Mount Piper to Wallerawang Transmission Line Upgrade

Technical Report 2 – Biodiversity Development Assessment Report

Transgrid

August 2025

→ The Power of Commitment



Project name		Mount Piper to Wallerawang Transmission Line Upgrade					
Document title		Mount Piper to Wallerawang Transmission Line Upgrade | Technical Report 2 – Biodiversity Development Assessment Report					
Project number		12612502					
File name		MP2W_BDAR.docx					
Status Code	**Revision**	**Author**	**Reviewer**		**Approved for issue**		
			Name	**Signature**	**Name**	**Signature**	**Date**
S4	0	J. Russo B. Harrington M. Weerakoon	K. Crosby B. James		G. Marshall		31/07/25
S4	1	M. Weerakoon	K. Crosby B James		G. Marshall		21/08/25

GHD Pty Ltd | ABN 39 008 488 373

133 Castlereagh Street, Level 15

Sydney, New South Wales 2000, Australia

T +61 2 9239 7100 | **F** +61 2 9239 7199 | **E** sydmail@ghd.com | **ghd.com**

© GHD 2025

This document is and shall remain the property of GHD. The document may only be used for the purpose for which it was commissioned and in accordance with the Terms of Engagement for the commission. Unauthorised use of this document in any form whatsoever is prohibited.

Declarations

i. Certification under Section 6.15 *Biodiversity Conservation Act 2016*

I, Mal Weerakoon, certify that this report has been prepared based on the requirements of, and information provided under, the Biodiversity Assessment Method and Section 6.15 of the *Biodiversity Conservation Act 2016* (BC Act). All listed threatened species and communities listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) that occur on the subject land, or in the vicinity, have been identified in the BDAR including those that are ecosystem credit species.

In preparing this assessment I have acted in accordance with the Accredited BAM Assessor Code of Conduct.

The credit calculations Parent case ID for the project is 00042373. The assessment is 00042373/BAAS23017/23/00042374, revision 1.

I declare that I have considered the circumstances and there is no actual, perceived or potential conflict of interest.

Signature:



Date: 21/08/2025

BAM Assessor Accreditation no: BAAS25007

Acknowledgement of Country

Transgrid and GHD acknowledge Aboriginal and Torres Strait Islander peoples as the Traditional Custodians of the land, water and sky throughout Australia on which we do business. We recognise their strength, diversity, resilience and deep connections to Country. We pay our respects to Elders of the past, present and future, as they hold the memories, knowledges and spirit of Australia. Transgrid and GHD are committed to learning from Aboriginal and Torres Strait Islander peoples in the work we do.



Executive Summary

The project

Transgrid is proposing to deliver approximately eight kilometres (km) of new 330 kilovolt (kV) transmission line between the Mount Piper and Wallerawang 330 kV substations (the project). The project would incorporate sections of an existing, single-circuit 132 kV transmission line, where the two transmission lines would share a widened easement and transmission structures. The project is located within the Central West region of NSW within the Lithgow Local Government Area (Lithgow LGA).

The project is identified in the NSW Network Infrastructure Strategy (EnergyCo, 2023) and also supports the key tenets of the NSW Electricity Infrastructure Roadmap (DPIE, 2020). The Roadmap identifies that the expansion of renewable generation must be accompanied by increased transmission capacity to transfer power from Renewable Energy Zones (REZ) in inland NSW to key demand centres. The Mount Piper to Wallerawang Transmission Line Upgrade Project would provide the additional capacity required to reliably transmit power from the Central West Orana REZ to the Greater Sydney region.

The project would require the clearance of vegetation for a number of activities including but not limited to the widening of existing easements and establishment of new easements, establishment of new access tracks, widening of existing access tracks and management of hazard trees adjacent to the easement. Clearing methods would be determined with consideration to vegetation type or structure, slope and terrain, and environmental and ecological constraints.

Transgrid is seeking approval for the project under Part 5, Division 5.2 of the NSW Environmental Planning and Assessment Act 1979 (EP&A Act). The project was declared Critical State Significant Infrastructure (CSSI) on 3 July 2024. The Secretary's Environmental Assessment Requirements (SEARs) for the project were issued on 24 July 2024 with supplementary SEARs issued on 4 October 2024. The Commonwealth Department of Climate Change, Energy, the Environment and Water (Cth DCCEEW) confirmed the project to be a controlled action in August 2024 and would be assessed under the bilateral agreement with New South Wales (project NSW 2024/09855) due to the potential for significant impacts on listed threatened species and communities (sections 18 and 18A) of the Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999* (EPBC Act)).

The NSW Biodiversity Offsets Scheme (BOS) applies to this project as it is declared CSSI. Under the BOS, a Biodiversity Development Assessment Report (BDAR) is required. This BDAR has been prepared to support the Environmental Impact Statement (EIS) for the project.

Method overview

This BDAR has been completed in accordance with the Biodiversity Assessment Method (BAM) and relevant environmental policy under the NSW *Biodiversity Conservation Act 2016* (BC Act) and Commonwealth EPBC Act.

Key methodologies employed in the BDAR include:

- desktop review to identify vegetation types, threatened flora and fauna species, populations and ecological communities (threatened biota) listed under the BC Act and EPBC Act, that could be expected to occur in the locality
- field surveys conducted between August 2023 and February 2025 to:
    - map vegetation zones and justify Plant Community Type (PCT) selection
    - calculate vegetation integrity scores from BAM plot data to generate credits
    - assess habitat suitability for threatened biota
    - survey for candidate species credit species for both flora and fauna and develop of species polygons for relevant threatened biota
- consultation with relevant government agencies.
- identification of measures to avoid and minimise impacts on biodiversity
- assessment of the impacts of the project on biodiversity values.

The ‘subject land’ assessed in this report, comprises the area that would be directly affected by construction and the location of operational infrastructure. This includes the easement and the new transmission line (including transmission structures), new and existing access tracks to/from the easement and temporary construction compounds and laydown areas. The subject land is synonymous with the ‘project footprint’ used in the EIS.

Existing environment

Vegetation

The project occurs within the South Eastern Highlands bioregion and Capertee Uplands subregion. Habitat within the subject land is connected to extensive areas of forest and woodland habitat in the surrounding locality, particularly where it adjoins the Gardens of Stone State Conservation Area (SCA). Extensive vegetation clearing has occurred for agriculture and various infrastructure outside of the Gardens of Stone SCA. Remnant and regenerating native vegetation has however been retained, particularly in the area associated with the Gardens of Stone SCA. Habitat connectivity is maintained across and beyond the assessment area. All vegetation zones at the subject land have a patch size of >101 ha. The riparian corridors of the Coxs River and its tributaries lie adjacent to the subject land and have value as fauna movement corridors, even if the riparian vegetation is fragmented and often planted.

Six PCTs over 14 vegetation zones occur within the subject land comprising dry sclerophyll forest and woodland, paddock trees, poor condition grassland, shrubland and sedgeland, riparian woodland and wetland and derived shrublands and grasslands. Planted vegetation and non-native vegetation are also present.

Threatened species

The following ecosystem credit species have been recorded in the study area:

– Black Falcon (*Falco subniger*)
– Brown Treecreeper (*Climacteris picumnus*) (recorded in study area by Umwelt 2022)
– Dusky Woodswallow (*Artamus cyanopterus cyanopterus*)
– Little Lorikeet (*Glossopsitta pusilla*)
– South-eastern Glossy Black-cockatoo (*Calyptorhynchus lathami lathami*)
– Scarlet Robin (*Petroica boodang*)
– Speckled Warbler (*Chthonicola sagittata*)
– Varied Sittella (*Daphoenositta chrysoptera*)
– White-bellied Sea-eagle (*Haliaeetus leucogaster*)
– Eastern False Pipistrelle (*Falsistrellus tasmaniensis*)
– Large Bent-winged Bat (*Miniopterus orianae oceanensis*)
– Yellow-bellied Sheathtail Bat (*Saccolaimus flaviventris*).

The following species credit species have been recorded in the study area:

– Black Gum (*Eucalyptus aggregata*)
– Capertee Stringybark (*Eucalyptus cannonii*)
– Barking Owl (Ninox connivens)
– Gang-gang Cockatoo (*Callocephalum fimbriatum*)
– Powerful Owl (*Ninox strenua*)
– Southern Myotis (*Myotis macropus*)
– Large-eared Pied Bat (*Chalinolobus dwyeri*)
– Squirrel Glider (*Petaurus norfolcensis*).

Threatened Ecological Communities

No threatened ecological communities (TECs) are present in the subject land. PCT 3376 Southern Tableland Grassy Box Woodland is potentially associated with White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland TEC but occurs in the broader area and would not be impacted.

PCT 3932 (Central and Southern Tableland Swamp Meadow Complex) is potentially associated with Temperate Highland Peat Swamps on Sandstone TEC, but the study area does not contain the correct geology for this TEC according to the approved conservation advice. Therefore, this TEC does not occur in the study area.

Avoid and minimise impacts

The subject land is tied to the location of the existing electricity transmission lines and substations between Mount Piper and Wallerawang. A Preferred Route Report was developed in 2023 (Transgrid, 2023) to assess potential route options for the transmission line between the Mount Piper and Wallerawang 330 kV substations. Eleven route options were considered. The preferred option for the project uses the existing 45 metre (m) wide easement for Line 94E, a 132 kV transmission line. While the easement would need to be widened by approximately 15 m, the use of the existing easement would reduce the impact on intact woodland vegetation. Feedback from the National Park and Wildlife Services (NPWS) was a key consideration in the route selection process as the design of the project passes through the Garden of Stone State Conservation Area (SCA). Existing access tracks within the existing easement to the south (Line 70/71) would be utilised during construction without upgrades to avoid and reduce the impacts from the project.

A rapid ecology assessment was undertaken in 2024 by GHD to identify areas of high biodiversity constraint along access tracks and other proposed ancillary infrastructure locations to assist Transgrid with selecting preferred locations of access tracks, compounds and brake and winch sites. Various iterations of the subject land have been made since this assessment, with the footprint of the access tracks developed to avoid impacts to biodiversity values. These include a reduction in the number of access tracks required for the project, particularly within the Gardens of Stone SCA where no additional clearing is required; the patch of Box-Gum Woodland and the rocky outcrop containing a small cave have been completely avoided; and the positioning of laydown areas have been designed within non-native or poor condition vegetation. Ongoing efforts to avoid and minimise impacts have and will continue throughout the design process.

Impact assessment

Residual impacts on PCTs

Up to 55.43 hectares (ha) of native vegetation would be directly impacted by the project and a further 1.08 ha of native vegetation is likely to be indirectly impacted and would require offsets as outlined in Table ES.1. The project would require the retirement of 888 and 130 ecosystem credits associated with direct impacts and indirect impacts, respectively. The generation of offsets assumes complete loss of vegetation integrity in the subject land (i.e. no assessment of partial loss) and a loss of 20 per cent in the vegetation composition and structure to mid-story and groundcover species outside the subject land to account for the loss of vegetation integrity as a result of edge effects in more susceptible PCTs. There are no residual impacts on TECs in the study area.

Table ES.1 Impacts that require an offset – ecosystem credits

Vegetation zone	PCT ID	TEC	Direct impact area (ha)	Indirect impact area (ha)	Number of ecosystem credits required
3369_Good_Central Tableland Ranges Peppermint-Gum Grassy Forest	3369	No	1.47	-	48
3369_Shrubland_Central Tableland Ranges Peppermint-Gum Grassy Forest	3369	No	5.48	-	72
3385_Good_Southern Tableland Creekflat Swamp Woodland	3385	No	2.59	1.03	110
3385_Poor_Southern Tableland Creekflat Swamp Woodland	3385	No	6.94	-	0[1]
3385_Moderate_Southern Tableland Creekflat Swamp Woodland	3385	No	0.83	0.05	20

Vegetation zone	PCT ID	TEC	Direct impact area (ha)	Indirect impact area (ha)	Number of ecosystem credits required
3385_Paddock trees_Southern Tableland Creekflat Swamp Woodland	3385	No	0.61	-	11
3735_Good_Central Tableland Peppermint Shrub-Grass Forest	3735	No	1.69	-	68
3735_Shrubland_Central Tableland Peppermint Shrub-Grass Forest	3735	No	7.53	-	126
3747_Good_Southern Tableland Western Hills Scribbly Gum Forest	3747	No	4.65	-	163
3747_Shrubland_Southern Tableland Western Hills Scribbly Gum Forest	3747	No	12.30	-	235
3747_Poor_Southern Tableland Western Hills Scribbly Gum Forest	3747	No	5.96	-	48
3749_Good_Western Blue Mountains Scribbly Gum Forest	3749	No	1.64	-	46
3749_Shrubland_Western Blue Mountains Scribbly Gum Forest	3749	No	1.35	-	20
3932_Moderate_Central and Southern Tableland Swamp Meadow Complex	3932	No	2.38	-	51

Note: 1. Areas of poor condition native vegetation at the subject land which have a Vegetation Integrity score <17 as calculated in accordance with the BAM do not require the generation of ecosystem credits for the clearing of this vegetation.

Residual impacts on species credit species

Species polygons have been prepared for eight threatened species recorded in the subject land. No species have been assumed present. Residual direct and indirect impacts to species credit species and their offset obligation is outlined in Table ES.2. The project would require the retirement of 5057 species credits. The project would also remove up to 180 hollow-bearing trees within the subject land.

Table ES.2 Impacts that require an offset – species credits

Scientific name	Common name	BC Act status	EPBC Act status	Direct loss of habitat (ha) or individuals	Indirect impact area (ha)	Number of species credits required
Callocephalon fimbriatum	Gang-gang Cockatoo	E	E	10.39 ha	0.52	420
Chalinolobus dwyeri	Large-eared Pied Bat	E	E	55.43 ha	1.08	1,806
Eucalyptus aggregata	Black Gum	V	V	274 individuals	-	548
Eucalyptus cannonii	Capertee Stringybark	V	-	142 individuals	-	214
Myotis macropus	Southern Myotis	V	-	26.72 ha	0.95	541
Ninox connivens	Barking Owl	V	-	10.39 ha	0.52	420
Ninox strenua	Powerful Owl	V	-	10.39 ha	0.52	420
Petaurus norfolcensis	Squirrel Glider	V	-	22.69 ha	0.52	688

Notes: E – listed as an endangered species.
V – listed as a vulnerable species.

Serious and irreversible impacts

Entities at potential risk of a SAII have been assessed and the project is unlikely to result in a SAII. While the Large-eared Pied Bat has been recorded in the subject land, no confirmed breeding habitat would be removed.

Prescribed impacts

Prescribed impacts relevant to the project include:

– karst, caves, crevices, cliffs, rocks, and other geological features of significance
– human-made structures
– non-native vegetation offering habitat for threatened species
– habitat connectivity, including injury or mortality from transmission line collision, entanglement, or electrocution
– waterbodies, water quality and hydrological processes
– vehicle strikes.

No significant prescribed impacts are likely as a result of the project.

Impacts within the Gardens of Stone SCA

Impacts within the SCA are associated with clearing up to 15 m of corridor to widen the existing easement of the 132 kV line, south of the Centennial Springvale Coal Services facility, for approximately 3 km. Up to 17.54 ha of vegetation associated with the project would be removed from within the SCA, including the removal of 80 hollow-bearing trees. The vegetation proposed for removal within the Gardens of Stone SCA comprises a mix of planted vegetation (occurring on fill and gravel), regenerating shrubland and mature eucalypt forest. This vegetation is subject to edge effects as it occurs adjacent to the existing easement but also dust impacts from the adjacent tailings dam within the Centennial Springvale Coal Services facility. Vegetation clearing is not anticipated for the upgrade of existing access tracks within the existing 330kV line easement.

The project would impact on known habitat for Black Gum, Capertee Stringybark, Large-eared Pied Bat, Southern Myotis, Powerful Owl, Barking Owl, Gang-gang Cockatoo and Squirrel Glider within the SCA.

Impacts on Matters of National Environmental Significance

Four threatened species listed under the EPBC Act were identified during surveys of the subject land with an additional 10 species having the potential to occur in the subject land (Table ES.3). Offset requirements have been calculated in accordance with the BAM for likely significantly impacted MNES (Black Gum (*Eucalyptus aggregata*) and Gang-gang Cockatoo (*Callocephalon fimbriatum*)) and will be delivered in accordance with the BOS and BC Act, pursuant to the bilateral agreement. Notwithstanding that most species in Table ES.3 are considered unlikely to be significantly impacted, ecosystem and/or species credits have been calculated, and offsets will be required in accordance with the BOS.

Table ES.3 Impacts on MNES recorded or with the potential to occur in the subject land

Common name	Scientific name	EPBC Act status	Likelihood of occurrence	Likelihood of significant impact	Biodiversity credits secured as offsets	Offset trading group
Black Gum	*Eucalyptus aggregata*	V	Known	**High**	**548**	Species credit
Australasian Bittern	*Botaurus poiciloptilus*	E	Moderate	Low	51	As per PCT associations / ecosystem credits.
Australian Painted Snipe	*Rostratula australis*	E	Moderate	Low	51	As per PCT associations / ecosystem credits.
Brown Treecreeper	*Climacteris picumnus victoriae*	V	Known	Low	914	As per PCT associations / ecosystem credits.
Diamond Firetail	*Stagonopleura guttata*	V	Moderate	Low	848	As per PCT associations / ecosystem credits.

Common name	Scientific name	EPBC Act status	Likelihood of occurrence	Likelihood of significant impact	Biodiversity credits secured as offsets	Offset trading group
Gang-gang Cockatoo	*Callocephalon fimbriatum*	E	Known	**High**	**420**	Species credit
Hooded Robin (south-eastern form)	*Melanodryas cucullata cucullata*	E	Moderate	Low	914	As per PCT associations / ecosystem credits.
Latham's Snipe	*Gallinago hardwickii*	V	Moderate	Low	1,013	As per PCT associations / ecosystem credits.
Painted Honeyeater	*Grantiella picta*	V	Moderate	Low	914	As per PCT associations / ecosystem credits.
South-eastern Glossy Black-cockatoo	*Calyptorhynchus lathami lathami*	V	Likely	Low	914	As per PCT associations / ecosystem credits.
White-throated Needletail	*Hirundapus caudacutus*	V	Moderate	Low	1,013	As per PCT associations / ecosystem credits.
Grey-headed Flying-fox	*Pteropus poliocephalus*	V	Moderate	Low	712	As per PCT associations / ecosystem credits.
Large-eared Pied Bat	*Chalinolobus dwyeri*	V	Known	Low	1,806	Species credits
Spotted-tail Quoll	*Dasyurus maculatus*	E	Moderate	Low	899	As per PCT associations / ecosystem credits.

Notes: E – listed as an endangered species; V – listed as a vulnerable species. Bold – species for which like-for-like offsets are required for significant impacts.

Mitigation measures

The project will include implementation of measures to mitigate residual impacts, specified in a Construction Environmental Management Plan (CEMP). The CEMP will provide detailed environmental controls to manage key environmental issues. Mitigation measures include:

– environmental site inductions prior to construction starting
– erosion and sedimentation controls within the Gardens of Stone SCA in accordance with Erosion and sediment control on unsealed roads (OEH, 2012), Managing Urban Stormwater – Soils and Construction, Volume II (DECC, 2008) and A Resource Guide for Local Councils: Erosion and Sediment Control (DEC, 2006)
– preparation of subplans including a Biodiversity Management Plan (BMP) that will outline flora and fauna management controls including:
    - protocols to prevent introduction or spread of chytrid fungus following the NSW hygiene guidelines for wildlife (DPIE, 2020c)
    - pre-clearing surveys prior to construction
    - protocols for the management of fauna and habitats
    - restoration to their previous condition of all areas impacted by the project during construction that are not required during operation, unless otherwise agreed with a landowner.
    - fauna connectivity strategy.

Transgrid will continue to consult with all landowners including Centennial Coal and NPWS on any refinements to further avoid and minimise impacts as the project proceeds through the detailed design phase.

Biodiversity offset measures

The biodiversity credits required as offsets have been calculated for both direct and indirect impacts. Ecosystem credits are summarised in Table ES.4. Each of the ecosystem credit types can be traded with credits in the same offset trading group (OTG) and located in the Capertee Uplands, Capertee Valley, Hill End, Inland Slopes and Wollemi subregions. Species credits are presented in Table ES.2 above and can be traded with matching credits anywhere in NSW.

The Commonwealth Government has formally endorsed the NSW BOS (and use of the BAM (DPIE, 2020a) as the methodology for calculating biodiversity credit requirements) through the EPBC Act Condition-setting Policy (DAWE, 2020b), which allows the BOS to be applied to assess and meet Commonwealth biodiversity offset requirements for a project. Biodiversity offset measures will be secured in accordance with the offset rules of the BOS as set out in section 6.2 of the BC Regulation comprising retiring like-for-like credits, funding conservation actions that directly benefit the species or community impacted, or paying into the BCF the value of the credits.

Table ES.4 'Like-for-like' ecosystem credits required to offset impacts of the project

Vegetation zone	Number of ecosystem credits required	Credit class	Offset trading group	Hollow bearing trees
3369_Good_Central Tableland Ranges Peppermint-Gum Grassy Forest	48	Southern Tableland Grassy Woodlands	Southern Tableland Grassy Woodlands greater than or equal to 50% and less than 70%	Yes
3369_Shrubland_Central Tableland Ranges Peppermint-Gum Grassy Forest	72	Southern Tableland Grassy Woodlands	Southern Tableland Grassy Woodlands greater than or equal to 50% and less than 70%	No
3385_Good_Southern Tableland Creekflat Swamp Woodland	106	Subalpine Woodlands	Subalpine Woodlands greater than or equal to 70% and less than 90%	Yes
3385_Poor_Southern Tableland Creekflat Swamp Woodland	0	Subalpine Woodlands	Subalpine Woodlands greater than or equal to 70% and less than 90%	No
3385_Non-native_Southern Tableland Creekflat Swamp Woodland	0	Subalpine Woodlands	Subalpine Woodlands greater than or equal to 70% and less than 90%	No
3385_Moderate_Southern Tableland Creekflat Swamp Woodland	19	Subalpine Woodlands	Subalpine Woodlands greater than or equal to 70% and less than 90%	No
3385_Paddock trees_Southern Tableland Creekflat Swamp Woodland	11	Subalpine Woodlands	Subalpine Woodlands greater than or equal to 70% and less than 90%	No
3385_Good_Southern Tableland Creekflat Swamp Woodland_MZ3I	4	Subalpine Woodlands	Subalpine Woodlands greater than or equal to 70% and less than 90%	Yes
3385_Moderate_Southern Tableland Creekflat Swamp Woodland_MZ4I	1	Subalpine Woodlands	Subalpine Woodlands greater than or equal to 70% and less than 90%	Yes
3735_Good_Central Tableland Peppermint Shrub-Grass Forest	68	Southern Tableland Dry Sclerophyll Forests	Southern Tableland Dry Sclerophyll Forest greater than or equal to 50% and less than 70%	Yes

Vegetation zone	Number of ecosystem credits required	Credit class	Offset trading group	Hollow bearing trees
3735_Shrubland_Central Tableland Peppermint Shrub-Grass Forest	126	Southern Tableland Dry Sclerophyll Forests	Southern Tableland Dry Sclerophyll Forest greater than or equal to 50% and less than 70%	No
3747_Good_Southern Tableland Western Hills Scribbly Gum Forest	163	Southern Tableland Dry Sclerophyll Forests	Southern Tableland Dry Sclerophyll Forest greater than or equal to 50% and less than 70%	Yes
3747_Shrubland_Southern Tableland Western Hills Scribbly Gum Forest	235	Southern Tableland Dry Sclerophyll Forests	Southern Tableland Dry Sclerophyll Forest greater than or equal to 50% and less than 70%	No
3747_Poor_Southern Tableland Western Hills Scribbly Gum Forest	48	Southern Tableland Dry Sclerophyll Forests	Southern Tableland Dry Sclerophyll Forest greater than or equal to 50% and less than 70%	No
3749_Good_Western Blue Mountains Scribbly Gum Forest	46	Southern Tableland Dry Sclerophyll Forests	Southern Tableland Dry Sclerophyll Forests less than 50%	Yes
3749_Shrubland_Western Blue Mountains Scribbly Gum Forest	20	Southern Tableland Dry Sclerophyll Forests	Southern Tableland Dry Sclerophyll Forests less than 50%	No
3932_Moderate_Central and Southern Tableland Swamp Meadow Complex	51	Montane Bogs and Fens	Montane Bogs and Fens >=50% and <70%	No

Transgrid are investigating and considering the following biodiversity offset measures to secure the NSW and Commonwealth offset requirements for the project:

– Retire credits from Biodiversity Stewardship Agreements (BSAs) newly established for the project containing the required biodiversity values.
– Retire credits from existing Transgrid BSAs or Transgrid held credits.
– Purchase suitable ‘like-for-like’ biodiversity credits from the credit market or the Planning, Offsets, Threatened Species and Ecosystems division (POTSE) Credit Supply Fund, and formally retire the credits.
– Entering a Strategic Offset Delivery Agreement (SODA) for a portion of the credit liability.
– Funding of approved conservation measures.
– Payment to the Biodiversity Conservation Fund (BCF) for a portion of the credit liability.

