parv	*Plectranthus parviflorus*		Lamiaceae	0.1	20		Forb (FG)	No
Chei sieb	*Cheilanthes sieberi*	Rock Fern	Pteridaceae	0.2	100		Fern (EG)	No
Bill scan	*Billardiera scandens*	Hairy Apple Berry	Pittosporaceae	0.1	10		Other (OG)	No
Pers line	*Persoonia linearis*	Narrow-leaved Geebung	Proteaceae	0.5	2		Shrub (SG)	No
Kenn rubi	*Kennedia rubicunda*	Dusky Coral Pea	Fabaceae (Faboideae)	0.1	2		Other (OG)	No
Wahl stri	*Wahlenbergia stricta*	Tall Bluebell	Campanulaceae	0.2	25		Forb (FG)	No
Good hede	*Goodenia hederacea*	Ivy Goodenia	Goodeniaceae	0.1	1		Forb (FG)	No
Oper hisp	*Opercularia hispida*	Hairy Stinkweed	Rubiaceae	0.1	10		Forb (FG)	No
Dian caer	*Dianella caerulea*	Blue Flax-lily	Phormiaceae	0.1	1		Forb (FG)	No
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE

	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE

BAM Site Field Survey									
Project:	20-617 Oven Mt	**Plot Identifier**	LW_OMPS_1	**Pic 20x20**		**Pic 20x50**			
Survey date:	19/11/2020		**Compass Orientation (head of 20x20 plot)**						
Recorders	GX LW		**PCT:**	842	High				
GPS Easting	422772	GPS Northing	6597263		**Datum**	GDA	**Zone**	56	
Landform			**Soils**			**Drainage & Slope**			
Morphology			**Soil Texture**			**Slope**			
LandF Element			**Soil Colour**			**Aspect**			
LandF Pattern			**Soil Depth**			**Drainage**			
Microrelief			**Geology**			**Watercourses**			

Plot Disturbance			
	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
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)

Additional information
Current land use
vacant land in industrial zone
Age class of trees (DBH range) , Condition of Vegetation, Hollows
mature and regrowth possible hollows mod condition
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
as above
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)
none

Dominant Species outside Plot	

FUNCTION

Function attributes for	LW_OMPS_1

BAM Attribute (20x20m plot)		
Count of Native Richness	Stratum	Sum
	Tree (TG)	5
	Shrub (SG)	1
	Forb (FG)	10
	Grass & grasslike (GG)	5
	Fern (EG)	0
	Other (OG)	3
	TOTAL	24

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	76.1
	Shrub (SG)	0.1
	Forb (FG)	1.4
	Grass & grasslike (GG)	90.1
	Fern (EG)	0
	Other (OG)	15.1
	TOTAL Native	182.8
	TOTAL 'HTE'	5.1

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79	2		1
30-49	2		
20-29	1		1
10-19	5		1
5-9	2		
<5	1		N/A
Length of logs (m)		10	

0.1%=63x63cm
0.5%=1.4x1.4m
1%=2×2m
5%=4×5m
25%=10×10m

BAM Attributes (1 x 1m Plots)			
	Tape length	% cover	Average %
Litter Cover	5m	70%	50.0%
	15m	30%	
	25m	30%	
	35m	50%	
	45m	70%	
Bare ground cover	5m	5%	14.0%
	15m	30%	
	25m	10%	
	35m	20%	
	45m	5%	
Cryptogam cover	5m	0%	0.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	
Rock Cover	5m	25%	22.0%
	15m	30%	
	25m	25%	
	35m	15%	
	45m	15%	

COMPOSITION & STRUCTURE

Species recorded for LW_OMPS_1

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?
euca ampl	*Eucalyptus amplifolia*	Cabbage Gum	Myrtaceae	30	6		Tree (TG)	No
cory inte	*Corymbia intermedia*	Pink Bloodwood	Myrtaceae	20	3		Tree (TG)	No
euca mell	*Eucalyptus melliodora*	Yellow Box	Myrtaceae	25	1		Tree (TG)	No
dich sp.	*Dichondra sp. A*	Kidney Weed	Convolvulace	0.5	20		Forb (FG)	No
pani effu	*Panicum effusum*	Hairy Panic	Poaceae	50	200		Grass & grasslike (GG)	No
glyc tome	*Glycine tomentella*	Woolly Glycine	Fabaceae (Fat	5	100		Other (OG)	No
meli repe	*Melinis repens*	Red Natal Grass	Poaceae	10	30	*		No
aris grac	*Aristida gracilipes*	Three-awn Speargrass	Poaceae	5	10		Grass & grasslike (GG)	No
sola maur	*Solanum mauritianum*	Wild Tobacco Bush	Solanaceae	0.1	1	*		No
brey oblo	*Breynia oblongifolia*	Coffee Bush	Phyllanthacea	0.1	1		Shrub (SG)	No
spor fert	*Sporobolus fertilis*	Giant Parramatta Grass	Poaceae	5	30	*		HTE
alph exce	*Alphitonia excelsa*	Red Ash	Rhamnaceae	0.1	1		Tree (TG)	No
comm ensi	*Commelina ensifolia*	Scurvy Grass	Commelinace	0.1	5		Forb (FG)	No
loma mult mult	*Lomandra multiflora sul*	Many-flowered Mat-rush	Lomandracea	5	30		Grass & grasslike (GG)	No
glyc taba	*Glycine tabacina*	Variable Glycine	Fabaceae (Fat	10	100		Other (OG)	No
wahl stri	*Wahlenbergia stricta*	Tall Bluebell	Campanulace	0.1	1		Forb (FG)	No
crot mont angu	*Crotalaria montana var.*		Fabaceae (Fat	0.1	5		Forb (FG)	No
tric elat	*Tricoryne elatior*	Yellow Autumn-lily	Anthericaceae	0.1	5		Forb (FG)	No
sche aust	*Schenkia australis*	Spike Centaury	Gentianaceae	0.1	2		Forb (FG)	No
cony bona	*Conyza bonariensis*	Flaxleaf Fleabane	Asteraceae	0.1	5	*		No
sola amer	*Solanum americanum*	Glossy Nightshade	Solanaceae	0.1	1		Forb (FG)	No
heli ampl	*Heliotropium amplexica*	Blue Heliotrope	Boraginaceae	0.1	5	*		HTE
hete cont	*Heteropogon contortus*	Bunch Speargrass	Poaceae	30	100		Grass & grasslike (GG)	No
scle mack	*Scleria mackaviensis*		Cyperaceae	0.1	5		Grass & grasslike (GG)	No
sige aust	*Sigesbeckia australiensis*		Asteraceae	0.1	10		Forb (FG)	No
glyc micr	*Glycine microphylla*	Small-leaf Glycine	Fabaceae (Fat	0.1	1		Other (OG)	No
dian revo	*Dianella revoluta*	Blueberry Lily	Phormiaceae	0.1	1		Forb (FG)	No
ango subv	*Angophora subvelutina*	Broad-leaved Apple	Myrtaceae	1	1		Tree (TG)	No
glos bide	*Glossocardia bidens*	Cobbler's Tack	Asteraceae	0.1	5		Forb (FG)	No
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE

	#N/A	#N/A	#N/A			#N/A		FALSE

BAM Site Field Survey								
Project:	20-617	**Plot Identifier**	LW_OMPS_2	**Pic 20x20**		**Pic 20x50**		
Survey date:	19/11/2020		**Compass Orientation (head of 20x20 plot)**					
Recorders	GX LW		**PCT:**	1106	ModerateFP			
GPS Easting	422769	**GPS Northing**	6597297		**Datum**	GDA	**Zone**	56
Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance			
	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
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)

Additional information

Current land use

vacant land in industrial zone

Age class of trees (DBH range) , Condition of Vegetation, Hollows

mature and regrowth possible hollows mod condition

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

as above

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

none

Dominant Species outside Plot

FUNCTION

Function attributes for	LW_OMPS_2

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	Tree (TG)	4
	Shrub (SG)	3
	Forb (FG)	11
	Grass & grasslike (GG)	5
	Fern (EG)	0
	Other (OG)	1
	TOTAL	24

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of cover abundance (native vascular plants)	Tree (TG)	65
	Shrub (SG)	7.1
	Forb (FG)	2.9
	Grass & grasslike (GG)	23
	Fern (EG)	0
	Other (OG)	0.1
	TOTAL Native	98.1
	TOTAL 'HTE'	10.5

BAM Attribute (20 x 50m plot) Tree Stem Counts

DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79	2	1	1
30-49			
20-29		1	
10-19			
5-9			
<5			N/A
Length of logs (m)		15	

0.1%=63x63cm
0.5%=1.4x1.4m
1%=2×2m
5%=4×5m
25%=10×10m

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %
Litter Cover	5m	70%	23.0%
	15m	30%	
	25m	10%	
	35m	0%	
	45m	5%	
Bare ground cover	5m	10%	5.2%
	15m	0%	
	25m	15%	
	35m	0%	
	45m	1%	
Cryptogam cover	5m	0%	0.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	
Rock Cover	5m	5%	1.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	

COMPOSITION & STRUCTURE

Species recorded for		LW_OMPS_2						
Abbreviation	**Scientific Name**	**Common Name**	**Family**	**% Cover**	**Abundance**	**Exotic**	**Growth Form**	**High Threat?**
casu cunn cunn	*Casuarina cunninghamia*	River Oak	Casuarinaceae	25	2		Tree (TG)	No
euca ampl	*Eucalyptus amplifolia*	Cabbage Gum	Myrtaceae	30	2		Tree (TG)	No
mela brac	*Melaleuca bracteata*	Black Tea-tree	Myrtaceae	2	1		Shrub (SG)	No
call vimi	*Callistemon viminalis*	Weeping Bottlebrush	Myrtaceae	5	2		Tree (TG)	No
mall phil	*Mallotus philippensis*	Red Kamala	Euphorbiaceae	5	1		Tree (TG)	No
aust vert	*Austrostipa verticillata*	Slender Bamboo Grass	Poaceae	10	50		Grass & grasslike (GG)	No
plan debi	*Plantago debilis*	Shade Plantain	Plantaginaceae	1	20		Forb (FG)	No
heli ampl	*Heliotropium amplexica*	Blue Heliotrope	Boraginaceae	10	100	*		HTE
sida rhom	*Sida rhombifolia*	Paddy's Lucerne	Malvaceae	5	30	*		No
abut oxyc	*Abutilon oxycarpum*	Straggly Lantern-bush	Malvaceae	5	30		Shrub (SG)	No
cony bona	*Conyza bonariensis*	Flaxleaf Fleabane	Asteraceae	1	5	*		No
phyt octa	*Phytolacca octandra*	Inkweed	Phytolaccaceae	1	5	*		No
nyss diff	*Nyssanthes diffusa*	Barbwire Weed	Amaranthaceae	1	5		Forb (FG)	No
cyno dact	*Cynodon dactylon*	Common Couch	Poaceae	10	100		Grass & grasslike (GG)	No
malv amer	*Malvastrum americanur*	Spiked Malvastrum	Malvaceae	1	10	*		No
axon comp	*Axonopus compressus*	Broad-leaved Carpet Grass	Poaceae	40	100	*		No
wahl grac	*Wahlenbergia gracilenta*	Annual Bluebell	Campanulaceae	0.1	1		Forb (FG)	No
chlo vent	*Chloris ventricosa*	Tall Chloris	Poaceae	1	10		Grass & grasslike (GG)	No
spor elon	*Sporobolus elongatus*	Slender Rat's Tail Grass	Poaceae	1	10		Grass & grasslike (GG)	No
	Calotis spp.	#N/A	#N/A	0.1	1	#N/A	Forb (FG)	No
cype grac	*Cyperus gracilis*	Slender Flat-sedge	Cyperaceae	1	100		Grass & grasslike (GG)	No
sene mada	*Senecio madagascariens*	Fireweed	Asteraceae	0.1		*		No
sola viar	*Solanum viarum*	Tropical Soda Apple	Solanaceae	0.1	1	*		No
nico fors	*Nicotiana forsteri*		Solanaceae	0.1	1		Forb (FG)	No
sola amer	*Solanum americanum*	Glossy Nightshade	Solanaceae	0.1	1		Forb (FG)	No
brey oblo	*Breynia oblongifolia*	Coffee Bush	Phyllanthaceae	0.1	1		Shrub (SG)	No
rume brow	*Rumex brownii*	Swamp Dock	Polygonaceae	0.1	1		Forb (FG)	No
datu stra	*Datura stramonium*	Common Thornapple	Solanaceae	1	10	*		No
eleu indi	*Eleusine indica*	Crowsfoot Grass	Poaceae	0.5	30	*		No
bide bipi	*Bidens bipinnata*	Bipinnate Beggar's Ticks	Asteraceae	0.2	10	*		No
sonc oler	*Sonchus oleraceus*	Common Sowthistle	Asteraceae	0.1	1	*		No
oxal corn	*Oxalis corniculata*	Creeping Oxalis	Oxalidaceae	0.1	1	*		No
ipom pleb	*Ipomoea plebeia*		Convolvulaceae	0.1	1		Other (OG)	No
lant cama	*Lantana camara*	Lantana	Verbenaceae	0.5	1	*		HTE
caps burs	*Capsella bursa-pastoris*	Shepherd's Purse	Brassicaceae	0.5	1	*		No
cent cunn	*Centipeda cunninghamii*	Common Sneezeweed	Asteraceae	0.1	1		Forb (FG)	No
cent asia	*Centella asiatica*	Indian Pennywort	Apiaceae	0.1	1		Forb (FG)	No
wahl comm	*Wahlenbergia communi*	Tufted Bluebell	Campanulaceae	0.1	1		Forb (FG)	No
dysp pumi	*Dysphania pumilio*	Small Crumbweed	Chenopodiaceae	0.1	1		Forb (FG)	No
	#N/A	#N/A	#N/A			#N/A		FALSE

	#N/A	#N/A	#N/A			#N/A		FALSE

BAM Site Field Survey									
Project:	20-617 Oven Mt	**Plot Identifier**	LW_OMPS_3	**Pic 20x20**		**Pic 20x50**			
Survey date:	19/11/2020		**Compass Orientation (head of 20x20 plot)**						
Recorders	GX LW		**PCT:**	842	High				
GPS Easting	421908	**GPS Northing**	6595069		**Datum**	GDA	**Zone**	56	
Landform			**Soils**			**Drainage & Slope**			
Morphology			**Soil Texture**			**Slope**			
LandF Element			**Soil Colour**			**Aspect**			
LandF Pattern			**Soil Depth**			**Drainage**			
Microrelief			**Geology**			**Watercourses**			

Plot Disturbance			
	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
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)

Additional information

Current land use

vacant land in industrial zone

Age class of trees (DBH range) , Condition of Vegetation, Hollows

mature and regrowth possible hollows mod condition

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

as above

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

none

Dominant Species outside Plot

FUNCTION

Function attributes for	LW_OMPS_3

BAM Attribute (20x20m plot)		
Count of Native Richness	Stratum	Sum
	Tree (TG)	8
	Shrub (SG)	5
	Forb (FG)	7
	Grass & grasslike (GG)	3
	Fern (EG)	2
	Other (OG)	3
	TOTAL	28

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	64
	Shrub (SG)	11.2
	Forb (FG)	0.9
	Grass & grasslike (GG)	3
	Fern (EG)	0.3
	Other (OG)	5.2
	TOTAL Native	84.6
	TOTAL 'HTE'	0

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79	5		2
30-49	5		
20-29	3		
10-19	3		
5-9	2		
<5	2		N/A
Length of logs (m)		15	

0.1%=63x63cm
0.5%=1.4x1.4m
1%=2×2m
5%=4×5m
25%=10×10m

BAM Attributes (1 x 1m Plots)			
	Tape length	% cover	Average %
Litter Cover	5m	10%	55.0%
	15m	40%	
	25m	60%	
	35m	80%	
	45m	85%	
Bare ground cover	5m	30%	6.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	
Cryptogam cover	5m	0%	0.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	
Rock Cover	5m	5%	3.0%
	15m	10%	
	25m	0%	
	35m	0%	
	45m	0%	

COMPOSITION & STRUCTURE

Species recorded for LW_OMPS_3

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?
euca mell	*Eucalyptus melliodora*	Yellow Box	Myrtaceae	20	2		Tree (TG)	No
euca ampl	*Eucalyptus amplifolia*	Cabbage Gum	Myrtaceae	25	3		Tree (TG)	No
euca carn	*Eucalyptus carnea*	Thick-leaved Mahogany	Myrtaceae	5	1		Tree (TG)	No
alec subd	*Alectryon subdentatus f.*		Sapindaceae	1	1		Shrub (SG)	No
pers corn	*Persoonia cornifolia*		Proteaceae	5	2		Shrub (SG)	No
cory inte	*Corymbia intermedia*	Pink Bloodwood	Myrtaceae	5	1		Tree (TG)	No
mall phil	*Mallotus philippensis*	Red Kamala	Euphorbiacea	5	1		Tree (TG)	No
burs spin	*Bursaria spinosa*	Native Blackthorn	Pittosporacea	2	1		Shrub (SG)	No
ficu rubi	*Ficus rubiginosa*	Port Jackson Fig	Moraceae	2	1		Tree (TG)	No
euca euge	*Eucalyptus eugenioides*	Thin-leaved Stringybark	Myrtaceae	1	1		Tree (TG)	No
leuc muti	*Leucopogon muticus*	Blunt Beard-heath	Ericaceae	3	10		Shrub (SG)	No
alph exce	*Alphitonia excelsa*	Red Ash	Rhamnaceae	1	1		Tree (TG)	No
loma long	*Lomandra longifolia*	Spiny-headed Mat-rush	Lomandracea	1	2		Grass & grasslike (GG)	No
bide pilo	*Bidens pilosa*	Cobbler's Pegs	Asteraceae	0.1	1	*		No
tric elat	*Tricoryne elatior*	Yellow Autumn-lily	Anthericaceae	0.1	1		Forb (FG)	No
glyc tome	*Glycine tomentella*	Woolly Glycine	Fabaceae (Fal	5	50		Other (OG)	No
dian long	*Dianella longifolia*	Blueberry Lily	Phormiaceae	0.1	2		Forb (FG)	No
meli repe	*Melinis repens*	Red Natal Grass	Poaceae	80	100	*		No
plec parv	*Plectranthus parviflorus*		Lamiaceae	0.1	1		Forb (FG)	No
cymb refr	*Cymbopogon refractus*	Barbed Wire Grass	Poaceae	1	10		Grass & grasslike (GG)	No
them tria	*Themeda triandra*		Poaceae	1	5		Grass & grasslike (GG)	No
glyc micr	*Glycine microphylla*	Small-leaf Glycine	Fabaceae (Fal	0.1	1		Other (OG)	No
brey oblo	*Breynia oblongifolia*	Coffee Bush	Phyllanthacea	0.2	1		Shrub (SG)	No
eust lati	*Eustrephus latifolius*	Wombat Berry	Luzuriagaceae	0.1	1		Other (OG)	No
sene mada	*Senecio madagascariens*	Fireweed	Asteraceae	0.1	1	*		No
crot mont angu	*Crotalaria montana var.*		Fabaceae (Fal	0.2	10		Forb (FG)	No
rost adsc	*Rostellularia adscendens*	Pink Tongues	Acanthaceae	0.1	1			No
wahl stri	*Wahlenbergia stricta*	Tall Bluebell	Campanulace	0.2	10		Forb (FG)	No
chei sieb	*Cheilanthes sieberi*	Rock Fern	Pteridaceae	0.2	10		Fern (EG)	No
zorn dyct dyct	*Zornia dyctiocarpa var. d*	Zornia	Fabaceae (Fal	0.1	1		Forb (FG)	No
sida rhom	*Sida rhombifolia*	Paddy's Lucerne	Malvaceae	1	10	*		No
gomp phys	*Gomphocarpus physoca*	Balloon Cotton Bush	Apocynaceae	0.1	1	*		No
chei dist	*Cheilanthes distans*	Bristly Cloak Fern	Pteridaceae	0.1	10		Fern (EG)	No
sola amer	*Solanum americanum*	Glossy Nightshade	Solanaceae	0.1	1		Forb (FG)	No
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE

	#N/A	#N/A	#N/A			#N/A		FALSE

BAM Site Field Survey								
Project:	20-617	**Plot Identifier**	LW_OMPS_5	**Pic 20x20**		**Pic 20x50**		
Survey date:	19/11/2020		**Compass Orientation (head of 20x20 plot)**					
Recorders	GX LW		**PCT:**	842	DNGModerate			
GPS Easting	421110	**GPS Northing**	6594255		**Datum**	GDA	**Zone**	56
Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance			
	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
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)

Additional information

Current land use

vacant land in industrial zone

Age class of trees (DBH range) , Condition of Vegetation, Hollows

mature and regrowth possible hollows mod condition

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

as above

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

none

Dominant Species outside Plot

FUNCTION

Function attributes for	LW_OMPS_5

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	Tree (TG)	0
	Shrub (SG)	1
	Forb (FG)	2
	Grass & grasslike (GG)	2
	Fern (EG)	1
	Other (OG)	3
	TOTAL	9

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of cover abundance (native vascular plants)	Tree (TG)	0
	Shrub (SG)	2
	Forb (FG)	2
	Grass & grasslike (GG)	10.5
	Fern (EG)	0.5
	Other (OG)	5.3
	TOTAL Native	20.3
	TOTAL 'HTE'	30

BAM Attribute (20 x 50m plot) Tree Stem Counts

DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49			
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)			

0.1%=63x63cm
0.5%=1.4x1.4m
1%=2×2m
5%=4×5m
25%=10×10m

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %
Litter Cover	5m	2%	1.6%
	15m	2%	
	25m	0%	
	35m	2%	
	45m	2%	
Bare ground cover	5m	0%	7.0%
	15m	20%	
	25m	5%	
	35m	5%	
	45m	5%	
Cryptogam cover	5m	0%	0.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	
Rock Cover	5m	0%	0.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	

COMPOSITION & STRUCTURE

Species recorded for LW_OMPS_5

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?
lant cama	*Lantana camara*	Lantana	Verbenaceae	5	5	*		HTE
sida rhom	*Sida rhombifolia*	Paddy's Lucerne	Malvaceae	2	10	*		No
fimb dich	*Fimbristylis dichotoma*	Common Fringe-sedge	Cyperaceae	0.5	30		Grass & grasslike (GG)	No
chei sieb	*Cheilanthes sieberi*	Rock Fern	Pteridaceae	0.5	20		Fern (EG)	No
wahl stri	*Wahlenbergia stricta*	Tall Bluebell	Campanulaceae	1	95		Forb (FG)	No
hete cont	*Heteropogon contortus*	Bunch Speargrass	Poaceae	10	100		Grass & grasslike (GG)	No
sene mada	*Senecio madagascariens*	Fireweed	Asteraceae	0.5	10	*		No
rich bras	*Richardia brasiliensis*	Mexican Clover	Rubiaceae	0.1	1	*		No
desm vari	*Desmodium varians*	Slender Tick-trefoil	Fabaceae (Fabo	0.2	5		Other (OG)	No
cony bona	*Conyza bonariensis*	Flaxleaf Fleabane	Asteraceae	0.2	5	*		No
heli ampl	*Heliotropium amplexica*	Blue Heliotrope	Boraginaceae	25	100	*		HTE
axon comp	*Axonopus compressus*	Broad-leaved Carpet Grass	Poaceae	60	300	*		No
sida hack	*Sida hackettiana*	Golden Rod, Spiked Sida, Queen	Malvaceae	1	10		Forb (FG)	No
arge ochr ochr	*Argemone ochroleuca su*	Mexican Poppy	Papaveraceae	0.5	10	*		No
glyc tome	*Glycine tomentella*	Woolly Glycine	Fabaceae (Fabo	5	20		Other (OG)	No
gomp phys	*Gomphocarpus physoca*	Balloon Cotton Bush	Apocynaceae	2	10	*		No
lepi afri	*Lepidium africanum*	Common Peppercress	Brassicaceae	0.1	1	*		No
brey oblo	*Breynia oblongifolia*	Coffee Bush	Phyllanthaceae	2	1		Shrub (SG)	No
meli repe	*Melinis repens*	Red Natal Grass	Poaceae	2	10	*		No
glyc clan	*Glycine clandestina*	Twining glycine	Fabaceae (Fabo	0.1	1		Other (OG)	No
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE

	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE

BAM Site Field Survey								
Project:	20-617	**Plot Identifier**	LW_OMPS_6	**Pic 20x20**		**Pic 20x50**		
Survey date:	19/11/2020		**Compass Orientation (head of 20x20 plot)**					
Recorders	GX LW		**PCT:**	842	DNGModerate			
GPS Easting	420948	**GPS Northing**	6594108		**Datum**	GDA	**Zone**	56
Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance			
	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
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)

Additional information

Current land use

vacant land in industrial zone

Age class of trees (DBH range) , Condition of Vegetation, Hollows

mature and regrowth possible hollows mod condition

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

as above

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

none

Dominant Species outside Plot

FUNCTION

Function attributes for	LW_OMPS_6

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	Tree (TG)	0
	Shrub (SG)	2
	Forb (FG)	8
	Grass & grasslike (GG)	4
	Fern (EG)	2
	Other (OG)	1
	TOTAL	17