While Transgrid may discharge their offset obligation through any of these options, including combinations, the preferred approach is to secure credits for the project through BSA establishment, supplemented with market purchase of residual credits not acquitted via project-specific BSAs.

To deliver this outcome and due to the critical nature of this project, Transgrid requests that the conditions of approval for the project would support identification and establishment of BSAs after construction has begun. The terms of this deferral, (including details and equivalent BCF costs of the specific offset measures to be implemented and delivered, deferral security, timing and responsibilities) would be negotiated with the relevant authority prior to project approval and the approval conditions appropriately drafted. It is anticipated that a Biodiversity Offset Package to support the deferral would be prepared for consultation in approximately late-October 2025. This flexibility will enable Transgrid to deliver the dual outcome of best-practice offsets and lowest cost to the consumer, as has been demonstrated on Transgrid’s Project Energy Connect. Project-specific BSA establishment is also likely to have benefits for biodiversity conservation associated with an appropriately located offset that would more directly benefit the species and communities affected by the project.

All biodiversity credits would be secured in accordance with the like-for like trading rules of the BC Regulation, BC Act and bilateral agreement as presented above for ecosystem credits / OTGs, species credits and MNES.

Contents

Key terms, acronyms and abbreviations **xiv**

1 Introduction **1**

1.1 Background 1
1.2 Location 1
1.3 The project 3
1.4 Environmental assessment requirements 14
1.5 Purpose and structure of this report 15

Stage 1: Biodiversity Assessment **16**

2 Approach and methodology **17**

2.1 Legislative and policy context 17
2.2 Study area 20
2.3 Desktop review and consultation 20
2.4 Survey overview 22
2.5 Vegetation and flora surveys 23
2.6 Terrestrial fauna surveys 25
2.7 Weather conditions 30
2.8 GIS 32
2.9 Credit calculations 33

3. Site context **36**

3.1 Assessment area 36
3.2 Key landscape features 43
3.3 Native vegetation cover 44

4. Native vegetation, threatened ecological communities and vegetation integrity **45**

4.1 Native vegetation extent 45
4.2 Planted vegetation assessment 54
4.3 Plant community types 55
4.4 Vegetation zones 60
4.5 Threatened ecological communities 86

5. Habitat suitability for threatened and migratory species **90**

5.1 Identification of threatened species for assessment 90
5.2 Presence of candidate species credit species 137
5.3 Matters of National Environmental Significance 240

6. Identifying prescribed impacts **245**

6.1 Introduction 245
6.2 Threatened biota that may be subject to prescribed impacts 245
6.3 Prescribed impact features of relevance to the project 246

Stage 2: Impact assessment (biodiversity values and prescribed impacts) **249**

7. Avoid and minimise impacts **250**

7.1 Introduction 250
7.2 Avoid and minimise direct and indirect impacts 250

8. Impact assessment **258**
8.1 Direct impacts 258
8.2 Indirect impacts 263
8.3 Impacts on Gardens of Stone State Conservation Area 276
8.4 Cumulative impacts 285
8.5 Prescribed impacts 291
8.6 Serious and irreversible impacts 306
8.7 Impacts on MNES 312
8.8 Mitigating residual impacts – management measures and implementation 312
9. Impact and offset summary **320**
9.1 Offset requirement for impacts under the BC Act 320
9.2 Impacts that do not require calculation of offsets 324
9.3 Impacts that do not need further assessment under the BC Act 324
9.4 Offsets for MNES 331
9.5 Biodiversity offset measures 332
10. Summary and conclusions **337**
11. References **340**

Table index

Table 1.1 The project 3
Table 1.2 Relevant Secretary's environmental assessment requirements 14
Table 2.1 Permissibility of the project under the NPW Act 18
Table 2.2 Government agency consultation 21
Table 2.3 Survey techniques and timing 22
Table 2.4 Site data collected within each plot 24
Table 2.5 Confidence ratings applied to calls 27
Table 2.6 Frog ID recordings 29
Table 2.7 Benchmark classes based on cumulative rainfall in preceding year 30
Table 2.8 Daily weather observations during the survey period 31
Table 2.9 Personnel qualifications and project roles 35
Table 3.1 Summary of landscape features present within the assessment area 36
Table 3.2 Mitchell Landscapes 43
Table 3.3 Native vegetation cover 44
Table 4.1 Non-native vegetation description 46
Table 4.2 Planted vegetation assessment 54
Table 4.3 Plant community types in the subject land 56
Table 4.4 PCT 3369 justification 57
Table 4.5 PCT 3385 justification 58
Table 4.6 PCT 3735 justification 58
Table 4.7 PCT 3747 justification 59
Table 4.8 PCT 3749 justification 59
Table 4.9 PCT 3932 justification 60
Table 4.10 Vegetation zones and other map units in the subject land 61
Table 4.11 Vegetation integrity scores 63

Table 4.12	Description of PCT 3369 Good within the subject land	64
Table 4.13	Description of PCT 3369 shrubland within the subject land	66
Table 4.14	Description of PCT 3385 Good within the subject land	67
Table 4.15	Description of PCT 3385 Moderate within the subject land	69
Table 4.16	Description of PCT 3385 Paddock Trees within the subject land	70
Table 4.17	Description of PCT 3385 Poor within the subject land	72
Table 4.18	Description of PCT 3735 Good within the subject land	73
Table 4.19	Description of PCT 3735 Shrubland within the subject land	75
Table 4.20	Description of PCT 3747 Good within the subject land	76
Table 4.21	Description of PCT 3747 Poor within the subject land	78
Table 4.22	Description of PCT 3747 Shrubland within the subject land	80
Table 4.23	Description of PCT 3749 Good within the subject land	82
Table 4.24	Description of PCT 3747 Shrubland within the subject land	83
Table 4.25	Description of PCT 3932 Moderate within the subject land	85
Table 4.26	Associated TECs within the study area	86
Table 4.27	Assessment of PCT 3376 in the study area against the NSW Scientific Committee final determination (2020) for the relevant BC-Act listed TEC	88
Table 4.28	Assessment of PCT 3932 against TSSC final determination (2005) for the relevant BC-Act listed TEC	88
Table 4.29	Assessment of PCT 3376 in the study area against the Approved Conservation Advice under the EPBC Act (DCCEEW, 2023)	89
Table 4.30	Assessment of PCT 3932 against the Approved Conservation Advice under the EPBC Act (DEWHA, 2005)	89
Table 5.1	Predicted ecosystem credit species	92
Table 5.2	Candidate species credit species	107
Table 5.3	Threatened frog breeding habitat assessment and targeted survey effort	119
Table 5.4	Targeted species credit matter survey techniques and effort	137
Table 5.5	Threatened owl call playback targeted survey effort	143
Table 5.6	Dedicated spotlighting transects for Koala	144
Table 5.7	Dedicated aural-visual surveys for Green and Golden Bell Frog	148
Table 5.8	Determining the presence of candidate species credit species on the subject land	150
Table 5.9	Candidate species credit matters recorded in the subject land	186
Table 5.10	Threatened species listed under the EPBC Act that have been recorded or are likely to occur at the subject land	240
Table 5.11	Migratory terrestrial species listed under the EPBC Act that may occur at the subject land	243
Table 6.1	Threatened species potentially subject to prescribed impacts	245
Table 6.2	Prescribed impacts	246
Table 7.1	Avoidance	250
Table 7.2	Evaluation of route options	252
Table 7.3	Comparison of native vegetation impact reduction within ancillary areas	256
Table 7.4	Avoidance and minimisation measures for direct, indirect and prescribed impacts	257
Table 8.1	Summary of residual direct impacts	258
Table 8.2	Direct impacts associated with proposed activities	259
Table 8.3	Impacts on vegetation integrity	261
Table 8.4	Summary of residual direct impacts on fauna habitat types	263
Table 8.5	Summary of residual indirect impacts	264
Table 8.6	Indirect impacts – vegetation zones	269
Table 8.7	Indirect impacts areas – species	269

Table 8.8	Direct native vegetation impacts in the Gardens of Stone SCA	276
Table 8.9	Impacts on species credit species and removal of habitat resources in the Gardens of Stone SCA	277
Table 8.10	Indirect and other impacts on National Park estate	278
Table 8.11	Potential cumulative impacts of relevant future projects	287
Table 8.12	Residual prescribed impacts on the subject land	291
Table 8.13	Summary of prescribed impacts	305
Table 8.14	Entities at potential for risk of an SAII	306
Table 8.15	Additional impact provisions for threatened species at risk of SAII	307
Table 8.16	Summary of proposed mitigation and management measures for residual impacts (direct, indirect and prescribed)	313
Table 9.1	Direct impacts that require an offset – ecosystem credits	320
Table 9.2	Direct impacts that require an offset – species credits	321
Table 9.3	Summary of proposed conservation measures for residual indirect and prescribed impacts	322
Table 9.4	Indirect impacts that require an offset – ecosystem credits	323
Table 9.5	Indirect impacts that require an offset – species credits	324
Table 9.6	Impacts that do not require ecosystem credits	324
Table 9.7	Impacts that do not need further assessment for ecosystem credits	324
Table 9.8	Biodiversity credits required to offset significant impacts to EPBC Act MNES	332
Table 9.9	‘Like-for-like’ ecosystem credits required to offset impacts of the project	333
Table 9.10	‘Like-for-like’ species credits required to offset impacts of the project	334

Figure index

Figure 1.1	Project location and regional context	2
Figure 1.2	Key features of the project	6
Figure 1.3	Site map	7
Figure 3.1	Location map	37
Figure 4.1	Vegetation	48
Figure 5.1	Threatened flora and threatened ecological communities	125
Figure 5.2	Threatened and migratory fauna and habitat resources	131
Figure 5.3	Threatened flora survey effort (June to November)	160
Figure 5.4	Threatened flora survey effort (January to February)	166
Figure 5.5	Fauna survey effort (Winter/Autumn)	172
Figure 5.6	Fauna survey effort (Spring/summer)	178
Figure 5.7	Black Gum species polygons	192
Figure 5.8	Capertee Stringybark species polygons	198
Figure 5.9	Large-eared Pied Bat species polygons	204
Figure 5.10	Southern Myotis species polygons	210
Figure 5.11	Barking Owl species polygons	216
Figure 5.12	Powerful Owl species polygons	222
Figure 5.13	Gang-gang Cockatoo species polygons	228
Figure 5.14	Squirrel Glider species polygons	234
Figure 7.1	Alternate route option corridors	255
Figure 8.1	Management zones	270
Figure 8.2	Impacts within Gardens of Stone SCA	283
Figure 8.3	Projects considered in cumulative assessment	286

Figure 8.4 Squirrel Glider – potential existing crossing locations 301
Figure 8.5 Squirrel Glider – potential future crossing locations 303
Figure 9.1 Impact summary 325

Appendices

Appendix A Consistency with BAM
Appendix B Threatened species for assessment
Appendix C Species recorded in the study area
Appendix D Vegetation integrity plot data
Appendix E Matters of National Environmental Significance
Appendix F Biodiversity credit reports
Appendix G Anabat call analysis results
Appendix H Audiomoth call analysis results

Key terms, acronyms and abbreviations

Term	Description
Accredited assessor	An individual trained and accredited under Section 6.10 of the BC Act to apply the Biodiversity Assessment Method.
AHIMS	Aboriginal Heritage Information Management System
APZ	Asset Protection Zone
Assessment area	The area of land within the 1,500 metre buffer area surrounding the subject land for a site-based development.
AV	Aural-visual
BAM	Biodiversity Assessment Method
BAM-C	Biodiversity Assessment Method Calculator
BC Act	Biodiversity Conservation Act 2016 (NSW)
BC Regulation	Biodiversity Conservation Regulation 2017 (NSW)
BCF	Biodiversity Conservation Fund
BCT	Biodiversity Conservation Trust
BCS	Biodiversity, Conservation and Science Group (now CPHR)
BDAR	Biodiversity Development Assessment Report
Biodiversity credit	A unit of biodiversity value to measure specific development impacts or conservation gains in accordance with the BAM. Includes ecosystem credits and species credits.
Biodiversity credit report	Specifies the number and type of biodiversity credits: required to offset the impacts of a development to obtain a Biodiversity Certification Agreement; or that would be generated through conservation and management of a Stewardship site under a Biodiversity Stewardship site agreement.
Biodiversity offsets	Specific measures that are put in place to compensate for impacts on biodiversity values.
Biodiversity values	The composition, structure and function of ecosystems, including threatened species, populations and ecological communities, and their habitats.
BioNet Atlas	A database open to public access. Provides information from individual plant sightings to detailed scientific surveys, as well as knowledge about ecology and threatened species in NSW.
BOAMS	Biodiversity Offsets and Agreement Management System
BOM	Bureau of Meteorology
BOS	Biodiversity Offsets Scheme
BMP	Bushfire Management Plan
BSA	Biodiversity Stewardship Agreement
CEEC	Critically Endangered Ecological Community
CEMP	Construction Environmental Management Plan
Controlled Action	Actions that the Minister decides have, will have or are likely to have a significant impact on one or more protected matters and therefore require assessment and approval under the Act.
CPHR	Conservation Programs, Heritage and Regulation Group (formerly BCS)
Cumulative Impacts	The combined impacts of the proposed project on a matter with other relevant future proposed projects (see the Department's Cumulative Impact Assessment Guidelines for State Significant Projects).
Commonwealth DCCEEW	Commonwealth Department of Climate Change, Energy, Environment and Water
CWO REZ	Central-West Orana Renewable Energy Zone
DBH	diameter at breast height over bark
DPHI	NSW Department of Planning, Housing and Infrastructure
DPI	Department of Primary Industries

Term	Description
Easement	A legal property right attached to a parcel of land that enables the use of an identified part of the land by a third party other than the owner. For transmission lines, an easement defines the corridor area where the lines are located and that allows access, construction and maintenance work to take place. The easements for the 330 kV transmission lines would typically be 60 metres wide. The easement grants a right of access and for construction, maintenance and operation of the transmission line and other operational assets. For the project, some easements may overlap with existing easements such that the final easement width for the new easement would be narrower than 60 m (e.g. where paralleling the existing transmission line north of the Wallerawang 330 kV substation) and in other areas it may be wider to accommodate diverging transmission lines (e.g. in the area south of the Mount Piper 330 kV substation).
Ecosystem credit	A credit that relates to a vegetation type and the threatened species that are reliably predicted by that vegetation type (as a habitat surrogate).
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999 (Cth)
EP&A Act	Environmental Planning and Assessment Act 1979 (NSW)
EEC	Endangered ecological community
EIS	Environmental Impact Statement
EnergyCo	The Energy Corporation of NSW
FAFT	Fire Access and Fire Trail
FFMP	Flora and Fauna Management Plan
FM Act	Fisheries Management Act 1994
GDE	Atlas of Groundwater Dependent Ecosystems
GHD	GHD Pty Ltd
GIS	Geographic Information System
GPS	Global positioning system
Ha	Hectare
Hazard tree	A hazard tree is defined as a tree or part of tree that if it were to fall would infringe on the vegetation clearance requirements at maximum conductor sag of the transmission lines.
HTW	High Threat Weed
IBRA	Interim Biogeographic Regionalisation for Australia
km	Kilometre
KTP	Key Threatening Process
kV	Kilovolt
LGA	Local Government Area
LLS Act	Local Land Services Act 2013 (NSW)
m	Metre
Migratory species	Species listed under listed under international agreements (i.e. Ramsar, JAMBA, CAMBA and ROKAMBA conventions) to which Australia is a party.
Locality	The area within a 10 km radius of the subject land
MNES	matters of national environmental significance
NEM	National Energy Market
NPW Act	National Parks and Wildlife Act 1974 (NSW)
NSW	New South Wales
NSW DCCEEW	NSW Department of Climate Change, Energy, Environment and Water
NSW DPHI	NSW Department of Planning, Housing and Infrastructure
NSW DPI	NSW Department of Primary Industries
NPWS	National Parks and Wildlife Service

Term	Description
NVR Map	Native Vegetation Regulatory Map
OEH	Office of Environment and Heritage
OTG	Offset Trading Group
PAD	Potential Archaeological Deposit
PCT	Plant Community Type
PlantNET	A platform that allows you to identify and better understand all kinds of plants.
POTSE	Planning, Offsets, Threatened Species and Ecosystems division of NSW DCCEEW
Priority weeds	Plants that have the potential to pose a biosecurity risk to human health, the economy, the liveability of a community and the environment.
Prescribed impacts	Impacts on biodiversity values which are not related to, or are in addition to, native vegetation clearing and habitat loss.
Project	The CSSI project “Mount Piper to Wallerawang Transmission Line Upgrade Project”, which is the subject of this Environmental Impact Statement. The project involves the construction and operation of high voltage transmission lines between the Mount Piper and Wallerawang 330 kV substations.
Project footprint	The area that would be directly affected by construction and the location of operational infrastructure. The project footprint for the purposes of this report is referred to as the ‘subject land’.
Residual impact	The remaining impact after all reasonable measures are made to avoid and minimise the impacts and mitigate the impacts of the project. These impacts are subject to calculation of ecosystem and species credits.
REZ	Renewable Energy Zone
SAII	Serious and Irreversible Impact
SAII entity	Species and ecological communities that are likely to be the subject of serious and irreversible impacts (SAIIs).
SAT	Spot Assessment Technique
SCA	State Conservation Area
SEARs	Secretary’s Environmental Assessment Requirements
SIS	Species Impact Statement
SODA	Strategic Offset Delivery Agreement
Species credit	A credit that relates to an individual threatened species that cannot be reliably predicted based on habitat surrogates. Threatened species that require species credits are identified in the Threatened Biodiversity Data Collection.
SPRAT	Species profile and threats database, online profiles
SSD	State Significant Development
Study area	The area investigated for this assessment includes the subject land and a 250 m buffer from the subject land, which includes areas with the potential to be directly or indirectly affected by the project. This buffer incorporates areas that may be subject to edge effects and allows for assessment of nest tree buffers for cockatoos.
Subject land	The area that would be directly affected by construction and the location of operational infrastructure. Includes the easement and route of the new transmission line (including transmission structures), substations, new and existing access tracks to/from the easement and temporary construction compounds and laydown areas. The subject land is synonymous with the ‘project footprint’ used in the EIS.
SVTM	NSW State Vegetation Type Map
TBDC	Threatened Biodiversity Data Collection
TEC	Threatened Ecological Community
VCRs	Vegetation Clearance Requirements
VEC	Vulnerable Ecological Community
VI	Vegetation integrity

1 Introduction

1.1 Background

The Commonwealth and NSW governments have both established targets to achieve net-zero emissions by 2050. Achieving these targets requires low emissions technologies to be deployed at scale across all sectors of the economy, including the electricity generation sector, currently Australia's largest source of greenhouse gas emissions.

The NSW Transmission Infrastructure Strategy (DPE, 2018) aims to engage the private sector to invest in priority energy infrastructure projects, which can deliver low-cost, clean and reliable energy to consumers

As part of the Transmission Infrastructure Strategy, the NSW Government has developed a plan to establish five Renewable Energy Zones (REZs) to increase renewable energy generation, reduce carbon emissions, and help deliver lower wholesale electricity costs to consumers. The Central-West Orana REZ (CWO REZ), being the first REZ established, is planned to generate at least 4.5 gigawatt by the late-2020s.

The NSW Government's Electricity Infrastructure Roadmap (DPIE, 2020) identifies that the expansion of renewable generation must be accompanied by increased transmission capacity to transfer power from REZs in inland NSW to key demand centres. Interest in new energy generation projects in the CWO REZ is forecasted to exceed the existing transmission network capacity in several locations. The existing infrastructure located between the Mount Piper 550/330 kilovolt (kV) substation (Mount Piper 330 kV substation) and the Wallerawang 330/132 kV substation (Wallerawang 330 kV substation) has been identified in the NSW Network Infrastructure Strategy (EnergyCo, 2023) as requiring upgrades. The Mount Piper to Wallerawang Transmission Line Upgrade Project (the project) would provide the additional capacity required to reliably transmit power from the CWO REZ to the Greater Sydney region.

1.2 Location

The project is located within the Central West region of NSW within the Lithgow City Council Local Government Area (LGA). It is located approximately 14 kilometres (km) north-west of Lithgow situated on the western fringes of the Blue Mountains (Figure 1.1).

The area that is to be directly affected by the construction and operation of the project, is referred to as the project footprint and is shown in Figure 1.1. The project footprint is approximately 86.5 hectares (ha) in size and is generally bounded by the following:

– Castlereagh Highway to the north
– Former Wallerawang Power Station site to the east
– Gardens of Stone State Conservation Area (SCA) to the south
– Mount Piper Power Station to the north-west.

Land uses within and adjacent to the project footprint include:

– electricity generation at Mount Piper Power Station
– electricity transmission, including the Mount Piper and Wallerawang 330 kV substations, and associated transmission lines
– mining activities, with several Centennial Coal operations including the former Ivanhoe Coal Mine and Springvale Coal Services overlapping the project footprint
– agriculture, primarily livestock grazing
– conservation, notably the Gardens of Stone SCA
– state and local road reserves including the Castlereagh Highway, Boulder Road and Brays Lane
– rail corridors including the Main Western Rail Line and a disused railway line near Brays Lane.

A mixture land uses are proposed at the former Wallerawang Power Station site including predominately commercial land uses in the vicinity of the project. This may include redevelopment of the land for commercial and industrial land use and also the development of a Battery Energy Storage System (BESS).

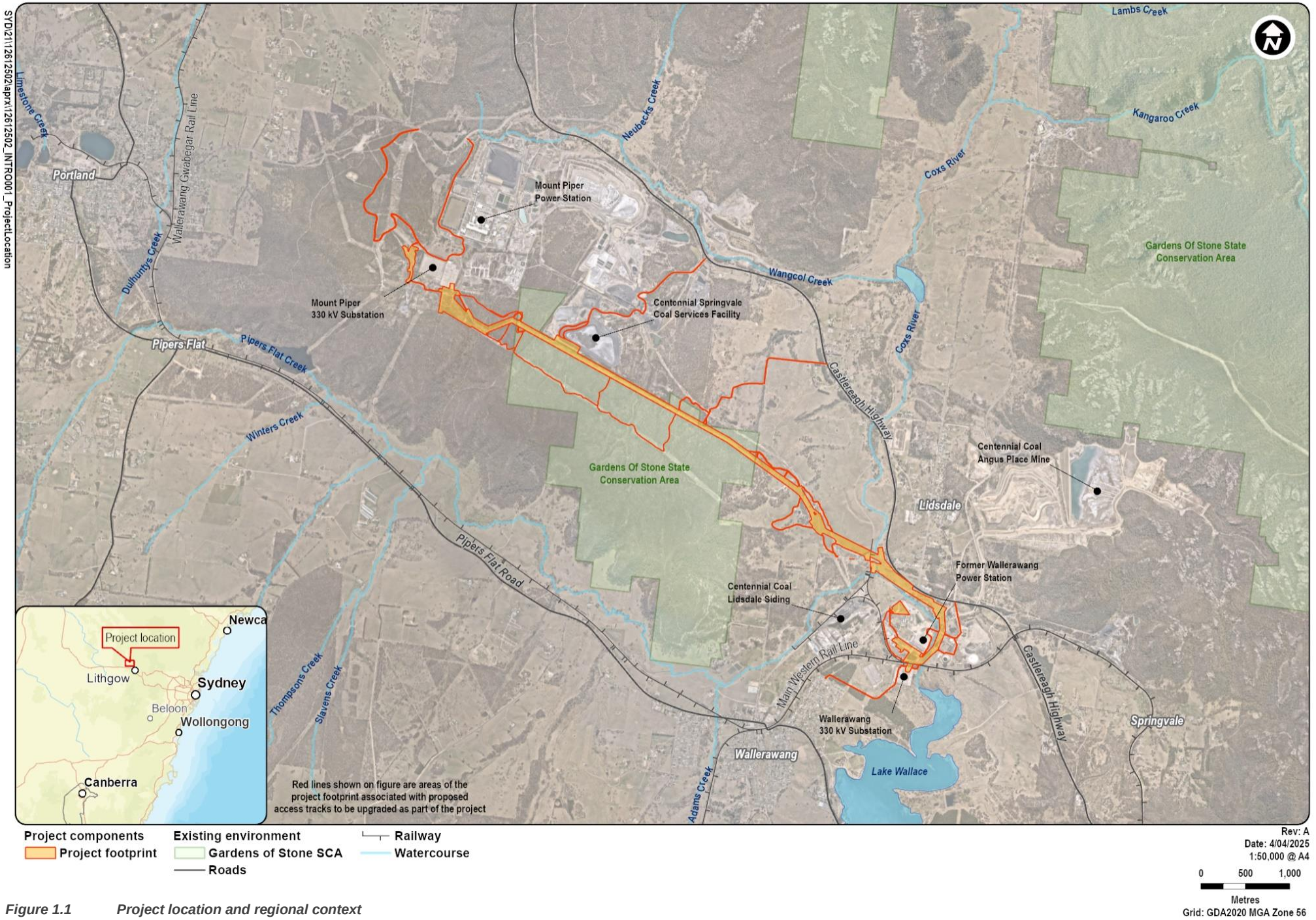


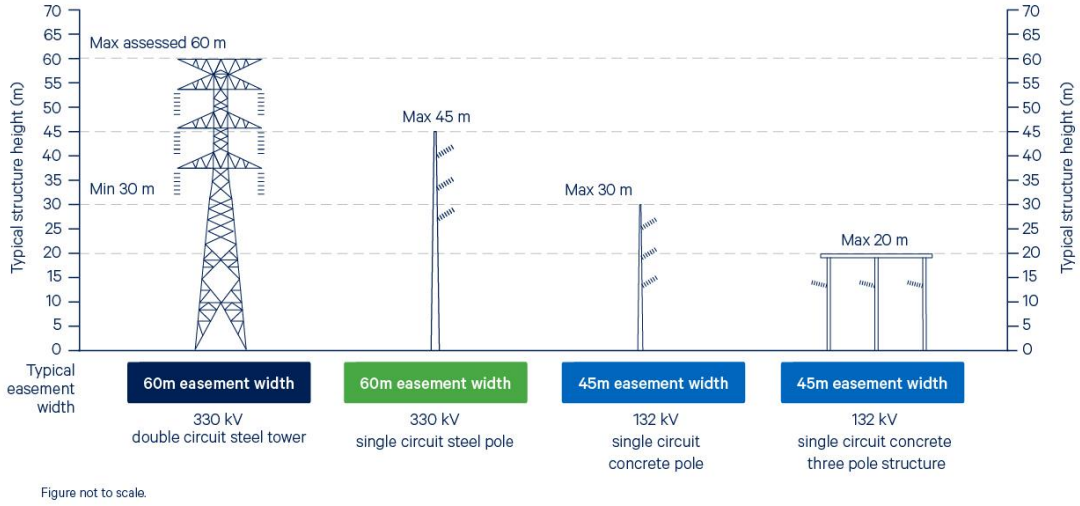
Figure 1.1 Project location and regional context

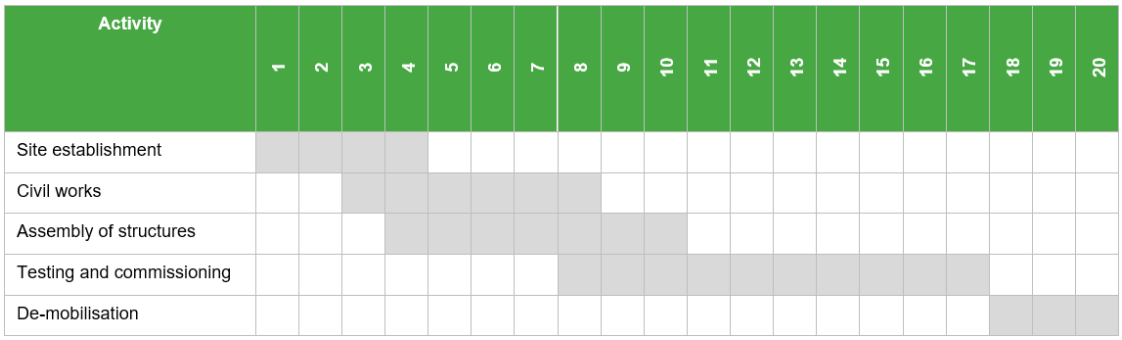
1.3 The project

The project would involve construction and operation of approximately 8 km of new 330 kV transmission line between the Mount Piper and Wallerawang 330 kV substations as shown in Figure 1.2. The project would also include the replacement of transmission structures, partial adjustment of existing transmission lines, permanent and temporary access tracks, construction compounds and laydown areas.

Table 1.1 outlines the key features of the project. The description of the project in Table 1.1 is based on the current concept design. Further detail is provided in Chapter 3 of the Environmental Impact Statement (EIS). The project will continue to be refined as part of detailed design.

Table 1.1 The project

Feature	Description
Design	
Transmission line and easement	Approximately 8 km of new 330 kV transmission line between the existing Mount Piper 330 kV and Wallerawang 330 kV substations that would include (from north-west to south-east): – widening of approximately 0.5 km of existing easements in the vicinity of the Mount Piper 330 kV substation by up to 40 metres (m) to accommodate the new 330 kV transmission line and adjustments to existing 132 kV and 330 kV transmission lines – widening of the existing 132 kV easement from 45 m to 60 m for 4.8 km to accommodate double circuit transmission structures for the existing 132 kV transmission line and the new 330 kV transmission line – installation of two 132 kV pole structures where the existing 132 kV transmission line is restrung onto the new double circuit transmission structures – construction of 1.2 km of new 330 kV transmission line from the existing 132 kV transmission line south-east to the intersection of Main Street and the Castlereagh Highway on a 60 m easement – construction of 1.5 km of new 330 kV transmission line on a 40 m easement running parallel to existing 330 kV transmission lines for approximately 1.1 km and then diverging and widening to 60 m for the remaining 0.4 km to the Wallerawang 330 kV substation. The standard easement widths for 132 kV and 330 kV transmission lines are 45 m and 60 m respectively. However, easements may vary in width where multiple transmission lines converge/ diverge or where they overlap with an existing easement.
Transmission structures	Transmission structures for the project include approximately 28 new steel lattice towers and four steel and/or concrete pole structures. Transmission structures would range in height from approximately 14 to up to 60 m, however these heights would be subject to detailed design. The image below presents an indicative illustration of the types of structures proposed for the project and their maximum heights.  Figure not to scale. The steel transmission structures would generally be spaced between 100 m to 550 m apart and the pole structures about 30 m to 50 m apart. New conductors, earth wires and optical ground wire (OPGW) would be installed on the new transmission structures for the new 330 kV and existing 132 kV lines.

Feature	Description
	Local adjustment of existing transmission structures would be required in the vicinity of the Mount Piper 330 kV substation to minimise crossover of transmission lines. Redundant transmission structures, including the gantry immediately north of the Main Western Rail Line, would be removed and recycled, where possible.
Construction	
Program	Construction of the project would commence once all necessary approvals are obtained. It is anticipated that construction would commence in late 2026. Construction would be undertaken in stages over a period of approximately 20 months. The key activities and their indicative durations shown in the below table. 
Construction methodology	Construction of the project would include: – site establishment including vegetation removal, construction compound establishment, access track construction and upgrade – removal of existing transmission structures where required – civil works involving earthworks and establishment of construction benches for each transmission structure, and establishment of brake and winch sites – construction of footings and foundation work for the new transmission structures – assembly and erection of new transmission structures – stringing of conductors.
Construction hours	The proposed construction working hours for the project are 7 am to 7 pm Monday to Sunday. Out-of-hours construction work will likely be required between 7 pm to 7 am Monday to Sunday and public holidays, to align with scheduled outages. Justification for the out-of-hours works includes: – proximity to live transmission lines requiring the work to be completed under a scheduled outage for network and personnel and contractor safety – the need to complete works within a limited time window to meet a timeframe to re-energise the transmission line to avoid disruption to customers – minimising disruptions to the use of the Main Western Rail Line during stringing.
Construction workforce	Expected to peak at about 150 personnel and contractor, with an average workforce of about 60 personnel and contractor.
Construction compounds and laydown areas	A total of three construction compounds would support the construction of the project. One would be located at the western end of the project near the Mount Piper 330 kV substation and two located at the eastern end of the project within the former Wallerawang Power Station site. The locations of these compounds are shown in Figure 1.3. Laydown of materials (e.g. poles, cable drums, other large equipment, etc.) would also occur at specified locations along the easement within the project footprint, particularly at transmission structure locations.
Access	To facilitate efficient construction access, the following is required: – upgrading and widening of approximately 25 km of existing access tracks to at least 6 m, with some sections widened up to 10 m due to local topography – construction of approximately 2 km of new 6 m wide access tracks. In addition to those tracks, approximately 4 km of existing track would be used only by light vehicles. The light vehicle tracks may require minor repairs (for example, filling potholes), but would not be graded or widened. The project footprint would be accessed from public roads at 13 access points, with the majority of these being existing property access points.

Feature	Description
	Existing access tracks would be used in preference to new tracks wherever possible. Access track upgrades and widening would include required drainage. Access points and access tracks established for the construction of the project that are not required for future operation and maintenance activities would be returned to pre-project conditions, subject to agreement with landowners.
Utility adjustments and infrastructure crossings	The new transmission line would need to cross the following utilities and infrastructure: – water pipeline operated by WaterNSW – distribution lines operated by Endeavour Energy – rail signal power supply – council drainage and other assets – public roads at Brays Lane and Main Street – rail lines at the Main Western Rail Line and the disused rail line travelling north of Brays Lane. It is not currently anticipated that the project would require the adjustment of any nearby utilities. Further investigations and consultation with asset owners would be undertaken during detailed design.
Vegetation clearing	The project would require the clearance of vegetation for a number of activities including but not limited to building new access tracks and widening existing ones, establishment of construction compounds, laydown areas, and brake and winch sites, construction of the transmission structures, and establishing and maintaining the vegetation clearance requirement for the transmission lines. Vegetation clearing would be undertaken either with the use of machinery or manually, where it is unsafe to operate machinery, or when access is limited. Root balls would be retained where possible. Clearing methods would be determined with consideration to vegetation type or structure, slope and terrain, and environmental and ecological constraints. Removed vegetation, which is weed free, would be mulched for beneficial reuse, where appropriate. Areas cleared for construction, that are not needed for operation of the project, would be rehabilitated to a stable and weed free condition.
Testing and commissioning	Testing and structure checks would form part of the final construction and installation work. These activities would ensure the project has been installed in accordance with the design and statutory standards and is safe to proceed to commissioning which would include, but not be limited to: – transmission line cut-in and connection to the electrical network – protection, control and metering checks – high voltage equipment operation and energisation – post commissioning testing and verification.
Demobilisation and rehabilitation	Upon completion of the construction works, all construction equipment, temporary fencing and waste would be removed. All disturbed areas would be rehabilitated to a stable, weed-free condition, unless designated as a permanent access track. This would include spreading topsoil, cleared and stockpiled at the beginning of construction, across the disturbed area to stabilise it to a state where natural regrowth can occur.
Operation	
Design life	About 50 years.
Maintenance	All project infrastructure would require regular maintenance to maintain serviceability and maximise its operational life. Maintenance activities would include: – transmission structure monitoring – annual aerial inspection – routine vegetation management on the easement and in the hazard tree zone – access tracks would be maintained in a trafficable condition. Should any irregularities be identified following routine inspections, a work crew would be dispatched from existing Transgrid maintenance depots to rectify any defects found. Periodic inspection and maintenance work would be managed by Transgrid as part of existing operations, with no additional personnel requirements.

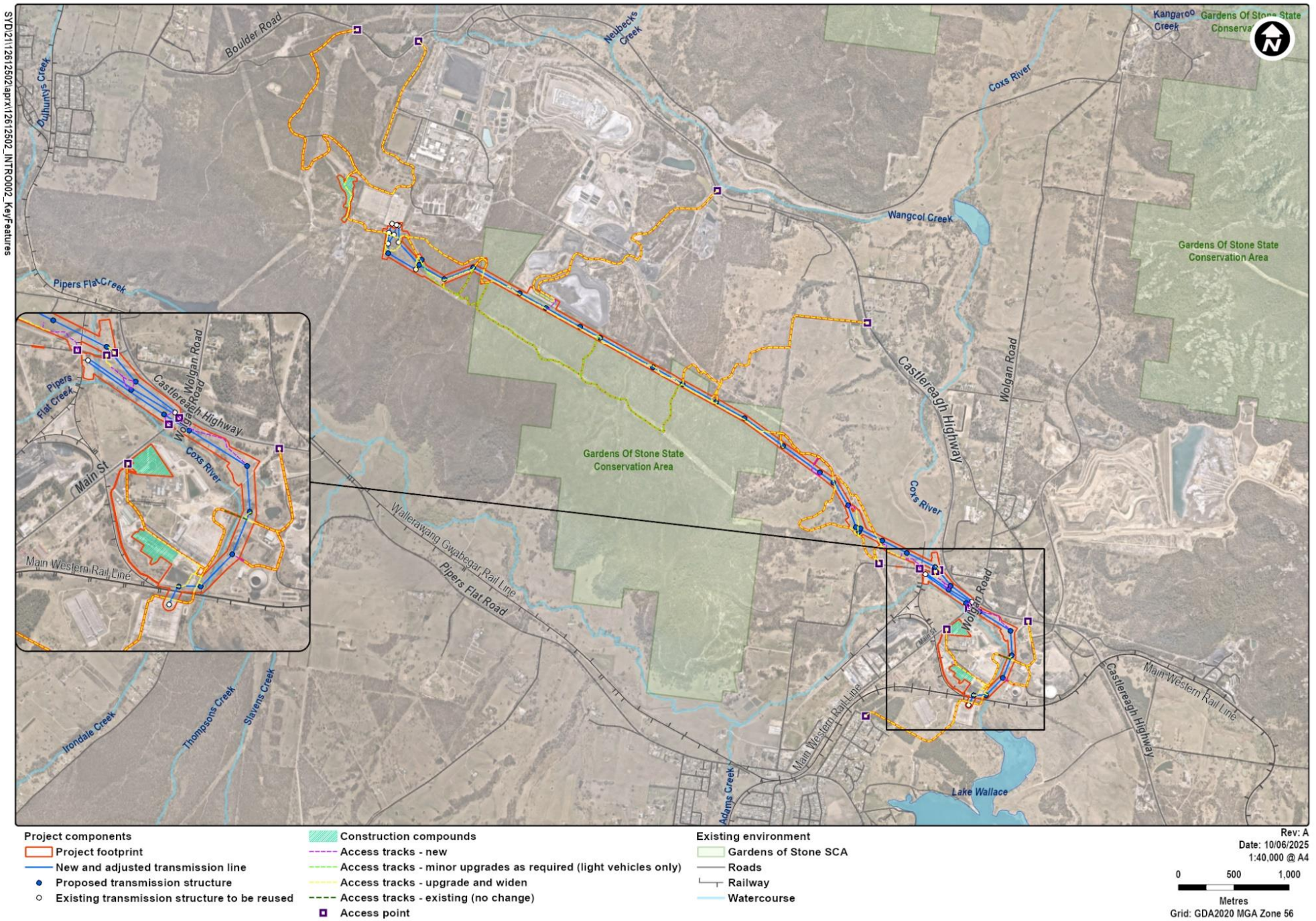
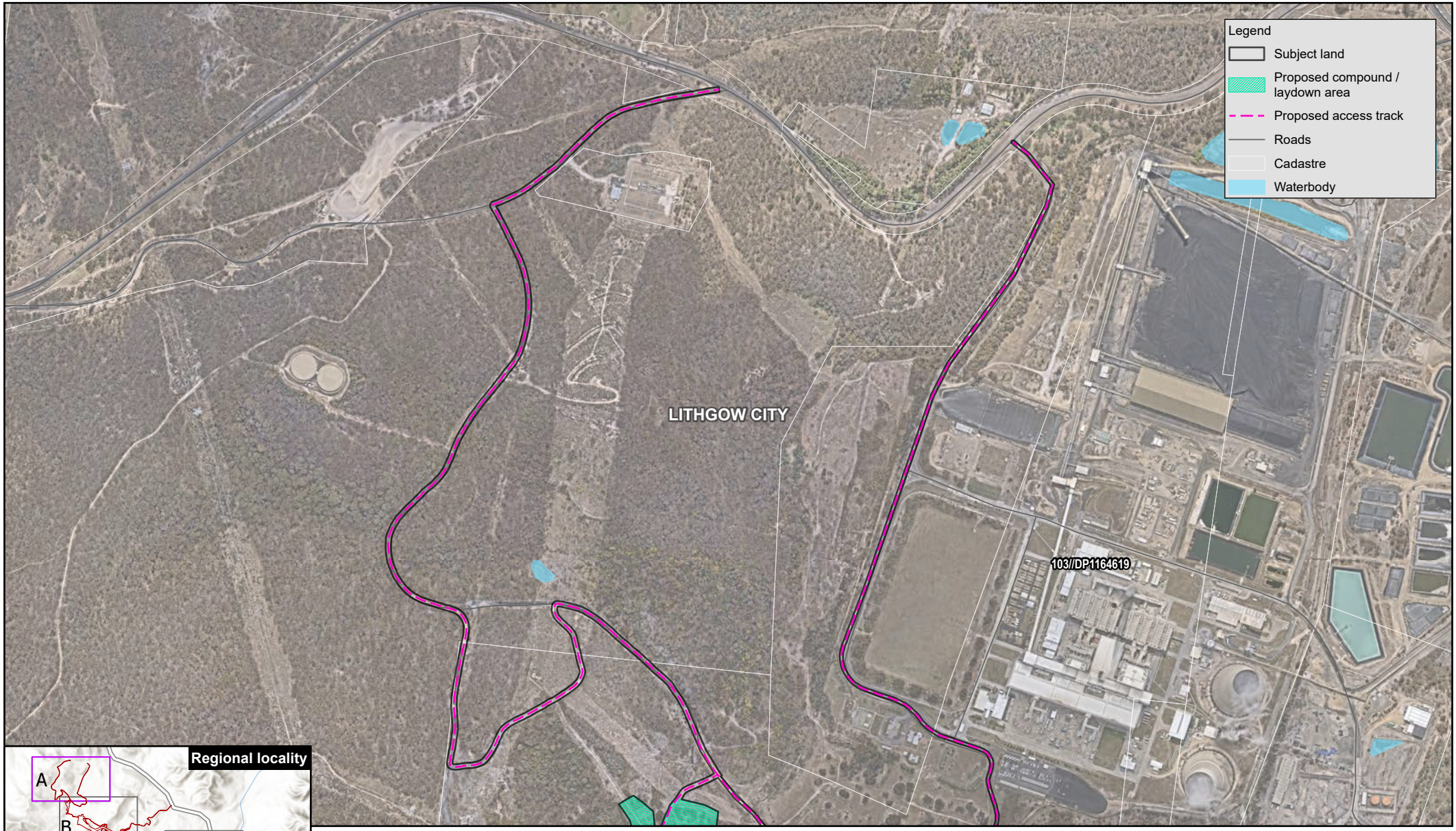


Figure 1.2 Key features of the project



Paper Size ISO A4

0 100 200 300

Metres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

GHD

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

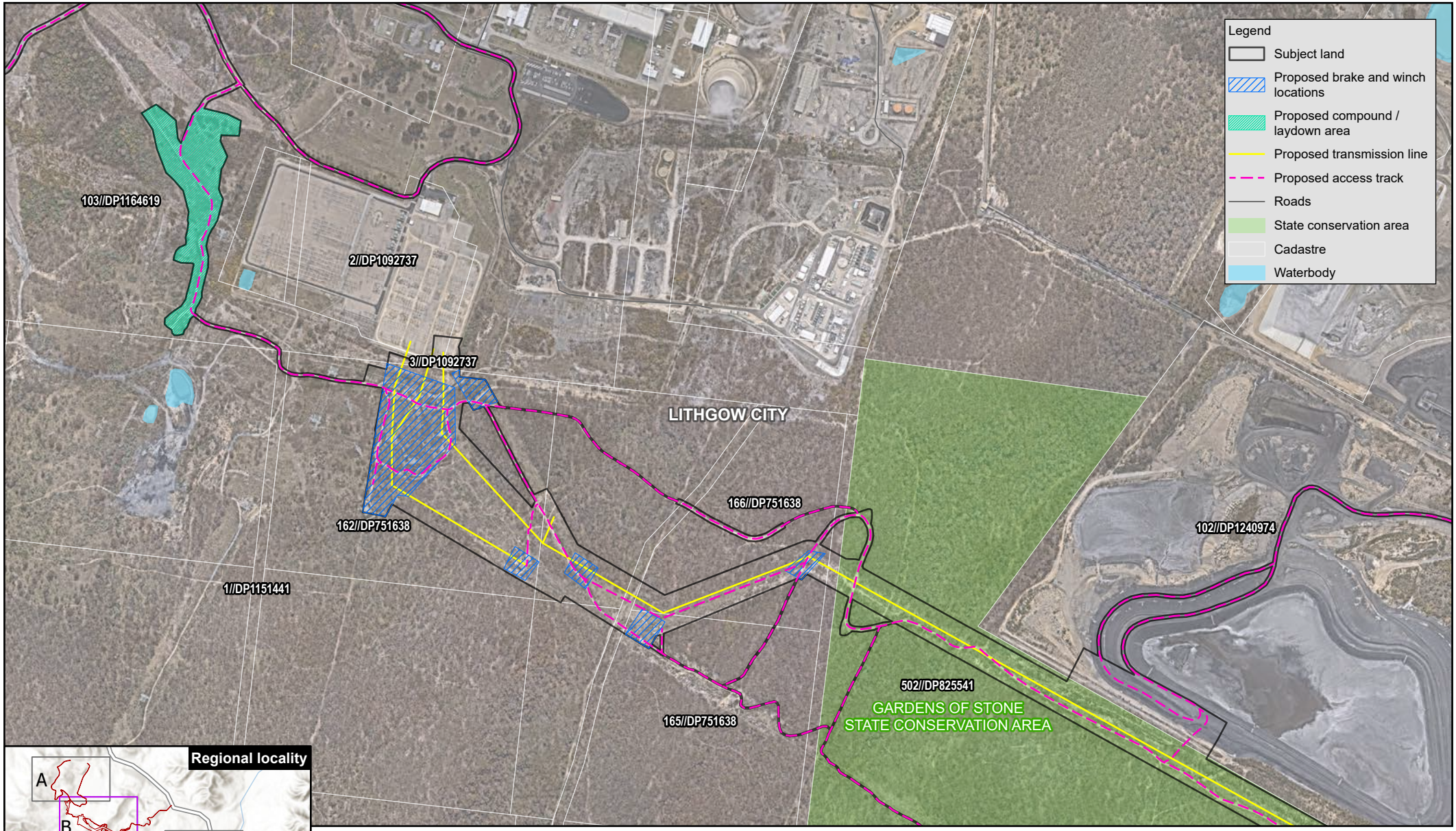
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