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of cover abundance (native vascular plants)	Tree (TG)	0
	Shrub (SG)	13
	Forb (FG)	4
	Grass & grasslike (GG)	26
	Fern (EG)	2
	Other (OG)	5
	TOTAL Native	50
	TOTAL 'HTE'	15.1

BAM Attribute (20 x 50m plot) Tree Stem Counts

DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49			
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)			

0.1%=63x63cm
0.5%=1.4x1.4m
1%=2×2m
5%=4×5m
25%=10×10m

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %
Litter Cover	5m	3%	2.4%
	15m	1%	
	25m	3%	
	35m	4%	
	45m	1%	
Bare ground cover	5m	30%	48.2%
	15m	80%	
	25m	16%	
	35m	95%	
	45m	20%	
Cryptogam cover	5m	0%	0.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	
Rock Cover	5m	0%	0.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	

COMPOSITION & STRUCTURE

Species recorded for LW_OMPS_6

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?
lant cama	*Lantana camara*	Lantana	Verbenaceae	15	20	*		HTE
dodo visc	*Dodonaea viscosa*	Sticky Hop-bush	Sapindaceae	3	1		Shrub (SG)	No
gomp phys	*Gomphocarpus physoca*	Balloon Cotton Bush	Apocynaceae	10	30	*		No
evol alsi	*Evolvulus alsinoides*	Bindweed	Convolvulaceae	1	30		Forb (FG)	No
rost adsc	*Rostellularia adscenden*	Pink Tongues	Acanthaceae	1	50		Forb (FG)	No
fimb dich	*Fimbristylis dichotoma*	Common Fringe-sedge	Cyperaceae	5	100		Grass & grasslike (GG)	No
leuc muti	*Leucopogon muticus*	Blunt Beard-heath	Ericaceae	10	30		Shrub (SG)	No
wahl grac	*Wahlenbergia gracilent*	Annual Bluebell	Campanulaceae	1	30		Forb (FG)	No
meli repe	*Melinis repens*	Red Natal Grass	Poaceae	70	500	*		No
cymb refr	*Cymbopogon refractus*	Barbed Wire Grass	Poaceae	10	50		Grass & grasslike (GG)	No
glos bide	*Glossocardia bidens*	Cobbler's Tack	Asteraceae	1	50			No
glyc tome	*Glycine tomentella*	Woolly Glycine	Fabaceae (Fabo	5	100		Other (OG)	No
chei sieb	*Cheilanthes sieberi*	Rock Fern	Pteridaceae	1	50		Fern (EG)	No
heli ampl	*Heliotropium amplexica*	Blue Heliotrope	Boraginaceae	0.1	1	*		HTE
aris caly	*Aristida calycina*		Poaceae	1	20		Grass & grasslike (GG)	No
wahl comm	*Wahlenbergia communi*	Tufted Bluebell	Campanulaceae	0.5	20		Forb (FG)	No
axon comp	*Axonopus compressus*	Broad-leaved Carpet Grass	Poaceae	5	50	*		No
hete cont	*Heteropogon contortus*	Bunch Speargrass	Poaceae	10	100		Grass & grasslike (GG)	No
hypo radi	*Hypochaeris radicata*	Catsear	Asteraceae	0.1	1	*		No
sida rhom	*Sida rhombifolia*	Paddy's Lucerne	Malvaceae	0.2	1	*		No
chei dist	*Cheilanthes distans*	Bristly Cloak Fern	Pteridaceae	1	30		Fern (EG)	No
tric elat	*Tricoryne elatior*	Yellow Autumn-lily	Anthericaceae	0.2	2		Forb (FG)	No
comm ensi	*Commelina ensifolia*	Scurvy Grass	Commelinaceae	0.1	1		Forb (FG)	No
oxal exil	*Oxalis exilis*		Oxalidaceae	0.1	1		Forb (FG)	No
zorn dyct dyct	*Zornia dyctiocarpa var. d*	Zornia	Fabaceae (Fabo	0.1	1		Forb (FG)	No
cham hirt	*Chamaesyce hirta*	Asthma Plant	Euphorbiaceae	0.1	10	*		No
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
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	#N/A	#N/A	#N/A			#N/A		FALSE
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	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
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	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
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	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE

BAM Site Field Survey								
Project:	20-617 Oven Mt	**Plot Identifier**	LW_OMPS_7	**Pic 20x20**		**Pic 20x50**		
Survey date:	18/11/2020		**Compass Orientation (head of 20x20 plot)**					
Recorders	GX LW		**PCT:**	842	High			
GPS Easting	420750	GPS Northing	6594038		**Datum**	GDA	**Zone**	56
Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance			
	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
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)

Additional information
Current land use
vacant land in industrial zone
Age class of trees (DBH range) , Condition of Vegetation, Hollows
mature and regrowth possible hollows mod condition
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
as above
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)
none

Dominant Species outside Plot	

FUNCTION

Function attributes for	LW_OMPS_7

BAM Attribute (20x20m plot)		
Count of Native Richness	Stratum	Sum
	Tree (TG)	6
	Shrub (SG)	4
	Forb (FG)	3
	Grass & grasslike (GG)	7
	Fern (EG)	2
	Other (OG)	2
	TOTAL	24

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	70.1
	Shrub (SG)	1.7
	Forb (FG)	6.2
	Grass & grasslike (GG)	58.4
	Fern (EG)	5.1
	Other (OG)	10.1
	TOTAL Native	151.6
	TOTAL 'HTE'	0

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79	3		
30-49	4		
20-29	1		
10-19	3		
5-9	1		
<5	5		N/A
Length of logs (m)		25	

0.1%=63x63cm
0.5%=1.4x1.4m
1%=2×2m
5%=4×5m
25%=10×10m

BAM Attributes (1 x 1m Plots)			
	Tape length	% cover	Average %
Litter Cover	5m	80%	64.0%
	15m	80%	
	25m	60%	
	35m	30%	
	45m	70%	
Bare ground cover	5m	3%	14.6%
	15m	20%	
	25m	10%	
	35m	20%	
	45m	20%	
Cryptogam cover	5m	0%	0.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	
Rock Cover	5m	0%	0.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	

COMPOSITION & STRUCTURE

Species recorded for LW_OMPS_7

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?
cory inte	*Corymbia intermedia*	Pink Bloodwood	Myrtaceae	10	3		Tree (TG)	No
euca euge	*Eucalyptus eugenioides*	Thin-leaved Stringybark	Myrtaceae	5	1		Tree (TG)	No
euca punc	*Eucalyptus punctata*	Grey Gum	Myrtaceae	25	2		Tree (TG)	No
euca mell	*Eucalyptus melliodora*	Yellow Box	Myrtaceae	5	1		Tree (TG)	No
euca ampl	*Eucalyptus amplifolia*	Cabbage Gum	Myrtaceae	25	4		Tree (TG)	No
glyc tome	*Glycine tomentella*	Woolly Glycine	Fabaceae (Fabc	10	50		Other (OG)	No
zorn dyct dyct	*Zornia dyctiocarpa var. d*	Zornia	Fabaceae (Fabc	5	100		Forb (FG)	No
pani effu	*Panicum effusum*	Hairy Panic	Poaceae	15	100		Grass & grasslike (GG)	No
cype iria	*Cyperus iria*		Cyperaceae	20	100		Grass & grasslike (GG)	No
hibb obtu	*Hibbertia obtusifolia*	Hoary Guinea Flower	Dilleniaceae	1	1		Shrub (SG)	No
chei sieb	*Cheilanthes sieberi*	Rock Fern	Pteridaceae	0.1	1		Fern (EG)	No
aris lept	*Aristida leptopoda*	White Speargrass	Poaceae	0.2	5		Grass & grasslike (GG)	No
cymb refr	*Cymbopogon refractus*	Barbed Wire Grass	Poaceae	1	10		Grass & grasslike (GG)	No
chei dist	*Cheilanthes distans*	Bristly Cloak Fern	Pteridaceae	5	20		Fern (EG)	No
loma mult mult	*Lomandra multiflora sub*	Many-flowered Mat-rush	Lomandraceae	0.2	10		Grass & grasslike (GG)	No
erag brow	*Eragrostis brownii*	Brown's Lovegrass	Poaceae	2	10		Grass & grasslike (GG)	No
leuc tric	*Leucopogon trichostylus*	Daphne Heath	Ericaceae	0.1	5		Shrub (SG)	No
acac	*Acacia spp.*	Wattle	Fabaceae (Mim	0.5	5		Shrub (SG)	No
Crot mont angu	*Crotalaria montana var.*		Fabaceae (Fabc	1	10		Forb (FG)	No
brey oblo	*Breynia oblongifolia*	Coffee Bush	Phyllanthaceae	0.1	1		Shrub (SG)	No
crot medi negl	*Crotalaria medicaginea*	Trefoil Rattlepod	Fabaceae (Fabc	0.2	5		Forb (FG)	No
sida rhom	*Sida rhombifolia*	Paddy's Lucerne	Malvaceae	0.1	1	*		No
meli repe	*Melinis repens*	Red Natal Grass	Poaceae	0.2	10	*		No
glyc micr	*Glycine microphylla*	Small-leaf Glycine	Fabaceae (Fabc	0.1	1		Other (OG)	No
hete cont	*Heteropogon contortus*	Bunch Speargrass	Poaceae	20	100		Grass & grasslike (GG)	No
euca blak	*Eucalyptus blakelyi*	Blakely's Red Gum	Myrtaceae	0.1	1		Tree (TG)	No
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
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	#N/A	#N/A	#N/A			#N/A		FALSE
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	#N/A	#N/A	#N/A			#N/A		FALSE

	#N/A	#N/A	#N/A			#N/A		FALSE

BAM Site Field Survey								
Project:	20-617 Oven Mt	**Plot Identifier**	LW_OMPS_8	**Pic 20x20**		**Pic 20x50**		
Survey date:	17/11/2020		**Compass Orientation (head of 20x20 plot)**					
Recorders	GX LW		**PCT:**	842	High			
GPS Easting	420149	**GPS Northing**	6593178		**Datum**	GDA	**Zone**	56
Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance			
	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
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)

Additional information

Current land use

vacant land in industrial zone

Age class of trees (DBH range) , Condition of Vegetation, Hollows

mature and regrowth possible hollows mod condition

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

as above

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

none

Dominant Species outside Plot

FUNCTION

Function attributes for	LW_OMPS_8

BAM Attribute (20x20m plot)		
	Stratum	Sum
Count of Native Richness	Tree (TG)	6
	Shrub (SG)	4
	Forb (FG)	9
	Grass & grasslike (GG)	9
	Fern (EG)	2
	Other (OG)	7
	TOTAL	37

BAM Attribute (20x20m plot)		
	Stratum	Sum
Count of cover abundance (native vascular plants)	Tree (TG)	68
	Shrub (SG)	11
	Forb (FG)	2.9
	Grass & grasslike (GG)	47
	Fern (EG)	1.1
	Other (OG)	3.1
	TOTAL Native	133.1
	TOTAL 'HTE'	0

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79	1		
30-49	5		1
20-29	6		
10-19	6		
5-9			
<5	2		N/A
Length of logs (m)		12	

0.1%=63x63cm
0.5%=1.4x1.4m
1%=2×2m
5%=4×5m
25%=10×10m

BAM Attributes (1 x 1m Plots)			
	Tape length	% cover	Average %
Litter Cover	5m	50%	52.0%
	15m	20%	
	25m	80%	
	35m	50%	
	45m	60%	
Bare ground cover	5m	2%	7.8%
	15m	2%	
	25m	5%	
	35m	20%	
	45m	10%	
Cryptogam cover	5m	0%	0.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	
Rock Cover	5m	30%	17.0%
	15m	0%	
	25m	10%	
	35m	40%	
	45m	5%	

COMPOSITION & STRUCTURE

Species recorded for LW_OMPS_8

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?
euca ampl	*Eucalyptus amplifolia*	Cabbage Gum	Myrtaceae	25	20		Tree (TG)	No
cory inte	*Corymbia intermedia*	Pink Bloodwood	Myrtaceae	10	15		Tree (TG)	No
pasp dist	*Paspalidium distans*		Poaceae	5	100		Grass & grasslike (GG)	No
them tria	*Themeda triandra*		Poaceae	5	50		Grass & grasslike (GG)	No
hete cont	*Heteropogon contortus*	Bunch Speargrass	Poaceae	30	100		Grass & grasslike (GG)	No
hard viol	*Hardenbergia violacea*	False Sarsaparilla	Fabaceae (Fabo	1	20		Other (OG)	No
glyc tome	*Glycine tomentella*	Woolly Glycine	Fabaceae (Fabo	1	20		Other (OG)	No
glyc taba	*Glycine tabacina*	Variable Glycine	Fabaceae (Fabo	0.5	10		Other (OG)	No
chei dist	*Cheilanthes distans*	Bristly Cloak Fern	Pteridaceae	0.1	10		Fern (EG)	No
crot mont angu	*Crotalaria montana var.*		Fabaceae (Fabo	0.1	10		Forb (FG)	No
teph bidw	*Tephrosia bidwillii*		Fabaceae (Fabo	1	50		Forb (FG)	No
chei sieb	*Cheilanthes sieberi*	Rock Fern	Pteridaceae	1	50		Fern (EG)	No
leuc muti	*Leucopogon muticus*	Blunt Beard-heath	Ericaceae	5	20		Shrub (SG)	No
evol alsi	*Evolvulus alsinoides*	Bindweed	Convolvulaceae	0.1	10		Forb (FG)	No
pani effu	*Panicum effusum*	Hairy Panic	Poaceae	0.2	10		Grass & grasslike (GG)	No
exoc cupr	*Exocarpos cupressiformi*	Cherry Ballart	Santalaceae	5	5		Shrub (SG)	No
euca mell	*Eucalyptus melliodora*	Yellow Box	Myrtaceae	1	1		Tree (TG)	No
dian revo	*Dianella revoluta*	Blueberry Lily	Phormiaceae	0.1	1		Forb (FG)	No
loma mult mult	*Lomandra multiflora sub*	Many-flowered Mat-rush	Lomandraceae	5	50		Grass & grasslike (GG)	No
plec parv	*Plectranthus parviflorus*		Lamiaceae	1	50		Forb (FG)	No
zorn dyct dyct	*Zornia dyctiocarpa var. d*	Zornia	Fabaceae (Fabo	0.1	10		Forb (FG)	No
glyc clan	*Glycine clandestina*	Twining glycine	Fabaceae (Fabo	0.1	5		Other (OG)	No
rost adsc	*Rostellularia adscendens*	Pink Tongues	Acanthaceae	0.1	2			No
oper diph	*Opercularia diphylla*	Stinkweed	Rubiaceae	0.1	1		Forb (FG)	No
wahl grac	*Wahlenbergia gracilenta*	Annual Bluebell	Campanulaceae	0.2	10		Forb (FG)	No
desm vari	*Desmodium varians*	Slender Tick-trefoil	Fabaceae (Fabo	0.2	10		Other (OG)	No
dich seri	*Dichanthium sericeum*	Queensland Bluegrass	Poaceae	0.2	10		Grass & grasslike (GG)	No
euca euge	*Eucalyptus eugenioides*	Thin-leaved Stringybark	Myrtaceae	15	10		Tree (TG)	No
euca carn	*Eucalyptus carnea*	Thick-leaved Mahogany	Myrtaceae	15	10		Tree (TG)	No
glyc micr	*Glycine microphylla*	Small-leaf Glycine	Fabaceae (Fabo	0.2	10		Other (OG)	No
desm	*Desmodium spp.*	Tick-trefoil	Fabaceae (Fabo	0.1	1		Other (OG)	No
scle mack	*Scleria mackaviensis*		Cyperaceae	0.1	1		Grass & grasslike (GG)	No
glos bide	*Glossocardia bidens*	Cobbler's Tack	Asteraceae	0.1	10			No
comm ensi	*Commelina ensifolia*	Scurvy Grass	Commelinaceae	0.2	10		Forb (FG)	No
spor elon	*Sporobolus elongatus*	Slender Rat's Tail Grass	Poaceae	0.5	10		Grass & grasslike (GG)	No
brey oblo	*Breynia oblongifolia*	Coffee Bush	Phyllanthaceae	0.5	5		Shrub (SG)	No
hibb obtu	*Hibbertia obtusifolia*	Hoary Guinea Flower	Dilleniaceae	0.5	5		Shrub (SG)	No
euca tere	*Eucalyptus tereticornis*	Forest Red Gum	Myrtaceae	2	1		Tree (TG)	No
cymb refr	*Cymbopogon refractus*	Barbed Wire Grass	Poaceae	1	10		Grass & grasslike (GG)	No
meli repe	*Melinis repens*	Red Natal Grass	Poaceae	0.1	1	*		No

	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
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	#N/A	#N/A	#N/A			#N/A		FALSE
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	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE

BAM Site Field Survey									
Project:	20-617	**Plot Identifier**	LW_OMPS_9	**Pic 20x20**		**Pic 20x50**			
Survey date:	17/11/2020		**Compass Orientation (head of 20x20 plot)**						
Recorders	GX LW		**PCT:**	842	DNGModerate				
GPS Easting	419832	**GPS Northing**	6593167		**Datum**	GDA	**Zone**	56	
Landform			**Soils**			**Drainage & Slope**			
Morphology			**Soil Texture**			**Slope**			
LandF Element			**Soil Colour**			**Aspect**			
LandF Pattern			**Soil Depth**			**Drainage**			
Microrelief			**Geology**			**Watercourses**			

Plot Disturbance			
	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
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)

Additional information

Current land use

vacant land in industrial zone

Age class of trees (DBH range) , Condition of Vegetation, Hollows

mature and regrowth possible hollows mod condition

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

as above

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

none

Dominant Species outside Plot

FUNCTION

Function attributes for	LW_OMPS_9

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	Tree (TG)	0
	Shrub (SG)	1
	Forb (FG)	6
	Grass & grasslike (GG)	4
	Fern (EG)	2
	Other (OG)	1
	TOTAL	14

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of cover abundance (native vascular plants)	Tree (TG)	0
	Shrub (SG)	0.1
	Forb (FG)	1
	Grass & grasslike (GG)	90.3
	Fern (EG)	0.2
	Other (OG)	0.1
	TOTAL Native	91.7
	TOTAL 'HTE'	1.5

BAM Attribute (20 x 50m plot) Tree Stem Counts

DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49			
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)		0	

0.1%=63x63cm
0.5%=1.4x1.4m
1%=2×2m
5%=4×5m
25%=10×10m

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %
Litter Cover	5m	1%	1.0%
	15m	1%	
	25m	0%	
	35m	1%	
	45m	2%	
Bare ground cover	5m	0%	4.4%
	15m	5%	
	25m	2%	
	35m	5%	
	45m	10%	
Cryptogam cover	5m	0%	0.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	
Rock Cover	5m	0%	0.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	

COMPOSITION & STRUCTURE

Species recorded for		LW_OMPS_9						
Abbreviation	**Scientific Name**	**Common Name**	**Family**	**% Cover**	**Abundance**	**Exotic**	**Growth Form**	**High Threat?**
aust ramo	*Austrostipa ramosissima*	Stout Bamboo Grass	Poaceae	90	1000		Grass & grasslike (GG)	No
heli ampl	*Heliotropium amplexicau*	Blue Heliotrope	Boraginaceae	1	100	*		HTE
sene mada	*Senecio madagascariens*	Fireweed	Asteraceae	1	50	*		No
sida rhom	*Sida rhombifolia*	Paddy's Lucerne	Malvaceae	2	100	*		No
wahl grac	*Wahlenbergia gracilenta*	Annual Bluebell	Campanulace	0.5	100		Forb (FG)	No
glyc sten	*Glycine stenophita*		Fabaceae (Fal	0.1	10		Other (OG)	No
cype grac	*Cyperus gracilis*	Slender Flat-sedge	Cyperaceae	0.1	10		Grass & grasslike (GG)	No
pani effu	*Panicum effusum*	Hairy Panic	Poaceae	0.1	1		Grass & grasslike (GG)	No
spor fert	*Sporobolus fertilis*	Giant Parramatta Grass	Poaceae	0.5	50	*		HTE
comm ensi	*Commelina ensifolia*	Scurvy Grass	Commelinace	0.1	1		Forb (FG)	No
chei dist	*Cheilanthes distans*	Bristly Cloak Fern	Pteridaceae	0.1	10		Fern (EG)	No
chei sieb	*Cheilanthes sieberi*	Rock Fern	Pteridaceae	0.1	10		Fern (EG)	No
rume brow	*Rumex brownii*	Swamp Dock	Polygonaceae	0.1	1		Forb (FG)	No
sida cord	*Sida cordifolia*		Malvaceae	0.1	1		Forb (FG)	No
sche aust	*Schenkia australis*	Spike Centaury	Gentianaceae	0.1	1		Forb (FG)	No
cony bona	*Conyza bonariensis*	Flaxleaf Fleabane	Asteraceae	0.1	1	*		No
murd gram	*Murdannia graminea*		Commelinace	0.1	1		Forb (FG)	No
fimb nuta	*Fimbristylis nutans*		Cyperaceae	0.1	1		Grass & grasslike (GG)	No
	Leucopogon spp.	#N/A	#N/A	0.1	1	#N/A	Shrub (SG)	No
sida rhom	*Sida rhombifolia*	Paddy's Lucerne	Malvaceae	0.1	1	*		No
axon comp	*Axonopus compressus*	Broad-leaved Carpet Grass	Poaceae	90	100	*		No
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE

	#N/A	#N/A	#N/A			#N/A		FALSE

BAM Site Field Survey								
Project:	20-617	**Plot Identifier**	LW_OMPS_10	**Pic 20x20**		**Pic 20x50**		
Survey date:	17/11/2020		**Compass Orientation (head of 20x20 plot)**					
Recorders	GX LW		**PCT:**	1106	HighFP			
GPS Easting	420413	**GPS Northing**	6594008		**Datum**		**Zone**	56
Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance			
	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
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)

Additional information

Current land use

vacant land in industrial zone

Age class of trees (DBH range) , Condition of Vegetation, Hollows

mature and regrowth possible hollows mod condition

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

as above

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

none

Dominant Species outside Plot

FUNCTION

Function attributes for	LW_OMPS_10

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	Tree (TG)	7
	Shrub (SG)	5
	Forb (FG)	6
	Grass & grasslike (GG)	5
	Fern (EG)	1
	Other (OG)	4
	TOTAL	28

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of cover abundance (native vascular plants)	Tree (TG)	130.2
	Shrub (SG)	6.7
	Forb (FG)	1.9
	Grass & grasslike (GG)	2.3
	Fern (EG)	0.1
	Other (OG)	2.2
	TOTAL Native	143.4
	TOTAL 'HTE'	10.1

BAM Attribute (20 x 50m plot) Tree Stem Counts

DBH (cm)	Euc	Non Euc	Hollows
>80		1	
50-79	1	2	
30-49		P	
20-29			
10-19			
5-9	1		
<5			N/A
Length of logs (m)		13	

0.1%=63x63cm
0.5%=1.4x1.4m
1%=2×2m
5%=4×5m
25%=10×10m

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %
Litter Cover	5m	20%	10.2%
	15m	1%	
	25m	10%	
	35m	5%	
	45m	15%	
Bare ground cover	5m	80%	40.4%
	15m	2%	
	25m	0%	
	35m	75%	
	45m	45%	
Cryptogam cover	5m	0%	0.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	
Rock Cover	5m	0%	0.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	