Site map

FIGURE 1.3A

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR001_SiteMap
Print date: 17 Jul 2025 - 13:37

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;World Hillshade: Esri, Geoscience Australia, NASA, NGA, USGS;Nearmap WMS Server: . Created by: lmanasan



Paper Size ISO A4

0 100 200 300

Metres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

GHD

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

Site map

FIGURE 1.3B

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR001_SiteMap
Print date: 17 Jul 2025 - 13:37

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;World Hillshade: Esri, Geoscience Australia, NASA, NGA, USGS;Nearmap WMS Server: . Created by: lmanasan



Paper Size ISO A4

0 100 200 300

Metres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

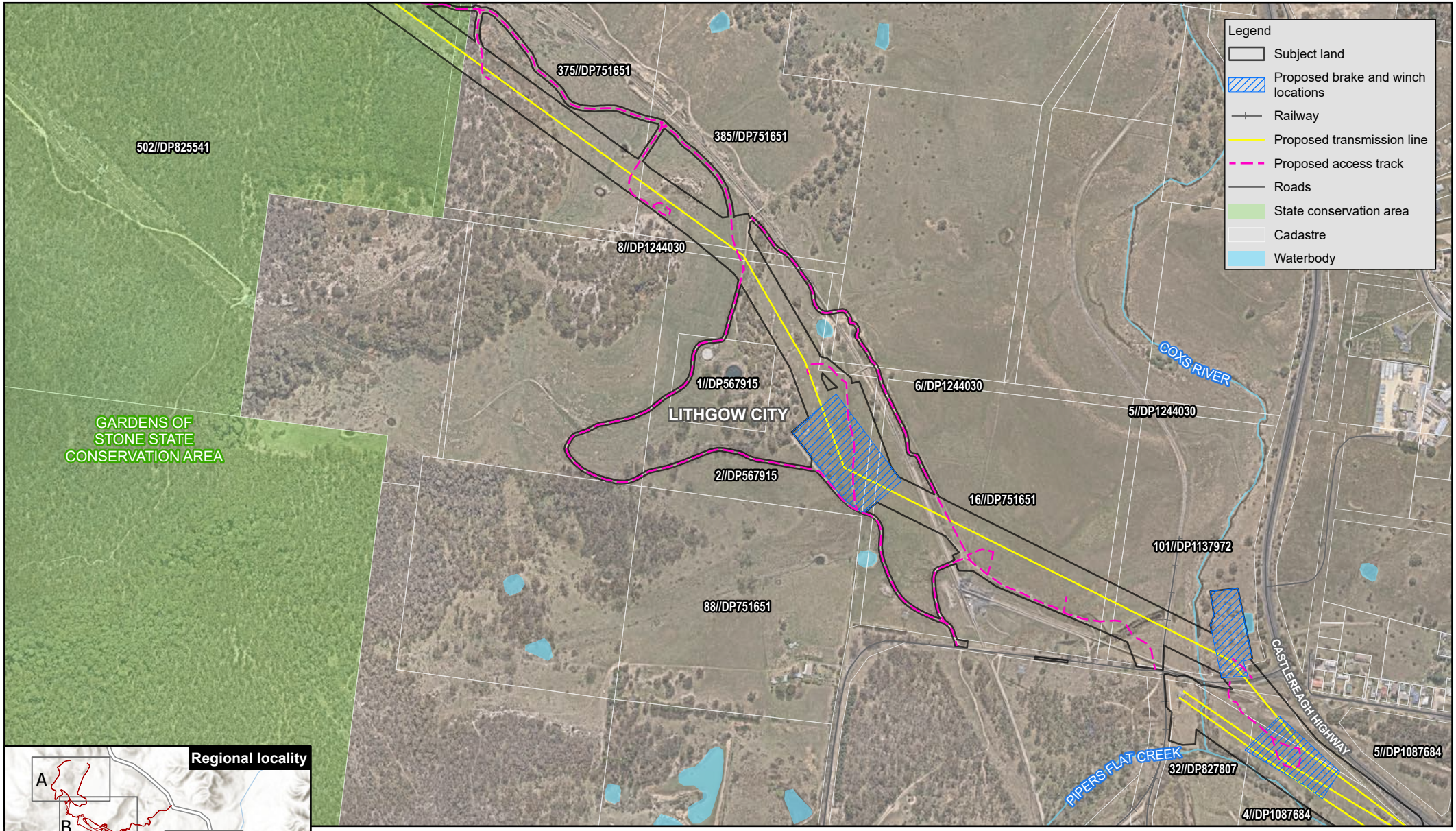
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

Site map

FIGURE 1.3C

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR001_SiteMap
Print date: 17 Jul 2025 - 13:38

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;World Hillshade: Esri, Geoscience Australia, NASA, NGA, USGS;Nearmap WMS Server: . Created by: lmanasan



Paper Size ISO A4

0 100 200 300

Metres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

GHD

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

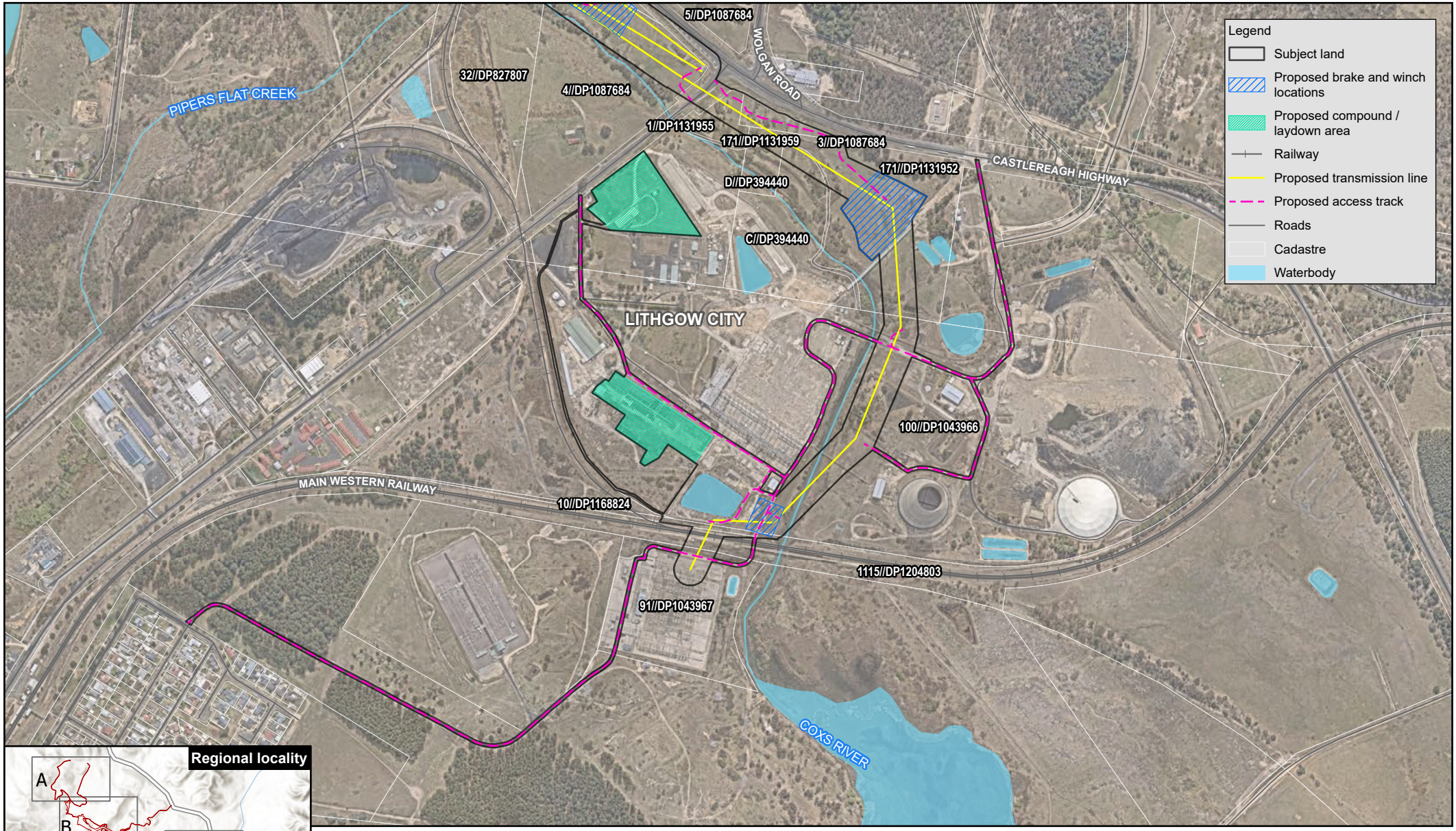
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

Site map

FIGURE 1.3D

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR001_SiteMap
Print date: 17 Jul 2025 - 13:38

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;World Hillshade: Esri, Geoscience Australia, NASA, NGA, USGS;Nearmap WMS Server: . Created by: lmanasan



Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

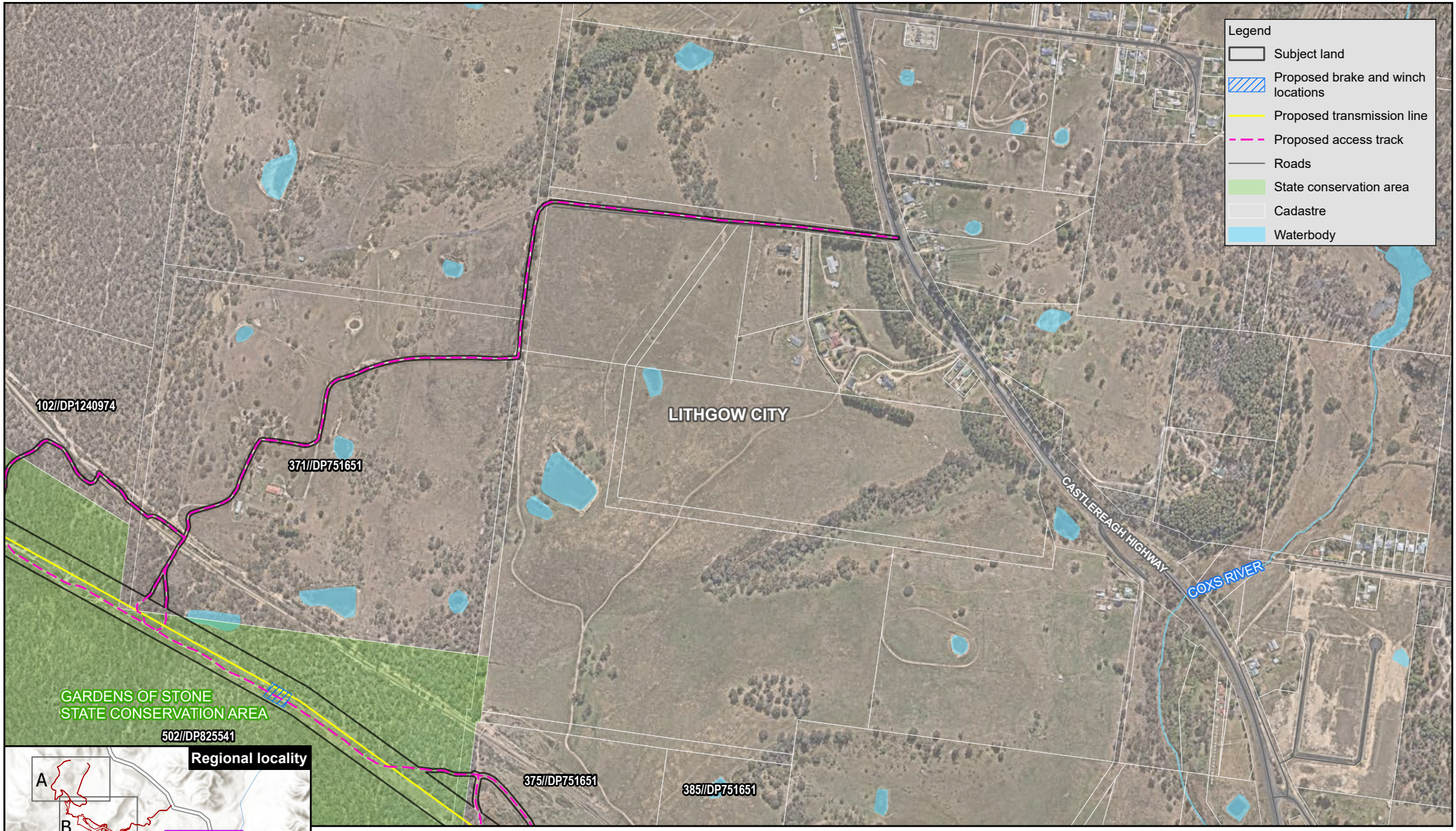
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

Site map

FIGURE 1.3E

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR001_SiteMap
Print date: 17 Jul 2025 - 13:39

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;World Hillshade: Esri, Geoscience Australia, NASA, NGA, USGS;Nearmap WMS Server: . Created by: lmanasan



Paper Size ISO A4

0 100 200 300

Metres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

Site map

FIGURE 1.3F

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR001_SiteMap
Print date: 17 Jul 2025 - 13:39

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;World Hillshade: Esri, Geoscience Australia, NASA, NGA, USGS;Nearmap WMS Server: . Created by: lmanasan



Paper Size ISO A4

0 100 200 300

Metres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

GHD

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

Site map

FIGURE 1.3G

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR001_SiteMap
Print date: 17 Jul 2025 - 13:40

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;World Hillshade: Esri, Geoscience Australia, NASA, NGA, USGS;Nearmap WMS Server: . Created by: lmanasan

1.4 Environmental assessment requirements

This Biodiversity Development Assessment Report (BDAR) has been prepared to address the Secretary's Environmental Assessment Requirements (SEARs) which were issued on 22 May 2025. Supplementary SEARs were also received on 4 October 2024 outlining the requirements for preparing documentation relevant to the *Environmental Protection and Biodiversity Conservation Act 1999* assessment under the NSW Bilateral Agreement. Table 1.2 outlines the requirements relevant to this assessment.

The assessment also considers requirements raised by the NSW Department of Primary Industries (DPI) – Agriculture, National Parks and Wildlife Service Group (NPWS) and the Biodiversity, Conservation and Science Group (BCS) of the NSW Department of Climate Change, Energy, the Environment and Water (NSW DCCEEW).

Table 1.2 Relevant Secretary's environmental assessment requirements

Requirements	Where addressed in this report
Biodiversity assessment –	
1. An assessment of the biodiversity impacts of the project, including impacts associated with transport route road upgrades, in accordance with the NSW Biodiversity Conservation Act 2016, having regard to the Biodiversity Assessment Method (BAM), and documented in a Biodiversity Development Assessment Report (BDAR). The BDAR must:	
a. be prepared using the approved BDAR template	Section 1.4
b. document the application of the avoid, minimise and offset framework including assessing all direct, indirect and prescribed impacts in accordance with the BAM	Section 7.1 Section 7.2 Section 8.1 Section 8.2 Section 8.5
c. assess any impacts to nearby conservation areas and nature reserves	Section 8.3
d. assess the impacts associated with all ancillary infrastructure, including the transport route road upgrades;	Section 8.1
e. include an assessment for SAII in accordance with Section 9.1 of the BAM; and	Section 8.6
f. be finalised by an accredited assessor as BAM-compliant within 14 days of submission	See cover page
2. an assessment of the likely direct and indirect impacts on listed aquatic threatened species, populations or ecological communities, scheduled under the *Fisheries Management Act 1994*, and a description of the measures to minimise and rehabilitate impacts; and	See Water Surface Assessment in Appendix G of EIS
3. if an offset is required, details of the measures proposed to address the offset obligations.	Section 9.1 Section 9.5
Supplementary SEARS (NSW DPHI)	
15. The EIS must identify each EPBC Act listed threatened species and communities 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 study area or in the vicinity that are not likely to be impacted, provide evidence why they are not likely to be impacted.	Section 5.3 Appendix E
16. For each of the EPBC Act listed threatened species and communities likely to be impacted by the 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	Section 3 Section 4 Section 5 Appendix E
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 Commonwealth Government guidelines and policy statements	Appendix E Section 2 Section 7 Section 8
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;	

Requirements	Where addressed in this report
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	Section 8 Section 9.4
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	Section 9.5
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	Section 9.4 Appendix E

1.5 Purpose and structure of this report

This report has been prepared by GHD Pty Ltd (GHD) as part of the Environmental Impact Statement (EIS) for the project.

The purpose of this report is to assess potential biodiversity issues from the construction and operation of the project, and where required, identify feasible and reasonable mitigation and management measures. This report:

– sescribes the existing environment of the study area, including the results of the desktop assessment and field surveys
– assesses the value and conservation significance of native vegetation and habitats at the subject land and the potential for threatened biota including matters of national environmental significance (MNES) to occur or be affected by the project
– provides a description of the project, including potential impacts on biodiversity values and measures to avoid or mitigate impacts
– assesses the significance of impacts on threatened biota and Commonwealth MNES under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act)
– presents the data used to perform the Biodiversity Assessment Method (BAM) (DPIE, 2020a) credit calculations for the project
– calculates the number and type of biodiversity credits that would be required to offset residual impacts of the project in accordance with the BAM
– recommends measures to mitigate and manage the impacts identified including decommissioning and rehabilitation of the subject land.

The structure of this BDAR is as follows:

– Section 1 – provides an introduction to the project and the assessment
– Section 2 – describes the methodology for the assessment
– Section 3 – describes the context for the site and landscape-scale inputs to the biodiversity assessment
– Section 4 – describes the existing environment of the subject land including vegetation and threatened ecological communities and site-scale inputs to the biodiversity assessment
– Section 5 – describes the extent and quality of habitat for threatened and migratory species at the subject land
– Section 6 – identifies prescribed impacts that are relevant to the assessment
– Section 7 – outlines steps taken to avoid and minimise potential impacts on biodiversity values
– Section 8 – assesses the impacts of the construction and operation of the project and presents mitigation measures for potential impacts and considers the potential for serious and irreversible impacts (SAII)
– Section 9 – presents a summary of impacts pursuant to the assessment and offsetting thresholds set out in the BAM
– Section 10 – presents conclusions of the assessment pursuant to the key requirements of the BAM and related legislation and policy.

Stage 1: Biodiversity Assessment

2 Approach and methodology

2.1 Legislative and policy context

2.1.1 Biodiversity Conservation Act 2016

The NSW *Biodiversity Conservation Act 2016* (BC Act) provides legal protection for biota of conservation significance in NSW. The BC Act aims to, amongst other things, 'maintain a healthy, productive and resilient environment for the greatest well-being of the community, now and into the future, consistent with the principles of ecologically sustainable development'. It provides for the listing of threatened species and communities, establishes a framework to avoid, minimise and offset the impacts of proposed development (the Biodiversity Offsets Scheme, or BOS), and establishes a scientific method for assessing the likely impacts on biodiversity values and calculating measures to offset those impacts (the Biodiversity Assessment Method, BAM). These are discussed further below.

As of 7 March 2025, certain provisions of the *Biodiversity Conservation Amendment (Biodiversity Offsets Scheme) Act 2024* (the BC Amendment Act) commenced. The BC Amendment Act removes the ability for proponents to seek approval to use the variation rules in securing biodiversity credits as offsets. Proponents may purchase like-for-like credits, make a payment into the Biodiversity Conservation Fund, establish a biodiversity stewardship agreement or fund a prescribed biodiversity conservation action. Other provisions of the BC Amendment Act, including those related to nature positive outcomes and the assessment of genuine measures taken to avoid and minimise biodiversity impacts, are yet to commence as supporting regulations have not yet been developed.

The BC Act and the BC Amendment Act have been considered in this assessment through the application of the BAM as described below.

2.1.2 Biodiversity Offset Scheme and Biodiversity Assessment Methodology

The BC Act, together with the NSW *Biodiversity Conservation Regulation 2017*, provides a mechanism to address impacts on biodiversity from land clearing associated with development, clearing or conferral of biodiversity certification. Under this legislation, there are provisions for a Biodiversity Offsets Scheme (BOS), which includes a framework to avoid, minimise and offset impacts of development on biodiversity.

The aim of the BOS is to provide a transparent, consistent and scientifically based approach to biodiversity assessment and offsetting, to ensure that the impacts of development, clearing or biodiversity certification will result in no net loss of biodiversity. The scheme creates a market framework for the conservation of biodiversity values and the offsetting of development impacts, by establishing the mechanisms to offset impacts of development, clearing or biodiversity certification through biodiversity credit trading such that there is no net loss of biodiversity values. The scheme also allows for the establishment of biodiversity stewardship agreements, which are in-perpetuity agreements entered into by landowners, to secure offset sites and generate biodiversity credits, which can be used to offset impacts of development.

The BAM underpins the BOS and establishes a standard method to address the loss of biodiversity and threatened species. The BAM sets out how biodiversity values will be assessed, prescribes requirements to avoid and minimise impacts, establishes rules for calculating the number and class of credits required for unavoidable impacts, and determines the trading rules that will apply. The methodology includes a software package known as the Biodiversity Assessment Method Calculator (the credit calculator, or BAM-C) which processes field survey and assessment data. The credit calculator specifies the type and extent of surveys required for a Biodiversity assessment and then processes survey data to calculate the number and type of biodiversity credits that are either required at a development site or will be generated at a stewardship site. The BAM must be applied by a person accredited under the BC Act.

2.1.3 National Parks and Wildlife Act 1974

The NSW *National Parks and Wildlife Act 1974* (NPW Act) provides legal protection for the conservation of the natural and cultural heritage of the state of New South Wales; fosters public appreciation, understanding and enjoyment of its natural and cultural heritage; and provides for the management of any lands reserved for the purposes of conserving and fostering public appreciation and enjoyment of its natural and/or cultural heritage.

The Gardens of Stone SCA was formally gazetted under the NPW Act in May 2022, and included three former state forests, including Newnes State Forest and parts of Ben Bullen and Wolgan state forests. The project is located partly within the Gardens of Stone SCA, primarily within an existing transmission easement.

The project is an authorised activity (utilities and access) which allows for the granting of relevant authorisations for utility infrastructure under the Gardens of Stone SCA Plan of Management (DPE, 2022).

The project is generally consistent with the objects of the NPW Act (set out in Section 2A of the Act) and management principles for state conservation areas (as set out in Section 30G of the NPW Act) as outlined below in Table 2.1.

Table 2.1 Permissibility of the project under the NPW Act

	How the project is permissible
Objects of the NPW Act	
a) the conservation of nature, including, but not limited to, the conservation of: i. habitat, ecosystems and ecosystem processes ii. biological diversity at the community, species and genetic levels iii. landforms of significance, including geological features and processes, and iv. iv. landscapes and natural features of significance including wilderness and wild rivers, b) the conservation of objects, places or features (including biological diversity) of cultural value within the landscape, including, but not limited to: i. places, objects and features of significance to Aboriginal people, and ii. places of social value to the people of New South Wales, and iii. places of historic, architectural or scientific significance, c) fostering public appreciation, understanding and enjoyment of nature and cultural heritage and their conservation, d) providing for the management of land reserved under this Act in accordance with the management principles applicable for each type of reservation	a) The project includes biodiversity survey and methods consistent with the BAM. The project has attempted to implement mitigation measures to conserve ecosystems, biological diversity and landforms of significance within Gardens of Stone SCA. b) An Aboriginal Cultural Heritage Assessment Report (ACHAR) has been prepared (Ozark, 2025) to conserve areas of cultural value within Gardens of Stone SCA. c) N/A d) N/A
Management principles for state conservation areas	
a) the conservation of biodiversity, the maintenance of ecosystem function, the protection of natural phenomena and the maintenance of natural landscapes b) the conservation of places, objects and features of cultural value e) provision for the undertaking of uses permitted under other provisions of this Act in such areas (including uses permitted under Section 47J) having regard to the conservation of the natural and cultural values of the state conservation area f) provision for the carrying out of development in any part of a special area (within the meaning of the *Hunter Water Act 1991*) in the state conservation area that is permitted under Section 185A having regard to the conservation of the natural and cultural values of the state conservation area g) provision for sustainable visitor or tourist use and enjoyment that is compatible with the conservation of the state conservation area's natural and cultural values and with uses permitted under other provisions of this Act in such areas h) provision for the sustainable use (including adaptive reuse) of any buildings or structures or modified natural areas having regard to the conservation of the state conservation area's natural and cultural values and with uses permitted under other provisions of this Act in such areas i) provision for appropriate research and monitoring.	e) See above f) See above g) N/A h) N/A i) This portion of the SCA has not been identified as an area for tourism (DPE, 2022b). No additional access or proposed vantage points have been considered within or in the vicinity of the subject land. j) N/A i) Field surveys conducted for this BDAR have added to knowledge of the biodiversity values of the SCA.

2.1.4 Biosecurity Act 2015

The NSW *Biosecurity Act 2015* provides for risk-based management of biosecurity in NSW. It provides a statutory framework to protect the NSW economy, environment and community from the negative impact of pests, diseases and weeds.

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

In NSW, all plants 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.

Priority weeds recorded in the study area are provided in Appendix C.

2.1.5 Environment Protection and Biodiversity Conservation Act 1999

The purpose of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is to ensure that actions likely to cause a significant impact on 'matters of national environmental significance' undergo an assessment and approval process. Under the EPBC Act, an action includes a project, a development, an undertaking, an activity or a series of activities, or an alteration of any of these. An action that 'has, will have or is likely to have a significant impact on a Matter of National Environmental Significance (MNES)' is deemed to be a 'controlled action' and may not be undertaken without prior approval from the Commonwealth Minister for the Environment and Water. MNES relevant to this report include threatened species and ecological communities and migratory species.

A referral was submitted to the Commonwealth Department of Climate Change, Energy, the Environment and Water (Commonwealth DCCEEW) including assessment of significance of impacts on protected matters. Commonwealth DCCEEW confirmed a decision to assess the project as a controlled action in August 2024 under the assessment bilateral agreement with New South Wales (project NSW 2024/09855) due to the potential for significant impacts on the following matters protected under the EPBC Act:

– Gang-gang Cockatoo (*Callocephalon fimbriatum*)
– Brown Treecreeper (*Climacteris picumnus victoriae*)
– Glossy Black-cockatoo (*Calyptorhynchus lathami lathami*)
– Grey-headed Flying-fox (*Pteropus poliocephalus*)
– Black Gum (*Eucalyptus aggregata*).

Further consideration of impacts on these protected matters is provided in section 8.7, section 9.4 and Appendix E. The EPBC Act has been considered in this assessment through:

– desktop review to determine the listed biodiversity matters that are predicted to occur within the locality of the project and hence could occur, subject to the habitats present
– targeted field surveys for listed threatened biota and migratory species
– identification of suitable impact mitigation and environmental management measures for threatened and migratory biota, where required
– discussion of how offsets for significant residual impacts on protected matters would be delivered within the framework of the NSW BOS.

2.2 Study area

For the purposes of the assessment the project, subject land and study area have been defined as follows:

– The project – Construction and operation of a new 330kV transmission line between existing 330kV substations at Mount Piper and Wallerawang.
– Subject land – The area that would be directly affected by construction and the location of operational infrastructure. Includes the easement and route of the new transmission line (including transmission structures), substations, new and existing access tracks to/from the easement and temporary construction compounds and laydown areas. The subject land is shown in Figure 1.3. The subject land aligns with the area referred to as the 'project footprint' throughout the EIS and other specialist reports.
– Study area – The area investigated for this assessment includes the subject land and a 250 m buffer from the subject land, which includes areas with the potential to be directly or indirectly affected by the project. A 250 m buffer area was used to help determine the presence of threatened species nest trees to inform the assessment of species credits. The study area is shown in Figure 1.3.

2.3 Desktop review and consultation

2.3.1 Desktop assessment

Data review

A desktop database review was undertaken to identify threatened flora and fauna species, populations and ecological communities (threatened biota) listed under the BC Act and EPBC Act, that could be expected to occur in the locality, based on previous records, known distribution ranges, and habitats present. These were also used to obtain the necessary site data to perform BAM calculations.

Information sources used in the preparation of this report include:

– NSW DCCEEW BioNet Atlas for records of threatened biota previously recorded in a 10 km radius around the subject land (NSW DCCEEW, 2025a) and Threatened Biodiversity Data Collection (TBDC) profiles of threatened species listed under the BC Act (NSW DCCEEW, 2025b)
– The NSW State Vegetation Type Map (SVTM) (NSW DCCEEW, 2025c) to identify candidate plant community types (PCTs) in the study area and to map native vegetation extent
– NSW BioNet Vegetation Classification (NSW DCCEEW, 2025d) descriptions and characteristic plant species lists to identify and map PCTs at fine scale in the study area
– NSW DCCEEW Threatened biodiversity profile search online database for threatened ecological communities and species listed under the BC Act (DPE, 2025e)
– Commonwealth DCCEEW (2024a) EPBC Act Protected Matters Search Tool – for a 10 km radius around the subject land (searched on 24/02/2024)
– Commonwealth DCCEEW (2024b) Species profile and threats database, online profiles (SPRAT)
– the list of candidate species credit-type species and predicted species identified by the BAM calculator.

The threatened biota and migratory species identified in the desktop assessment are presented in Appendix B. Following collation of database records and threatened species and community profiles, a list of threatened species requiring assessment was compiled according to the 'steps for identifying habitat suitability for threatened species' in the BAM. This was further refined following field surveys and an assessment of habitat present within the subject land. A likelihood of occurrence ranking was attributed to biota based on this information and used to compile lists of 'predicted threatened species' (that is, ecosystem credit species) and 'candidate threatened species' (that is, species credit entities requiring targeted survey) according to Step 2 'assessment of habitat constraints' of the BAM.

Background research

Background research was conducted to identify:

– landscape-scale features of the study area in accordance with Section 3.1.3 of the BAM (DPIE, 2020a)
– site context of the study area that includes assessing vegetation cover and patch size as required under Section 3.2 and Subsection 4.3.2 of the BAM (DPIE, 2020a)
– the likely distribution of native vegetation and threatened ecological communities, based on previous mapping and aerial photograph interpretation, for targeted field verification as required under Section 4 of the BAM (DPIE, 2020a)
– a list of predicted and candidate threatened species and populations of flora and fauna to assess the habitat suitability and threatened biodiversity data collection as required under Section 5 of the BAM (DPIE, 2020a)
– availability of baseline information to determine whether additional surveys, mapping and reporting is required to support project approval.

The background research included analysis of the following information sources:

– NSW (Mitchell) Landscapes mapping Version 3.1 (DPIE, 2016) and Descriptions for NSW (Mitchell) Landscapes Version 2 (DECC, 2002)
– Interim Biogeographic Regionalisation of Australia (IBRA version 7.0) mapping
– Initial BAM calculations
– Atlas of Groundwater Dependent Ecosystems (GDE) (BOM, 2023)
– Previous ecological assessments completed for the site (Umwelt, 2022)
– Aerial photograph imagery of the subject land and buffer area.

2.3.2 Consultation with government agencies

Government agencies have been consulted throughout the preparation of this BDAR. Meeting dates, attendance and agenda topics are summarised in Table 2.2. It is noted that additional meetings with these government agencies may have occurred as part of the project. Those meeting outlined in Table 2.2 are where biodiversity was specifically discussed including any initial meetings to brief agencies.

Table 2.2 Government agency consultation

Date	Agencies present	Topics discussed
09/11/2023	DPE (now NSW DPHI)	Project overview Project need Route selection and consultation Environmental assessment and program Biodiversity survey results to date
22/02/2024	NSW DCCEEW (BCS)	Project overview Project need Route selection Environmental assessment and program Ongoing engagement
27/02/2024	Commonwealth DCCEEW	BDAR preparation Biodiversity survey program Biodiversity surveys results to date Potential impacts on MNES Project referral
06/06/2024	NPWS	BDAR preparation Biodiversity survey program Biodiversity survey results to date Impacts on Gardens of Stone SCA

Date	Agencies present	Topics discussed
10/12/2024	NSW DCCEEW (BCS)	Project overview Biodiversity survey program Biodiversity survey results to date Species polygons and key impacts Avoid and minimise Impact assessment approach Biodiversity Offset Delivery Strategy
26/02/2025	NSW DCCEEW (former BCS now CPHR)	Biodiversity survey results to date Species polygons and key impacts Squirrel Glider habitat connectivity Gang-gang Cockatoo species polygons Large-eared Pied Bat SAII assessment Avoid and minimise
05/03/25	NPWS	Property access Information on site investigation and survey findings Biodiversity offsets Aviation impacts
01/05/2025	NSW DCCEEW (former BCS now CPHR)	Squirrel Glider habitat connectivity Gang-gang Cockatoo species polygons Large-eared Pied Bat SAII assessment

2.4 Survey overview

Staged surveys within the study area were conducted with reference to the BAM and appropriate threatened species survey guidelines for targeted species.

Survey effort that has directly contributed to this BDAR is summarised in Table 2.3 and is described in detail in section 2.5 and 2.6.

Table 2.3 Survey techniques and timing

Survey stage	Date	Survey technique
Preliminary investigation of biodiversity values	14/08/2023 - 17/08/2023	Vegetation zone mapping Vegetation integrity plots Habitat assessment Spotlighting and call playback
August 2023 fauna surveys	28/8/2023 - 1/09/2023	Habitat assessment Hollow-bearing tree mapping and nest tree census Diurnal bird surveys Spotlighting and call playback
September 2023 flora surveys	11/09/2023 - 15/09/2023	Refinement of vegetation zone mapping Vegetation integrity plots Systematic threatened flora traverses
October 2023 fauna surveys	23/10/2023 - 27/10/2023	Diurnal bird surveys Hollow-bearing tree mapping and nest tree census Spotlighting and call playback Anabat detectors Systematic traverses for Purple Copper Butterfly
November 2023 flora surveys	20/11/2023 - 24/11/2023	Vegetation integrity plots Threatened flora traverses
January 2024 flora surveys	29/1/2024 - 2/2/2024	Vegetation integrity plots Threatened flora traverses Anabat detectors

Survey stage	Date	Survey technique
February 2024 fauna surveys	19/2/2024 - 23/2/204	Vegetation integrity plots Frog breeding habitat assessment Frog Aural/visual surveys Spotlighting and call playback Camera trap deployment Anabat detectors
March 2024 fauna surveys	4/3/2024 - 8/3/2024	Diurnal bird surveys Spotlighting and call playback Frog Aural/visual surveys Hollow-bearing tree mapping and nest tree census Camera trap rebaiting
April 2024 fauna surveys	16/4/2024 - 18/4/2024	Camera trap collection Vegetation zone mapping Vegetation integrity plots
Preliminary investigation of biodiversity values along access tracks	11/6/2024 - 14/6/2024	Vegetation zone mapping Habitat assessment Vegetation integrity plots
June 2024 fauna surveys	11/6/2024 - 14/6/2024	Diurnal bird surveys Spotlighting and call playback Threatened flora traverses
July 2024 fauna surveys	1/7/2024 - 5/7/2023	Diurnal bird surveys Spotlighting and call playback Hollow-bearing tree mapping and nest tree census
October 2024 flora surveys	14/10/2024 - 18/10/2024	Vegetation zone mapping Threatened flora traverses Vegetation integrity plots
October 2024 fauna surveys	14/10/2024 - 18/10/2024	Habitat assessment Diurnal bird surveys Spotlighting Frog Aural/visual surveys
November 2024 flora survey	05/11/2024 - 07/11/2024	Vegetation integrity plots Threatened flora traverses
January 2025 flora surveys	28/1/2025 - 30/1/2025	Threatened flora traverses Roost/refuge inspection of rock outcrop

2.5 Vegetation and flora surveys

2.5.1 Vegetation mapping

Regional vegetation mapping (NSW DCCEEW, 2025c) was ground-truthed in the field to verify community type and boundaries, floristic and structural homogeneity within patches and to update mapping as required. Vegetation mapping was undertaken via systematic walked transects across the entire subject land and by walking the boundary of likely vegetation units, based on aerial photograph interpretation. The overall condition of vegetation was assessed through general observation and comparison against the PCT condition benchmark data as well as using parameters such as species diversity, history of disturbance, weed invasion and canopy health.

Native vegetation communities in the study area were assigned to the closest equivalent Plant Community Type (PCT) held in the BioNet Vegetation Classification database (NSW DCCEEW, 2025d). The closest equivalent PCT for each vegetation community was determined through a comparison of the floristic descriptions of PCTs in the database with the vegetation integrity plot data collected from the site. In addition to floristic and structural similarity, the landscape position, soil type and other diagnostic features of the vegetation communities on the sites were also compared to the descriptions in the database to determine the most suitable PCT. Threatened ecological communities (TECs) as defined in NSW and Commonwealth legislation were also identified.

The native vegetation in the subject land was then stratified into vegetation zones in accordance with the BAM. A vegetation zone is defined in the BAM as a relatively homogenous area that is the same PCT and has the same broad condition state. Each vegetation zone was assigned a patch size in accordance with Subsection 4.3.2 of the BAM. Justification for selected PCTs and condition classes is provided in section 4.2.

2.5.2 Vegetation integrity survey plots (assessing site condition)

Following the stratification of the subject land into vegetation zones, plot surveys were conducted in accordance with the BAM (DPIE, 2020a) to obtain vegetation integrity data for the calculation of biodiversity credits. The sampling was undertaken using 20 x 20 m plots nested within a larger 20 x 50 m plot.

Vegetation integrity was calculated by assessing ten attributes used to evaluate vegetation function, composition and structure (refer Table 2.4). These attributes were then assessed against benchmark values using the BAM-C.

All flora species recorded within each plot were allocated a growth form group and designated as either native, exotic or high threat weeds (HTWs) in accordance with defined lists obtained from the BAM-C. Plant identification and nomenclature follows keys and taxonomy in PlantNET (RBGT, 2023).

Table 2.4 Site data collected within each plot

Attribute	Area assessed
Native plant species richness	20 X 20 m plot
Percentage foliage cover for each species	20 X 20 m plot
Estimated number of individuals for each species	20 X 20 m plot
Number of large trees	50 X 20 m plot
Tree regeneration (presence/absence)	50 X 20 m plot
Tree stem size class	50 X 20 m plot
Total length of fallen logs	50 X 20 m plot
Litter cover	5 times 1 X 1 m plot
High threat exotic vegetation cover	50 X 20 m plot
Hollow bearing trees	50 X 20 m plot

The survey effort undertaken to address the minimum plot sampling required by the BAM is summarised in Table 4.10. The locations of the survey plots are shown in Figure 4.1. Plots were located away from ecotones, tracks and track edges or other disturbed areas where possible.

2.5.3 Planted native vegetation assessment

The subject land and study area includes some areas of land that support planted native vegetation as defined in Appendix D of the BAM (Streamlined assessment module – Planted native vegetation).

These are patches of planting generally located along existing access tracks near the existing Mount Piper 330 kV substation. The plantings comprise a mix of locally native and non-locally native trees and shrubs which do not align with any locally occurring PCT types. The decision-making key in Appendix D.1 of the BAM was applied and any vegetation that met the definition of planted vegetation was assessed in line with Appendix D.2 of the BAM (see section 4.2).

2.5.4 Threatened flora searches

Potential candidate species credit entities for the subject land were identified with reference to the BAM. All threatened flora are classified under the BAM as species credit entities as their occurrence cannot be reliably predicted based on vegetation type. The suite of threatened flora with potential to occur in the subject land was identified based on the desktop assessment results and the species credit entities identified by preliminary BAM-C calculations. Habitat for these species was identified and assessed based on threatened species database records (NSW DCCEEW, 2025d) and threatened species profiles (NSW DCCEEW, 2025e) and the experience and judgement of GHD ecologists.

Targeted searches were undertaken with reference to the BAM flora survey guidelines (DPIE, 2020b) for threatened flora species that were either predicted to occur at the subject land by the BAM calculator or identified during the desktop review as having potential to occur within the study area given known distributions, previous records in the locality and habitat requirements for each species.

Habitat assessment and nest trees census survey effort was used to opportunistically record threatened flora (e.g. July 2024 Diurnal bird survey in Figure 5.5, however the survey effort and associated tracklogs have not been counted as threatened flora traverse survey effort.

Section 5 provides a summary of the candidate threatened flora species that were considered during field surveys and further details regarding survey timing and effort.

2.6 Terrestrial fauna surveys

2.6.1 Fauna habitat assessment and searches

General fauna habitat assessments were undertaken throughout the study area, including active searches for potential shelter, basking, roosting, nesting and/or foraging sites. Specific habitat features and resources such as water bodies, food trees, the density of understorey vegetation, the composition of ground cover, the soil type, leaf litter and ground debris were noted.

Indicative habitat criteria for targeted threatened species (i.e. those determined as having the potential to occur within the subject land following the desktop review) were identified prior to fieldwork occurring with particular focus on species credit matters. Habitat criteria were based on information provided in the TBDC, threatened species profiles, recovery plans, field guides, and the knowledge and experience of GHD field ecologists.

Habitat assessments were conducted including active searches for:

– Rock outcrops or overhangs providing potential shelter sites for fauna
– Burrows, dens and warrens
– Evidence of fauna occupation such as: distinctive scats or latrine sites; whitewash and regurgitated pellets under roost sites; tracks or animal remains
– Evidence of activity such as feeding scars, scratches and diggings
– Extent of woody debris ground cover.

The locations and quantitative descriptions of significant habitat features were captured with a handheld GPS unit and photographed where appropriate.

2.6.2 Opportunistic observations

Opportunistic and incidental observations of fauna species were recorded at all times during field surveys. This included a conscious focus on suitable areas of habitat during surveys. For instance, rock outcrops and fallen timber were scanned and/or turned for reptiles and mature trees and stags were scanned for roosting birds.

2.6.3 Nest tree census

A ‘systematic nest tree census’ was conducted over the entire subject land and accessible vegetation over adjoining areas to help determine the presence of threatened species nest trees to inform the assessment of species credits. All mature trees were inspected for the presence of stick nests and/or hollows. Any large stick nests and hollow bearing trees were mapped and data collected on tree species, diameter at breast height and number of hollows in the size classes 30 cm, 20-30 cm, 10-20 cm, 5-10 cm and <5 cm. The presence of fissures was also recorded. The nest tree census commenced in August 2023 to target winter breeding birds and to assist in identifying any key potential nest trees for surveys in spring.

Nest tree census surveys included targeted effort within the breeding season to detect evidence of nesting birds as noted in the TBDC profiles for target species such as the presence of a male and female; or any adult with nesting material; or an individual on a large stick nest in the top half of the tree canopy; or pairs displaying (soaring, diving, engaging in chases, or a male observed calling in flight with a female begging from tree) (NSW DCCEEW, 2025b). Additional surveys were conducted outside the breeding season for target species, aligned with diurnal bird survey effort, habitat searches and all other time spent on site. These additional survey periods contributed to the overall effort for species credit matters through observation of candidate nest trees with suitable large stick nests or hollows that could be used for breeding at other times of year.

The TBDC notes that where a breeding site has been identified in accordance with the BAM the species polygon should include a buffer by mapping a circular polygon with a radius of up to 500 m (depending on the species) around the nest tree. This includes habitat suitable for roosting, guarding, feeding, grooming perches and fledgling requirements (NSW DCCEEW, 2025b). As such the systematic nest tree census included inspection of candidate trees within creeklines between the easement and proposed access tracks, and scanning adjacent vegetation with the use of binoculars in more open country.

2.6.4 Targeted surveys

Fauna survey methods are described below. Section 2.6.4 provides a summary of the candidate threatened fauna species that were considered during field surveys and section 5.2.1 presents targeted survey effort and results.

Diurnal bird surveys

Surveys followed the area search method, and birds were identified by observation with binoculars and/or call identification. Diurnal bird surveys also included searches for signs indicative of certain threatened species, including searching for evidence of feeding, foraging and signs of bird presence, such as pellets, whitewash, nests and chewed cones.

All opportunistic observations of birds were recorded during field surveys. For threatened species, GPS coordinates were taken as close to the location of the individual as practicable. These surveys were often conducted in conjunction with nest tree censuses to confirm the presence and/or absence of species credit matters and a general understanding of the habitat resources and use by bird life within the subject land.

Microbat survey

Microbat calls were recorded during field surveys using Anabat Express detectors. Stationary Anabat recordings were undertaken over several survey periods within the subject land as shown on Figure 5.5 and Figure 5.6. Anabats were set to record throughout the night.

Calls were identified using zero-crossing analysis and AnalookW software (version 4.2n, Chris Corben, 2017) by visually comparing the time-frequency graph and call characteristics (e.g. characteristic frequency and call shape) with reference calls and/or species call descriptions from available reference material.

The Bat calls of NSW: Region based guide to the echolocation calls of microchiropteran bats (Pennay *et al.*, 2004) was used to assist call analysis. Call identification was also assisted by consulting distribution information for possible species (Pennay et al., 2004; Churchill, 2008; Van Dyck *et al.*, 2013) and records from BioNet (October 2016). No reference calls were collected during the survey.

A call (pass) was defined as a sequence of three or more consecutive pulses of similar frequency and shape. Calls with less than three defined consecutive pulses of similar frequency and shape were not unambiguously identified to a species but were used as part of the activity count for the survey area. Due to variability in the quality of calls and the difficulty in distinguishing some species the identification of each call was assigned a confidence rating (see Mills et al., 1996; Duffy et al., 2000) as summarised in Table 2.5. Due to the absence of reference calls from the study area, high level of variability within a bat call and overlap in call characteristics between some species, a conservative approach was taken when analysing calls. Species nomenclature follows van Dyck et al., (2013) and Reardon et al., (2014).

Table 2.5 Confidence ratings applied to calls

Identification	Description
D – Definite	Species identification not in doubt.
PR – Probable	Call most likely to represent a particular species, but there exists a low probability of confusion with species of similar call type or call lacks sufficient detail.
SG – Species Group	Call made by one of two or more species. Call characteristics overlap making it too difficult to distinguish between species e.g. *Chalinolobus gouldii* / *Mormopterus ozimops* sp. *Nyctophilus* sp. The calls of *Nyctophilus geoffroyi* / *gouldi* cannot be distinguished during the analysis process and are therefore lumped together. *Nyctophilus* sp / *Macropus*. The calls of these species can be easily confused during the analysis process and are therefore often lumped together.

Spotlighting and call playback

Spotlighting and call playback surveys were conducted on foot for at least two person hours per session, with a particular focus on threatened arboreal mammals and owls with reference to the Koala Biodiversity Assessment Method survey guide (DPE, 2022d) and the TBDC.

Due to the change in survey methods for forest owls in BAM-C and the TBDC in March 2024, a dedicated survey was conducted in July 2024 with spotlighting and call playback surveys targeted primarily threatened forest owls. Supplementary spotlighting for threatened arboreal fauna followed dedicated call playback monitoring stations sampled 1.5 km apart. The sampling of dedicated call playback monitoring stations and survey effort required for threatened owls was done with reference to survey guidelines outline in the TBDC and involved a series of listening, broadcast and spotlighting sessions: Further detail on survey effort for threatened forest owls is detailed in section 5.2.1.