COMPOSITION & STRUCTURE

Species recorded for		LW_OMPS_10						
Abbreviation	**Scientific Name**	**Common Name**	**Family**	**% Cover**	**Abundance**	**Exotic**	**Growth Form**	**High Threat?**
casu cunn cunn	*Casuarina cunninghamia*	River Oak	Casuarinaceae	25	1		Tree (TG)	No
euca tere	*Eucalyptus tereticornis*	Forest Red Gum	Myrtaceae	30	2		Tree (TG)	No
ficu rubi	*Ficus rubiginosa*	Port Jackson Fig	Moraceae	40	2		Tree (TG)	No
call vimi	*Callistemon viminalis*	Weeping Bottlebrush	Myrtaceae	25	3		Tree (TG)	No
alec subd	*Alectryon subdentatus f.*		Sapindaceae	5	2		Shrub (SG)	No
mall phil	*Mallotus philippensis*	Red Kamala	Euphorbiaceae	10	2		Tree (TG)	No
aust vert	*Austrostipa verticillata*	Slender Bamboo Grass	Poaceae	1	3		Grass & grasslike (GG)	No
opli aemu	*Oplismenus aemulus*		Poaceae	1	50		Grass & grasslike (GG)	No
lant cama	*Lantana camara*	Lantana	Verbenaceae	5	5	*		HTE
senn sept	*Senna septemtrionalis*	Arsenic Bush	Fabaceae (Caesa	1	1	*		No
dipl palm	*Diplocyclos palmatus*		Cucurbitaceae	0.1	1		Other (OG)	No
abut oxyc	*Abutilon oxycarpum*	Straggly Lantern-bush	Malvaceae	0.5	5		Shrub (SG)	FALSE
cony bona	*Conyza bonariensis*	Flaxleaf Fleabane	Asteraceae	0.5	5	*		No
sola maur	*Solanum mauritianum*	Wild Tobacco Bush	Solanaceae	0.1	1	*		No
axon comp	*Axonopus compressus*	Broad-leaved Carpet Grass	Poaceae	60	100	*		No
heli ampl	*Heliotropium amplexica*	Blue Heliotrope	Boraginaceae	5	50	*		HTE
sige orie orie	*Sigesbeckia orientalis su*	Indian Weed	Asteraceae	1	10		Forb (FG)	No
sida rhom	*Sida rhombifolia*	Paddy's Lucerne	Malvaceae	1	50	*		No
caps burs	*Capsella bursa-pastoris*	Shepherd's Purse	Brassicaceae	0.5	10	*		No
hibi hete hete	*Hibiscus heterophyllus s*	Native Rosella	Malvaceae	0.1	1		Shrub (SG)	No
macl coch	*Maclura cochinchinensis*	Cockspur Thorn	Moraceae	1	1		Other (OG)	No
rubu frut	*Rubus fruticosus sp. agg*	Blackberry complex	Rosaceae	0.1	1	*		No
sola avic	*Solanum aviculare*	Kangaroo Apple	Solanaceae	0.1	1		Shrub (SG)	No
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.1	1		Forb (FG)	No
plec parv	*Plectranthus parviflorus*		Lamiaceae	0.1	5		Forb (FG)	No
hydr acut	*Hydrocotyle acutiloba*		Apiaceae	0.1	1		Forb (FG)	No
cype trin	*Cyperus trinervis*		Cyperaceae	0.1	10		Grass & grasslike (GG)	No
pter trem	*Pteris tremula*	Tender Brake	Pteridaceae	0.1	1		Fern (EG)	No
verb lito	*Verbena litoralis*		Verbenaceae	0.2	5	*		No
	Sida spp.	#N/A	#N/A	0.3	10	#N/A		No
sola seaf	*Solanum seaforthianum*	Climbing Nightshade	Solanaceae	0.1	5	*		HTE
eust lati	*Eustrephus latifolius*	Wombat Berry	Luzuriagaceae	0.1	1		Other (OG)	No
cler tome	*Clerodendrum tomentos*	Hairy Clerodendrum	Lamiaceae	0.1	2		Tree (TG)	No
gloc ferd	*Glochidion ferdinandi*	Cheese Tree	Phyllanthaceae	0.1	1		Tree (TG)	No
eina hast	*Einadia hastata*	Berry Saltbush	Chenopodiaceae	0.1	10		Forb (FG)	No
brey oblo	*Breynia oblongifolia*	Coffee Bush	Phyllanthaceae	1	10		Shrub (SG)	No
sola amer	*Solanum americanum*	Glossy Nightshade	Solanaceae	0.5	5		Forb (FG)	No
legn moor	*Legnephora moorei*	Round-leaf Vine	Menispermacea	1	1		Other (OG)	No
junc cont	*Juncus continuus*		Juncaceae	0.1	1		Grass & grasslike (GG)	No
cype diff	*Cyperus difformis*	Dirty Dora	Cyperaceae	0.1	1		Grass & grasslike (GG)	No

sene mada	*Senecio madagascariens*	Fireweed	Asteraceae	0.1	1	*		No
cype rotu	*Cyperus rotundus*	Nutgrass	Cyperaceae	0.1	1	*		No
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE

BAM Site Field Survey								
Project:	20-617	**Plot Identifier**	LW_OMPS_11	**Pic 20x20**		**Pic 20x50**		
Survey date:	17/11/2020		**Compass Orientation (head of 20x20 plot)**					
Recorders	GX LW		**PCT:**	842	High			
GPS Easting	419934	**GPS Northing**	6592448		**Datum**	GDA	**Zone**	56
Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance			
	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
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)

Additional information

Current land use

vacant land in industrial zone

Age class of trees (DBH range) , Condition of Vegetation, Hollows

mature and regrowth possible hollows mod condition

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

as above

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

none

Dominant Species outside Plot

FUNCTION

Function attributes for		LW_OMPS_11
BAM Attribute (20x20m plot)		
Count of Native Richness	Stratum	Sum
	Tree (TG)	4
	Shrub (SG)	3
	Forb (FG)	7
	Grass & grasslike (GG)	6
	Fern (EG)	1
	Other (OG)	3
	TOTAL	24
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	77
	Shrub (SG)	2.1
	Forb (FG)	5.6
	Grass & grasslike (GG)	80.2
	Fern (EG)	1
	Other (OG)	2.1
	TOTAL Native	168
	TOTAL 'HTE'	0

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79	1		
30-49	p		
20-29	p		
10-19	p		
5-9	p		
<5	p		N/A
Length of logs (m)		30	

0.1%=63x63cm
0.5%=1.4x1.4m
1%=2×2m
5%=4×5m
25%=10×10m

BAM Attributes (1 x 1m Plots)			
	Tape length	% cover	Average %
Litter Cover	5m	50%	46.0%
	15m	70%	
	25m	50%	
	35m	40%	
	45m	20%	
Bare ground cover	5m	15%	15.0%
	15m	20%	
	25m	10%	
	35m	10%	
	45m	20%	
Cryptogam cover	5m	0%	0.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	
Rock Cover	5m	40%	37.0%
	15m	5%	
	25m	20%	
	35m	70%	
	45m	50%	

COMPOSITION & STRUCTURE

Species recorded for LW_OMPS_11

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?
euca ampl	*Eucalyptus amplifolia*	Cabbage Gum	Myrtaceae	30	30		Tree (TG)	No
cory gumm	*Corymbia gummifera*	Red Bloodwood	Myrtaceae	25	25		Tree (TG)	No
euca euge	*Eucalyptus eugenioides*	Thin-leaved Stringybark	Myrtaceae	20	15		Tree (TG)	No
aris ramo	*Aristida ramosa*	Purple Wiregrass	Poaceae	30			Grass & grasslike (GG)	No
loma long	*Lomandra longifolia*	Spiny-headed Mat-rush	Lomandraceae	10	50		Grass & grasslike (GG)	No
desm vari	*Desmodium varians*	Slender Tick-trefoil	Fabaceae (Faboideae)	1	20		Other (OG)	No
pani simi	*Panicum simile*	Two-colour Panic	Poaceae	5	100		Grass & grasslike (GG)	No
hard viol	*Hardenbergia violacea*	False Sarsaparilla	Fabaceae (Faboideae)	1	20		Other (OG)	No
both deci deci	*Bothriochloa decipiens v*	Pitted Bluegrass	Poaceae	5	50		Grass & grasslike (GG)	No
cymb refr	*Cymbopogon refractus*	Barbed Wire Grass	Poaceae	30	100		Grass & grasslike (GG)	No
crot mont angu	*Crotalaria montana var.*		Fabaceae (Faboideae)	0.1	10		Forb (FG)	No
dian revo	*Dianella revoluta*	Blueberry Lily	Phormiaceae	0.1	10		Forb (FG)	No
loma mult mult	*Lomandra multiflora sul*	Many-flowered Mat-rush	Lomandraceae	0.2	30		Grass & grasslike (GG)	No
	Leucopogon spp.	#N/A	#N/A	1	50	#N/A	Shrub (SG)	No
zorn dyct dyct	*Zornia dyctiocarpa var. d*	Zornia	Fabaceae (Faboideae)	5	100		Forb (FG)	No
chei dist	*Cheilanthes distans*	Bristly Cloak Fern	Pteridaceae	1	50		Fern (EG)	No
exoc cupr	*Exocarpos cupressiformi*	Cherry Ballart	Santalaceae	0.1	1		Shrub (SG)	No
wahl gran	*Wahlenbergia graniticol*	Granite Bluebell	Campanulaceae	0.1	10		Forb (FG)	No
glyc clan	*Glycine clandestina*	Twining glycine	Fabaceae (Faboideae)	0.1	10		Other (OG)	No
brey oblo	*Breynia oblongifolia*	Coffee Bush	Phyllanthaceae	1	10		Shrub (SG)	No
tric elat	*Tricoryne elatior*	Yellow Autumn-lily	Anthericaceae	0.1	10		Forb (FG)	No
ango subv	*Angophora subvelutina*	Broad-leaved Apple	Myrtaceae	2	3		Tree (TG)	No
desm rhyt	*Desmodium rhytidophyll*		Fabaceae (Faboideae)	0.1	1		Forb (FG)	No
comm ensi	*Commelina ensifolia*	Scurvy Grass	Commelinaceae	0.1	1		Forb (FG)	No
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE

	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE

BAM Site Field Survey								
Project:	20-617	**Plot Identifier**	LW_OMPS_16	**Pic 20x20**		**Pic 20x50**		
Survey date:	18/11/2020		**Compass Orientation (head of 20x20 plot)**					
Recorders	GX LW		**PCT:**	842	High			
GPS Easting	419585	**GPS Northing**	6591318		**Datum**	GDA	**Zone**	56
Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance			
	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
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)

Additional information

Current land use

vacant land in industrial zone

Age class of trees (DBH range) , Condition of Vegetation, Hollows

mature and regrowth possible hollows mod condition

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

as above

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

none

Dominant Species outside Plot

FUNCTION

Function attributes for	LW_OMPS_16

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	Tree (TG)	3
	Shrub (SG)	4
	Forb (FG)	18
	Grass & grasslike (GG)	10
	Fern (EG)	2
	Other (OG)	6
	TOTAL	43

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of cover abundance (native vascular plants)	Tree (TG)	40.1
	Shrub (SG)	0.6
	Forb (FG)	8.4
	Grass & grasslike (GG)	57.9
	Fern (EG)	0.2
	Other (OG)	15.8
	TOTAL Native	123
	TOTAL 'HTE'	0

BAM Attribute (20 x 50m plot) Tree Stem Counts

DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79	4		1
30-49	7		
20-29	5		
10-19	2		
5-9	1		
<5	1		N/A
Length of logs (m)		5	

0.1%=63x63cm
0.5%=1.4x1.4m
1%=2×2m
5%=4×5m
25%=10×10m

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %
Litter Cover	5m	15%	14.0%
	15m	25%	
	25m	5%	
	35m	15%	
	45m	10%	
Bare ground cover	5m	5%	7.0%
	15m	5%	
	25m	0%	
	35m	25%	
	45m	0%	
Cryptogam cover	5m	0%	0.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	
Rock Cover	5m	5%	7.0%
	15m	10%	
	25m	0%	
	35m	20%	
	45m	0%	

COMPOSITION & STRUCTURE

Species recorded for LW_OMPS_16

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?
euca carn	*Eucalyptus carnea*	Thick-leaved Mahogany	Myrtaceae	35	18		Tree (TG)	No
chry fall	*Chrysopogon fallax*		Poaceae	5	20		Grass & grasslike (GG)	No
poa labi labi	*Poa labillardierei var. lal*	Tussock	Poaceae	10	100		Grass & grasslike (GG)	No
vern cine	*Vernonia cinerea*		Asteraceae	0.2	5		Forb (FG)	No
plec parv	*Plectranthus parviflorus*		Lamiaceae	0.2	5		Forb (FG)	No
euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	0.2	10		Forb (FG)	No
jasm suav	*Jasminum suavissimum*		Oleaceae	15	100		Other (OG)	No
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.2	10		Forb (FG)	No
	Brunoniella australis	#N/A	#N/A	0.2	20	#N/A	Forb (FG)	No
glyc clan	*Glycine clandestina*	Twining glycine	Fabaceae (Faboid	0.2	10		Other (OG)	No
spor elon	*Sporobolus elongatus*	Slender Rat's Tail Grass	Poaceae	2	50		Grass & grasslike (GG)	No
sige orie orie	*Sigesbeckia orientalis su*	Indian Weed	Asteraceae	2	20		Forb (FG)	No
loma mult mult	*Lomandra multiflora sul*	Many-flowered Mat-rush	Lomandraceae	10	50		Grass & grasslike (GG)	No
rubu parv	*Rubus parvifolius*	Native Raspberry	Rosaceae	0.2	5		Shrub (SG)	No
hype gram	*Hypericum gramineum*	Small St John's Wort	Clusiaceae	0.1	5		Forb (FG)	No
dich repe	*Dichondra repens*	Kidney Weed	Convolvulaceae	0.1	10		Forb (FG)	No
sche aust	*Schenkia australis*	Spike Centaury	Gentianaceae	2	30		Forb (FG)	No
loma long	*Lomandra longifolia*	Spiny-headed Mat-rush	Lomandraceae	0.5			Grass & grasslike (GG)	No
sene mada	*Senecio madagascariens*	Fireweed	Asteraceae	0.2	2	*		No
rost adsc	*Rostellularia adscendens*	Pink Tongues	Acanthaceae	0.2	10		Forb (FG)	No
glyc tome	*Glycine tomentella*	Woolly Glycine	Fabaceae (Faboid	0.1	1		Other (OG)	No
prat purp	*Pratia purpurascens*	Whiteroot	Lobeliaceae	0.1	1		Forb (FG)	No
aris grac	*Aristida gracilipes*	Three-awn Speargrass	Poaceae	5	20		Grass & grasslike (GG)	No
ajug aust	*Ajuga australis*	Austral Bugle	Lamiaceae	0.1	1		Forb (FG)	No
sida rhom	*Sida rhombifolia*	Paddy's Lucerne	Malvaceae	0.5	10	*		No
acac	*Acacia spp.*	Wattle	Fabaceae (Mimos	0.2	2		Shrub (SG)	No
adia aeth	*Adiantum aethiopicum*	Common Maidenhair	Adiantaceae	0.1	1		Fern (EG)	No
glyc micr	*Glycine microphylla*	Small-leaf Glycine	Fabaceae (Faboid	0.1	1		Other (OG)	No
verb lito	*Verbena litoralis*		Verbenaceae	0.2	5	*		No
eust lati	*Eustrephus latifolius*	Wombat Berry	Luzuriagaceae	0.2	2		Other (OG)	No
abut oxyc	*Abutilon oxycarpum*	Straggly Lantern-bush	Malvaceae	0.1	1		Shrub (SG)	FALSE
wahl comm	*Wahlenbergia communi*	Tufted Bluebell	Campanulaceae	0.2	2		Forb (FG)	No
pasp dist	*Paspalidium distans*		Poaceae	25	50		Grass & grasslike (GG)	No
dian long	*Dianella longifolia*	Blueberry Lily	Phormiaceae	2	5		Forb (FG)	No
gomp phys	*Gomphocarpus physoca*	Balloon Cotton Bush	Apocynaceae	5	20	*		No
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.1	1	*		No
ment aust	*Mentha australis*	River Mint	Lamiaceae	0.2	10		Forb (FG)	No
halo hete	*Haloragis heterophylla*	Variable Raspwort	Haloragaceae	0.1	1		Forb (FG)	No
dich seto	*Dichanthium setosum*	Bluegrass	Poaceae	0.2	5		Grass & grasslike (GG)	No
wahl grac	*Wahlenbergia gracilenta*	Annual Bluebell	Campanulaceae	0.2	5		Forb (FG)	No

digi parv	*Digitaria parviflora*	Small-flowered Finger Grass	Poaceae	0.1			Grass & grasslike (GG)	No
erem debi	*Eremophila debilis*	Amulla	Myoporaceae	0.1	1		Shrub (SG)	No
desm nemo	*Desmodium nemorosum*		Fabaceae (Faboid	0.1	1		Forb (FG)	No
euca ampl	*Eucalyptus amplifolia*	Cabbage Gum	Myrtaceae	5	2		Tree (TG)	No
	Echinopogon spp.	#N/A	#N/A	0.1	1	#N/A	Grass & grasslike (GG)	No
chei sieb	*Cheilanthes sieberi*	Rock Fern	Pteridaceae	0.1	1		Fern (EG)	No
cory gumm	*Corymbia gummifera*	Red Bloodwood	Myrtaceae	0.1	1		Tree (TG)	No
hard viol	*Hardenbergia violacea*	False Sarsaparilla	Fabaceae (Faboid	0.2	2		Other (OG)	No
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE

BAM Site Field Survey								
Project:	20-617 Oven Mt	**Plot Identifier**	LW_OMPS_19	**Pic 20x20**		**Pic 20x50**		
Survey date:	17/11/2020		**Compass Orientation (head of 20x20 plot)**					
Recorders	GX LW		**PCT:**	842	DNGModerate			
GPS Easting	420125	**GPS Northing**	6592070		**Datum**	GDA	**Zone**	56
Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance			
	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
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)

Additional information

Current land use

vacant land in industrial zone

Age class of trees (DBH range) , Condition of Vegetation, Hollows

mature and regrowth possible hollows mod condition

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

as above

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

none

Dominant Species outside Plot

FUNCTION

Function attributes for	LW_OMPS_19

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	Tree (TG)	1
	Shrub (SG)	0
	Forb (FG)	8
	Grass & grasslike (GG)	5
	Fern (EG)	1
	Other (OG)	2
	TOTAL	17

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of cover abundance (native vascular plants)	Tree (TG)	0.5
	Shrub (SG)	0
	Forb (FG)	1.7
	Grass & grasslike (GG)	56.3
	Fern (EG)	0.2
	Other (OG)	0.6
	TOTAL Native	59.3
	TOTAL 'HTE'	0

BAM Attribute (20 x 50m plot) Tree Stem Counts

DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49			
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)			

0.1%=63x63cm
0.5%=1.4x1.4m
1%=2×2m
5%=4×5m
25%=10×10m

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %
Litter Cover	5m	15%	7.4%
	15m	2%	
	25m	20%	
	35m	0%	
	45m	0%	
Bare ground cover	5m	0%	0.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	
Cryptogam cover	5m	3%	0.6%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	
Rock Cover	5m	0%	0.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	

COMPOSITION & STRUCTURE

Species recorded for		LW_OMPS_19						
Abbreviation	**Scientific Name**	**Common Name**	**Family**	**% Cover**	**Abundance**	**Exotic**	**Growth Form**	**High Threat?**
euca ampl	*Eucalyptus amplifolia*	Cabbage Gum	Myrtaceae	0.5	2		Tree (TG)	No
leuc	*Leucochrysum spp.*		Asteraceae	0.1	1		Forb (FG)	No
aris ramo	*Aristida ramosa*	Purple Wiregrass	Poaceae	30	100		Grass & grasslike (GG)	No
dich seri	*Dichanthium sericeum*	Queensland Bluegrass	Poaceae	1	50		Grass & grasslike (GG)	No
glyc clan	*Glycine clandestina*	Twining glycine	Fabaceae (Faboid	0.1	10		Other (OG)	No
tric elat	*Tricoryne elatior*	Yellow Autumn-lily	Anthericaceae	0.1	10		Forb (FG)	No
chei sieb	*Cheilanthes sieberi*	Rock Fern	Pteridaceae	0.2	100		Fern (EG)	No
hete cont	*Heteropogon contortus*	Bunch Speargrass	Poaceae	25	1000		Grass & grasslike (GG)	No
glyc tome	*Glycine tomentella*	Woolly Glycine	Fabaceae (Faboid	0.5	100		Other (OG)	No
wahl gran	*Wahlenbergia graniticol*	Granite Bluebell	Campanulaceae	1	1000		Forb (FG)	No
rost adsc	*Rostellularia adscendens*	Pink Tongues	Acanthaceae	0.2	50		Forb (FG)	No
cent	*Centaurea spp.*	Thistle	Asteraceae	0.1	100	*		No
sida	*Sida spp.*		Malvaceae	0.1	50	*		No
lepi afri	*Lepidium africanum*	Common Peppercress	Brassicaceae	0.1	10	*		No
sene mada	*Senecio madagascariens*	Fireweed	Asteraceae	0.05	2	*		No
evol alsi	*Evolvulus alsinoides*	Bindweed	Convolvulaceae	0.05	2		Forb (FG)	No
erag brow	*Eragrostis brownii*	Brown's Lovegrass	Poaceae	0.1	10		Grass & grasslike (GG)	No
unk exotic	*#N/A*	#N/A	#N/A	0.05	1	*		FALSE
zorn dyct dyct	*Zornia dyctiocarpa var. d*	Zornia	Fabaceae (Faboid	0.05	1		Forb (FG)	No
murd gram	*Murdannia graminea*		Commelinaceae	0.1	1		Forb (FG)	No
dian revo	*Dianella revoluta*	Blueberry Lily	Phormiaceae	0.1	2		Forb (FG)	No
cype sesq	*Cyperus sesquiflorus*		Cyperaceae	0.1	1	*		No
fimb nuta	*Fimbristylis nutans*		Cyperaceae	0.2	10		Grass & grasslike (GG)	No
oeno	*Oenothera spp.*		Onagraceae	0.1		*		No
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE

	#N/A	#N/A	#N/A			#N/A		FALSE

BAM Site Field Survey								
Project:	20-617 Oven Mt	**Plot Identifier**	LW_OMPS_20	**Pic 20x20**		**Pic 20x50**		
Survey date:	19/11/2020		**Compass Orientation (head of 20x20 plot)**					
Recorders	GX LW		**PCT:**	868	High			
GPS Easting	420304	**GPS Northing**	6592897		**Datum**	GDA	**Zone**	56
Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance			
	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
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)

Additional information

Current land use

vacant land in industrial zone

Age class of trees (DBH range) , Condition of Vegetation, Hollows

mature and regrowth possible hollows mod condition

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

as above

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

none

Dominant Species outside Plot

FUNCTION

Function attributes for	LW_OMPS_20

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	Tree (TG)	6
	Shrub (SG)	4
	Forb (FG)	12
	Grass & grasslike (GG)	8
	Fern (EG)	1
	Other (OG)	8
	TOTAL	39

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of cover abundance (native vascular plants)	Tree (TG)	85.1
	Shrub (SG)	1.4
	Forb (FG)	2.4
	Grass & grasslike (GG)	31
	Fern (EG)	1
	Other (OG)	4.1
	TOTAL Native	125
	TOTAL 'HTE'	0

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %
Litter Cover	5m	70%	65.0%
	15m	85%	
	25m	85%	
	35m	10%	
	45m	75%	
Bare ground cover	5m	15%	5.2%
	15m	3%	
	25m	5%	
	35m	0%	
	45m	3%	
Cryptogam cover	5m	0%	0.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	
Rock Cover	5m	15%	32.0%
	15m	5%	
	25m	25%	
	35m	90%	
	45m	25%	

BAM Attribute (20 x 50m plot) Tree Stem Counts

DBH (cm)	Euc	Non Euc	Hollows
>80	1		1
50-79	3	1	5
30-49	3	3	1
20-29	1	1	
10-19	1	2	
5-9		1	
<5	3		N/A
Length of logs (m)		50	