The Koala (*Phascolarctos cinereus*) survey guide states that the minimum survey effort to detect Koala presence on the subject land requires the total effort for two standard survey methods to be met. A scat detection method, which may indicate past occupancy, was paired with a non-scat detection method as follows:

1. Spot Assessment Technique (SAT) (in accordance with Section 4.1, DPE, 2022d) (see below)
2. Spotlighting (in accordance with Section 4.3, DPE, 2022d).

For suitable habitat ≥5 ha, two 200 m koala spotlighting transects are required for every 5 ha of suitable habitat (DSEWPaC, 2011). The number of dedicated 200 m koala spotlighting transects required was determined by dividing the hectares of suitable habitat by 2.5 as per the koala guide. Each spotlighting transects was repeated over a second night, on foot with ecologists moving approximately 10 m/min. A detailed summary of Koala survey effort and how it meets the requirement of the survey guide is provided in section 5.2.1.

Mammals and nocturnal birds were identified by observation under spotlight or by vocalisations heard whilst spotlighting by walking slowly and quietly through potential habitat. Surveyors carried headtorches / hand-held torches with a >200 lumen output.

These survey methods were supplemented with infra-red camera surveys and use of audiomoths.

Camera trapping

Cameras were deployed on tree trunks along the subject land in February 2024, were rebaited after two weeks in March 2024 and collected in April 2024. Cameras were set in trees (baited with oats and peanut butter). Cameras were configured to record video at night to confirm the presence of arboreal mammals. Cameras were scheduled to operate between 7 PM-7 AM with a 10 second video when it was triggered. Thirty-six cameras primarily comprising Browning Spec Ops Elite HP5 were used.

Following collection from the field, photos and videos were loaded into the program TimeLapse. Each file was checked for evidence of species. Any potential threatened species photos were reviewed by a senior zoologist.

AudioMoth detector surveys

AudioMoth devices were deployed in the June and July 2024 survey rounds to provide additional survey effort for nocturnal birds and arboreal mammals, and to complement other survey methods such as spotlighting and call playback. Fifteen AudioMoths were set throughout the study area in June and July 2024. Prior to field deployment all devices were programmed to record 13.5 hours a day from 5:45 am to 07:15 am. During June 2024 surveys, each AudioMoth device was programmed using the AudioMoth Configuration App (Version 1.7.1., Open Acoustic Devices), as follows:

– Sample rate: 32000 Hz (32 kHz)
– Gain: medium-high
– Enable sleep/record cycle: on (Sleep duration: 5 seconds / Record duration: 55 seconds thus each file is 55 seconds)
– Enable filtering: band pass (0.4 kHz – 15.0 kHz).

AudioMoths were housed inside the AudioMoth IPX7 waterproof case, with the microphone adjacent to a small hole. All devices were strapped to a tree trunk or limb no wider than 30 cm diameter at a height of 1.5 m and at least 5 m away from dense foliage. Photographs of the location and the device in situ were recorded. All devices were retrieved after two nights. Standardisation of practices for acoustic monitoring of avian species is still being developed. Protocols that specifically mention AudioMoths have suggested using minimum distances between sampling locations of at least 250 m (Abrahams, 2018). Recently published guidelines (TBDC) for using passive acoustic devices for monitoring forest owls suggest AudioMoths should be placed 200m apart (i.e. each device having a radius of 100 m). The survey effort provided via these devices should be considered supplementary to the call playback and spotlighting survey effort conducted for the following threatened nocturnal species: Koala, Powerful Owl (*Ninox strenua*), Barking Owl (*Ninox connivens*) and Masked Owl (*Tyto novaehollandiae*). AudioMoth surveys are also considered a supplementary method for the detection of Gang-gang Cockatoo (*Callocephalon fimbriatum*) in general and nesting Glossy Black-cockatoos (*Calyptorhynchus lathami*). Gang-gang Cockatoos are known to be noisy in the lead up to nesting and regularly check potential nesting hollows during this period. Once nesting commences, the species tends to be more quiet (Mulvaney et al., 2022), potentially also avoid detection by predators.

Frog surveys

Frog surveys including breeding habitat assessments and aural-visual surveys were conducted in accordance with the *NSW Survey Guide for Threatened Frogs* (DPIE, 2020c). The guideline outlines a systematic approach to threatened frog surveys to support confirmation of the presence of target species and identification of breeding habitat and surrounding non-breeding habitat that must be mapped in species polygons. Surveys to detect the target species within the subject land will be required if suitable breeding and/or non-breeding habitat located within breeding migration distance of breeding habitat is present. Characteristics of breeding habitat for threatened frogs and migration buffers are identified in Chapter 3 of the guideline (DPIE, 2020c).

A frog breeding habitat assessment was undertaken including identification of potential breeding habitat for confirmed candidate threatened frog species (i.e. threatened frogs potentially requiring calculation of species credits). Surveys for potential breeding habitat were initially conducted in August 2023, with later surveys focusing on drainage lines, pools and dams identified during earlier surveys. Systematic traverses were conducted in low-lying areas and potential stream and wetland frog breeding habitat was identified and mapped to inform targeted frog survey effort. Potential breeding habitat including drainage lines, floodplain depressions, dams and sediment ponds within the study area is shown on Figure 5.2. A detailed description of potential frog breeding habitat, including specific consideration of breeding habitat characteristics of threatened frog species is provided in section 5.1 and section 5.2.

Frog aural-visual (AV) surveys were conducted targeting potential breeding habitat for candidate threatened frog species under appropriate seasonal survey conditions (see Table 2.8). Four frog aural-visual survey transects (frog AV transects) were sampled for at least one hour each night per 250 m reaches of potential frog breeding habitat in accordance with the *NSW Survey Guide for Threatened Frogs* (DPIE, 2020c).This comprised five minutes of silence, followed by two minutes of call playback and then five minutes of active searches over each 50m of potential breeding habitat over at least one hour per frog AV transect per survey night. Two ecologists sampled two frog AV transects each per survey night during February 2024 AV surveys. Total effort comprised at least one person-hour of aural visual surveys, per transect per night. Additional spotlighting and quiet listening was undertaken in non-breeding habitat areas between frog AV transects and at all times during nocturnal survey rounds.

A detailed summary of the extent of potential breeding habitat for each candidate threatened frog species and the frog AV transect survey effort employed is discussed further in section 5.2.

Various recordings of frogs were made opportunistically using the Australian Museum's Frog ID app (Table 2.6).

Table 2.6 Frog ID recordings

Recording ID	Date	Location	Waterbody	Frog species recorded	Threatened species recorded
582866	28/08/2023	SCA	No waterbody	1	No
582828	28/08/2023	SCA	Dam	2	No
582774	28/08/2023	SCA	Flooded area	1	No
583342	29/08/2023	SCA	Dam	2	No
584263	31/08/2023	SCA	Creek	1	No
584279	31/08/2023	SCA	Creek	1	No
584284	31/08/2023	SCA	Creek	1	No
584196	31/08/2023	SCA	Dam	2	No
589333	14/09/2023	SCA	Flooded area	3	No
681573	6/03/2024	SCA	Dam	1	No
681702	6/03/2024	SCA	Dam	1	No
699834	29/03/2024	SCA	No waterbody	1	No
699835	12/06/2024	SCA	Flooded area	1	No
730219	13/06/2024	SCA	No waterbody	1	No
700060	14/06/2024	SCA	Dam	1	No
702544	1/07/2024	SCA	Dam	2	No
702545	1/07/2024	SCA	Flooded area	1	No
702803	3/07/2024	SCA	Flooded area	1	No
702811	3/07/2024	SCA	Flooded area	1	No
702809	3/07/2024	SCA	Flooded area	1	No
702821	3/07/2024	SCA	Flooded area	1	No
743636	7/11/2024	SCA	Dam	1	No
682598	7/03/2024	WPS	Wetland	2	No
682599	7/03/2024	WPS	Wetland	2	No
583475	30/08/2023	WPS	Wetland	1	No
631627	23/11/2023	WPS	Creek	1	No
583520	30/08/2023	TG	Dam	1	No
682598	7/03/2024	WPS	Wetland	2	No

Recording ID	Date	Location	Waterbody	Frog species recorded	Threatened species recorded
682599	7/03/2024	WPS	Wetland	2	No
583475	30/08/2023	WPS	Wetland	1	No

Key: SCA = Gardens of Stone SCA and adjacent forested land; WPS = former Wallerawang power station land; TG = Transgrid substation land

Surveys for insects

Surveys for the Purple Copper Butterfly comprised identification of suitable habitat during August 2023 surveys and targeted survey in the appropriate survey season in October 2024. Habitat surveys were conducted where *Bursaria spinosa* subsp. *spinosa* had been identified. Surveys comprised two ecologists walking slowly between *spinosa* subsp. *lasiophylla* to search for adults by brushing a butterfly net against vegetation in order to flush out butterflies if present, and to also look for signs of the attendant ant. Surveys were conducted in full sunshine and temperatures above 15 degrees.

Spot Assessment Technique

Twenty-one Spot Assessment Techniques (SAT) surveys were conducted over the August and October 2023 survey rounds with reference to the Koala Biodiversity Assessment Survey Guide (DPE, 2022d). A centre tree was selected with reference to the grid point and then the 29 closest trees in the vicinity of this centre tree were inspected for scats for two person-minutes. Given the irregular shape of the subject land, and scattered distribution of Koala use trees, and degraded habitat adjacent to the Mount Piper and Wallerawang 330 KV substations, SAT locations were sampled in the closest patch of at least 30 Koala use trees, and not located precisely at grid intersections as prescribed by the survey guide. Tree species and presence of any fauna scats were recorded.

2.7 Weather conditions

Field surveys were conducted across the study area between August 2023 and January 2025, with targeted survey for species credit matters commencing in September 2023. 2023 was an average year for rain, however 2024 started off with significant rainfall in January which cumulatively has led to a well above average cumulative total.

Bureau of Meteorology (BOM) records for survey dates are outlined in Table 2.8. Weather observations were recorded from Lithgow (station 63226) (BOM, 2025), located around 10 km to the east of the study area.

Prolonged dry conditions may, in general, have a negative effect on the ability to accurately detect target threatened flora species or calculate Vegetation Integrity (VI). Cumulative rainfall recorded at Lithgow (BOM, 2025) for 12 months prior to mapping vegetation zones and sampling vegetation integrity plots in September 2023, November 2023, February 2024 and June 2024 was compared with wet or dry rainfall year thresholds to reflect climatic variation in accordance with the guidance for assessors and decision-makers in applying modified benchmarks to assessments of vegetation integrity (DPIE, 2020e). and Section 1.4.2(3) of the BAM. As shown in Table 2.7, average rainfall within the study area has exceeded the wet rainfall year threshold for only PCT 3369 (DPE, 2022e) in the last 12 months preceding the survey rounds in which VI plot data was collected (BOM, 2025).

The rainfall data in Table 2.7 also confirms that conditions would have been suitable for the detection of candidate threatened flora, if present. Surveys for threatened frogs were also conducted in optimal conditions.

Table 2.7 Benchmark classes based on cumulative rainfall in preceding year

Weather Station	PCT ID	Wet rainfall year threshold (cumulative total over 12 months mm) (DPE 2022e)	Cumulative rainfall for preceding 12 months September 2023 (mm)	Cumulative rainfall for preceding 12 months November 2023 (mm)	Cumulative rainfall for preceding 12 months February 2024 (mm)	Cumulative rainfall for preceding 12 months June 2024 (mm)
Lithgow	3369	> 846	859	684	769	917
	3385	>1110	859	684	769	917
	3735	>926	859	684	769	917
	3747	>926	859	684	769	917

Weather Station	PCT ID	Wet rainfall year threshold (cumulative total over 12 months mm) (DPE 2022e)	Cumulative rainfall for preceding 12 months September 2023 (mm)	Cumulative rainfall for preceding 12 months November 2023 (mm)	Cumulative rainfall for preceding 12 months February 2024 (mm)	Cumulative rainfall for preceding 12 months June 2024 (mm)
	3749	>926	859	684	769	917
	3932	>1044	859	684	769	917

Weather conditions during the field survey period based on daily weather conditions at Lithgow (Cooerwull) {station 063226} (BOM, 2025) are summarised in Table 2.8.

Table 2.8 Daily weather observations during the survey period

Date	Survey stage	Minimum temperature (°C)	Maximum temperature (°C)	Rainfall previous 24 hours (mm)	Rainfall previous 7 days (mm)
14/8/2023	Preliminary PCT mapping	7.0	11.9	1.4	1.4
15/8/2023	Preliminary PCT mapping	5.0	-	17.2	18.6
16/8/2023	Preliminary PCT mapping	-	13.5	8.2	26.8
17/8/2023	Preliminary PCT mapping	-1.5	15.2	-	-
28/8/2023	August 2023 fauna surveys	0.7	18.2	0	0
29/8/2023	August 2023 fauna surveys	0.3	18.2	0	0
30/8/2023	August 2023 fauna surveys	2.2	19.2	1.4	1.4
31/8/2023	August 2023 fauna surveys	1.9	14.7	0	1.4
1/9/2023	August 2023 fauna surveys	2.4	15.2	6.6	8
11/9/2023	September 2023 flora surveys	-3.0	16.0	0.0	16.8
12/9/2023	September 2023 flora surveys	-0.7	17.2	0.0	16.8
13/9/2023	September 2023 flora surveys	-1.4	19.7	0.0	16.6
14/9/2023	September 2023 flora surveys	1.0	22.2	0.0	16.6
15/9/2023	September 2023 flora surveys	2.3	23.3	0.0	16.6
23/10/2023	October 2023 fauna surveys	5.3	21.0	0.0	2.6
24/10/2023	October 2023 fauna surveys	0.9	27.7	0.0	2.6
25/10/2023	October 2023 fauna surveys	10.6	22.4	0.0	1
26/10/2023	October 2023 fauna surveys	2.5	12.1	0.0	0.0
27/10/2023	October 2023 fauna surveys	5.2	13.7	0.0	0.0
20/11/2023	November 2023 flora surveys	14.5	21.0	0.0	2.2
21/11/2023	November 2023 flora surveys	7.0	25.0	0.0	2.2
22/11/2023	November 2023 flora surveys	9.5	23.1	0.0	2.2
23/11/2023	November 2023 flora surveys	13.4	19.8	0.0	2.2
24/11/2023	November 2023 flora surveys	13.6	18.8	2.0	4.2
29/1/2023	January 2024 surveys	14.4	31.1	0.0	0.4
30/1/2023	January 2024 surveys	19.1	26.1	0.0	0.4
31/1/2023	January 2024 surveys	17.9	26.6	0.0	0.0
1/2/2024	January 2024 surveys	16.1	29.6	0.0	0.0
2/2/2024	January 2024 surveys	13.1	30.4	0.2	0.2
19/2/2024	February 2024 frog surveys	11.7	24.3	0.2	5.6

Date	Survey stage	Minimum temperature (°C)	Maximum temperature (°C)	Rainfall previous 24 hours (mm)	Rainfall previous 7 days (mm)
20/2/2024	February 2024 frog surveys	12.7	21.5	0.4	6
21/2/2024	February 2024 frog surveys	14.0	23.6	0.0	4.2
22/2/2024	February 2024 frog surveys	13.2	28.7	0.8	4.4
23/2/2024	February 2024 frog surveys	13.0	30.2	0.0	4.4
4/3/2024	March 2024 fauna surveys	6.2	20.4	1.0	1.6
5/3/2024	March 2024 fauna surveys	10.5	25.3	0.0	1.6
6/3/2024	March 2024 fauna surveys	10.0	28.3	0.0	1.2
7/3/2024	March 2024 fauna surveys	14.7	27.6	0.0	1.2
8/3/2024	March 2024 fauna surveys	15.9	25.7	0.0	1.0
16/4/2024	April 2024 fauna surveys	3.4	21.4	0.0	8.8
17/4/2024	April 2024 fauna surveys	8.0	21.7	0.0	0.2
18/4/2024	April 2024 fauna surveys	10.9	18.8	0.0	0.2
11/6/2024	June 2024 fauna surveys	8.6	13.0	0.0	0.0
12/6/2024	June 2024 fauna surveys	4.5	9.1	0.2	0.2
13/6/2024	June 2024 fauna surveys	4.9	8.9	0.0	0.2
14/6/2024	June 2024 fauna surveys	2.0	10.0	0.0	1.0
1/7/2024	July 2024 fauna surveys	4.7	7.9	0.0	0.0
2/7/2024	July 2024 fauna surveys	5.5	12.5	1.0	0.0
3/7/2024	July 2024 fauna surveys	5.7	9.5	0.2	1.0
4/7/2024	July 2024 fauna surveys	3.3	10.7	1.0	5.0
5/7/2024	July 2024 fauna surveys	6.6	10.4	3.8	6.0
14/10/2024	October 2024 surveys	12.4	22.2	12.2	14.0
15/10/2024	October 2024 surveys	8.5	14.2	19.4	20.6
16/10/2024	October 2024 surveys	11.3	14.5	0.4	21.0
17/10/2024	October 2024 surveys	17.0	21.4	0.0	20.2
18/10/2024	October 2024 surveys	13.0	22.2	0.0	20.2
05/11/2024	November 2024 flora surveys	11.3	22.5	0.0	0.8
06/11/2024	November 2024 flora surveys	13.4	30.5	0.0	0.8
07/11/2024	November 2024 flora surveys	14.3	28.6	0.0	0.8
28/1/2025	January 2025 flora surveys	9.0	24.7	0.0	0.4
291/2025	January 2025 flora surveys	14.4	31.1	0.0	0.4
30/1/2025	January 2025 flora surveys	19.1	26.1	0.0	0.4
31/1/2025	January 2025 flora surveys	17.9	26.6	0.0	0.0

2.8 GIS

GIS software (ArcGIS) was used to load various layers onto FieldMaps, an application used on Smartphones in the field. Layers included:

– the subject land
– waterways and waterbodies
– contours
– aerial photography

– vegetation zone mapping
– species polygon maps
– threatened species records (BioNet)
– data collection layers (point, line and polygon).

Handheld Global Position System (GPS) devices (such as Garmin InReach and Etrex) and Gaia, a Smartphone application, were used to collect survey tracks. Survey tracks were used to demonstrate survey effort in the removal of species polygons in areas where no evidence of species was recorded, in combination with other survey methods as relevant (spotlighting, call playback etc).

Tracklogs typically include around 3-5 m of GPS, sometimes greater during periods of poor satellite connectivity or in areas with dense vegetation cover, and mapped tracks may not accurately represent actual spacing of team members. Intensive targeted survey effort has been demonstrated, generally in accordance with the traverse spacing and other requirements of the DPIE (2020b) threatened flora survey guidelines. The survey effort employed for this BDAR is generally sufficient to determine that the candidate flora species recorded as 'no – surveyed' '...are unlikely to be present, on the subject land' pursuant to Section 5.2.4.4 of the BAM.

2.9 Credit calculations

BAM credit calculations were completed by Mal Weerakoon (accredited assessor number (BAAS25007) in accordance with the BAM and using the Credit calculator Version 1.5 and version 1.2 benchmark data (with BAM data last updated 05/08/2025 – Version 82) as a 'Development – Major Project' assessment to determine the number and type of biodiversity credits that would be required to offset impacts of the project.

The credit calculations Parent case ID for the project is 00042373. The assessment is 00042373/BAAS23017/23/00042374, revision 1. This case assumes complete loss of vegetation integrity in the subject land (i.e. no assessment of partial loss). Impacts have also been calculated for indirect impacts (edge effects) outside the subject land in section 8.2.

The biodiversity credit report is included in Appendix F.

2.9.1 Predicted threatened species (ecosystem credit entities)

Based on the bioregional context for the assessment and the PCTs, patch size, vegetation cover and habitat resources present at the subject land, the BAM calculator generates a list of threatened fauna species that are predicted to utilise the subject land (that is, potential 'predicted threatened species', or potential 'ecosystem credit entities'). The potential for these predicted threatened species to occur within the subject land were further refined based on the desktop assessment, habitat resources observed during field surveys, records during the surveys, and the knowledge and experience of the assessor. Targeted surveys are not required under the BAM for these species as they are assumed to be present.

Targeted surveys may, however, be required if the predicted species are also listed under the EPBC Act, to assess the significance of impacts in accordance with the *MNES Significant impact guidelines 1.1 – Environment Protection and Biodiversity Conservation Act 1999* (DotE, 2013). A range of methods were employed to ensure appropriate survey effort for EPBC Act threatened species.

2.9.2 Candidate threatened species (species credit entities)

Threatened species that cannot reliably be predicted to occur on a development site based on PCT, distribution and habitat criteria are identified by the Threatened Biodiversity Data Collection as 'species credit' entities. In some circumstances, the particular habitat components of species assessed for ecosystem credit species, such as the breeding habitat of a cave roosting bat or forest owls, are also assessed for species credits.

The credit calculator references geographic, vegetation and habitat data for the subject land to generate a list of the species credit entities that are predicted to occur (i.e. the 'potential candidate threatened species'). Searches of threatened species databases were also completed to identify any additional potential candidate threatened species (to those generated by the credit calculator) that are known or predicted to occur in the locality. The likelihood of occurrence of potential candidate threatened species were reviewed, giving consideration to the habitats available in the study area (refer to likelihood of occurrence tables in Appendix B).

2.9.3 Assessor's use of judgement

Accredited assessors made the following judgements and/or assumptions while completing this BDAR:

- With regards to the identification of candidate PCTs, descriptions of the regional distribution of PCTs in the Bionet Vegetation Classification (NSW DCCEEW, 2024d) was given greater weight than positive species match revealed by the PCT filter tool.
- For the purpose of calculating a VI score and species credits (if necessary) non-native vegetation in the subject land was assigned to PCT 3385 in BAM-C (vegetation zone 15) 3385_non-native (refer to section 4.1). PCT 3385 was selected as the closest matching PCT in these areas based on landscape position (lower elevations at the former Wallerawang Power Station site and along the Coxs River floodplains; outer floodplains and minor drainage channels with infrequent inundation by floodwater where the original native vegetation has been cleared) and presence of PCT 3385 in adjoining areas.
- Targeted surveys for *Acacia meiantha* were conducted outside the nominal survey period (July to September across a small portion of the subject land (refer to section 5.2.1). The TBDC notes that the species can still be surveyed at any time of the year (NSW DCCEEW, 2024b). The basis for the July to October survey period for *Acacia meiantha* is the species would be in flower and is more easily identified during this time. Previous detailed assessments conducted on the distribution and ecology *of Acacia meiantha* included surveys conducted during January (Medd, 2020). The species was detectable and high numbers of the species were recorded (Medd, 2020). Extensive survey of the majority of the subject land in September 2023 did not detect any individuals of the species. Site conditions and groundcover species composition in November 2024 was similar to September 2023 when targeted surveys were conducted within the survey window. As such, *Acacia meiantha* has been excluded from occurring at the subject land or requiring calculation of species credits through 'Targeted threatened species survey'.

2.9.4 Limitations

Access to the former Wallerawang Power Station site was removed in mid-2024. Limited access to the subject land at this site caused a variation in survey timing, but ultimately did not impact the ability of ecologists to adequately survey for candidate species credit species.

Nocturnal surveys in October 2023 were hampered by light drizzle and moderate winds, likely leading to the reduced detectability of targeted fauna species. This limitation has been considered when determining the presence or absence of species credit species.

2.9.5 Assumptions

A 'subject land' polygon was prepared for the project based on the design data provided by Transgrid. It is assumed that the description and spatial data accurately represent the extent of direct impacts arising from the project and so this data has been used to calculate the extent of removal of vegetation and habitat arising from the project using GIS. These calculations have in turn been relied upon in the BAM calculations and the determination of key thresholds such as whether the project would have a direct impact on a threatened species, whether biodiversity offsets are required for a particular impact and whether a particular impact is likely to be significant. The conclusions of this assessment may change as a result of the provision of an updated transmission line design and/or spatial data.

Justification for species polygons based on known habitat requirements, habitat values present in the study area and survey results are provided in section 5.2.

2.9.6 Personnel qualifications

This BDAR and associated credit calculations has been prepared by Mal Weerakoon (BAAS25007) and Jessie Ellen Russo (accredited assessor number (BAAS23017). The credit calculator and BDAR were peer reviewed by Kirsten Crosby (accredited assessor number BAAS17011).

Qualifications of GHD ecologists who completed field surveys and report inputs are presented in Table 2.9.

Table 2.9 Personnel qualifications and project roles

Name	Position/project role	Qualifications	Relevant experience
Mal Weerakoon	Senior Ecologist/ accredited assessor: author of BDAR, flora and fauna surveys, BAM-C calculations	BSc, MPhil BAM Assessor Accreditation	10+ years
Kirsten Crosby	Technical Director – Biodiversity: flora and fauna surveys, technical review	BSc, PhD BAM Assessor Accreditation	17+ years
Jessie Russo	Senior Ecologist / co-author of BDAR: flora and fauna surveys, BAM-C calculations	BEnvSc BAM Assessor Accreditation	6+ years
Ben Harrington	Technical Director - Biodiversity: flora and fauna surveys, offset strategy	BSc. MSc. BAM Assessor Accreditation	18+ years
Gary Leonard	Senior Ecologist: flora surveys	MSc (in progress), Dip Ed, Dip of Horticulture, Horticulture Certificate; AQF10 Arborist	40+ years
Fanny Stricher	Ecologist: flora and fauna surveys	BEnvSc, MSc (Ecology)	6 years
Chris Palmer	Ecologist: fauna surveys	BSc (Adv) (Hons), PhD	4+ years
Kylie Blain	Ecologist: fauna surveys	AssDeg AppSc	4+ years
Keeley Dart	Environmental Scientist: flora and fauna surveys	BScAg (Hons)	3+ years
Bryan Rees	Ecologist: flora and fauna surveys	BSc, PostGradSus	2+ years
Rebecca Woods	Graduate Ecologist: flora surveys	BSc-EnvSc	1 year
Jennifer Gainsford	Graduate Ecologist: reporting	BSc-AdvSc	1 year

3. Site context

The BAM requires the assessment of landscape features to establish the site context, describe the biodiversity values of the subject land and assess the impacts of the project on the subject land. Landscape features within the subject land and assessment area relevant to the BAM calculations are discussed in the following sections below.

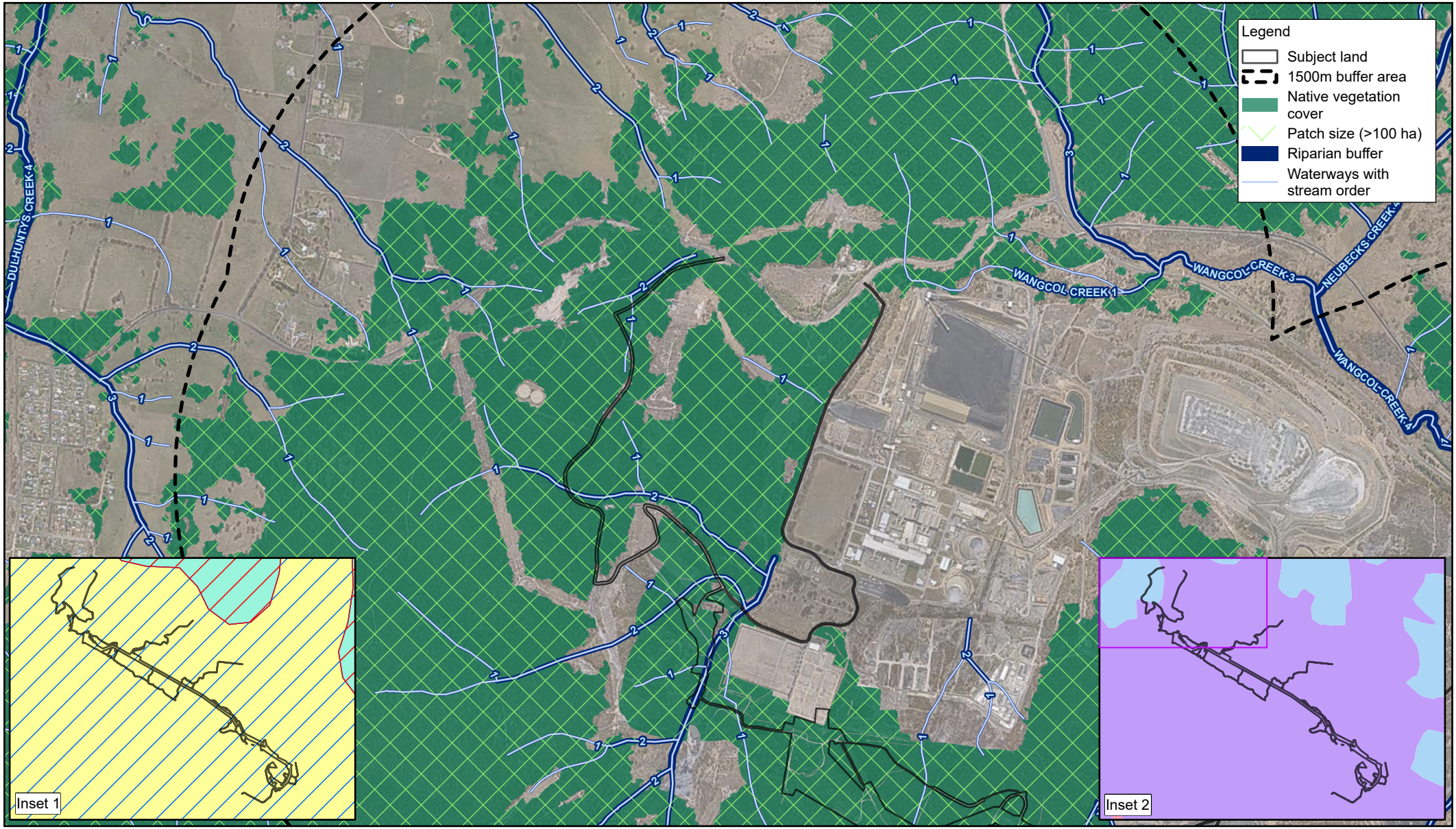
3.1 Assessment area

The assessment area is defined as the area of land within the 1,500 m buffer area surrounding the subject land for a site-based development that is determined as per Subsection 3.1.2 of the BAM (DPIE, 2020a) and as shown on Figure 3.1.

Although the project contains linear components, the site-based method was chosen as the project also contains a number of site-based areas within the subject land, and the larger 1,500 m buffer assessment area provides a more conservative approach. A summary of the landscape features associated with the assessment area of the project is provided in Table 3.1. Individual landscape features are described in more detail throughout the sections below including justifications for the use of data entered in the BAM-C. No additional or specific landscape features are identified in the SEARs (Table 1.2).

Table 3.1 Summary of landscape features present within the assessment area

Landscape features	Subject land
Method applied for site context components	Site-based
IBRA bioregion (DoEE, 2018a)	South-eastern highlands
IBRA subregion (DoEE, 2018a)	Capertee Uplands
LGA	City of Lithgow City Council
Mitchell landscape (DPE, 2016)	Capertee Plateau and Newnes Plateau
% native vegetation extent within buffer area	51%
Rivers, streams and estuaries	Coxs River
Wetlands	No significant named wetlands, however ephemeral wetland communities occur within the former Wallerawang Power Station site and intermittently throughout the alignment.
Connectivity features	Forested vegetation associated with the subject land provides key habitat connectivity in the locality. These areas generally provide a canopied east-west connection between open woodlands with grassland connecting in the north and south. Planted and riparian vegetation along the Coxs River provides a narrow band of connectivity in the predominantly cleared floodplain. Small patches of vegetation in agricultural land provides stepping stone connectivity between larger expanses of intact native vegetation.
Areas of geological significance or soil hazard features	Soil landscapes for the subject land and surrounding buffer area indicate that the soils have moderate to high erosional risk. There are no areas of geological significance of relevance to the subject land. Escarpments and cliffs are located around 1 km to the south-west along the edge of the Gardens of Stone SCA.
Areas of outstanding biodiversity value	No areas identified under the BC Act as being of outstanding biodiversity value have been mapped in the subject land.
Other landscape features	Nil



Legend

Mitchell Landscapes
- Capertee Plateau
- Mount Horrible Plateau
- Newnes Plateau

IBRA Regions
- South Eastern Highlands
- Sydney Basin

IBRA Subregions
- Capertee Uplands
- Wollemi

Paper Size ISO A4

0 200 400 600

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

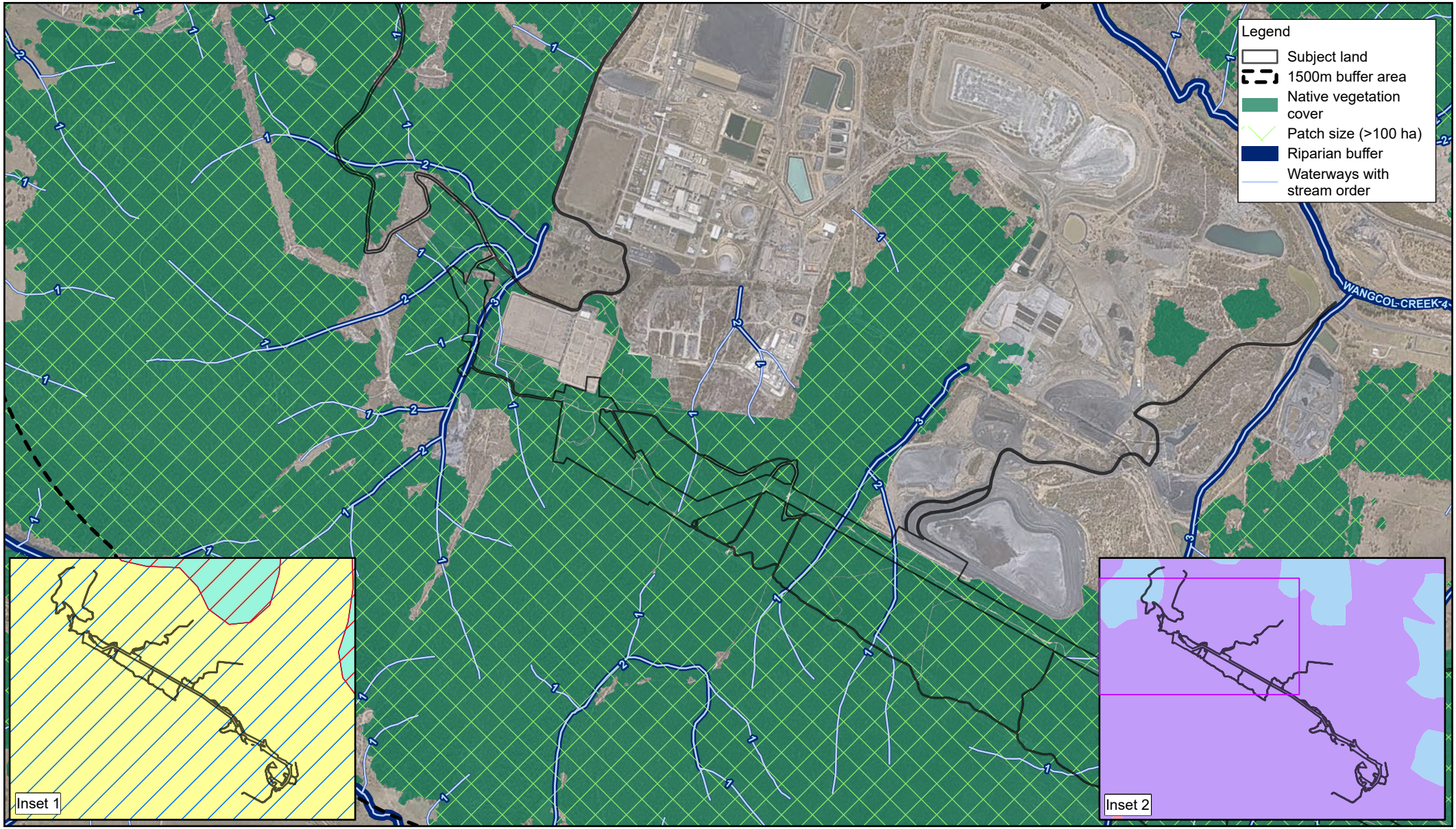
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

Location map

FIGURE 3.1A

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR002_LocationMap
Print date: 17 Jul 2025 - 13:41

Data source: Subject Land - Transgrid, 2023; Strahler - WaterNSW, 2023; Native Veg Cover (Seamless SVTM - Dec 2022) - DPIE, 2023; Railways, Roads - NSW SS, 2023; Mitchell Landscapes - DPIE, 2023; IBRA Regions and Subregions - NSW SS, 2023; Nearmap WMS Server: . Created by: lmanasan



Legend

Mitchell Landscapes
- Capertee Plateau
- Mount Horrible Plateau
- Newnes Plateau

IBRA Regions
- South Eastern Highlands
- Sydney Basin

IBRA Subregions
- Capertee Uplands
- Wollemi

Paper Size ISO A4

0 200 400 600

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

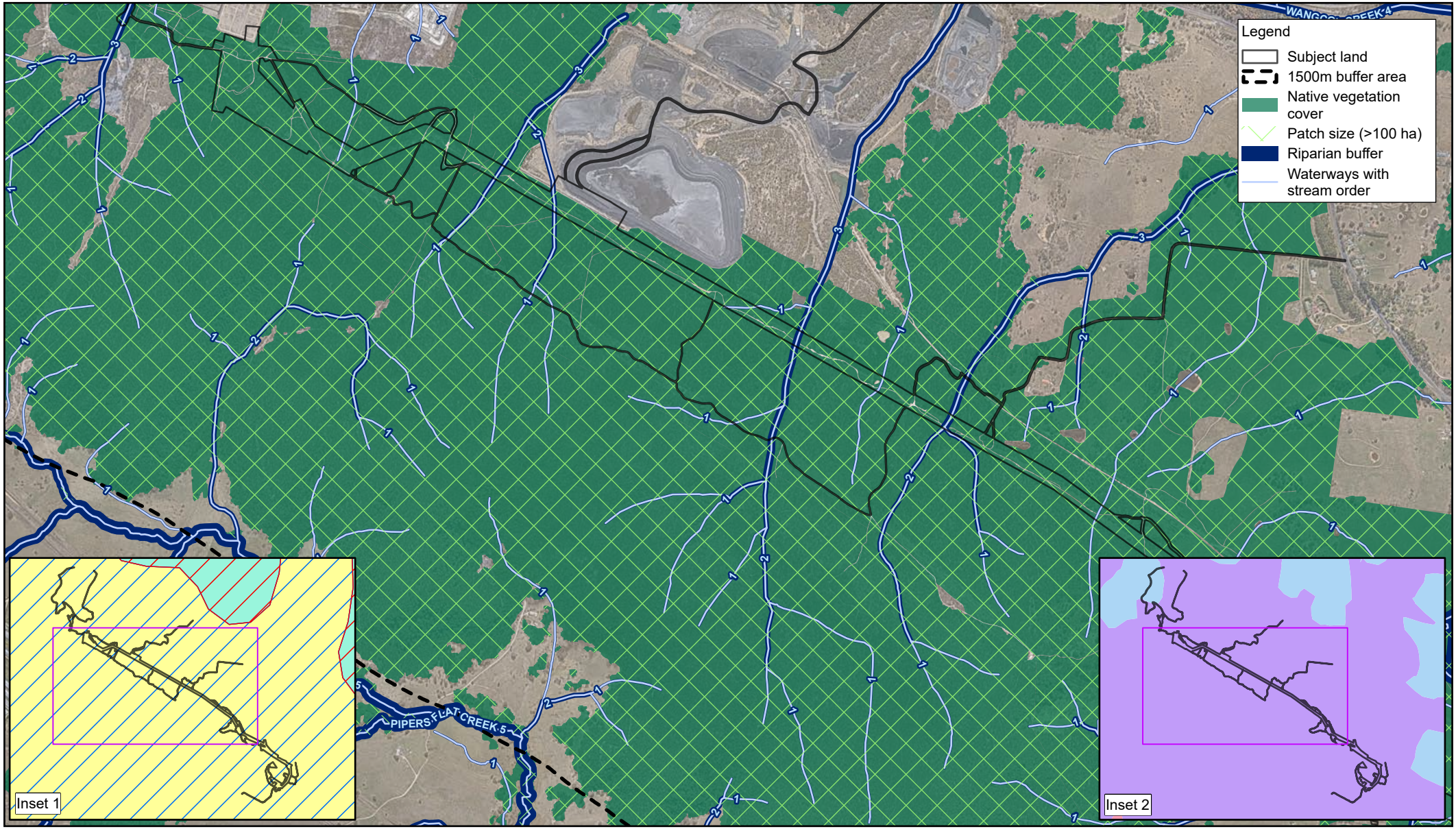
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

Location map

FIGURE 3.1B

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR002_LocationMap
Print date: 17 Jul 2025 - 13:42

Data source: Subject Land - Transgrid, 2023; Strahler - WaterNSW, 2023; Native Veg Cover (Seamless SVTM - Dec 2022) - DPIE, 2023; Railways, Roads - NSW SS, 2023; Mitchell Landscapes - DPIE, 2023; IBRA Regions and Subregions - NSW SS, 2023; Nearmap WMS Server: . Created by: lmanasan



Legend

Mitchell Landscapes
- Capertee Plateau
- Mount Horrible Plateau
- Newnes Plateau

IBRA Regions
- South Eastern Highlands
- Sydney Basin

IBRA Subregions
- Capertee Uplands
- Wollemi

Paper Size ISO A4

0 200 400 600

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

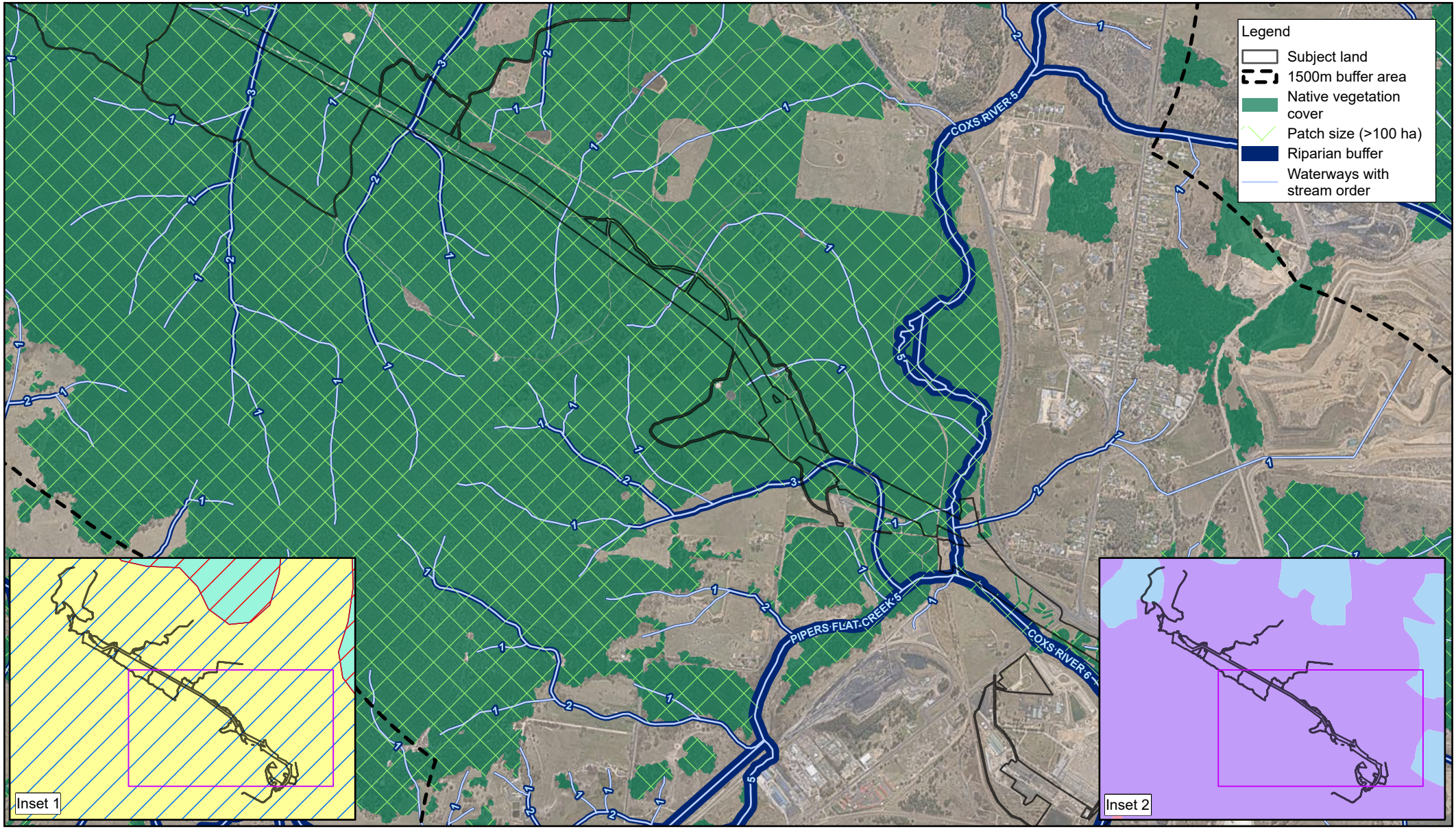
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

Location map

FIGURE 3.1C

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR002_LocationMap
Print date: 17 Jul 2025 - 13:42

Data source: Subject Land - Transgrid, 2023; Strahler - WaterNSW, 2023; Native Veg Cover (Seamless SVTM - Dec 2022) - DPIE, 2023; Railways, Roads - NSW SS, 2023; Mitchell Landscapes - DPIE, 2023; IBRA Regions and Subregions - NSW SS, 2023; Nearmap WMS Server: . Created by: lmanasan