0.1%=63x63cm
0.5%=1.4x1.4m
1%=2×2m
5%=4×5m
25%=10×10m

COMPOSITION & STRUCTURE

Species recorded for		LW_OMPS_20						
Abbreviation	**Scientific Name**	**Common Name**	**Family**	**% Cover**	**Abundance**	**Exotic**	**Growth Form**	**High Threat?**
euca punc	*Eucalyptus punctata*	Grey Gum	Myrtaceae	25	1		Tree (TG)	No
cory inte	*Corymbia intermedia*	Pink Bloodwood	Myrtaceae	30	3		Tree (TG)	No
ango subv	*Angophora subvelutina*	Broad-leaved Apple	Myrtaceae	10	2		Tree (TG)	No
allo toru	*Allocasuarina torulosa*	Forest Oak	Casuarinaceae	10	4		Tree (TG)	No
ficu rubi	*Ficus rubiginosa*	Port Jackson Fig	Moraceae	10	1		Tree (TG)	No
digi ramu	*Digitaria ramularis*	Finger Panic Grass	Poaceae	0.5	1		Grass & grasslike (GG)	No
pter escu	*Pteridium esculentum*	Bracken	Dennstaedtiacea	1	2		Fern (EG)	No
eust lati	*Eustrephus latifolius*	Wombat Berry	Luzuriagaceae	0.2	2		Other (OG)	No
xero brac	*Xerochrysum bracteatur*	Golden Everlasting	Asteraceae	0.1	1		Forb (FG)	No
impe cyli	*Imperata cylindrica*	Blady Grass	Poaceae	10	50		Grass & grasslike (GG)	No
rubu parv	*Rubus parvifolius*	Native Raspberry	Rosaceae	1	10		Shrub (SG)	No
hibi sple	*Hibiscus splendens*	Pink Hibiscus	Malvaceae	0.2	3		Shrub (SG)	No
swai gale	*Swainsona galegifolia*	Smooth Darling Pea	Fabaceae (Faboid	0.2	3		Forb (FG)	No
plec grav	*Plectranthus graveolens*		Lamiaceae	0.2	4		Forb (FG)	No
glyc tome	*Glycine tomentella*	Woolly Glycine	Fabaceae (Faboid	0.5	10		Other (OG)	No
cymb refr	*Cymbopogon refractus*	Barbed Wire Grass	Poaceae	15	30		Grass & grasslike (GG)	No
ripo albu	*Ripogonum album*	White Supplejack	Ripogonaceae	1	1		Other (OG)	No
dios tran	*Dioscorea transversa*	Native Yam	Dioscoreaceae	0.2	2		Other (OG)	No
myrs vari	*Myrsine variabilis*		Myrsinaceae	0.1	1		Shrub (SG)	No
kenn rubi	*Kennedia rubicunda*	Dusky Coral Pea	Fabaceae (Faboid	1	2		Other (OG)	No
loma long	*Lomandra longifolia*	Spiny-headed Mat-rush	Lomandraceae	5	10		Grass & grasslike (GG)	No
sige orie orie	*Sigesbeckia orientalis su*	Indian Weed	Asteraceae	1	10		Forb (FG)	No
wahl comm	*Wahlenbergia communi*	Tufted Bluebell	Campanulaceae	0.2	5		Forb (FG)	No
ciss anta	*Cissus antarctica*	Water Vine	Vitaceae	1	1		Other (OG)	No
cayr clem	*Cayratia clematidea*	Native Grape	Vitaceae	0.1	1		Other (OG)	No
meli repe	*Melinis repens*	Red Natal Grass	Poaceae	0.1	1	*		No
cony bona	*Conyza bonariensis*	Flaxleaf Fleabane	Asteraceae	0.1	1	*		No
verb lito	*Verbena litoralis*		Verbenaceae	0.2	5	*		No
oxal chno	*Oxalis chnoodes*		Oxalidaceae	0.1	1		Forb (FG)	No
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	0.1	1		Grass & grasslike (GG)	No
scle mack	*Scleria mackaviensis*		Cyperaceae	0.2	5		Grass & grasslike (GG)	No
euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	0.1	5		Forb (FG)	No
wahl grac	*Wahlenbergia gracilenta*	Annual Bluebell	Campanulaceae	0.1	1		Forb (FG)	No
plec parv	*Plectranthus parviflorus*		Lamiaceae	0.1	1		Forb (FG)	No
pasp dist	*Paspalidium distans*		Poaceae	0.1	1		Grass & grasslike (GG)	No
glyc clan	*Glycine clandestina*	Twining glycine	Fabaceae (Faboid	0.1	1		Other (OG)	No
brey oblo	*Breynia oblongifolia*	Coffee Bush	Phyllanthaceae	0.1	1		Shrub (SG)	No
evol alsi	*Evolvulus alsinoides*	Bindweed	Convolvulaceae	0.1	1		Forb (FG)	No
desm brac	*Desmodium brachypodu*	Large Tick-trefoil	Fabaceae (Faboid	0.1	1		Forb (FG)	No
dich seri	*Dichanthium sericeum*	Queensland Bluegrass	Poaceae	0.1	1		Grass & grasslike (GG)	No

prat purp	*Pratia purpurascens*	Whiteroot	Lobeliaceae	0.1	1		Forb (FG)	No
cler tome	*Clerodendrum tomentos*	Hairy Clerodendrum	Lamiaceae	0.1	1		Tree (TG)	No
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE

BAM Site Field Survey								
Project:	20-617	**Plot Identifier**	LW_OMPS_21	**Pic 20x20**		**Pic 20x50**		
Survey date:	17/11/2020		**Compass Orientation (head of 20x20 plot)**					
Recorders	GX LW		**PCT:**	842	High			
GPS Easting	419663	**GPS Northing**	6591979		**Datum**	GDA	**Zone**	56
Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance			
	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
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)

Additional information

Current land use

vacant land in industrial zone

Age class of trees (DBH range) , Condition of Vegetation, Hollows

mature and regrowth possible hollows mod condition

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

as above

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

none

Dominant Species outside Plot

FUNCTION

Function attributes for	LW_OMPS_21

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	Tree (TG)	3
	Shrub (SG)	2
	Forb (FG)	16
	Grass & grasslike (GG)	12
	Fern (EG)	2
	Other (OG)	4
	TOTAL	39

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of cover abundance (native vascular plants)	Tree (TG)	36
	Shrub (SG)	0.3
	Forb (FG)	2.5
	Grass & grasslike (GG)	86.3
	Fern (EG)	0.2
	Other (OG)	0.5
	TOTAL Native	125.8
	TOTAL 'HTE'	0

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %
Litter Cover	5m	20%	24.0%
	15m	30%	
	25m	30%	
	35m	25%	
	45m	15%	
Bare ground cover	5m	5%	27.0%
	15m	30%	
	25m	5%	
	35m	30%	
	45m	65%	
Cryptogam cover	5m	1%	0.8%
	15m	1%	
	25m	1%	
	35m	1%	
	45m	0%	
Rock Cover	5m	15%	12.0%
	15m	0%	
	25m	0%	
	35m	30%	
	45m	15%	

BAM Attribute (20 x 50m plot) Tree Stem Counts

DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49	5		
20-29	8		
10-19	3		
5-9	2		
<5	3		N/A
Length of logs (m)		10	

0.1%=63x63cm
0.5%=1.4x1.4m
1%=2×2m
5%=4×5m
25%=10×10m

COMPOSITION & STRUCTURE

Species recorded for LW_OMPS_21

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?
euca ampl	*Eucalyptus amplifolia*	Cabbage Gum	Myrtaceae	30	25		Tree (TG)	No
euca carn	*Eucalyptus carnea*	Thick-leaved Mahogany	Myrtaceae	5	2		Tree (TG)	No
euca mell	*Eucalyptus melliodora*	Yellow Box	Myrtaceae	1	1		Tree (TG)	No
hydr hirt	*Hydrocotyle hirta*	Hairy Pennywort	Apiaceae	0.1	2		Forb (FG)	No
glyc clan	*Glycine clandestina*	Twining glycine	Fabaceae (Faboideae)	0.2	10		Other (OG)	No
cent	*Centaurium spp.*	Thistle	Asteraceae	0.2	100	*		No
rost adsc	*Rostellularia adscendens*	Pink Tongues	Acanthaceae	0.1	50		Forb (FG)	No
chei dist	*Cheilanthes distans*	Bristly Cloak Fern	Pteridaceae	0.1	20		Fern (EG)	No
bide pilo	*Bidens pilosa*	Cobbler's Pegs	Asteraceae	0.5	100	*		No
burs spin	*Bursaria spinosa*	Native Blackthorn	Pittosporaceae	0.1			Shrub (SG)	No
gomp	*Gomphocarpus spp.*		Apocynaceae	1	10	*		No
jasm suav	*Jasminum suavissimum*		Oleaceae	0.1	5		Other (OG)	No
plec parv	*Plectranthus parviflorus*		Lamiaceae	0.1	5		Forb (FG)	No
brey	*Breynia spp.*		Phyllanthaceae	0.2	10		Shrub (SG)	No
aris grac	*Aristida gracilipes*	Three-awn Speargrass	Poaceae	50	100		Grass & grasslike (GG)	No
desm vari	*Desmodium varians*	Slender Tick-trefoil	Fabaceae (Faboideae)	0.1			Other (OG)	No
glyc taba	*Glycine tabacina*	Variable Glycine	Fabaceae (Faboideae)	0.1			Other (OG)	No
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	10	300		Grass & grasslike (GG)	No
verb lito	*Verbena litoralis*		Verbenaceae	0.5	50	*		No
arth mill	*Arthropodium millefloru*	Pale Vanilla-lily	Anthericaceae	0.1	3		Forb (FG)	No
sida rhom	*Sida rhombifolia*	Paddy's Lucerne	Malvaceae	10	100	*		No
loma fili	*Lomandra filiformis*	Wattle Matt-rush	Lomandraceae	1	10		Grass & grasslike (GG)	No
sene mada	*Senecio madagascariens*	Fireweed	Asteraceae	0.1	1	*		No
chei sieb	*Cheilanthes sieberi*	Rock Fern	Pteridaceae	0.1	10		Fern (EG)	No
wahl gran	*Wahlenbergia graniticol*	Granite Bluebell	Campanulaceae	0.1	10		Forb (FG)	No
sige	*Sigesbeckia spp.*		Asteraceae	1	100		Forb (FG)	No
dich	*Dichanthium spp.*		Poaceae	0.1	10		Grass & grasslike (GG)	No
prat purp	*Pratia purpurascens*	Whiteroot	Lobeliaceae	0.1	1		Forb (FG)	No
dich micr	*Dichelachne micrantha*	Shorthair Plumegrass	Poaceae	1	10		Grass & grasslike (GG)	No
apiu	*Apium spp.*		Apiaceae	0.1			Forb (FG)	No
cymb refr	*Cymbopogon refractus*	Barbed Wire Grass	Poaceae	20	100		Grass & grasslike (GG)	No
echi ovat	*Echinopogon ovatus*	Forest Hedgehog Grass	Poaceae	1	50		Grass & grasslike (GG)	No
pseu lute	*Pseudognaphalium lutec*	Jersey Cudweed	Asteraceae	0.1			Forb (FG)	No
plan vari	*Plantago varia*		Plantaginaceae	0.1	2		Forb (FG)	No
tric elat	*Tricoryne elatior*	Yellow Autumn-lily	Anthericaceae	0.1	2		Forb (FG)	No
loma mult mult	*Lomandra multiflora sul*	Many-flowered Mat-rush	Lomandraceae	1	10		Grass & grasslike (GG)	No
pani simi	*Panicum simile*	Two-colour Panic	Poaceae	1	100		Grass & grasslike (GG)	No
opli aemu	*Oplismenus aemulus*		Poaceae	1	50		Grass & grasslike (GG)	No
scle mack	*Scleria mackaviensis*		Cyperaceae	0.1	1		Grass & grasslike (GG)	No
cony	*Conyza spp.*	A Fleabane	Asteraceae	1	50	*		No

halo hete	*Haloragis heterophylla*	Variable Raspwort	Haloragaceae	0.1			Forb (FG)	No
pavo hast	*Pavonia hastata*		Malvaceae	0.1		*		No
cent asia	*Centella asiatica*	Indian Pennywort	Apiaceae	0.1			Forb (FG)	No
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	0.1			Grass & grasslike (GG)	No
micr spp spp	*Microtis spp subsp. spp*		Orchidaceae	0.1			Forb (FG)	No
wahl stri	*Wahlenbergia stricta*	Tall Bluebell	Campanulaceae	0.1			Forb (FG)	No
oxal	*Oxalis spp.*		Oxalidaceae	0.1			Forb (FG)	No
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE

BAM Site Field Survey								
Project:	20-617 Oven Mt	**Plot Identifier**	LW_OMPS_23	**Pic 20x20**		**Pic 20x50**		
Survey date:	18/11/2020		**Compass Orientation (head of 20x20 plot)**					
Recorders	GX LW		**PCT:**	1106	PoorRF			
GPS Easting	419669	**GPS Northing**	6591653		**Datum**	GDA	**Zone**	56
Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance			
	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
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)

Additional information
Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
possible hollows mod condition
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for	LW_OMPS_23

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	Tree (TG)	9
	Shrub (SG)	6
	Forb (FG)	6
	Grass & grasslike (GG)	5
	Fern (EG)	4
	Other (OG)	8
	TOTAL	38

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of cover abundance (native vascular plants)	Tree (TG)	64.5
	Shrub (SG)	21.5
	Forb (FG)	0.6
	Grass & grasslike (GG)	2.4
	Fern (EG)	10.8
	Other (OG)	1.3
	TOTAL Native	101.1
	TOTAL 'HTE'	0.9

BAM Attribute (20 x 50m plot) Tree Stem Counts

DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49		3	
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)			

0.1%=63x63cm
0.5%=1.4x1.4m
1%=2×2m
5%=4×5m
25%=10×10m

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %
Litter Cover	5m	15%	32.0%
	15m	50%	
	25m	60%	
	35m	15%	
	45m	20%	
Bare ground cover	5m	5%	9.0%
	15m	15%	
	25m	0%	
	35m	5%	
	45m	20%	
Cryptogam cover	5m	0%	0.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	
Rock Cover	5m	90%	47.0%
	15m	30%	
	25m	40%	
	35m	15%	
	45m	60%	

COMPOSITION & STRUCTURE

Species recorded for LW_OMPS_23

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?
ficu rubi	*Ficus rubiginosa*	Port Jackson Fig	Moraceae	50	1		Tree (TG)	No
syzy aust	*Syzygium australe*	Brush Cherry	Myrtaceae	20	2		Shrub (SG)	No
elae obov	*Elaeocarpus obovatus*	Hard Quandong	Elaeocarpaceae	5	1		Tree (TG)	No
mall phil	*Mallotus philippensis*	Red Kamala	Euphorbiaceae	5	2		Tree (TG)	No
stre brun	*Streblus brunonianus*	Whalebone Tree	Moraceae	1	3		Tree (TG)	No
daph apat	*Daphnandra apatela*		Monimiaceae	0.2	1		Tree (TG)	No
para prui prui	*Pararchidendron pruinosum v*	Snow Wood	Fabaceae (Mim	0.2	2		Tree (TG)	No
plec trid	*Plectorrhiza tridentata*	Tangle Orchid	Orchidaceae	0.1	1		Other (OG)	No
dend tere	*Dendrobium teretifolium*	Rat's Tail Orchid	Orchidaceae	0.1	1		Other (OG)	No
pyrr conf conf	*Pyrrosia confluens var. conflue*	Horseshoe Felt Fern	Polypodiaceae	0.2	10		Fern (EG)	No
ango subv	*Angophora subvelutina*	Broad-leaved Apple	Myrtaceae	1	1		Tree (TG)	No
cory inte	*Corymbia intermedia*	Pink Bloodwood	Myrtaceae	2	1		Tree (TG)	No
adia aeth	*Adiantum aethiopicum*	Common Maidenhair	Adiantaceae	10	100		Fern (EG)	No
	Citrus spp.	#N/A	#N/A	1	1	#N/A	Shrub (SG)	No
opli aemu	*Oplismenus aemulus*		Poaceae	2	50		Grass & grasslike (GG)	No
myrs vari	*Myrsine variabilis*		Myrsinaceae	0.1	1		Shrub (SG)	No
xero brac	*Xerochrysum bracteatum*	Golden Everlasting	Asteraceae	0.1	1		Forb (FG)	No
loma hyst	*Lomandra hystrix*		Lomandraceae	0.1	1		Grass & grasslike (GG)	No
jasm simp	*Jasminum simplicifolium*		Oleaceae	0.2	1		Other (OG)	No
eust lati	*Eustrephus latifolius*	Wombat Berry	Luzuriagaceae	0.1	1		Other (OG)	No
plec grav	*Plectranthus graveolens*		Lamiaceae	0.1	1		Forb (FG)	No
ligu sine	*Ligustrum sinense*	Small-leaved Privet	Oleaceae	0.2	1	*		HTE
adia hisp	*Adiantum hispidulum*	Rough Maidenhair	Adiantaceae	0.5	20		Fern (EG)	No
dend ling	*Dendrobium linguiforme*	Tongue Orchid	Orchidaceae	0.1	1		Other (OG)	No
rubu parv	*Rubus parvifolius*	Native Raspberry	Rosaceae	0.2	2		Shrub (SG)	No
back myrt	*Backhousia myrtifolia*	Grey Myrtle	Myrtaceae	0.1	1		Shrub (SG)	No
psil nudu	*Psilotum nudum*	Skeleton Fork-Fern	Psilotaceae	0.1	1		Fern (EG)	No
mori jasm	*Morinda jasminoides*	Sweet Morinda	Rubiaceae	0.1	1		Other (OG)	No
cype tetr	*Cyperus tetraphyllus*		Cyperaceae	0.1	1		Grass & grasslike (GG)	No
dend spec	*Dendrobium speciosum*	Rock Lily	Orchidaceae	0.1	1		Forb (FG)	No
cayr clem	*Cayratia clematidea*	Native Grape	Vitaceae	0.1	2		Other (OG)	No
brac disc	*Brachychiton discolor*	Lacebark Tree	Malvaceae	0.1	1		Tree (TG)	No
ligu luci	*Ligustrum lucidum*	Large-leaved Privet	Oleaceae	0.2	1	*		HTE
tetr nite	*Tetrastigma nitens*		Vitaceae	0.5	1		Other (OG)	No
pseu vari	*Pseuderanthemum variabile*	Pastel Flower	Acanthaceae	0.1	5		Forb (FG)	No
lant cama	*Lantana camara*	Lantana	Verbenaceae	0.5	1	*		HTE
wahl stri	*Wahlenbergia stricta*	Tall Bluebell	Campanulaceae	0.1	1		Forb (FG)	No
gera negl	*Geranium neglectum*		Geraniaceae	0.1	1		Forb (FG)	No
verb afri	*Verbena africana*		Verbenaceae	0.1	1	*		No
hyme flav	*Hymenosporum flavum*	Native Frangipani	Pittosporaceae	0.1	1		Shrub (SG)	No

care appr	*Carex appressa*	Tall Sedge	Cyperaceae	0.1	5		Grass & grasslike (GG)	No
ento marg	*Entolasia marginata*	Bordered Panic	Poaceae	0.1	20		Grass & grasslike (GG)	No
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE

BAM Site Field Survey								
Project:	20-617	**Plot Identifier**	LW_OMPS_37	**Pic 20x20**		**Pic 20x50**		
Survey date:	18/11/2020		**Compass Orientation (head of 20x20 plot)**					
Recorders	GX LW		**PCT:**	842	High			
GPS Easting	419498	**GPS Northing**	6591239		**Datum**	GDA	**Zone**	56
Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance			
	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
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)

Additional information

Current land use

vacant land in industrial zone

Age class of trees (DBH range) , Condition of Vegetation, Hollows

mature and regrowth possible hollows mod condition

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

as above

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

none

Dominant Species outside Plot

FUNCTION

Function attributes for	LW_OMPS_37

BAM Attribute (20x20m plot)		
Count of Native Richness	Stratum	Sum
	Tree (TG)	3
	Shrub (SG)	0
	Forb (FG)	6
	Grass & grasslike (GG)	5
	Fern (EG)	1
	Other (OG)	3
	TOTAL	18

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	31
	Shrub (SG)	0
	Forb (FG)	1
	Grass & grasslike (GG)	14.2
	Fern (EG)	0.1
	Other (OG)	1.2
	TOTAL Native	47.5
	TOTAL 'HTE'	0

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49	3		
20-29	5		2
10-19	5		1
5-9			
<5	2		N/A
Length of logs (m)		37	

0.1%=63x63cm
0.5%=1.4x1.4m
1%=2×2m
5%=4×5m
25%=10×10m

BAM Attributes (1 x 1m Plots)			
	Tape length	% cover	Average %
Litter Cover	5m	20%	29.0%
	15m	15%	
	25m	50%	
	35m	20%	
	45m	40%	
Bare ground cover	5m	0%	12.0%
	15m	40%	
	25m	10%	
	35m	5%	
	45m	5%	
Cryptogam cover	5m	0%	0.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	
Rock Cover	5m	5%	17.0%
	15m	20%	
	25m	20%	
	35m	20%	
	45m	20%	

COMPOSITION & STRUCTURE

Species recorded for LW_OMPS_37

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?
euca carn	*Eucalyptus carnea*	Thick-leaved Mahogany	Myrtaceae	25	15		Tree (TG)	No
euca molu	*Eucalyptus moluccana*	Grey Box	Myrtaceae	5	2		Tree (TG)	No
cory gumm	*Corymbia gummifera*	Red Bloodwood	Myrtaceae	1	1		Tree (TG)	No
glyc tome	*Glycine tomentella*	Woolly Glycine	Fabaceae (Faboid	0.2	2		Other (OG)	No
glyc taba	*Glycine tabacina*	Variable Glycine	Fabaceae (Faboid	0.5	10		Other (OG)	No
jasm suav	*Jasminum suavissimum*		Oleaceae	0.5	20		Other (OG)	No
crot mont angu	*Crotalaria montana var.*		Fabaceae (Faboid	0.1	1		Forb (FG)	No
vitt	*Vittadinia spp.*	Fuzzweed	Asteraceae	0.1	1		Forb (FG)	No
pani effu	*Panicum effusum*	Hairy Panic	Poaceae	2	20		Grass & grasslike (GG)	No
pasp dist	*Paspalidium distans*		Poaceae	2	20		Grass & grasslike (GG)	No
evol alsi	*Evolvulus alsinoides*	Bindweed	Convolvulaceae	0.5			Forb (FG)	No
wahl comm	*Wahlenbergia communi*	Tufted Bluebell	Campanulaceae	0.1			Forb (FG)	No
wahl grac	*Wahlenbergia gracilento*	Annual Bluebell	Campanulaceae	0.1			Forb (FG)	No
hete cont	*Heteropogon contortus*	Bunch Speargrass	Poaceae	10	100		Grass & grasslike (GG)	No
meli repe	*Melinis repens*	Red Natal Grass	Poaceae	70	500	*		No
chei sieb	*Cheilanthes sieberi*	Rock Fern	Pteridaceae	0.1	5		Fern (EG)	No
scle mack	*Scleria mackaviensis*		Cyperaceae	0.1	1		Grass & grasslike (GG)	No
crot	*Crotalaria spp.*		Fabaceae (Faboid	0.1		*		No
loma mult mult	*Lomandra multiflora sul*	Many-flowered Mat-rush	Lomandraceae	0.1			Grass & grasslike (GG)	No
cham noma noma	*Chamaecrista nomame*		Fabaceae (Caesalp	0.1	1		Forb (FG)	No
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE

	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE

BAM Site Field Survey								
Project:	20-617 Oven Mt	**Plot Identifier**	LW_OMPS_38	**Pic 20x20**		**Pic 20x50**		
Survey date:	18/11/2020		**Compass Orientation (head of 20x20 plot)**					
Recorders	GX LW		**PCT:**	842	High			
GPS Easting	419470	**GPS Northing**	6591519		**Datum**	GDA	**Zone**	56
Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance			
	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
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)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

possible hollows mod condition

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for	LW_OMPS_38

BAM Attribute (20x20m plot)		
	Stratum	Sum
Count of Native Richness	Tree (TG)	3
	Shrub (SG)	3
	Forb (FG)	15
	Grass & grasslike (GG)	13
	Fern (EG)	1
	Other (OG)	5
	TOTAL	40

BAM Attribute (20x20m plot)		
	Stratum	Sum
Count of cover abundance (native vascular plants)	Tree (TG)	41
	Shrub (SG)	20.3
	Forb (FG)	2.8
	Grass & grasslike (GG)	67.4
	Fern (EG)	0.1
	Other (OG)	22.4
	TOTAL Native	154
	TOTAL 'HTE'	0

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79	1		
30-49	10		
20-29	10		
10-19	2		2
5-9			
<5	2		N/A
Length of logs (m)		23	

0.1%=63x63cm
0.5%=1.4x1.4m
1%=2×2m
5%=4×5m
25%=10×10m

BAM Attributes (1 x 1m Plots)			
	Tape length	% cover	Average %
Litter Cover	5m	15%	13.0%
	15m	15%	
	25m	25%	
	35m	5%	
	45m	5%	
Bare ground cover	5m	2%	6.8%
	15m	10%	
	25m	2%	
	35m	5%	
	45m	15%	
Cryptogam cover	5m	0%	0.4%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	2%	
Rock Cover	5m	15%	55.0%
	15m	15%	
	25m	85%	
	35m	90%	
	45m	70%	

COMPOSITION & STRUCTURE

Species recorded for LW_OMPS_38

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?
phyl fuer	*Phyllanthus fuernrohrii*		Phyllanthaceae	20	100		Shrub (SG)	No
jasm suav	*Jasminum suavissimum*		Oleaceae	20	100		Other (OG)	No
desm rhyt	*Desmodium rhytidophyll*		Fabaceae (Faboide	0.2	5		Forb (FG)	No
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	0.1	1		Grass & grasslike (GG)	No
pani effu	*Panicum effusum*	Hairy Panic	Poaceae	2	50		Grass & grasslike (GG)	No
euca carn	*Eucalyptus carnea*	Thick-leaved Mahogany	Myrtaceae	30	20		Tree (TG)	No
euca ampl	*Eucalyptus amplifolia*	Cabbage Gum	Myrtaceae	10	2		Tree (TG)	No
cymb refr	*Cymbopogon refractus*	Barbed Wire Grass	Poaceae	20	50		Grass & grasslike (GG)	No
loma mult mult	*Lomandra multiflora sub*	Many-flowered Mat-rush	Lomandraceae	10	100		Grass & grasslike (GG)	No
capi spic	*Capillipedium spicigerun*	Scented-top Grass	Poaceae	5	20		Grass & grasslike (GG)	No
sche aust	*Schenkia australis*	Spike Centaury	Gentianaceae	1	20			No
sann cras	*Sannantha crassa*		Myrtaceae	1	10			No
dich seri	*Dichanthium sericeum*	Queensland Bluegrass	Poaceae	1	5		Grass & grasslike (GG)	No
plec parv	*Plectranthus parviflorus*		Lamiaceae	0.2	10		Forb (FG)	No
glyc taba	*Glycine tabacina*	Variable Glycine	Fabaceae (Faboide	0.2	10		Other (OG)	No
glyc clan	*Glycine clandestina*	Twining glycine	Fabaceae (Faboide	2	30		Other (OG)	No
verb lito	*Verbena litoralis*		Verbenaceae	0.2	10	*		No
chei sieb	*Cheilanthes sieberi*	Rock Fern	Pteridaceae	0.1	10		Fern (EG)	No
pasp dist	*Paspalidium distans*		Poaceae	2	30		Grass & grasslike (GG)	No
wahl stri	*Wahlenbergia stricta*	Tall Bluebell	Campanulaceae	1	30		Forb (FG)	No
scle mack	*Scleria mackaviensis*		Cyperaceae	0.5	10		Grass & grasslike (GG)	No
crot mont angu	*Crotalaria montana var.*		Fabaceae (Faboide	0.2	10		Forb (FG)	No
glyc tome	*Glycine tomentella*	Woolly Glycine	Fabaceae (Faboide	0.1	1		Other (OG)	No
evol alsi	*Evolvulus alsinoides*	Bindweed	Convolvulaceae	0.1	10		Forb (FG)	No
dian caer	*Dianella caerulea*	Blue Flax-lily	Phormiaceae	0.1	1		Forb (FG)	No
meli repe	*Melinis repens*	Red Natal Grass	Poaceae	1	50	*		No
cony bona	*Conyza bonariensis*	Flaxleaf Fleabane	Asteraceae	0.1	3	*		No
sida rhom	*Sida rhombifolia*	Paddy's Lucerne	Malvaceae	0.5	10	*		No
sola amer	*Solanum americanum*	Glossy Nightshade	Solanaceae	0.1	1		Forb (FG)	No
both macr	*Bothriochloa macra*	Red Grass	Poaceae	0.2	10		Grass & grasslike (GG)	No
aust vert	*Austrostipa verticillata*	Slender Bamboo Grass	Poaceae	0.1	1		Grass & grasslike (GG)	No
cham noma noma	*Chamaecrista nomame v*		Fabaceae (Caesalpi	0.1	1		Forb (FG)	No
sige orie orie	*Sigesbeckia orientalis su*	Indian Weed	Asteraceae	0.2	5		Forb (FG)	No
kenn rubi	*Kennedia rubicunda*	Dusky Coral Pea	Fabaceae (Faboide	0.1	1		Other (OG)	No
chry fall	*Chrysopogon fallax*		Poaceae	0.5	10		Grass & grasslike (GG)	No
aris vaga	*Aristida vagans*	Threeawn Speargrass	Poaceae	25	100		Grass & grasslike (GG)	No
dian revo	*Dianella revoluta*	Blueberry Lily	Phormiaceae	0.1	1		Forb (FG)	No
vern cine	*Vernonia cinerea*		Asteraceae	0.1	1		Forb (FG)	No
loma long	*Lomandra longifolia*	Spiny-headed Mat-rush	Lomandraceae	1	10		Grass & grasslike (GG)	No
sene mada	*Senecio madagascariens*	Fireweed	Asteraceae	0.1	1	*		No

zorn dyct dyct	*Zornia dyctiocarpa var. d*	Zornia	Fabaceae (Faboide	0.1	1		Forb (FG)	No
dich repe	*Dichondra spp.*	Kidney Weed	Convolvulaceae	0.1	1		Forb (FG)	No
brun aust aust		Blue Trumpet	Acanthaceae	0.1	2		Forb (FG)	No
gomp phys	*Gomphocarpus physoca*	Balloon Cotton Bush	Apocynaceae	0.1	1	*		No
abut oxyc	*Abutilon oxycarpum*	Straggly Lantern-bush	Malvaceae	0.2	3		Shrub (SG)	No
wahl comm	*Wahlenbergia communi*	Tufted Bluebell	Campanulaceae	0.1	1		Forb (FG)	No
brey oblo	*Breynia oblongifolia*	Coffee Bush	Phyllanthaceae	0.1	1		Shrub (SG)	No
cory inte	*Corymbia intermedia*	Pink Bloodwood	Myrtaceae	1	1		Tree (TG)	No
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE

BAM Site Field Survey								
Project:	20-617 Oven Mt	**Plot Identifier**	LW_OMPS_39	**Pic 20x20**		**Pic 20x50**		
Survey date:	18/11/2020		**Compass Orientation (head of 20x20 plot)**					
Recorders	GX LW		**PCT:**	842	High			
GPS Easting	419361	**GPS Northing**	6591212		**Datum**	GDA	**Zone**	56
Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance			
	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
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)

Additional information

Current land use

Age class of trees (DBH range) , Condition of Vegetation, Hollows

possible hollows mod condition

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for	LW_OMPS_39

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	Tree (TG)	6
	Shrub (SG)	2
	Forb (FG)	16
	Grass & grasslike (GG)	9
	Fern (EG)	0
	Other (OG)	5
	TOTAL	38

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of cover abundance (native vascular plants)	Tree (TG)	52.2
	Shrub (SG)	1.1
	Forb (FG)	6.9
	Grass & grasslike (GG)	29.2
	Fern (EG)	0
	Other (OG)	2
	TOTAL Native	91.4
	TOTAL 'HTE'	0

BAM Attribute (20 x 50m plot) Tree Stem Counts

DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79	1		
30-49	4		
20-29	5		
10-19	2		
5-9	1		
<5	3		N/A
Length of logs (m)		10	

0.1%=63x63cm
0.5%=1.4x1.4m
1%=2×2m
5%=4×5m
25%=10×10m

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %
Litter Cover	5m	10%	7.0%
	15m	5%	
	25m	5%	
	35m	5%	
	45m	10%	
Bare ground cover	5m	80%	62.0%
	15m	80%	
	25m	5%	
	35m	80%	
	45m	65%	
Cryptogam cover	5m	0%	0.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	
Rock Cover	5m	20%	29.0%
	15m	5%	
	25m	80%	
	35m	10%	
	45m	30%	

COMPOSITION & STRUCTURE

Species recorded for LW_OMPS_39

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?
cory inte	*Corymbia intermedia*	Pink Bloodwood	Myrtaceae	40	20		Tree (TG)	No
euca carn	*Eucalyptus carnea*	Thick-leaved Mahogany	Myrtaceae	5	2		Tree (TG)	No
euca ampl	*Eucalyptus amplifolia*	Cabbage Gum	Myrtaceae	5	1		Tree (TG)	No
jack scop	*Jacksonia scoparia*	Dogwood	Fabaceae (Faboide	1	2		Shrub (SG)	No
good macb	*Goodenia macbarronii*	Narrow Goodenia	Goodeniaceae	0.2	2		Forb (FG)	No
zorn dyct dyct	*Zornia dyctiocarpa var. d*	Zornia	Fabaceae (Faboide	0.5	10		Forb (FG)	No
sper brac	*Spermacoce brachystem*		Rubiaceae	0.5	10		Forb (FG)	No
evol alsi	*Evolvulus alsinoides*	Bindweed	Convolvulaceae	0.1	1		Forb (FG)	No
aris vaga	*Aristida vagans*	Threeawn Speargrass	Poaceae	5	20		Grass & grasslike (GG)	No
vitt hisp	*Vittadinia hispidula*		Asteraceae	1	10		Forb (FG)	No
desm rhyt	*Desmodium rhytidophyll*		Fabaceae (Faboide	0.2	2		Forb (FG)	No
glyc clan	*Glycine clandestina*	Twining glycine	Fabaceae (Faboide	0.2	10		Other (OG)	No
dian revo	*Dianella revoluta*	Blueberry Lily	Phormiaceae	2	20		Forb (FG)	No
meli repe	*Melinis repens*	Red Natal Grass	Poaceae	1	10	*		No
glyc taba	*Glycine tabacina*	Variable Glycine	Fabaceae (Faboide	0.2	5		Other (OG)	No
cham noma noma	*Chamaecrista nomame v*		Fabaceae (Caesalpi	0.1	5		Forb (FG)	No
desm vari	*Desmodium varians*	Slender Tick-trefoil	Fabaceae (Faboide	0.1	1		Other (OG)	No
glos bide	*Glossocardia bidens*	Cobbler's Tack	Asteraceae	0.1	5		Forb (FG)	No
pasp dist	*Paspalidium distans*		Poaceae	5	20		Grass & grasslike (GG)	No
pani effu	*Panicum effusum*	Hairy Panic	Poaceae	5	20		Grass & grasslike (GG)	No
wahl stri	*Wahlenbergia stricta*	Tall Bluebell	Campanulaceae	0.5	10		Forb (FG)	No
lesp junc seri	*Lespedeza juncea subsp.*		Fabaceae (Faboide	0.2	2		Forb (FG)	No
hard viol	*Hardenbergia violacea*	False Sarsaparilla	Fabaceae (Faboide	0.5	5		Other (OG)	No
jasm suav	*Jasminum suavissimum*		Oleaceae	1	10		Other (OG)	No
cymb refr	*Cymbopogon refractus*	Barbed Wire Grass	Poaceae	10	50		Grass & grasslike (GG)	No
oper diph	*Opercularia diphylla*	Stinkweed	Rubiaceae	1	20		Forb (FG)	No
crot mont angu	*Crotalaria montana var.*		Fabaceae (Faboide	0.2	5		Forb (FG)	No
vern cine	*Vernonia cinerea*		Asteraceae	0.1	1		Forb (FG)	No
euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	0.1	1		Forb (FG)	No
both macr	*Bothriochloa macra*	Red Grass	Poaceae	1	10		Grass & grasslike (GG)	No
loma long	*Lomandra longifolia*	Spiny-headed Mat-rush	Lomandraceae	2	20		Grass & grasslike (GG)	No
dich seri	*Dichanthium sericeum*	Queensland Bluegrass	Poaceae	0.1	1		Grass & grasslike (GG)	No
chry fall	*Chrysopogon fallax*		Poaceae	1	10		Grass & grasslike (GG)	No
phyl gunn	*Phyllanthus gunnii*		Phyllanthaceae	0.1	1		Shrub (SG)	No
scle mack	*Scleria mackaviensis*		Cyperaceae	0.1	2		Grass & grasslike (GG)	No
ango subv	*Angophora subvelutina*	Broad-leaved Apple	Myrtaceae	2	1		Tree (TG)	No
	Brunoniella australis	#N/A	#N/A	0.1	1	#N/A	Forb (FG)	No
allo litt	*Allocasuarina littoralis*	Black She-Oak	Casuarinaceae	0.1	1		Tree (TG)	No
acac maid	*Acacia maidenii*	Maiden's Wattle	Fabaceae (Mimoso	0.1	1		Tree (TG)	No
	#N/A	#N/A	#N/A			#N/A		FALSE

	#N/A	#N/A	#N/A			#N/A		FALSE

BAM Site Field Survey								
Project:	OMPS	**Plot Identifier**	MP_OMPS_12	**Pic 20x20**		**Pic 20x50**		
Survey date:	28/10/2020		**Compass Orientation (head of 20x20 plot)**					
Recorders	MP/GX		**PCT:**	842	High			
GPS Easting	419125	**GPS Northing**	6591580		**Datum**	GDA	**Zone**	56
Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance			
	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
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)

Additional information
Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for	MP_OMPS_12

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	Tree (TG)	6
	Shrub (SG)	7
	Forb (FG)	14
	Grass & grasslike (GG)	9
	Fern (EG)	1
	Other (OG)	5
	TOTAL	42

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of cover abundance (native vascular plants)	Tree (TG)	28.1
	Shrub (SG)	9.1
	Forb (FG)	4.4
	Grass & grasslike (GG)	9
	Fern (EG)	0.5
	Other (OG)	1.6
	TOTAL Native	52.7
	TOTAL 'HTE'	0

BAM Attribute (20 x 50m plot) Tree Stem Counts

DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49	7		
20-29	4	1	
10-19	2	2	
5-9	2	2	
<5	5	2	N/A
Length of logs (m)		47	

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %
Litter Cover	5m	85%	69.0%
	15m	50%	
	25m	70%	
	35m	60%	
	45m	80%	
Bare ground cover	5m	5%	8.0%
	15m	20%	
	25m	5%	
	35m	10%	
	45m	0%	
Cryptogam cover	5m	2%	6.0%
	15m	5%	
	25m	3%	
	35m	15%	
	45m	5%	
Rock Cover	5m	5%	12.0%
	15m	15%	
	25m	10%	
	35m	20%	
	45m	10%	

COMPOSITION & STRUCTURE

Species recorded for MP_OMPS_12

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?
euca ampl	*Eucalyptus amplifolia*	Cabbage Gum	Myrtaceae	10			Tree (TG)	No
euca carn	*Eucalyptus carnea*	Thick-leaved Mahogany	Myrtaceae	10			Tree (TG)	No
ango flor	*Angophora floribunda*	Rough-barked Apple	Myrtaceae	5			Tree (TG)	No
allo toru	*Allocasuarina torulosa*	Forest Oak	Casuarinaceae	2			Tree (TG)	No
cymb refr	*Cymbopogon refractus*	Barbed Wire Grass	Poaceae	5			Grass & grasslike (GG)	No
ango subv	*Angophora subvelutina*	Broad-leaved Apple	Myrtaceae	1			Tree (TG)	No
exoc cupr	*Exocarpos cupressiformi*	Cherry Ballart	Santalaceae	5			Shrub (SG)	No
leuc juni	*Leucopogon juniperinus*	Prickly Beard-heath	Ericaceae	3			Shrub (SG)	No
them tria	*Themeda triandra*		Poaceae	1			Grass & grasslike (GG)	No
sorg leio	*Sorghum leiocladum*	Wild Sorghum	Poaceae	0.1	3		Grass & grasslike (GG)	No
erem debi	*Eremophila debilis*	Amulla	Myoporaceae	0.2	3		Shrub (SG)	No
chei sieb	*Cheilanthes sieberi*	Rock Fern	Pteridaceae	0.5	50		Fern (EG)	No
dian caer	*Dianella caerulea*	Blue Flax-lily	Phormiaceae	3			Forb (FG)	No
jack scop	*Jacksonia scoparia*	Dogwood	Fabaceae (Faboi	0.5	1		Shrub (SG)	No
note micr	*Notelaea microcarpa*	Native Olive	Oleaceae	0.1	1		Tree (TG)	No
desm vari	*Desmodium varians*	Slender Tick-trefoil	Fabaceae (Faboi	0.1	500		Other (OG)	No
loma long	*Lomandra longifolia*	Spiny-headed Mat-rush	Lomandraceae	2			Grass & grasslike (GG)	No
brey oblo	*Breynia oblongifolia*	Coffee Bush	Phyllanthaceae	0.1	3		Shrub (SG)	No
plec parv	*Plectranthus parviflorus*		Lamiaceae	0.1	50		Forb (FG)	No
caes parv	*Caesia parviflora*	Pale Grass-lily	Anthericaceae	0.1	1		Forb (FG)	No
desm brac	*Desmodium brachypodu*	Large Tick-trefoil	Fabaceae (Faboi	0.1	3		Forb (FG)	No
both deci deci	*Bothriochloa decipiens v*	Pitted Bluegrass	Poaceae	0.1	4		Grass & grasslike (GG)	No
stac mono	*Stackhousia monogyna*	Creamy Candles	Stackhousiaceae	0.1	1		Forb (FG)	No
hard viol	*Hardenbergia violacea*	False Sarsaparilla	Fabaceae (Faboi	1			Other (OG)	No
dich micr	*Dichelachne micrantha*	Shorthair Plumegrass	Poaceae	0.1	2		Grass & grasslike (GG)	No
acac impl	*Acacia implexa*	Hickory Wattle	Fabaceae (Mimo	0.2	1		Shrub (SG)	FALSE
euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	0.1	5		Forb (FG)	No
wahl stri	*Wahlenbergia stricta*	Tall Bluebell	Campanulaceae	0.1	20		Forb (FG)	No
ajug aust	*Ajuga australis*	Austral Bugle	Lamiaceae	0.1	3		Forb (FG)	No
astr lati	*Astrotricha latifolia*		Araliaceae	0.1	1		Shrub (SG)	No
cent eryt	*Centaurium erythraea*	Common Centaury	Gentianaceae	0.1	10	*		No
comm cyan	*Commelina cyanea*	Native Wandering Jew	Commelinaceae	0.1	2		Forb (FG)	No
prat purp	*Pratia purpurascens*	Whiteroot	Lobeliaceae	0.1	50		Forb (FG)	No
erag lept	*Eragrostis leptostachya*	Paddock Lovegrass	Poaceae	0.1	10		Grass & grasslike (GG)	No
pass	*Passiflora spp.*		Passifloraceae	0.1	1	*	Forb (FG)	No
geit cymo	*Geitonoplesium cymosu*	Scrambling Lily	Luzuriagaceae	0.1	1		Other (OG)	No
sige orie orie	*Sigesbeckia orientalis su*	Indian Weed	Asteraceae	0.1	1		Forb (FG)	No
jasm suav	*Jasminum suavissimum*		Oleaceae	0.3	10		Other (OG)	No
stel angu	*Stellaria angustifolia*	Swamp Starwort	Caryophyllaceae	0.1	1		Forb (FG)	No
glyc clan	*Glycine clandestina*	Twining glycine	Fabaceae (Faboi	0.1	20		Other (OG)	No

good hede	*Goodenia hederacea*	Ivy Goodenia	Goodeniaceae	0.2	15		Forb (FG)	No
loma mult mult	*Lomandra multiflora sul*	Many-flowered Mat-rush	Lomandraceae	0.5	10		Grass & grasslike (GG)	No
spor elon	*Sporobolus elongatus*	Slender Rat's Tail Grass	Poaceae	0.1	1		Grass & grasslike (GG)	No
rost adsc adsc	*Rostellularia adscendens*		Acanthaceae	0.1	3			No
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE

BAM Site Field Survey								
Project:	OMPS	**Plot Identifier**	MP_OMPS_17	**Pic 20x20**		**Pic 20x50**		
Survey date:	27/10/2020		**Compass Orientation (head of 20x20 plot)**					
Recorders	MP/GX		**PCT:**	868	High			
GPS Easting	420500	**GPS Northing**	6591599		**Datum**	GDA	**Zone**	56
Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance			
	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
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)

Additional information
Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for	MP_OMPS_17

BAM Attribute (20x20m plot)		
	Stratum	Sum
Count of Native Richness	Tree (TG)	4
	Shrub (SG)	5
	Forb (FG)	18
	Grass & grasslike (GG)	8
	Fern (EG)	0
	Other (OG)	4
	TOTAL	39

BAM Attribute (20x20m plot)		
	Stratum	Sum
Count of cover abundance (native vascular plants)	Tree (TG)	24.1
	Shrub (SG)	4.3
	Forb (FG)	3.7
	Grass & grasslike (GG)	22.7
	Fern (EG)	0
	Other (OG)	0.6
	TOTAL Native	55.4
	TOTAL 'HTE'	0

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79	1		1
30-49	4		1
20-29	2		
10-19	2		
5-9	5		
<5	5		N/A
Length of logs (m)		27	

BAM Attributes (1 x 1m Plots)			
	Tape length	% cover	Average %
Litter Cover	5m	40%	47.0%
	15m	30%	
	25m	20%	
	35m	75%	
	45m	70%	
Bare ground cover	5m	20%	29.0%
	15m	45%	
	25m	65%	
	35m	10%	
	45m	5%	
Cryptogam cover	5m	0%	1.2%
	15m	5%	
	25m	1%	
	35m	0%	
	45m	0%	
Rock Cover	5m	5%	8.0%
	15m	15%	
	25m	10%	
	35m	5%	
	45m	5%	

COMPOSITION & STRUCTURE

Species recorded for MP_OMPS_17

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?
euca bitu	*Eucalyptus biturbinata*	Grey Gum	Myrtaceae	15			Tree (TG)	No
euca carn	*Eucalyptus carnea*	Thick-leaved Mahogany	Myrtaceae	2			Tree (TG)	No
allo toru	*Allocasuarina torulosa*	Forest Oak	Casuarinaceae	7			Tree (TG)	No
loma mult mult	*Lomandra multiflora sul*	Many-flowered Mat-rush	Lomandraceae	5			Grass & grasslike (GG)	No
loma long	*Lomandra longifolia*	Spiny-headed Mat-rush	Lomandraceae	3			Grass & grasslike (GG)	No
pora micr	*Poranthera microphylla*	Small Poranthera	Phyllanthaceae	0.1	50		Forb (FG)	No
them tria	*Themeda triandra*		Poaceae	1			Grass & grasslike (GG)	No
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	10			Grass & grasslike (GG)	No
dian caer	*Dianella caerulea*	Blue Flax-lily	Phormiaceae	2			Forb (FG)	No
vero caly	*Veronica calycina*	Hairy Speedwell	Plantaginaceae	0.1	20		Forb (FG)	No
kenn rubi	*Kennedia rubicunda*	Dusky Coral Pea	Fabaceae (Faboid	0.1	3		Other (OG)	No
desm vari	*Desmodium varians*	Slender Tick-trefoil	Fabaceae (Faboid	0.1	500		Other (OG)	No
brey oblo	*Breynia oblongifolia*	Coffee Bush	Phyllanthaceae	3			Shrub (SG)	No
euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	0.1	20		Forb (FG)	No
wahl stri	*Wahlenbergia stricta*	Tall Bluebell	Campanulaceae	0.1	100		Forb (FG)	No
acac penn	*Acacia penninervis*	Mountain Hickory	Fabaceae (Mimos	0.1	1		Shrub (SG)	No
plec parv	*Plectranthus parviflorus*		Lamiaceae	0.1	20		Forb (FG)	No
vero pleb	*Veronica plebeia*	Trailing Speedwell	Plantaginaceae	0.1	10		Forb (FG)	No
glyc taba	*Glycine tabacina*	Variable Glycine	Fabaceae (Faboid	0.1	50		Other (OG)	No
tric elat	*Tricoryne elatior*	Yellow Autumn-lily	Anthericaceae	0.1	3		Forb (FG)	No
sene quad	*Senecio quadridentatus*	Cotton Fireweed	Asteraceae	0.1	2		Forb (FG)	No
hard viol	*Hardenbergia violacea*	False Sarsaparilla	Fabaceae (Faboid	0.3	10		Other (OG)	No
acac impl	*Acacia implexa*	Hickory Wattle	Fabaceae (Mimos	0.1	5		Shrub (SG)	FALSE
aris vaga	*Aristida vagans*	Threeawn Speargrass	Poaceae	0.1	5		Grass & grasslike (GG)	No
sorg leio	*Sorghum leiocladum*	Wild Sorghum	Poaceae	0.1	6		Grass & grasslike (GG)	No
laxm grac	*Laxmannia gracilis*	Slender Wire Lily	Anthericaceae	0.1	4		Forb (FG)	No
dich fimb	*Dichopogon fimbriatus*	Nodding Chocolate Lily	Anthericaceae	0.1	3		Forb (FG)	No
sola prin	*Solanum prinophyllum*	Forest Nightshade	Solanaceae	0.1	2		Forb (FG)	No
echi caes	*Echinopogon caespitosu*	Bushy Hedgehog-grass	Poaceae	3			Grass & grasslike (GG)	No
leuc juni	*Leucopogon juniperinus*	Prickly Beard-heath	Ericaceae	1			Shrub (SG)	No
plan gaud	*Plantago gaudichaudii*	Narrow Plantain	Plantaginaceae	0.1	5		Forb (FG)	No
chei sieb	*Cheilanthes sieberi*	Rock Fern	Pteridaceae	1				No
chry apic	*Chrysocephalum apicula*	Common Everlasting	Asteraceae	0.1	3		Forb (FG)	No
digi parv	*Digitaria parviflora*	Small-flowered Finger Grass	Poaceae	0.5	20		Grass & grasslike (GG)	No
brun aust	*Brunonia australis*	Blue Pincushion	Goodeniaceae	0.1	3		Forb (FG)	No
cory inte	*Corymbia intermedia*	Pink Bloodwood	Myrtaceae	0.1	1		Tree (TG)	No
rubu parv	*Rubus parvifolius*	Native Raspberry	Rosaceae	0.1	20		Shrub (SG)	No
halo hete	*Haloragis heterophylla*	Variable Raspwort	Haloragaceae	0.1	1		Forb (FG)	No
poma umbe	*Pomax umbellata*	Pomax	Rubiaceae	0.1	7		Forb (FG)	No
evol alsi	*Evolvulus alsinoides*	Bindweed	Convolvulaceae	0.1	20		Forb (FG)	No

	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
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	#N/A	#N/A	#N/A			#N/A		FALSE
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	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
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	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE

BAM Site Field Survey								
Project:	OMPS	**Plot Identifier**	MP_OMPS_25	**Pic 20x20**		**Pic 20x50**		
Survey date:	27/10/2020		**Compass Orientation (head of 20x20 plot)**					
Recorders	MP/GX		**PCT:**	868	High			
GPS Easting	420345	**GPS Northing**	6591726		**Datum**	GDA	**Zone**	56
Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance			
	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
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)

Additional information
Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for	MP_OMPS_25

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	Tree (TG)	5
	Shrub (SG)	3
	Forb (FG)	13
	Grass & grasslike (GG)	12
	Fern (EG)	0
	Other (OG)	4
	TOTAL	37

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of cover abundance (native vascular plants)	Tree (TG)	34
	Shrub (SG)	7.4
	Forb (FG)	8.2
	Grass & grasslike (GG)	14.7
	Fern (EG)	0
	Other (OG)	0.6
	TOTAL Native	64.9
	TOTAL 'HTE'	0

BAM Attribute (20 x 50m plot) Tree Stem Counts

DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79	1		
30-49	5		
20-29	3		
10-19	5		
5-9	3		
<5	10		N/A
Length of logs (m)		30	

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %
Litter Cover	5m	40%	38.0%
	15m	50%	
	25m	20%	
	35m	30%	
	45m	50%	
Bare ground cover	5m	5%	17.0%
	15m	5%	
	25m	5%	
	35m	50%	
	45m	20%	
Cryptogam cover	5m	3%	3.8%
	15m	0%	
	25m	0%	
	35m	10%	
	45m	6%	
Rock Cover	5m	15%	21.0%
	15m	5%	
	25m	70%	
	35m	5%	
	45m	10%	

COMPOSITION & STRUCTURE

Species recorded for MP_OMPS_25

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?
euca bitu	*Eucalyptus biturbinata*	Grey Gum	Myrtaceae	20			Tree (TG)	No
euca carn	*Eucalyptus carnea*	Thick-leaved Mahogany	Myrtaceae	3			Tree (TG)	No
ango flor	*Angophora floribunda*	Rough-barked Apple	Myrtaceae	5			Tree (TG)	No
euca ampl	*Eucalyptus amplifolia*	Cabbage Gum	Myrtaceae	5			Tree (TG)	No
vero pleb	*Veronica plebeia*	Trailing Speedwell	Plantaginaceae	0.1	12		Forb (FG)	No
brey oblo	*Breynia oblongifolia*	Coffee Bush	Phyllanthaceae	7			Shrub (SG)	No
cymb refr	*Cymbopogon refractus*	Barbed Wire Grass	Poaceae	5			Grass & grasslike (GG)	No
dian caer	*Dianella caerulea*	Blue Flax-lily	Phormiaceae	5			Forb (FG)	No
desm vari	*Desmodium varians*	Slender Tick-trefoil	Fabaceae (Faboi	0.2	500		Other (OG)	No
cent eryt	*Centaurium erythraea*	Common Centaury	Gentianaceae	0.1	10	*		No
loma mult mult	*Lomandra multiflora sul*	Many-flowered Mat-rush	Lomandraceae	5			Grass & grasslike (GG)	No
sorg leio	*Sorghum leiocladum*	Wild Sorghum	Poaceae	2			Grass & grasslike (GG)	No
ajug aust	*Ajuga australis*	Austral Bugle	Lamiaceae	0.2	50		Forb (FG)	No
plec parv	*Plectranthus parviflorus*		Lamiaceae	0.1	10		Forb (FG)	No
cory inte	*Corymbia intermedia*	Pink Bloodwood	Myrtaceae	1			Tree (TG)	No
wahl stri	*Wahlenbergia stricta*	Tall Bluebell	Campanulaceae	0.1	50		Forb (FG)	No
echi caes	*Echinopogon caespitosu*	Bushy Hedgehog-grass	Poaceae	0.2	50		Grass & grasslike (GG)	No
euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	0.1	3		Forb (FG)	No
poa sieb	*Poa sieberiana*	Snowgrass	Poaceae	0.5	7		Grass & grasslike (GG)	No
aris vaga	*Aristida vagans*	Threeawn Speargrass	Poaceae	0.1	3		Grass & grasslike (GG)	No
hard viol	*Hardenbergia violacea*	False Sarsaparilla	Fabaceae (Faboi	0.2	4		Other (OG)	No
hyba stel	*Hybanthus stellarioides*		Violaceae	0.1	7		Forb (FG)	No
acac penn	*Acacia penninervis*	Mountain Hickory	Fabaceae (Mimo	0.3	6		Shrub (SG)	No
evol alsi	*Evolvulus alsinoides*	Bindweed	Convolvulaceae	0.1	10		Forb (FG)	No
kenn rubi	*Kennedia rubicunda*	Dusky Coral Pea	Fabaceae (Faboi	0.1	1		Other (OG)	No
vero caly	*Veronica calycina*	Hairy Speedwell	Plantaginaceae	0.1	3		Forb (FG)	No
cent asia	*Centella asiatica*	Indian Pennywort	Apiaceae	0.1	100		Forb (FG)	No
impe cyli	*Imperata cylindrica*	Blady Grass	Poaceae	0.1	3		Grass & grasslike (GG)	No
stel angu	*Stellaria angustifolia*	Swamp Starwort	Caryophyllaceae	0.1	1		Forb (FG)	No
chei sieb	*Cheilanthes sieberi*	Rock Fern	Pteridaceae	0.2	100			No
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	0.1	10		Grass & grasslike (GG)	No
plan gaud	*Plantago gaudichaudii*	Narrow Plantain	Plantaginaceae	0.1	12		Forb (FG)	No
loma long	*Lomandra longifolia*	Spiny-headed Mat-rush	Lomandraceae	1			Grass & grasslike (GG)	No
erag lept	*Eragrostis leptostachya*	Paddock Lovegrass	Poaceae	0.5	50		Grass & grasslike (GG)	No
leuc juni	*Leucopogon juniperinus*	Prickly Beard-heath	Ericaceae	2			Forb (FG)	No
glyc taba	*Glycine tabacina*	Variable Glycine	Fabaceae (Faboi	0.1	100		Other (OG)	No
hibb obtu	*Hibbertia obtusifolia*	Hoary Guinea Flower	Dilleniaceae	0.1	1		Shrub (SG)	No
sola nigr	*Solanum nigrum*	Black-berry Nightshade	Solanaceae	0.1	1	*		No
dich micr	*Dichelachne micrantha*	Shorthair Plumegrass	Poaceae	0.1	10		Grass & grasslike (GG)	No
spor elon	*Sporobolus elongatus*	Slender Rat's Tail Grass	Poaceae	0.1	3		Grass & grasslike (GG)	No

rost adsc adsc	*Rostellularia adscendens*		Acanthaceae	0.1	3			No
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
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	#N/A	#N/A	#N/A			#N/A		FALSE

BAM Site Field Survey								
Project:	OMPS	**Plot Identifier**	MP_OMPS_35	**Pic 20x20**		**Pic 20x50**		
Survey date:	28/10/2020		**Compass Orientation (head of 20x20 plot)**					
Recorders	MP/GX		**PCT:**	1106	High			
GPS Easting	419200	**GPS Northing**	6591908		**Datum**	GDA	**Zone**	56
Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance			
	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
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)

Additional information
Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for	MP_OMPS_35

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	Tree (TG)	4
	Shrub (SG)	3
	Forb (FG)	8
	Grass & grasslike (GG)	2
	Fern (EG)	3
	Other (OG)	1
	TOTAL	21

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of cover abundance (native vascular plants)	Tree (TG)	25.2
	Shrub (SG)	40.5
	Forb (FG)	0.9
	Grass & grasslike (GG)	7
	Fern (EG)	5.1
	Other (OG)	0.1
	TOTAL Native	78.8
	TOTAL 'HTE'	0

BAM Attribute (20 x 50m plot) Tree Stem Counts

DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79			
30-49		2	
20-29		1	
10-19		1	
5-9		2	
<5			N/A
Length of logs (m)		5	

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %
Litter Cover	5m	20%	24.0%
	15m	10%	
	25m	15%	
	35m	5%	
	45m	70%	
Bare ground cover	5m	0%	22.0%
	15m	85%	
	25m	10%	
	35m	5%	
	45m	10%	
Cryptogam cover	5m	20%	4.8%
	15m	2%	
	25m	2%	
	35m	0%	
	45m	0%	
Rock Cover	5m	0%	21.4%
	15m	10%	
	25m	2%	
	35m	80%	
	45m	15%	

COMPOSITION & STRUCTURE

Species recorded for MP_OMPS_35

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?
mela brac	*Melaleuca bracteata*	Black Tea-tree	Myrtaceae	15			Shrub (SG)	No
meli dent	*Melicytus dentatus*	Tree Violet	Violaceae	25			Shrub (SG)	No
cony	*Conyza spp.*	A Fleabane	Asteraceae	0.1	10	*		No
adia aeth	*Adiantum aethiopicum*	Common Maidenhair	Adiantaceae	2			Fern (EG)	No
adia hisp	*Adiantum hispidulum*	Rough Maidenhair	Adiantaceae	3			Fern (EG)	No
euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	0.1	20		Forb (FG)	No
pell falc	*Pellaea falcata*	Sickle Fern	Adiantaceae	0.1	10		Fern (EG)	No
sola	*Solanum spp.*		Solanaceae	0.2	20	*	Forb (FG)	No
dios aust	*Diospyros australis*	Black Plum	Ebenaceae	0.5	5		Shrub (SG)	No
cent eryt	*Centaurium erythraea*	Common Centaury	Gentianaceae	0.1	5	*		No
crot insu	*Croton insularis*	Silver Croton	Euphorbiaceae	10			Tree (TG)	No
para prui prui	*Pararchidendron pruinos*	Snow Wood	Fabaceae (Mimoso	15			Tree (TG)	No
wahl	*Wahlenbergia spp.*	Bluebell	Campanulaceae	0.1	5		Forb (FG)	No
sonc	*Sonchus spp.*	Sowthistle	Asteraceae	0.1	20	*		No
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	5			Grass & grasslike (GG)	No
opli aemu	*Oplismenus aemulus*		Poaceae	2			Grass & grasslike (GG)	No
comm cyan	*Commelina cyanea*	Native Wandering Jew	Commelinaceae	0.1	3		Forb (FG)	No
dend ling	*Dendrobium linguiforme*	Tongue Orchid	Orchidaceae	0.1	1		Other (OG)	No
nyss diff	*Nyssanthes diffusa*	Barbwire Weed	Amaranthaceae	0.1	2		Forb (FG)	No
sida rhom	*Sida rhombifolia*	Paddy's Lucerne	Malvaceae	0.1	3	*		No
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.1	1		Forb (FG)	No
oxal pere	*Oxalis perennans*		Oxalidaceae	0.1	1		Forb (FG)	No
dauc gloc	*Daucus glochidiatus*	Native Carrot	Apiaceae	0.1	1		Forb (FG)	No
ficu rubi	*Ficus rubiginosa*	Port Jackson Fig	Moraceae	0.1	1		Tree (TG)	No
cler tome	*Clerodendrum tomentos*	Hairy Clerodendrum	Lamiaceae	0.1	1		Tree (TG)	No
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
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	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE

	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE

BAM Site Field Survey								
Project:	OMPS	**Plot Identifier**	MP_OMPS_38	**Pic 20x20**		**Pic 20x50**		
Survey date:	30/10/2020		**Compass Orientation (head of 20x20 plot)**					
Recorders	MP/GX		**PCT:**	1106	HighFP			
GPS Easting	422758	**GPS Northing**	6597413		**Datum**	GDA	**Zone**	56
Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance			
	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
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)

Additional information
Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for	MP_OMPS_38

BAM Attribute (20x20m plot)		
Count of Native Richness	Stratum	Sum
	Tree (TG)	3
	Shrub (SG)	2
	Forb (FG)	9
	Grass & grasslike (GG)	7
	Fern (EG)	0
	Other (OG)	0
	TOTAL	21

BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	33
	Shrub (SG)	3
	Forb (FG)	0.9
	Grass & grasslike (GG)	38.6
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	75.5
	TOTAL 'HTE'	0.6

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79		4	
30-49		3	
20-29		6	
10-19		13	
5-9		5	
<5			N/A
Length of logs (m)		5	

BAM Attributes (1 x 1m Plots)			
	Tape length	% cover	Average %
Litter Cover	5m	70%	76.0%
	15m	60%	
	25m	80%	
	35m	85%	
	45m	85%	
Bare ground cover	5m	2%	0.4%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	
Cryptogam cover	5m	0%	0.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	
Rock Cover	5m	5%	12.0%
	15m	20%	
	25m	15%	
	35m	10%	
	45m	10%	

COMPOSITION & STRUCTURE

Species recorded for MP_OMPS_38

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?
casu cunn cunn	*Casuarina cunninghamia*	River Oak	Casuarinaceae	15			Tree (TG)	No
call vimi	*Callistemon viminalis*	Weeping Bottlebrush	Myrtaceae	15			Tree (TG)	No
gloc ferd	*Glochidion ferdinandi*	Cheese Tree	Phyllanthaceae	3			Tree (TG)	No
mela brac	*Melaleuca bracteata*	Black Tea-tree	Myrtaceae	2			Shrub (SG)	No
heli ampl	*Heliotropium amplexica*	Blue Heliotrope	Boraginaceae	0.5	250	*		HTE
cyno dact	*Cynodon dactylon*	Common Couch	Poaceae	35			Grass & grasslike (GG)	No
micr stip	*Microlaena stipoides*	Weeping Grass	Poaceae	3			Grass & grasslike (GG)	No
arge ochr ochr	*Argemone ochroleuca su*	Mexican Poppy	Papaveraceae	0.5	100	*		No
cycl lept	*Cyclospermum leptophy*	Slender Celery	Apiaceae	0.1	20	*		No
euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	0.1	10		Forb (FG)	No
cony	*Conyza spp.*	A Fleabane	Asteraceae	1		*		No
ranu lapp	*Ranunculus lappaceus*	Common Buttercup	Ranunculaceae	0.1	5		Forb (FG)	No
pers deci	*Persicaria decipiens*	Slender Knotweed	Polygonaceae	0.1	2		Forb (FG)	No
tara offi	*Taraxacum officinale*	Dandelion	Asteraceae	0.1	1	*		No
loma long	*Lomandra longifolia*	Spiny-headed Mat-rush	Lomandraceae	0.1	2		Grass & grasslike (GG)	No
loma hyst	*Lomandra hystrix*		Lomandraceae	0.1	1		Grass & grasslike (GG)	No
gera sola	*Geranium solanderi*	Native Geranium	Geraniaceae	0.1	20		Forb (FG)	No
oxal pere	*Oxalis perennans*		Oxalidaceae	0.1	100		Forb (FG)	No
dich repe ingl	*Dichondra repens subsp.*	Kidney Weed	Convolvulaceae	0.1	500			No
pasp dila	*Paspalum dilatatum*	Paspalum	Poaceae	0.1	2	*		HTE
comm cyan	*Commelina cyanea*	Native Wandering Jew	Commelinaceae	0.1	20		Forb (FG)	No
opli aemu	*Oplismenus aemulus*		Poaceae	0.1	10		Grass & grasslike (GG)	No
bras	*Brassica spp.*	Brassica	Brassicaceae	0.1	10	*		No
wahl	*Wahlenbergia spp.*	Bluebell	Campanulaceae	0.1	2		Forb (FG)	No
ficu coro	*Ficus coronata*	Creek Sandpaper Fig	Moraceae	1			Shrub (SG)	No
Sali baby	*Salix babylonica*	Weeping Willow	Salicaceae	0.5	1	*		No
tetr tetr	*Tetragonia tetragonioid*	New Zealand Spinach	Aizoaceae	0.1	1		Forb (FG)	No
aust vert	*Austrostipa verticillata*	Slender Bamboo Grass	Poaceae	0.2	10		Grass & grasslike (GG)	No
junc pauc	*Juncus pauciflorus*		Juncaceae	0.1	1		Grass & grasslike (GG)	No
rume brow	*Rumex brownii*	Swamp Dock	Polygonaceae	0.1	1		Forb (FG)	No
verb bona	*Verbena bonariensis*	Purpletop	Verbenaceae	1		*		No
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE
	#N/A	#N/A	#N/A			#N/A		FALSE

	#N/A	#N/A	#N/A			#N/A		FALSE

BAM Site Field Survey								
Project:	OMPS	**Plot Identifier**	MP_OMPS_100	**Pic 20x20**		**Pic 20x50**		
Survey date:	28/10/2020		**Compass Orientation (head of 20x20 plot)**				350	
Recorders	MP/GX		**PCT:**	842	High			
GPS Easting	421681	**GPS Northing**	6594768		**Datum**	GDA	**Zone**	56
Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**		
LandF Element			**Soil Colour**			**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance			
	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
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)

Additional information
Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION

Function attributes for	MP_OMPS_100

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	Tree (TG)	5
	Shrub (SG)	5
	Forb (FG)	10
	Grass & grasslike (GG)	5
	Fern (EG)	3
	Other (OG)	3
	TOTAL	31

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of cover abundance (native vascular plants)	Tree (TG)	24.4
	Shrub (SG)	7.8
	Forb (FG)	1
	Grass & grasslike (GG)	8.6
	Fern (EG)	1.7
	Other (OG)	3.2
	TOTAL Native	46.7
	TOTAL 'HTE'	2.1

BAM Attribute (20 x 50m plot) Tree Stem Counts

DBH (cm)	Euc	Non Euc	Hollows
>80			
50-79	1		1
30-49	7		1
20-29	5		
10-19	3		
5-9	3		
<5	2		N/A
Length of logs (m)		5	

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %
Litter Cover	5m	95%	71.0%
	15m	50%	
	25m	40%	
	35m	80%	
	45m	90%	
Bare ground cover	5m	2%	2.0%
	15m	5%	
	25m	1%	
	35m	2%	
	45m	0%	
Cryptogam cover	5m	0%	0.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	
Rock Cover	5m	0%	11.0%
	15m	55%	
	25m	0%	
	35m	0%	
	45m	0%	

COMPOSITION & STRUCTURE

Species recorded for		MP_OMPS_100						
Abbreviation	**Scientific Name**	**Common Name**	**Family**	**% Cover**	**Abundance**	**Exotic**	**Growth Form**	**High Threat?**
Euca ampl	*Eucalyptus amplifolia*	Cabbage Gum	Myrtaceae	20			Tree (TG)	No
geit cymo	*Geitonoplesium cymosu*	Scrambling Lily	Luzuriagaceae	3			Other (OG)	No
mall	*Mallotus spp.*		Euphorbiaceae	1			Tree (TG)	No
lant cama	*Lantana camara*	Lantana	Verbenaceae	2		*		HTE
meli repe	*Melinis repens*	Red Natal Grass	Poaceae	10		*		No
aris vaga	*Aristida vagans*	Threeawn Speargrass	Poaceae	3			Grass & grasslike (GG)	No
cymb refr	*Cymbopogon refractus*	Barbed Wire Grass	Poaceae	3			Grass & grasslike (GG)	No
loma long	*Lomandra longifolia*	Spiny-headed Mat-rush	Lomandraceae	2			Grass & grasslike (GG)	No
hibi sple	*Hibiscus splendens*	Pink Hibiscus	Malvaceae	5			Shrub (SG)	No
hyme flav	*Hymenosporum flavum*	Native Frangipani	Pittosporaceae	1			Shrub (SG)	No
chei sieb	*Cheilanthes sieberi*	Rock Fern	Pteridaceae	1			Fern (EG)	No
dich repe ingl	*Dichondra repens subsp.*	Kidney Weed	Convolvulaceae	0.1	500		Forb (FG)	No
plec parv	*Plectranthus parviflorus*		Lamiaceae	0.1	10		Forb (FG)	No
desm vari	*Desmodium varians*	Slender Tick-trefoil	Fabaceae (Faboideae	0.1	500		Other (OG)	No
verb bona	*Verbena bonariensis*	Purpletop	Verbenaceae	0.2	5	*		No
wahl	*Wahlenbergia spp.*	Bluebell	Campanulaceae	0.1	10		Forb (FG)	No
euch spha	*Euchiton sphaericus*	Star Cudweed	Asteraceae	0.1	5		Forb (FG)	No
arge ochr ochr	*Argemone ochroleuca su*	Mexican Poppy	Papaveraceae	0.1	1	*		No
ager aden	*Ageratina adenophora*	Crofton Weed	Asteraceae	0.1	10	*		HTE
dios aust	*Diospyros australis*	Black Plum	Ebenaceae	1			Shrub (SG)	No
aspl	*Asplenium spp.*		Aspleniaceae	0.2	50		Fern (EG)	No
oxal pere	*Oxalis perennans*		Oxalidaceae	0.1	50		Forb (FG)	No
bide pilo	*Bidens pilosa*	Cobbler's Pegs	Asteraceae	0.1	10	*		No
gono tetr	*Gonocarpus tetragynus*	Poverty Raspwort	Haloragaceae	0.1	3		Forb (FG)	No
aspl	*Asplenium spp.*		Aspleniaceae	0.5	100		Fern (EG)	No
opli aemu	*Oplismenus aemulus*		Poaceae	0.5	50		Grass & grasslike (GG)	No
comm cyan	*Commelina cyanea*	Native Wandering Jew	Commelinaceae	0.1	10		Forb (FG)	No
cory inte	*Corymbia intermedia*	Pink Bloodwood	Myrtaceae	0.2	1		Tree (TG)	No
glyc clan	*Glycine clandestina*	Twining glycine	Fabaceae (Faboideae	0.1	20		Other (OG)	No
desm brac	*Desmodium brachypodu*	Large Tick-trefoil	Fabaceae (Faboideae	0.1	10		Forb (FG)	No
brey oblo	*Breynia oblongifolia*	Coffee Bush	Phyllanthaceae	0.3	5		Shrub (SG)	No
datu	*Datura spp.*		Solanaceae	0.1	1	*		No
ficu rubi	*Ficus rubiginosa*	Port Jackson Fig	Moraceae	0.2	2		Tree (TG)	No
dian caer	*Dianella caerulea*	Blue Flax-lily	Phormiaceae	0.1	7		Forb (FG)	No
rost adsc	*Rostellularia adscendens*	Pink Tongues	Acanthaceae	0.1	50		Forb (FG)	No
leuc juni	*Leucopogon juniperinus*	Prickly Beard-heath	Ericaceae	0.5	4		Shrub (SG)	No
gomp phys	*Gomphocarpus physoca*	Balloon Cotton Bush	Apocynaceae	0.1	7	*		No
digi parv	*Digitaria parviflora*	Small-flowered Finger Grass	Poaceae	0.1	10		Grass & grasslike (GG)	No
euca carn	*Eucalyptus carnea*	Thick-leaved Mahogany	Myrtaceae	3			Tree (TG)	No
	#N/A	#N/A	#N/A			#N/A		FALSE

	#N/A	#N/A	#N/A			#N/A		FALSE

Appendix B

Targeted fauna survey dates and weather conditions

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B.1 Targeted fauna survey dates and weather conditions

Survey date ranges and weather conditions of relevance to the species targeted are included in the tables below.

Table B.1 Frog survey dates and weather conditions

Date range	Rainfall in preceding 7 days	Rainfall in date range	Minimum temperature range during surveys (degrees Celsius)	Maximum temperature range during surveys (degrees Celsius)
24/09/2021–27/09/2021	0 mm	0 mm	4.8–12.1	19.7–29.4
05/03/2022–07/03/2022	18mm	289mm	12.5–20.5	21.4–32.6

Table B.2 Bat survey dates and temperate ranges

Date range	Techniques	Minimum temperature range during surveys (degrees Celsius)	Maximum temperature range during surveys (degrees Celsius)
09/2021–09/2021	Habitat assessment	2.3–13	18–31.9
11/01/2022–14/01/2022	Harp trapping	16.4–18.3	28.6–29.7
02/02/22–03/02/2022	Harp trapping	16.6–17.5	26.5–28.4
21/03/2022–23/03/2022	Anabat	12.5–13.8	27.7–32.6

Table B.3 Reptile survey dates and temperate ranges

Date range	Techniques	Minimum temperature range during surveys	Maximum temperature range during surveys (degrees Celsius)
05/03/2022–07/03/2022	Reptile spotlighting	12.5–20.5	21.4–32.6

Table B.4 Mammal survey dates and temperate ranges

Date range	Techniques	Minimum temperature range during surveys	Maximum temperature range during surveys (degrees Celsius)
06/2021–06/2021	BTP Remote Cameras	0.3–13	15.2–22.6
27/08/2021–30/08/2021	Thermal drone and listening surveys	0.9–5.5	21.1–23.2
09/2021–09/2021	Habitat assessment	2.3–13	18–31.9
02/11/2021–06/11/2021	Funnel traps	9.7–16.8	23.8–26.8

Table B.4 Mammal survey dates and temperate ranges

Date range	Techniques	Minimum temperature range during surveys	Maximum temperature range during surveys (degrees Celsius)
02/11/2021–06/11/2021	Arboreal traps	9.7–16.8	23.8–26.8
11/2021–11/2021	Spotlighting	5.9–20.3	20.2–33.1
11/2021–11/2021	Terrestrial and Arboreal remote cameras	5.9–20.3	20.2–33.1
11/2021–11/2021	Terrestrial remote cameras	5.9–20.3	20.2–33.1
01/2022–01/2022	Terrestrial remote cameras	16.4–22.5	24.2–32.1
03/2022–03/2022	Remote cameras	12.5–20.5	21.4–32.6
04/2022–04/2022	Remote cameras	11.7–18	18.6–28.7
05/2022–05/2022	Remote cameras	5.5–16.5	16.1–25.5
06/2022–06/2022	Terrestrial remote cameras	-0.5–9.1	17.7–23.3
28/06/2022–30/06/2022	Arboreal traps and remote terrestrial cameras	7.3–9.1	18–19.9
19/07/2022–22/07/2022	Terrestrial remote cameras	3.7–11.9	17.3–19.1
01/08/2022–04/08/2022	Detection dog	3.7–7.8	19.2–24.2
02/08/2022–11/08/2022	Scat collection	2.7–12.4	19–24.2
16/08/2022–18/08/2022	Detection dog	3.6–4.3	19.8–22.8

Table B.5 Bird survey dates and temperate ranges

Date range	Techniques	Minimum temperature range during surveys	Maximum temperature range during surveys (degrees Celsius)
27/08/2021–30/08/2021	Thermal drone and listening surveys	0.9–5.5	21.1–23.2
10/2021–10/2021	Vantage point surveys and area surveys	3.3–18.8	16.7–33.9
05/2022–05/2022	Hollow bearing tree	5.5–16.5	16.1–25.5
06/2022–06/2022	Hollow bearing tree	-0.5–9.1	17.7–23.3
19/07/2022–22/07/2022	Hollow watches and area searches	3.7–11.9	17.3–19.1
26/07/2022–30/07/2022	Hollow watches, area searches, call playback	3.2–7.5	18.2–24.3
02/08/2022–11/08/2022	Hollow watches, area searches, call playback	2.7–12.4	19–24.2

Appendix C

Combined Brush-tailed Rock-wallaby survey results

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C.1 Targeted counts and scat genotype results

Scat collection for genotype analysis was targeted in suitable habitat to support Brush-tailed Rock-wallaby where access could be safely gained on foot within the project area. Individuals were also counted at each colony where scats were collected.

Table C.1 Targeted counts and genotype results

Location reference	Eastings/Northings	Visual count	Genotype count
Hays – North (LC: Colony 1)	423,912; 6,596,552	13	9
Hays – South (LC: Colony 2)	423,394; 6,595,860	9	9
Northern Ridge (UC: Colony 3)	423,579; 6,594,250	7	4
Southern Ridge (UC: Colony 5)	422,415; 6,593,374	4	1
Access road LR-UR (LC: Colony 7)	420,591; 6,592,927	5	11
Middle gully (LC: Colony 4)	421,333; 6,593,661	1	5

C.2 Aerial surveys

Aerial surveys involved two flightpaths that past known records of Brush-tailed Rock-Wallabies within the project area. An initial proof of concept flight was undertaken with small adjustments to the flightpath. Four repeat surveys were undertaken. Colonies within the construction envelope included colony 6 along the upper Carrai transect and colony 7 along the lower Carrai. Upper Carrai transect is approximately 6 km long and the lower Carrai transect approximately 9 km long (see Figure 9.4).

Table C.2 Aerial counts

Transect	Transect no.	Date/time	Colony 1	Colony 2	Colony 3	Colony 4	Colony 5	Colony 6	Colony 7	Other records	Total (UC)
Upper Carrai	**Proof of concept**	28/10 7:30	N/A	1	Lower count (LC) 1 Upper count (UC) 2	1	1	1	N/A	0	7
Lower Carrai	**Proof of concept**	28/10 7:50	N/A	4	0	1	3	LC: 1 UC: 3	8	0	19
Upper Carrai	**1**	8/11 7:30	LC: 2 UC: 3	LC: 1 UC: 3	LC: 2 UC: 3	0	0	2	N/A	0	11
Lower Carrai	**1**	8/11 7:50	6	1	0	LC: 3 UC: 7	0	1	LC: 3 UC:8	0	24
Upper Carrai	**2**	9/11 7:00	LC: 1 UC:2	2	0	1	2	LC: 4 UC: 7	N/A	3	17
Lower Carrai	**2**	9/11 7:20	1	LC: 5 UC: 8	2	1	LC: 2 UC: 4	LC: 1 UC:2	LC: 2 UC: 5	1	24
Upper Carrai	**3**	10/11 7:00	LC: 2 UC: 5	1	1	1	0	1	N/A	5	14
Lower Carrai	**3**	10/11 7:20	LC: 2 UC: 4	3	LC: 4 UC: 5	LC: 2 UC: 3	4	LC: 2 UC: 4	LC: 1 UC: 4	7	31
Upper Carrai	**4**	11/11 7:00	LC: 1 UC: 4	0	1	LC: 1 UC: 2	0	2	N/A	1	10
Lower Carrai	**4**	11/11 7:20	0	LC: 3 UC: 5	LC: 1 UC: 2	1	LC: 4 UC: 5	LC: 5 UC: 6	LC: 2 UC: 3	1	24

C.3 Remote cameras

Remote camera targeting species such as Rufous Bettong and Long-noised Potoroo within the construction envelope also incidentally recorded Brush-tailed Rock-wallabies.

The following cameras recorded B.

Table C.3 Remote camera Brush-tailed Rock Wallaby data

Camera ID	Location	Number
TRC13A	Generation – access road to lower reservoir	Present
TRC15A	Generation – access road to lower reservoir	Present
TRC15B	Generation – access road to lower reservoir	Present
TRC17A	Generation – access road between lower and upper reservoir	Present
TRC17B	Generation – access road between lower and upper reservoir	2
TRC19A	Generation – access road between lower and upper reservoir	Present
TRC19B	Generation – access road between lower and upper reservoir	2
TRC20A	Generation – access road between lower and upper reservoir	2
TRC20B	Generation – access road between lower and upper reservoir	Present
TRC23B	Generation – lower reservoir	Present
TRC27B	Generation – access road between lower and upper reservoir	Present
TRC28A	Generation – access road between lower and upper reservoir	Present
TRC28B	Generation – access road between lower and upper reservoir	Present
TRC31A	Generation – lower grid and coms connection	2
TRC31B	Generation – lower grid and coms connection	Present
AC 12	Generation – outside of construction envelope	Present

Table C.3 Remote camera Brush-tailed Rock Wallaby data

Camera ID	Location	Number
TC 3	Generation - upper reservoir	Present
TC 4	Generation - upper reservoir	2
TC18	Generation – emergency egress road upper reservoir	Present

C.4 Ecological sightings raw data – Brush-tailed Rock-wallaby

Table C.4 Raw data

Scientific name:	Common Name	Count	Count estimate code	Sex code	Source code	Observation type	Survey method	First date/time	Easting	Northing
Petrogale penicillata	Brush-tailed Rock-wallaby	1	Exactly	Unknown	Sighting only	Observed	Opportunistic	22/09/2021 1:03	421123	6592177
Petrogale penicillata	Brush-tailed Rock-wallaby	1	Exactly	Unknown	Sighting only	Observed	Opportunistic	22/09/2021 1:13	421124	6592177
Petrogale penicillata	Brush-tailed Rock-wallaby	1	Exactly	Not recorded	Sighting only	Observed	Opportunistic	22/09/2021 1:34	421221	6592217
Petrogale penicillata	Brush-tailed Rock-wallaby	1	Exactly	Not recorded	Sighting only	Observed	Opportunistic	22/09/2021 5:44	421128	6591557
Petrogale penicillata	Brush-tailed Rock-wallaby	1	Exactly	Not recorded	Sighting only	Observed	Opportunistic	23/09/2021 2:10	420903	6592644
Petrogale penicillata	Brush-tailed Rock-wallaby	1	Exactly	Not recorded	Sighting only	Observed	Opportunistic	25/10/2021 21:23	422150	6595758
Petrogale penicillata	Brush-tailed Rock-wallaby	1	Exactly	Not recorded	Sighting only	Observed	<Null>	2/11/2021 22:37	421198	6592203
Petrogale penicillata	Brush-tailed Rock-wallaby	2	Exactly	Unknown	Sighting only	Observed	Opportunistic	18/01/2022 23:41	420596	6592946
Petrogale penicillata	Brush-tailed Rock-wallaby	1	Exactly	Unknown	Sighting only	Observed	Opportunistic	20/01/2022 23:26	420913	6592243
Petrogale penicillata	Brush-tailed Rock-wallaby	2	Exactly	Unknown	Sighting only	Observed	Opportunistic	22/01/2022 22:03	420954	6592212
Petrogale penicillata	Brush-tailed Rock-wallaby	4	At least	Unknown	Sighting only	Scat	Opportunistic	19/01/2022 23:04	420682	6592786
Petrogale penicillata	Brush-tailed Rock-wallaby	1	At least	Not recorded	Sighting only	Scat	Opportunistic	20/01/2022 0:26	420804	6592687
Petrogale penicillata	Brush-tailed Rock-wallaby	2	At least	Not recorded	Sighting only	Scat	Opportunistic	20/01/2022 2:56	420690	6592475
Petrogale penicillata	Brush-tailed Rock-wallaby	2	Exactly	Not recorded	Sighting only	Observed	Opportunistic	20/01/2022 22:38	420729	6592282
Petrogale penicillata	Brush-tailed Rock-wallaby	2	At least	Not recorded	Sighting only	Scat	Opportunistic	23/01/2022 0:31	421201	6592203
Petrogale penicillata	Brush-tailed Rock-wallaby	5	At least	Mixed sexes	Sighting only	Observed	Opportunistic	23/01/2022 22:44	420571	6592936
Petrogale penicillata	Brush-tailed Rock-wallaby	1	At least	Not recorded	Sighting only	Observed	Opportunistic	9/03/2022 22:32	420673	6592281

Table C.4 Raw data

Scientific name:	Common Name	Count	Count estimate code	Sex code	Source code	Observation type	Survey method	First date/time	Easting	Northing
Petrogale penicillata	Brush-tailed Rock-wallaby	1	At least	Not recorded	Sighting only	Observed	Other	2/08/2022 0:23	423708	6596224
Petrogale penicillata	Brush-tailed Rock-wallaby	1	At least	Not recorded	Sighting only	Observed	Other	2/08/2022 0:33	421111	6591250
Petrogale penicillata	Brush-tailed Rock-wallaby	1	Exactly	Not recorded	Sighting only	Observed	Other	2/08/2022 0:42	423319	6595968
Petrogale penicillata	Brush-tailed Rock-wallaby	1	Exactly	Not recorded	Sighting only	Observed	Other	2/08/2022 0:43	423373	6595762
Petrogale penicillata	Brush-tailed Rock-wallaby	1	Exactly	Not recorded	Sighting only	Observed	Other	2/08/2022 0:48	422464	6593606
Petrogale penicillata	Brush-tailed Rock-wallaby	1	At least	Not recorded	Sighting - Probable ID	Scat	Opportunistic	2/08/2022 23:36	424069	6596630
Petrogale penicillata	Brush-tailed Rock-wallaby	1	Exactly	Not recorded	Sighting - Probable ID	Scat	Opportunistic	3/08/2022 0:15	423963	6596588
Petrogale penicillata	Brush-tailed Rock-wallaby	7	At least	Mixed sexes	Sighting only	Observed	Opportunistic	3/08/2022 0:57	423912	6596552
Petrogale penicillata	Brush-tailed Rock-wallaby	4	At least	Mixed sexes	Sighting only	Observed	Opportunistic	3/08/2022 2:27	423838	6596572
Petrogale penicillata	Brush-tailed Rock-wallaby	1	Exactly	Not recorded	Sighting only	Observed	Opportunistic	3/08/2022 5:16	423691	6596026
Petrogale penicillata	Brush-tailed Rock-wallaby	1	Exactly	Not recorded	Sighting only	Observed	Opportunistic	3/08/2022 7:07	424191	6595881
Petrogale penicillata	Brush-tailed Rock-wallaby	1	Exactly	Not recorded	Sighting only	Observed	Opportunistic	3/08/2022 23:44	423442	6596032
Petrogale penicillata	Brush-tailed Rock-wallaby	1	Exactly	Not recorded	Sighting only	Observed	Opportunistic	4/08/2022 0:42	423456	6595917
Petrogale penicillata	Brush-tailed Rock-wallaby	7	Exactly	Mixed sexes	Sighting only	Observed	Opportunistic	4/08/2022 2:16	423394	6595860
Petrogale penicillata	Brush-tailed Rock-wallaby	1	Exactly	Not recorded	Sighting only	Observed	Opportunistic	4/08/2022 2:46	423417	6595781
Petrogale penicillata	Brush-tailed Rock-wallaby	1	Exactly	Not recorded	Sighting only	Observed	Opportunistic	4/08/2022 6:19	423571	6595202
Petrogale penicillata	Brush-tailed Rock-wallaby	1	Exactly	Not recorded	Sighting only	Observed	Other	7/08/2022 1:54	423774	6594407

Table C.4 Raw data

Scientific name:	Common Name	Count	Count estimate code	Sex code	Source code	Observation type	Survey method	First date/time	Easting	Northing
Petrogale penicillata	Brush-tailed Rock-wallaby	1	Exactly	Not recorded	Sighting only	Observed	Other	7/08/2022 2:51	423579	6594250
Petrogale penicillata	Brush-tailed Rock-wallaby	1	Exactly	Not recorded	Sighting only	Observed	Other	7/08/2022 3:14	423526	6594166
Petrogale penicillata	Brush-tailed Rock-wallaby	1	Exactly	Female	Sighting only	Observed	Other	7/08/2022 3:41	423536	6594190
Petrogale penicillata	Brush-tailed Rock-wallaby	2	Exactly	Unknown	Sighting only	Observed	Other	7/08/2022 4:59	423218	6593851
Petrogale penicillata	Brush-tailed Rock-wallaby	1	Exactly	Not recorded	Sighting only	Observed	Other	7/08/2022 5:19	423153	6594008
Petrogale penicillata	Brush-tailed Rock-wallaby	1	Exactly	Male	Sighting only	Observed	Other	7/08/2022 22:41	422611	6594570
Petrogale penicillata	Brush-tailed Rock-wallaby	2	Exactly	Mixed sexes	Sighting only	Observed	Other	8/08/2022 5:48	422415	6593374
Petrogale penicillata	Brush-tailed Rock-wallaby	1	Exactly	Not recorded	Sighting only	Observed	Other	8/08/2022 6:12	422301	6593414
Petrogale penicillata	Brush-tailed Rock-wallaby	2	Exactly	Mixed sexes	Sighting only	Observed	Other	10/08/2022 0:02	420872	6592322
Petrogale penicillata	Brush-tailed Rock-wallaby	2	Exactly	Not recorded	Sighting only	Observed	Other	10/08/2022 0:02	421019	6592322
Petrogale penicillata	Brush-tailed Rock-wallaby	1	Exactly	Not recorded	Sighting only	Observed	Other	10/08/2022 0:59	421044	6592266
Petrogale penicillata	Brush-tailed Rock-wallaby	1	Exactly	Not recorded	Sighting only	Observed	Other	10/08/2022 1:10	421059	6592305
Petrogale penicillata	Brush-tailed Rock-wallaby	1	Exactly	Not recorded	Sighting only	Observed	Other	10/08/2022 1:36	421087	6592344
Petrogale penicillata	Brush-tailed Rock-wallaby	1	Exactly	Male	Sighting only	Observed	Other	10/08/2022 3:20	421183	6592805
Petrogale penicillata	Brush-tailed Rock-wallaby	3	Exactly	Mixed sexes	Sighting only	Observed	Other	10/08/2022 7:01	420591	6592927
Petrogale penicillata	Brush-tailed Rock-wallaby	2	Exactly	Female	Sighting only	Observed	Other	10/08/2022 7:04	420590	6592958
Petrogale penicillata	Brush-tailed Rock-wallaby	1	Exactly	Female	Sighting only	Observed	Other	11/08/2022 4:57	421333	6593661
Petrogale penicillata	Brush-tailed Rock-wallaby	1	Exactly	Not recorded	Sighting only	Scat	Opportunistic	26/10/2022 0:26	423457	6596377

Table C.4 Raw data

Scientific name:	Common Name	Count	Count estimate code	Sex code	Source code	Observation type	Survey method	First date/time	Easting	Northing
Petrogale penicillata	Brush-tailed Rock-wallaby	4	At least	Not recorded	Sighting only	Observed	Opportunistic	26/10/2022 1:01	423455	6595935
Petrogale penicillata	Brush-tailed Rock-wallaby	1	At least	Not recorded	Sighting only	Observed	Opportunistic	26/10/2022 1:22	423484	6595730
Petrogale penicillata	Brush-tailed Rock-wallaby	3	At least	Not recorded	Sighting only	Observed	Other	27/10/2022 1:42	421161	6595212
Petrogale penicillata	Brush-tailed Rock-wallaby	5	At least	Not recorded	Sighting only	Observed	Other	25/10/2022 20:44	420765	6595187
Petrogale penicillata	Brush-tailed Rock-wallaby	1	At least	Not recorded	Sighting only	Observed	Other	25/10/2022 20:46	421957	6595750
Petrogale penicillata	Brush-tailed Rock-wallaby	7	At least	Not recorded	Sighting only	Observed	Other	25/10/2022 20:48	421978	6595892
Petrogale penicillata	Brush-tailed Rock-wallaby	1	At least	Not recorded	Sighting only	Observed	Other	25/10/2021 21:19	421914	6595898
Petrogale penicillata	Brush-tailed Rock-wallaby	1	At least	Not recorded	Sighting only	Observed	Other	26/10/2022 21:04	421294	6592967
Petrogale penicillata	Brush-tailed Rock-wallaby	1	At least	Not recorded	Sighting only	Observed	Other	26/10/2022 21:06	423084	6594530
Petrogale penicillata	Brush-tailed Rock-wallaby	1	At least	Not recorded	Sighting only	Observed	Other	26/10/2022 21:08	425027	6595291
Petrogale penicillata	Brush-tailed Rock-wallaby	1	At least	Not recorded	Sighting only	Observed	Other	26/10/2022 21:09	425228	6595057
Petrogale penicillata	Brush-tailed Rock-wallaby	1	At least	Not recorded	Sighting only	Observed	Other	26/10/2022 21:10	425225	6594752
Petrogale penicillata	Brush-tailed Rock-wallaby	5	At least	Not recorded	Sighting only	Observed	Other	7/11/2022 21:13	424924	6595528
Petrogale penicillata	Brush-tailed Rock-wallaby	1	At least	Not recorded	Sighting only	Observed	Other	7/11/2022 21:14	424587	6595333
Petrogale penicillata	Brush-tailed Rock-wallaby	1	At least	Not recorded	Sighting only	Observed	Other	7/11/2022 21:16	423604	6594377
Petrogale penicillata	Brush-tailed Rock-wallaby	3	At least	Not recorded	Sighting only	Observed	Other	8/11/2022 1:18	420577	6592395
Petrogale penicillata	Brush-tailed Rock-wallaby	1	At least	Not recorded	Sighting only	Observed	Other	7/11/2022 21:21	421121	6593322
Petrogale penicillata	Brush-tailed Rock-wallaby	1	At least	Not recorded	Sighting only	Observed	Other	8/11/2022 9:23	421744	6590897

Table C.4 Raw data

Scientific name:	Common Name	Count	Count estimate code	Sex code	Source code	Observation type	Survey method	First date/time	Easting	Northing
Petrogale penicillata	Brush-tailed Rock-wallaby	1	At least	Not recorded	Sighting only	Observed	Other	8/11/2022 19:42	422796	6594274
Petrogale penicillata	Brush-tailed Rock-wallaby	1	At least	Not recorded	Sighting only	Observed	Other	8/11/2022 19:43	422417	6594359
Petrogale penicillata	Brush-tailed Rock-wallaby	1	At least	Not recorded	Sighting only	Observed	Other	8/11/2022 19:45	421658	6593100
Petrogale penicillata	Brush-tailed Rock-wallaby	8	At least	Not recorded	Sighting only	Observed	Other	8/11/2022 21:46	421546	6593420
Petrogale penicillata	Brush-tailed Rock-wallaby	1	At least	Not recorded	Sighting only	Observed	Other	8/11/2022 19:49	421255	6592498
Petrogale penicillata	Brush-tailed Rock-wallaby	1	At least	Not recorded	Sighting only	Observed	Other	8/11/2022 19:50	421178	6592344
Petrogale penicillata	Brush-tailed Rock-wallaby	6	At least	Not recorded	Sighting only	Observed	Other	9/11/2022 0:54	420576	6592388
Petrogale penicillata	Brush-tailed Rock-wallaby	1	At least	Not recorded	Sighting only	Observed	Other	8/11/2022 19:56	420787	6591271
Petrogale penicillata	Brush-tailed Rock-wallaby	1	At least	Not recorded	Sighting only	Observed	Other	8/11/2022 19:58	424115	6595975
Petrogale penicillata	Brush-tailed Rock-wallaby	1	At least	Not recorded	Sighting only	Observed	Other	8/11/2022 20:00	422542	6593718
Petrogale penicillata	Brush-tailed Rock-wallaby	1	At least	Not recorded	Sighting only	Observed	Other	17/10/2021 1:02	421233	6591083
Petrogale penicillata	Brush-tailed Rock-wallaby	1	At least	Not recorded	Sighting only	Scat	Opportunistic	17/10/2021 0:06	420842	6590980
Petrogale penicillata	Brush-tailed Rock-wallaby	5	At least	Not recorded	Sighting only	Observed	Other	9/11/2022 20:05	424342	6594680
Petrogale penicillata	Brush-tailed Rock-wallaby	4	At least	Not recorded	Sighting only	Observed	Other	9/11/2022 20:06	424047	6594366
Petrogale penicillata	Brush-tailed Rock-wallaby	2	At least	Not recorded	Sighting only	Observed	Other	9/11/2022 20:07	421740	6593275
Petrogale penicillata	Brush-tailed Rock-wallaby	1	At least	Not recorded	Sighting only	Observed	Other	9/11/2022 20:09	421369	6593038
Petrogale penicillata	Brush-tailed Rock-wallaby	1	At least	Not recorded	Sighting only	Observed	Other	9/11/2022 20:11	424177	6595530
Petrogale penicillata	Brush-tailed Rock-wallaby	1	At least	Not recorded	Sighting only	Observed	Other	9/11/2022 20:12	423297	6595106

Table C.4 Raw data

Scientific name:	Common Name	Count	Count estimate code	Sex code	Source code	Observation type	Survey method	First date/time	Easting	Northing
Petrogale penicillata	Brush-tailed Rock-wallaby	3	At least	Not recorded	Sighting only	Observed	Other	9/11/2022 20:14	421732	6593919
Petrogale penicillata	Brush-tailed Rock-wallaby	1	At least	Not recorded	Sighting only	Observed	Other	3/11/2022 19:55	421374	6590757

Appendix D
BAM Credit Report

EMM
creating opportunities

BAM Credit Summary Report

Proposal Details

Assessment Id
00031111/BAAS21017/22/00035509

Proposal Name
OMPS - Access road and transmission Macleay Hastings

BAM data last updated *
22/06/2023

Assessor Name
Jason Brown

Report Created
08/09/2023

BAM Data version *
61

Assessor Number
BAAS21017

BAM Case Status
Finalised

Date Finalised
08/09/2023

Assessment Revision
6

Assessment Type
Major Projects

* 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
Cabbage Gum open forest or woodland on flats of the North Coast												
1	762_DNG Moderate 01	Not a TEC	11.7	11.7	0.13	PCT Cleared - 70%	High Sensitivity to Gain			2.00		0

2	762_EG0101	Not a TEC	1.9	1.9	0.47	PCT Cleared - 70%	High Sensitivity to Gain			2.00		0
3	762_Moderate0101	Not a TEC	63.1	63.1	0.3	PCT Cleared - 70%	High Sensitivity to Gain			2.00		9
4	762_Poor0101	Not a TEC	23.3	23.3	0.29	PCT Cleared - 70%	High Sensitivity to Gain			2.00		3
15	762_IndirectDNGModerate	Not a TEC	11.7	0.0	0.35	PCT Cleared - 70%	High Sensitivity to Gain			2.00		0
16	762_IndirectEG0101	Not a TEC	1.9	0.2	0.49	PCT Cleared - 70%	High Sensitivity to Gain			2.00		0
17	762_IndrectModerate0101	Not a TEC	63.1	1.1	0.3	PCT Cleared - 70%	High Sensitivity to Gain			2.00		1
18	762_IndirectPoor0101	Not a TEC	23.3	0.1	0.26	PCT Cleared - 70%	High Sensitivity to Gain			2.00		1
											Subtotal	**14**

Coastal floodplain sedgelands, rushlands, and forblands of the North Coast												
5	780_Moderate01	Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	10.7	10.7	0.12	Biodiversity Conservation Act listing status	High Sensitivity to Gain	Endangered Ecological Community	Not Listed	2.00		0
19	780_IndirectModerate01	Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	10.7	0.0	0.1	Biodiversity Conservation Act listing status	High Sensitivity to Gain	Endangered Ecological Community	Not Listed	2.00		0
											Subtotal	**0**
Forest Redgum - Broad-leaved Apple dry open forest of the gorges of NSW North Coast Bioregion												
6	842_DNG Moderate	Not a TEC	12.1	12.1	3.5	PCT Cleared - 40%	Low Sensitivity to Gain			1.00		0

7	842_EG	Not a TEC	0.6	0.6	6.7	PCT Cleared - 40%	Low Sensitivity to Gain			1.00		0
8	842_High	Not a TEC	73	73.0	3	PCT Cleared - 40%	High Sensitivity to Gain			1.50		81
9	842_Poor	Not a TEC	48.8	48.8	0.76	PCT Cleared - 40%	High Sensitivity to Gain			1.50		14
20	842_IndirectDNGModerate	Not a TEC	12.1	4.1	3.8	PCT Cleared - 40%	High Sensitivity to Gain			1.50		0
21	842_IndirectEG	Not a TEC	0.6	0.0	8.4	PCT Cleared - 40%	Moderate Sensitivity to Gain			1.25		0
22	842_IndirectHigh	Not a TEC	73	2.1	4.4	PCT Cleared - 40%	High Sensitivity to Gain			1.50		3
23	842_IndirectPoor	Not a TEC	48.8	0.6	1.9	PCT Cleared - 40%	High Sensitivity to Gain			1.50		1
											Subtotal	**99**
Grey gum - stringybark open forest of the gorges of the NSW North Coast Bioregion and New England Tableland Bioregion												
10	868_High	Not a TEC	77.6	77.6	12.6	PCT Cleared - 5%	High Sensitivity to Gain			1.50		367

24	868_IndirectHigh	Not a TEC	77.6	2.2	7.4	PCT Cleared - 5%	High Sensitivity to Gain			1.50		6
											Subtotal	**373**
River Oak riparian woodland of the NSW North Coast Bioregion and northern Sydney Basin Bioregion												
11	1106_Moderate01	Not a TEC	75.5	75.5	0.8	PCT Cleared - 90%	High Sensitivity to Gain			2.50		38
25	1106_IndrectModerate01	Not a TEC	75.5	1.9	1.5	PCT Cleared - 90%	High Sensitivity to Gain			2.50		2
											Subtotal	**40**
Spotted Gum - Grey Ironbark open forest of the Macleay Valley lowlands of the NSW North Coast Bioregion												
12	1215_DNGModerate	Not a TEC	41	41.0	1.2	PCT Cleared - 35%	Low Sensitivity to Gain			1.00		12
13	1215_High	Not a TEC	64.9	64.9	51.7	PCT Cleared - 35%	High Sensitivity to Gain			1.50		1258
26	1215_IndirectDNGModerate	Not a TEC	41	0.9	0.36	PCT Cleared - 35%	High Sensitivity to Gain			1.50		1

27	1215_IndirectHigh	Not a TEC	64.9	1.1	60.1	PCT Cleared - 35%	High Sensitivity to Gain			1.50		24
											Subtotal	**1295**
Tallowwood open forest of the coastal ranges of the NSW North Coast Bioregion												
14	1268_High	Not a TEC	72.7	72.7	1.1	PCT Cleared - 15%	High Sensitivity to Gain			1.50		29
28	1268_IndirectHigh	Not a TEC	72.7	1.2	0.96	PCT Cleared - 15%	High Sensitivity to Gain			1.50		1
											Subtotal	**30**
											Total	**1851**

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
Haloragis exalata subsp. velutina / Tall Velvet Sea-berry (Flora)									
1215_High	N/A	N/A	350	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	700

1215_IndirectHigh	N/A	N/A	1017	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	2034
								Subtotal	**2734**
Myotis macropus / Southern Myotis (Fauna)									
1215_High	64.9	64.9	0.13	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	4
842_IndirectHigh	2.1	2.1	4.4	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	5
842_IndirectPoor	0.6	0.6	1.9	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1
868_IndirectHigh	2.2	2.2	7.4	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	8
1215_IndirectHigh	1.1	1.1	60.1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	32

1268_IndirectHigh	1.2	1.2	0.95	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1
762_IndrectModerate0101	1.1	1.1	0.3	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1
762_IndirectPoor0101	0.1	0.1	0.25	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1
1106_IndrectModerate01	1.9	1.9	1.4	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1
								Subtotal	**54**
Petauroides volans / Southern Greater Glider (Fauna)									
868_High	77.6	77.6	12.6	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	489
1215_High	64.9	64.9	41.4	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	1345

868_IndirectHigh	2.2	2.2	7.4	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	8
1215_IndirectHigh	1.1	1.1	60	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	32
762_IndrectModerate0101	1.1	1.1	0.01	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	1
								Subtotal	**1875**
Petaurus norfolcensis / Squirrel Glider (Fauna)									
842_High	73.0	73.0	2.6	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	93
842_Poor	48.8	48.8	0.75	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	18
868_High	77.6	77.6	12.6	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	489

1215_High	64.9	64.9	51.7	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1678
1268_High	72.7	72.7	1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	38
842_IndirectHigh	2.1	2.1	3	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	3
842_IndirectPoor	0.6	0.6	0.75	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1
868_IndirectHigh	2.2	2.2	7.4	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	8
1215_IndirectHigh	1.1	1.1	51.7	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	28
1268_IndirectHigh	1.2	1.2	0.95	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1

762_IndrectModerate0101	1.1	1.1	0.3	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1
762_IndirectPoor0101	0.1	0.1	0.25	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1
1106_IndrectModerate01	1.9	1.9	0.79	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1
								Subtotal	**2360**
Phascogale tapoatafa / Brush-tailed Phascogale (Fauna)									
842_High	73.0	73.0	2.6	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	94
842_Poor	48.8	48.8	0.19	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	5
868_High	77.6	77.6	12.6	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	489

1215_High	64.9	64.9	51.6	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1677
842_IndirectHigh	2.1	2.1	4.4	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	5
842_IndirectPoor	0.6	0.6	1.9	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1
868_IndirectHigh	2.2	2.2	7.4	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	8
1215_IndirectHigh	1.1	1.1	60.1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	32
								Subtotal	**2311**
Phascolarctos cinereus / Koala (Fauna)									
842_High	73.0	73.0	1.7	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	61

842_Poor	48.8	48.8	0.56	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	14
868_High	77.6	77.6	12.6	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	489
1215_High	64.9	64.9	41.4	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	1345
1268_High	72.7	72.7	1	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	38
842_IndirectHigh	2.1	2.1	2.3	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	2
842_IndirectPoor	0.6	0.6	1.1	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	1

868_IndirectHigh	2.2	2.2	7.4	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	8
1215_IndirectHigh	1.1	1.1	47.2	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	25
1268_IndirectHigh	1.2	1.2	0.95	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	1
762_IndirectPoor0101	0.1	0.1	0.01	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	1
								Subtotal	**1985**
Planigale maculata / Common Planigale (Fauna)									
762_Moderate0101	63.1	63.1	0.3	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	9

762_Poor0101	23.3	23.3	0.28	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	3
868_High	77.6	77.6	12.6	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	489
1106_Moderate01	75.5	75.5	0.79	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	30
1215_High	64.9	64.9	51.7	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	1678
1268_High	72.7	72.7	1	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	38
762_IndrectModerate0101	1.1	1.1	0.3	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	1

762_IndirectPoor0101	0.1	0.1	0.25	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	1
868_IndirectHigh	2.2	2.2	7.4	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	8
1106_IndrectModerate01	1.9	1.9	1.4	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	1
1215_IndirectHigh	1.1	1.1	60.1	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	32
1268_IndirectHigh	1.2	1.2	0.95	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	1
								Subtotal	**2291**

Potorous tridactylus / Long-nosed Potoroo (Fauna)									
868_High	77.6	77.6	12.6	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	489
1215_High	64.9	64.9	41.4	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	1345
868_IndirectHigh	2.2	2.2	7.4	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	8
1215_IndirectHigh	1.1	1.1	60	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	32
762_IndrectModerate0101	1.1	1.1	0.01	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	1
								Subtotal	**1875**

Tylophora woollsii / Cryptic Forest Twiner (Flora)									
1215_High	64.9	64.9	9.3	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	301
1215_IndirectHigh	1.1	1.1	9.2	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	5
								Subtotal	**306**
Vespadelus troughtoni / Eastern Cave Bat (Fauna)									
868_High	77.6	77.6	7.9	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	458
868_IndirectHigh	2.2	2.2	7.3	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	12
								Subtotal	**470**

BAM Credit Summary Report

Proposal Details

Assessment Id
00031111/BAAS21017/22/00031120

Proposal Name
OMPS - Generation Site

BAM data last updated *
22/06/2023

Assessor Name
Jason Brown

Report Created
08/09/2023

BAM Data version *
61

Assessor Number
BAAS21017

BAM Case Status
Finalised

Date Finalised
08/09/2023

Assessment Revision
7

Assessment Type
Major Projects

* 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
Cabbage Gum open forest or woodland on flats of the North Coast												
1	762_DNG Moderate	Not a TEC	11.7	11.7	0.05	PCT Cleared - 70%	High Sensitivity to Gain			2.00		0

10	762_IndirectDNGModerate	Not a TEC	11.7	0.0	0.13	PCT Cleared - 70%	High Sensitivity to Gain			2.00		0
											Subtotal	**0**
Eurabbie tall open forest of the escarpment ranges of the NSW North Coast Bioregion												
6	822_High	Not a TEC	75.1	75.1	11.1	PCT Cleared - 0%	High Sensitivity to Gain			1.50		314
15	822_IndirectHigh	Not a TEC	75.1	0.0	10.1	PCT Cleared - 0%	High Sensitivity to Gain			1.50		1
											Subtotal	**315**
Forest Redgum - Broad-leaved Apple dry open forest of the gorges of NSW North Coast Bioregion												
2	842_DNG Moderate	Not a TEC	12.1	12.1	15.6	PCT Cleared - 40%	High Sensitivity to Gain			1.50		0
3	842_High	Not a TEC	73	73.0	103.4	PCT Cleared - 40%	High Sensitivity to Gain			1.50		2832
11	842_IndirectDNGModerate	Not a TEC	12.1	4.1	1.2	PCT Cleared - 40%	High Sensitivity to Gain			1.50		0

12	842_IndirectHigh	Not a TEC	73	2.1	33.3	PCT Cleared - 40%	High Sensitivity to Gain			1.50		27
											Subtotal	**2859**
Grey gum - stringybark open forest of the gorges of the NSW North Coast Bioregion and New England Tableland Bioregion												
4	868_Dry	Not a TEC	72.2	72.2	4.4	PCT Cleared - 5%	High Sensitivity to Gain			1.50		120
5	868_High	Not a TEC	77.6	77.6	44.2	PCT Cleared - 5%	High Sensitivity to Gain			1.50		1288
13	868_IndirectDry	Not a TEC	72.2	1.7	4.6	PCT Cleared - 5%	High Sensitivity to Gain			1.50		3
14	868_IndirectHigh	Not a TEC	77.6	1.9	12.6	PCT Cleared - 5%	High Sensitivity to Gain			1.50		9
											Subtotal	**1420**

River Oak riparian woodland of the NSW North Coast Bioregion and northern Sydney Basin Bioregion												
7	1106_High	Lowland Rainforest of Subtropical Australia	54.5	54.5	0.07	Environment Protection and Conservation Act listing status	High Sensitivity to Gain	Not Listed	Critically Endangered	2.50		2
16	1106_IndirectHigh	Lowland Rainforest of Subtropical Australia	54.5	0.9	0.41	Environment Protection and Conservation Act listing status	High Sensitivity to Gain	Not Listed	Critically Endangered	2.50		1
7	1106_High	Lowland Rainforest of Subtropical Australia	54.5	54.5	0.07	Environment Protection and Conservation Act listing status	High Sensitivity to Gain	Not Listed	Critically Endangered	2.50		2
16	1106_IndirectHigh	Lowland Rainforest of Subtropical Australia	54.5	0.9	0.41	Environment Protection and Conservation Act listing status	High Sensitivity to Gain	Not Listed	Critically Endangered	2.50		1
											Subtotal	**3**

Shatterwood - Giant Stinging Tree - Yellow Tulipwood dry rainforest of the NSW North Coast Bioregion and northern Sydney Basin Bioregion											
8	1142_Moderate	Not a TEC	37.6	37.6	5	PCT Cleared - 30%	High Sensitivity to Gain			1.50	70
17	1142_IndrectModerate	Not a TEC	37.6	0.2	0.36	PCT Cleared - 30%	High Sensitivity to Gain			1.50	1
										Subtotal	**71**
										Total	**4671**

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
Calyptorhynchus lathami / Glossy Black-Cockatoo (Fauna)									
842_High	73.0	73.0	2	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Vulnerable	False	72
868_Dry	72.2	72.2	1.7	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Vulnerable	False	63

868_High	77.6	77.6	4.9	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Vulnerable	False	191
842_IndirectHigh	2.1	2.1	2.1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Vulnerable	False	2
868_IndirectDry	1.7	1.7	1.5	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Vulnerable	False	1
868_IndirectHigh	1.9	1.9	3.2	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Vulnerable	False	3
								Subtotal	**332**
Grevillea guthrieana / Guthrie's Grevillea (Flora)									
842_High	N/A	N/A	12	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	24
868_High	N/A	N/A	2	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	4

842_IndirectHigh	N/A	N/A	21	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	42
868_IndirectHigh	N/A	N/A	8	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	16
								Subtotal	**86**
Lepidium peregrinum / Wandering Pepper Cress (Flora)									
1106_High	54.5	54.5	0.06	Geographic Distribution	Ability to colonise improved habitat	Endangered	Endangered	True	2
1106_IndirectHigh	0.9	0.9	0.4	Geographic Distribution	Ability to colonise improved habitat	Endangered	Endangered	True	1
								Subtotal	**3**
Myotis macropus / Southern Myotis (Fauna)									
842_High	73.0	73.0	2.5	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	92

1106_High	54.5	54.5	0.04	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1
1142_Moderate	37.6	37.6	0.01	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1
								Subtotal	**94**
Ninox connivens / Barking Owl (Fauna)									
842_High	73.0	73.0	0.19	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	7
868_High	77.6	77.6	1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	40
842_IndirectHigh	2.1	2.1	0.27	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1
868_IndirectHigh	1.9	1.9	0.09	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1
								Subtotal	**49**

Ninox strenua / Powerful Owl (Fauna)									
842_High	73.0	73.0	0.19	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	7
868_High	77.6	77.6	1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	40
842_IndirectHigh	2.1	2.1	0.27	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1
868_IndirectHigh	1.9	1.9	0.09	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1
								Subtotal	**49**
Petauroides volans / Southern Greater Glider (Fauna)									
868_Dry	72.2	72.2	4.4	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	160
868_High	77.6	77.6	43.9	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	1705

822_High	75.1	75.1	11.1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	418
868_IndirectDry	1.7	1.7	1.7	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	1
868_IndirectHigh	1.9	1.9	8.8	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	9
822_IndirectHigh	0.0	0.0	10.1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	1
								Subtotal	**2294**
Petaurus norfolcensis / Squirrel Glider (Fauna)									
842_High	73.0	73.0	103.4	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	3775
868_Dry	72.2	72.2	4.4	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	160

868_High	77.6	77.6	44.2	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1717
822_High	75.1	75.1	11.1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	418
1106_High	54.5	54.5	0.06	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	2
1142_Moderate	37.6	37.6	5	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	94
842_IndirectHigh	2.1	2.1	33.3	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	36
868_IndirectDry	1.7	1.7	1.7	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1
868_IndirectHigh	1.9	1.9	12.6	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	12

1106_IndirectHigh	0.9	0.9	0.4	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1
								Subtotal	**6216**
Petrogale penicillata / Brush-tailed Rock-wallaby (Fauna)									
842_High	73.0	73.0	94.5	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Vulnerable	True	5177
868_Dry	72.2	72.2	4.4	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Vulnerable	True	240
868_High	77.6	77.6	44.2	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Vulnerable	True	2575
822_High	75.1	75.1	9.3	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Vulnerable	True	525
1142_Moderate	37.6	37.6	0.69	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Vulnerable	True	19

842_IndirectHigh	2.1	2.1	31.1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Vulnerable	True	50
868_IndirectDry	1.7	1.7	4.6	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Vulnerable	True	6
868_IndirectHigh	1.9	1.9	8.8	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Vulnerable	True	13
822_IndirectHigh	0.0	0.0	6.6	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Vulnerable	True	1
1142_IndrectModerate	0.2	0.2	0.06	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Vulnerable	True	1
								Subtotal	**8607**
Potorous tridactylus / Long-nosed Potoroo (Fauna)									
868_Dry	72.2	72.2	4.4	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	160

868_High	77.6	77.6	43.9	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	1705
822_High	75.1	75.1	11.1	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	418
868_IndirectDry	1.7	1.7	4.6	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	4
868_IndirectHigh	1.9	1.9	12.6	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	12
822_IndirectHigh	0.0	0.0	10.1	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	1
								Subtotal	**2300**

Pultenaea parrisiae / Parris' Bush-pea (Flora)									
822_High	75.1	75.1	0.03	Geographic Distribution	Ecology or response to management is poorly known	Vulnerable	Vulnerable	True	2
822_IndirectHigh	0.0	0.0	0.7	Geographic Distribution	Ecology or response to management is poorly known	Vulnerable	Vulnerable	True	1
1287_High010101	100.0	100.0	0.03	Geographic Distribution	Ecology or response to management is poorly known	Vulnerable	Vulnerable	True	2
1287_IndirectHigh01010101	0.7	0.7	0.15	Geographic Distribution	Ecology or response to management is poorly known	Vulnerable	Vulnerable	True	1
								Subtotal	**6**
Tylophora woollsii / Cryptic Forest Twiner (Flora)									
822_High	75.1	75.1	3.5	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	130

822_IndirectHigh	0.0	0.0	3	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	1
								Subtotal	**131**
Tyto novaehollandiae / Masked Owl (Fauna)									
842_High	73.0	73.0	0.19	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	7
868_High	77.6	77.6	1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	40
842_IndirectHigh	2.1	2.1	0.27	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1
868_IndirectHigh	1.9	1.9	0.7	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1
								Subtotal	**49**

BAM Credit Summary Report

Proposal Details

Assessment Id
00031111/BAAS21017/22/00035386

Proposal Name
OMPS - Access road and transmission Macleay Gorges

BAM data last updated *
22/06/2023

Assessor Name
Jason Brown

Report Created
08/09/2023

BAM Data version *
61

Assessor Number
BAAS21017

BAM Case Status
Finalised

Date Finalised
08/09/2023

Assessment Revision
4

Assessment Type
Major Projects

* 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
Cabbage Gum open forest or woodland on flats of the North Coast												
6	762_DNG Moderate	Not a TEC	11.7	11.7	0.22	PCT Cleared - 70%	High Sensitivity to Gain			2.00		0

7	762_EG	Not a TEC	1.9	1.9	0.01	PCT Cleared - 70%	Low Sensitivity to Gain			1.50		0
14	762_IndirectEG	Not a TEC	1.9	0.2	0.13	PCT Cleared - 70%	Moderate Sensitivity to Gain			1.75		0
15	762_IndrectModerate	Not a TEC	63.1	1.1	0.25	PCT Cleared - 70%	High Sensitivity to Gain			2.00		1
											Subtotal	**1**
Eurabbie tall open forest of the escarpment ranges of the NSW North Coast Bioregion												
16	822_IndirectHigh	Not a TEC	75.1	0.0	0.04	PCT Cleared - 0%	High Sensitivity to Gain			1.50		1
											Subtotal	**1**
Forest Redgum - Broad-leaved Apple dry open forest of the gorges of NSW North Coast Bioregion												
1	842_DNG Moderate	Not a TEC	12.1	12.1	16.1	PCT Cleared - 40%	Low Sensitivity to Gain			1.00		0
2	842_High	Not a TEC	73	73.0	42.6	PCT Cleared - 40%	High Sensitivity to Gain			1.50		1167
3	842_Poor	Not a TEC	48.8	48.8	0.73	PCT Cleared - 40%	High Sensitivity to Gain			1.50		13

8	842_IndirectDNGModerate	Not a TEC	12.1	4.1	8.3	PCT Cleared - 40%	Low Sensitivity to Gain			1.00		0
9	842_IndirectHigh	Not a TEC	73	2.1	53.5	PCT Cleared - 40%	High Sensitivity to Gain			1.50		42
10	842_IndirectPoor	Not a TEC	48.8	0.6	0.81	PCT Cleared - 40%	High Sensitivity to Gain			1.50		1
17	842_IndirectEG	Not a TEC	0.6	0.0	0.12	PCT Cleared - 40%	High Sensitivity to Gain			1.50		0
											Subtotal	**1223**
Grey gum - stringybark open forest of the gorges of the NSW North Coast Bioregion and New England Tableland Bioregion												
4	868_High	Not a TEC	77.6	77.6	1.2	PCT Cleared - 5%	High Sensitivity to Gain			1.50		36
11	868_IndirectHigh	Not a TEC	77.6	2.2	3.8	PCT Cleared - 5%	High Sensitivity to Gain			1.50		3
12	868_IndirectDry	Not a TEC	72.2	1.7	0.83	PCT Cleared - 5%	High Sensitivity to Gain			1.50		1
											Subtotal	**40**

River Oak riparian woodland of the NSW North Coast Bioregion and northern Sydney Basin Bioregion												
5	1106_ModerateRF	Lowland Rainforest of Subtropical Australia	62.7	62.7	0.43	Environment Protection and Conservation Act listing status	High Sensitivity to Gain	Not Listed	Critically Endangered	2.50		17
13	1106_IndirectModerateRF01	Lowland Rainforest of Subtropical Australia	62.7	1.1	0.41	Environment Protection and Conservation Act listing status	High Sensitivity to Gain	Not Listed	Critically Endangered	2.50		1
18	1106_IndrectModerate01	Lowland Rainforest of Subtropical Australia	75.5	1.9	0.01	Environment Protection and Conservation Act listing status	High Sensitivity to Gain	Not Listed	Critically Endangered	2.50		1
											Subtotal	**19**
Shatterwood - Giant Stinging Tree - Yellow Tulipwood dry rainforest of the NSW North Coast Bioregion and northern Sydney Basin Bioregion												
19	1142_IndrectModerate	Not a TEC	37.6	0.2	0.11	PCT Cleared - 30%	High Sensitivity to Gain			1.50		1
											Subtotal	**1**
											Total	**1285**

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
Grevillea guthrieana / Guthrie's Grevillea (Flora)									
842_High	N/A	N/A	1	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	2
842_IndirectDNGModerate	N/A	N/A	1	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	2
842_IndirectHigh	N/A	N/A	15	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	30
								Subtotal	**34**
Haloragis exalata subsp. velutina / Tall Velvet Sea-berry (Flora)									
842_High	N/A	N/A	13	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	26

842_IndirectHigh	N/A	N/A	31	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	62
762_IndrectModerate	N/A	N/A	1	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	2
								Subtotal	**90**
Myotis macropus / Southern Myotis (Fauna)									
842_High	73.0	73.0	2.5	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	92
842_Poor	48.8	48.8	0.52	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	13
1106_Moderate RF	62.7	62.7	0.04	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1
842_IndirectHigh	2.1	2.1	0.62	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1

762_IndrectModerate	1.1	1.1	0.08	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1
1106_IndirectModerateRF01	1.1	1.1	0.15	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1
								Subtotal	**109**
Petauroides volans / Southern Greater Glider (Fauna)									
868_High	77.6	77.6	1.1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	42
868_IndirectHigh	2.2	2.2	2.7	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	3
868_IndirectDry	1.7	1.7	0.72	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	1
								Subtotal	**46**
Petaurus norfolcensis / Squirrel Glider (Fauna)									
842_High	73.0	73.0	42.6	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1555

1106_Moderate RF	62.7	62.7	0.4	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	13
842_IndirectHigh	2.1	2.1	53.5	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	56
842_IndirectPoor	0.6	0.6	0.8	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1
868_IndirectHigh	2.2	2.2	2.7	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	3
868_IndirectDry	1.7	1.7	0.72	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1
762_IndrectModerate	1.1	1.1	0.25	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1
1106_IndirectModerateRF01	1.1	1.1	0.41	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1
								Subtotal	**1631**

Petrogale penicillata / Brush-tailed Rock-wallaby (Fauna)									
842_High	73.0	73.0	37.7	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Vulnerable	True	2065
868_High	77.6	77.6	1.2	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Vulnerable	True	71
868_IndirectHigh	2.2	2.2	1.1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Vulnerable	True	2
868_IndirectDry	1.7	1.7	0.1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Vulnerable	True	1
822_IndirectHigh	0.0	0.0	0.03	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Vulnerable	True	1
								Subtotal	**2140**
Phascogale tapoatafa / Brush-tailed Phascogale (Fauna)									
842_High	73.0	73.0	15	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	549

842_Poor	48.8	48.8	0.73	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	18
842_IndirectHigh	2.1	2.1	15.9	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	17
842_IndirectPoor	0.6	0.6	0.8	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1
								Subtotal	**585**

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