Legend

Mitchell Landscapes
- Capertee Plateau
- Mount Horrible Plateau
- Newnes Plateau

IBRA Regions
- South Eastern Highlands
- Sydney Basin

IBRA Subregions
- Capertee Uplands
- Wollemi

Paper Size ISO A4

0 200 400 600

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

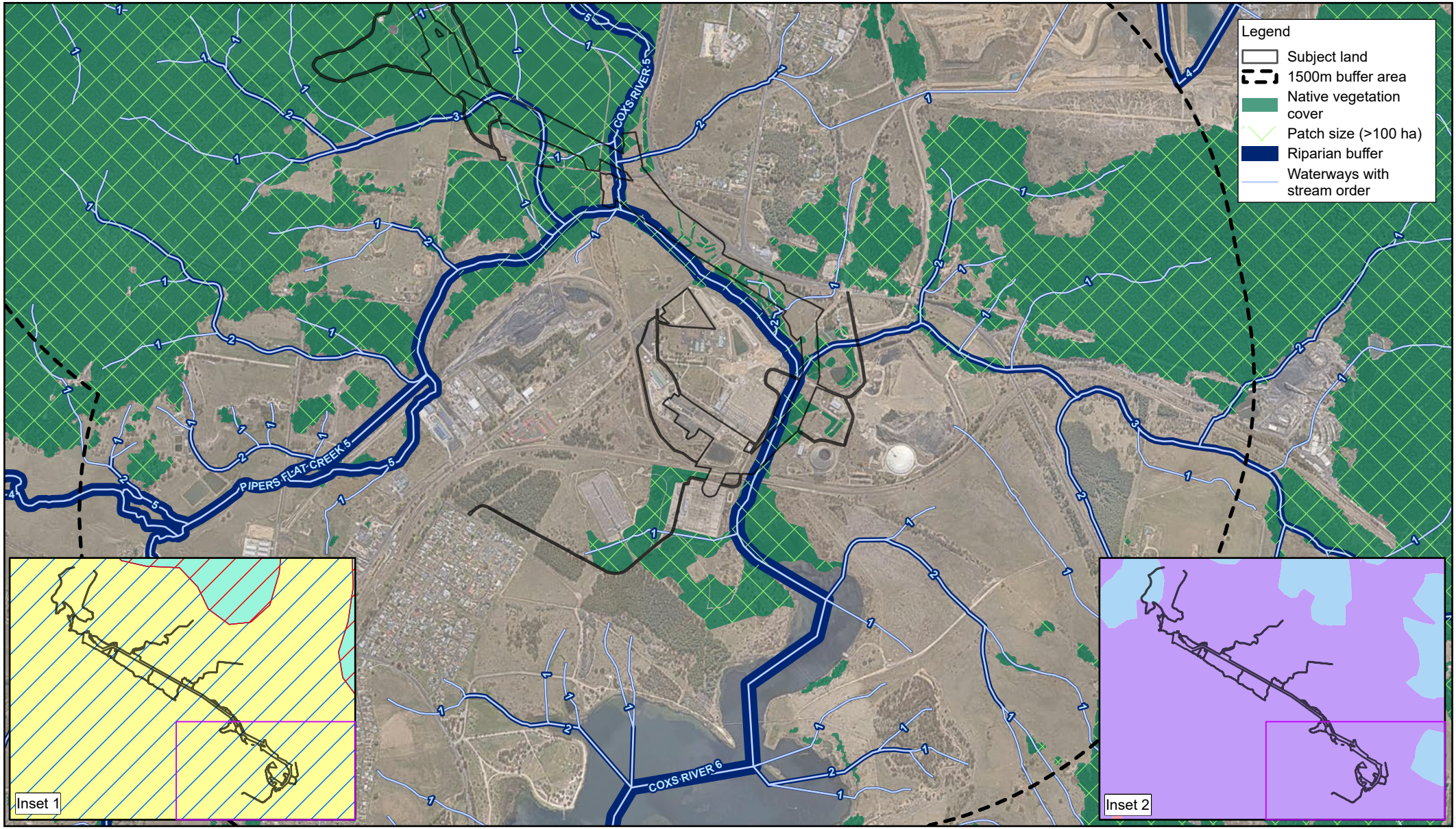
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

Location map

FIGURE 3.1D

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR002_LocationMap
Print date: 17 Jul 2025 - 13:43

Data source: Subject Land - Transgrid, 2023; Strahler - WaterNSW, 2023; Native Veg Cover (Seamless SVTM - Dec 2022) - DPIE, 2023; Railways, Roads - NSW SS, 2023; Mitchell Landscapes - DPIE, 2023; IBRA Regions and Subregions - NSW SS, 2023; Nearmap WMS Server: . Created by: lmanasan



Legend

Mitchell Landscapes
- Capertee Plateau
- Mount Horrible Plateau
- Newnes Plateau

IBRA Regions
- South Eastern Highlands
- Sydney Basin

IBRA Subregions
- Capertee Uplands
- Wollemi

Paper Size ISO A4

0 200 400 600

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

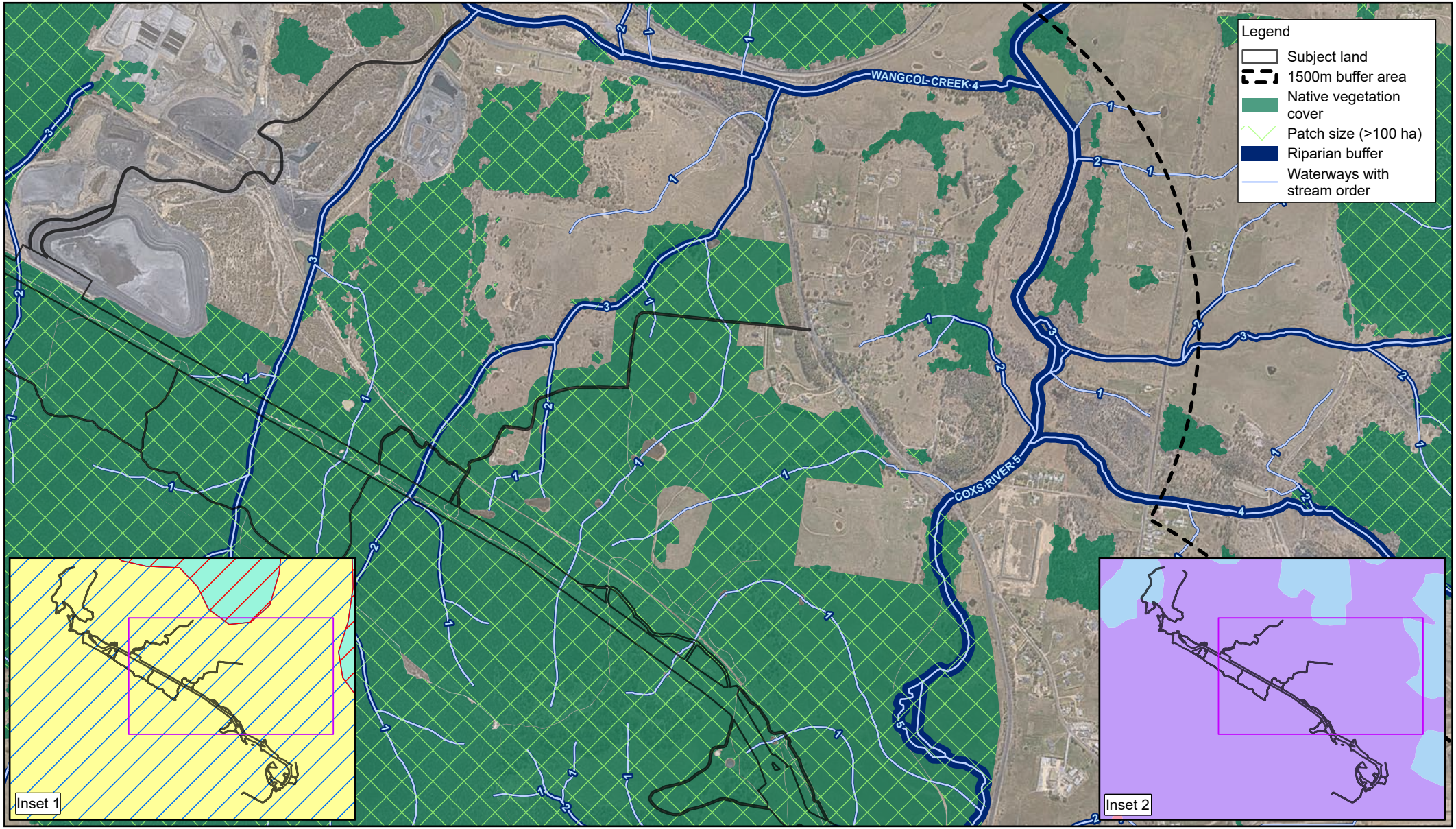
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

Location map

FIGURE 3.1E

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR002_LocationMap
Print date: 17 Jul 2025 - 13:44

Data source: Subject Land - Transgrid, 2023; Strahler - WaterNSW, 2023; Native Veg Cover (Seamless SVTM - Dec 2022) - DPIE, 2023; Railways, Roads - NSW SS, 2023; Mitchell Landscapes - DPIE, 2023; IBRA Regions and Subregions - NSW SS, 2023; Nearmap WMS Server: . Created by: lmanasan



Legend

Mitchell Landscapes
- Capertee Plateau
- Mount Horrible Plateau
- Newnes Plateau

IBRA Regions
- South Eastern Highlands
- Sydney Basin

IBRA Subregions
- Capertee Uplands
- Wollemi

Paper Size ISO A4

0 200 400 600

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

Location map

FIGURE 3.1F

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR002_LocationMap
Print date: 17 Jul 2025 - 13:44

Data source: Subject Land - Transgrid, 2023; Strahler - WaterNSW, 2023; Native Veg Cover (Seamless SVTM - Dec 2022) - DPIE, 2023; Railways, Roads - NSW SS, 2023; Mitchell Landscapes - DPIE, 2023; IBRA Regions and Subregions - NSW SS, 2023; Nearmap WMS Server: . Created by: lmanasan

3.2 Key landscape features

3.2.1 Habitat connectivity

Native vegetation extent was mapped across the assessment area using the SVTM (DPE, 2022f) as a base map and adjusted within the subject land based on the results of the desktop assessment and air photo interpretation. Patch size polygons were mapped in accordance with the BAM to include native vegetation in the assessment area that has a gap of less than 100 m from the next area of native vegetation (or ≤ 30 m for non-woody ecosystems). Native vegetation and patch size polygons are shown on Figure 3.1.

Habitat within the subject land is connected to extensive areas of forest and woodland habitat in the surrounding locality, particularly where it adjoins Gardens of Stone SCA (see Table 3.1 and Figure 3.1). The Gardens of Stone SCA and surrounding vegetated land provides good connectivity however the 45 m wide easement for the existing 132 kV transmission line and 60 m wide easement for existing 330 KV transmission line to the south-west impacts south-west to north-east connectivity for species that rely on canopy cover. Understory vegetation provides some connectivity across these easements for less mobile fauna and species that do no cross open areas. Vegetated riparian areas in deeper gullies in the existing 330 KV easement would provide connectivity for arboreal fauna such as the Squirrel Glider and other possums and gliders. Small creeklines would provide connectivity for frogs. Extensive vegetation clearing has occurred for agriculture and various infrastructure in the north-west near the Mount Piper 330 kV substation and in the south-east in close proximity to the Wallerawang 330 kV substation and former Wallerawang Power Station. Areas to the south of the subject land comprise cleared agricultural land with poor habitat connectivity to better quality habitats.

The riparian corridors of the Coxs River and its tributaries lie adjacent to the subject land and would also have some value as fauna movement corridors, even if the riparian vegetation is fragmented and often planted. All vegetation zones at the subject land have a patch size of >101 ha.

3.2.2 NSW Mitchell landscape

The subject land is located predominantly within the Capertee Plateau Mitchell Landscape, with the Newnes Plateau Mitchell Landscape (DPIE, 2016) intersecting the subject land in the north-west.

The Capertee Plateau and Newnes Plateau Mitchell Landscape within the subject land and assessment area is shown on Figure 3.1 and described in Table 3.2. Field observations of soil and geomorphology and floristic plot data confirm that the study area matches the description of the Capertee Plateau Mitchell Landscape.

Table 3.2 Mitchell Landscapes

Landscape name (DPIE, 2016)	Description (DECC, 2002)
Capertee Plateau	Comprises wide valleys, low rolling hills below sandstone cliffs on Permian conglomerates, sandstones, and shales with coal at the base of the Sydney Basin and exposure of underlying Devonian shale, siltstone or quartzite. Small areas of Tertiary basalt. General elevation 800 to 1000 m, local relief 100-120 m. Isolated flat top mountains in the valleys formed as pinnacles or remnant pieces of plateau. Shoulder slopes with stone pillars or 'pagodas' above steep canyons on tributary streams falling into gorges. Low gradient swampy streamlines. Shallow stony texture-contrast profiles, usually with gritty well drained A-horizons, over tough yellow or grey poorly drained clays. Bouldery debris with clay matrix below cliffs (talus). Organic sand in swamps. Red brown structured loams on basalt. Vegetation includes woodlands of Rough-barked Apple (*Angophora floribunda*), Red Stringybark *(Euscalyptus macrorhyncha*), Red Box (*Eucalyptus polyanthemos*), Yellow Box (*Eucalyptus melliodora*), Blakely's Red Gum (*Eucalyptus blakelyi*) with shrubby understorey and wallaby grass (*Austrodanthonia* sp.) in open valleys. Scribbly Gum (*Eucalyptus sclerophylla*), Red Stringybark (*Eucalyptus macrorhyncha*), Red Box and Broad-leaved Ironbark (*Eucalyptus fibrosa* subsp. *fibrosa*) on talus slopes. Silvertop Ash (*Eucalyptus sieberi*) and Sydney Peppermint (*Eucalyptus piperita*) on sandstone peaks. Dwarf Casuarina (*Allocasuarina nana*), Tea-tree (*Leptospermum* sp.), and sedge on pagoda margins.

Landscape name (DPIE, 2016)	Description (DECC, 2002)
Newnes Plateau	Comprises undulating high level plateau with shallowly incises swampy streams and occasional relic sand dunes on horizontal Triassic quartz sandstones and shale, general elevation 1000 m, local relief <100 m. Thin stony yellow red sands, deep yellow earths, podsols on dunes and yellow or grey texture-contrast soils on shale units. Vegetation included woodland of stunted Scribbly Gum (*Eucalyptus sclerophylla*), Snow Gum (*Eucalyptus pauciflora*), Blue Mountains Ash (*Eucalyptus oreades*), Silvertop Ash (*Eucalyptus sieberi*), Grey Ironbark (*Eucalyptus paniculata*), Red Bloodwood (*Corymbia gummifera*) and grass trees (*Xanthorrhoea* sp.) with numerous other shrubs and patches of Dwarf Casuarina (*Allocasuarina nana*) heath on very exposed and eroded aspects, sedge swamps with marginal heath form linear patterns in open valleys.

3.3 Native vegetation cover

Native vegetation cover was mapped across the 1500 m buffer area surrounding the subject land using the SVTM (DPE, 2022f). Figure 3.1 shows native vegetation cover within the subject land and assessment area. Table 3.3 summarises the extent of native vegetation cover within the assessment area.

Table 3.3 Native vegetation cover

1500 m buffer area (ha)	Native vegetation cover	Cover class
2,503	51%	30-70%

4. Native vegetation, threatened ecological communities and vegetation integrity

4.1 Native vegetation extent

The following section describes the extent of native vegetation at the subject land that requires assessment according to Chapter 4 of the BAM (DPE, 2020a). Native vegetation extent was initially mapped across the subject land using the SVTM (DPE, 2022f) and high-resolution aerial photographs and then observed and adjusted based on the GHD field surveys. Native vegetation cover is shown on Figure 4.1 and described in sections 4.2 and 4.4. Native vegetation is predominantly associated with the vegetation on the escarpment, and semi-intact vegetation within the existing transmission corridor.

The subject land also contains moderate areas of cleared and degraded land within Centennial Coal lands (including Centennial Springvale Coal Services facility and Ivanhoe Coal Mine) and leased agricultural land. Small patches of native vegetation are also present within leased agricultural lands, road corridors and fragmented patches within the former Wallerawang Power Station site. Areas that are not native vegetation do not require assessment according to Chapter 4 of the BAM (DPE, 2020a). Areas that have been mapped as not native vegetation include:

– formed tracks, hard stand and compacted bare earth
– human-made dams, ponds and other waterbodies
– buildings
– planted exotic vegetation, including a pine plantation in the south of the study area.

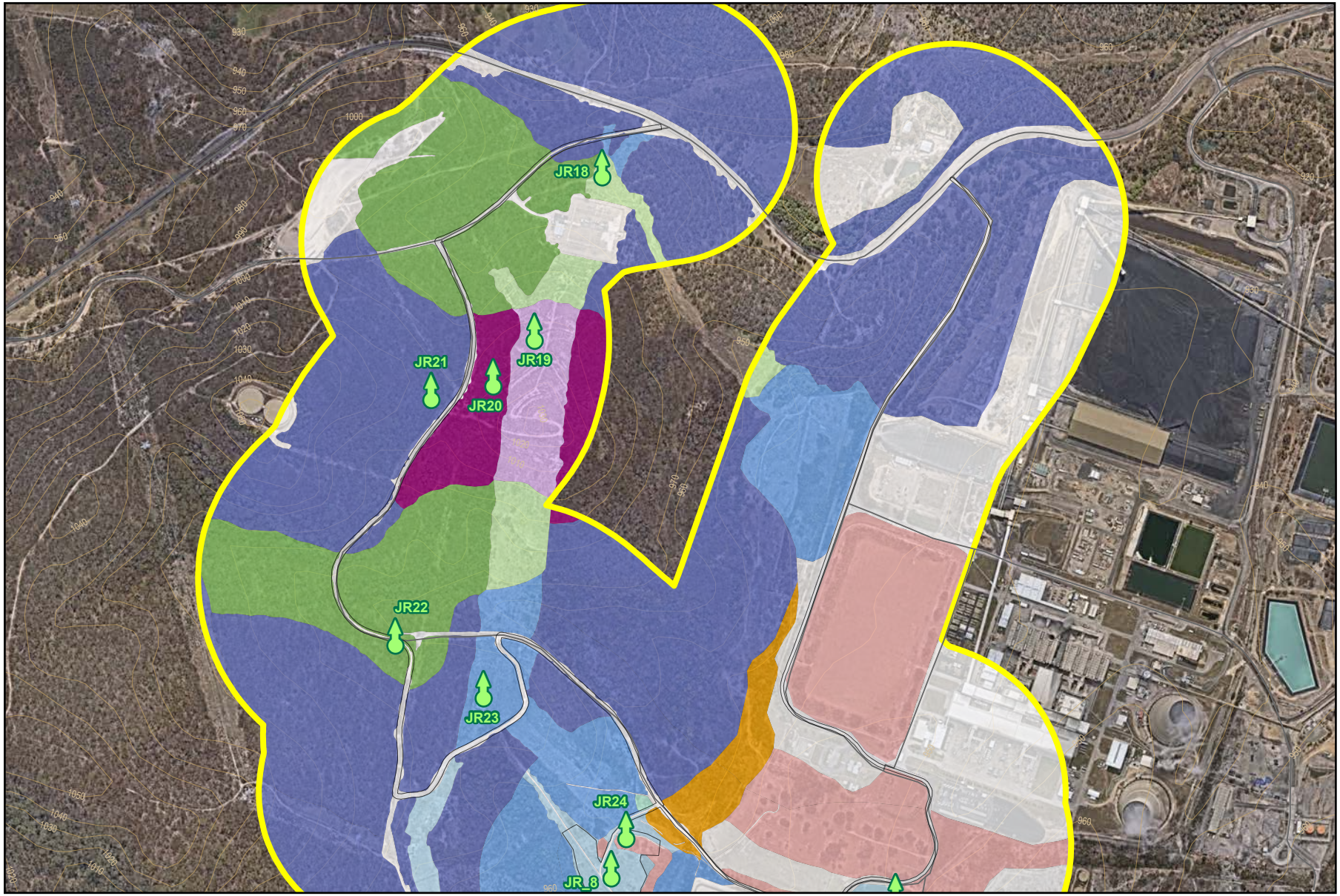
Areas containing non-native vegetation was sampled with VI plots JR7, JR7B (duplicate of JR7), BH15 and BH16 (see Figure 4.1D and E) to help confirm that these areas do not meet the definition of native vegetation requiring further assessment under Section 9.2.1.b of the BAM (an assessor must determine an offset for all impacts of a project on PCTs that are associated with a vegetation zone that has a VI score of ≥17 where the PCT is associated with threatened species habitat). The VI plots showed the total cover of native vegetation ranged between 0.1 and 10.4 per cent (Table 4.1, Appendix D). The VI plot data for non-native vegetation was entered into BAM-C and treated as PCT 3385 for the purposes of calculating VI. PCT 3385 was the most appropriate fit as this PCT is mapped adjacent to the areas containing non-native vegetation. By having the non-native vegetation as a vegetation zone in BAM-C, threatened flora species recorded in areas of non-native can be assigned to this vegetation zone for the purpose of calculating species credit offsets if necessary. Note however that threatened eucalypt species recorded in lowland areas dominated by exotic vegetation have been assigned to a separate paddock tree vegetation zone. Areas of non-native vegetation are described in detail in Table 4.1 below. Given the small area of non-native vegetation in the subject land, a land categorisation assessment was not considered necessary for this BDAR.

Mapping of access tracks on Figure 4.1 reflects the need or otherwise for clearing associated with widening and construction of batters. Access tracks that will be used by light vehicles, for example in the Gardens of Stone SCA, are shown as narrow lines on this figure as they do not require widening.

Table 4.1 Non-native vegetation description

Non-native vegetation	
Plant community type	N/A
PCT ID	Non-native vegetation. Treated as PCT 3385 for the purposes of calculating VI and Black Gum (*Eucalyptus aggregata*) species credits (vegetation zone 15 3385_non-native)
Photo	 *Photo 4.1 Example of non-native vegetation in the subject land*
Survey effort (PCT 3385)	JR7, JR7B (duplicate of JR7 due to shortfall in minimum number of plots required) BH15, BH16.
Conservation significance	Non-native vegetation.
Patch size	0 ha
Condition	Non-native – Grass and forb composition was well below benchmark – Grass and forb structure was well below benchmark – No fallen logs recorded – No trees present – Total cover of native vegetation ranged between 0.1 and 10.4 %.
Current vegetation integrity score (PCT 3385)	1.6
Landscape position	Lower elevations at the former Wallerawang Power Station site and along the Coxs River floodplains. Outer floodplains and minor drainage channels with infrequent inundation by floodwater where the original native vegetation has been cleared.
Structure	Exotic grassland derived from clearing of Creekflat swamp woodland with extensive areas of exotic vegetation. Certain areas are dominated by cover of exotic annual grasses, but this would be likely to vary with season and/or rainfall in recent months. Would periodically have high cover of exotic pasture species.
Over-storey	Absent.

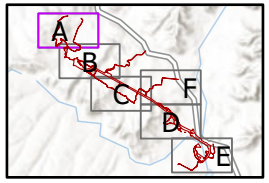
Non-native vegetation	
Mid-storey	Absent.
Groundcover	Dominated by exotic species (102.5% to 161.8% cover in plots sampled). Grasses: very sparse cover of *Carex longebrachiata* and *Juncus usitatus* Herbs: low species richness and cover of Native Geranium (*Geranium solanderi*), Rough Raspwort (*Haloragis heterophylla*) and Jersey Cudweed (*Pseudognaphalium luteoalbum*).
Exotic species	Locally very high cover of grasses such as Phalaris (*Phalaris aquatica*), Cocksfoot (*Dactylis glomerata*), Paspalum (*Paspalum dilatatum*), Kikuyu Grass (*Cenchrus clandestinus*). Moderate cover of other environmental weeds such as Black Mustard (Brassica nigra), Spear Thistle (*Cirsium vulgare*), Paterson's Curse (E*chium plantagineum*), Lamb's Tongues (*Plantago lanceolata*), Prickly Sowthistle (*Sonchus asper*), Dandelion (*Taraxacum officinale*), Cranesbill Geranium (*Geranium molle* subsp. *molle*), Sorrel (*Rumex acetosella*), *Lepidium africanum*, Soft Brome (*Bromus molliformis*), Prairie Grass (*Bromus catharticus*), Nettle-leaf Goosefoot (*Chenopodium murale*), Saffron Thistle (*Carthamus lanatus*) and Birds-foot Trefoil (*Lotus corniculatus*).



Subject land
Roads
Contour (10m)
Vegetation integrity plot

Vegetation zones
- 1-3369_Good_Central Tableland Ranges Peppermint-Gum Grassy Forest
- 2-3369_Shrubland_Central Tableland Ranges Peppermint-Gum Grassy Forest
- 6-3385_Poor_Southern Tableland Creekflat Swamp Woodland
- 9-3747_Good_Southern Tableland Western Hills Scribbly Gum Forest
- 10-3747_Poor_Southern Tableland Western Hills Scribbly Gum Forest
- 11-3747_Shrubland_Southern Tableland Western Hills Scribbly Gum Forest
- 12-3749_Good_Western Blue Mountains Scribbly Gum Forest
- 13-3749_Shrubland_Western Blue Mountains Scribbly Gum Forest

Other vegetation
- Non-native
- Planted native vegetation
- Waterbody



Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

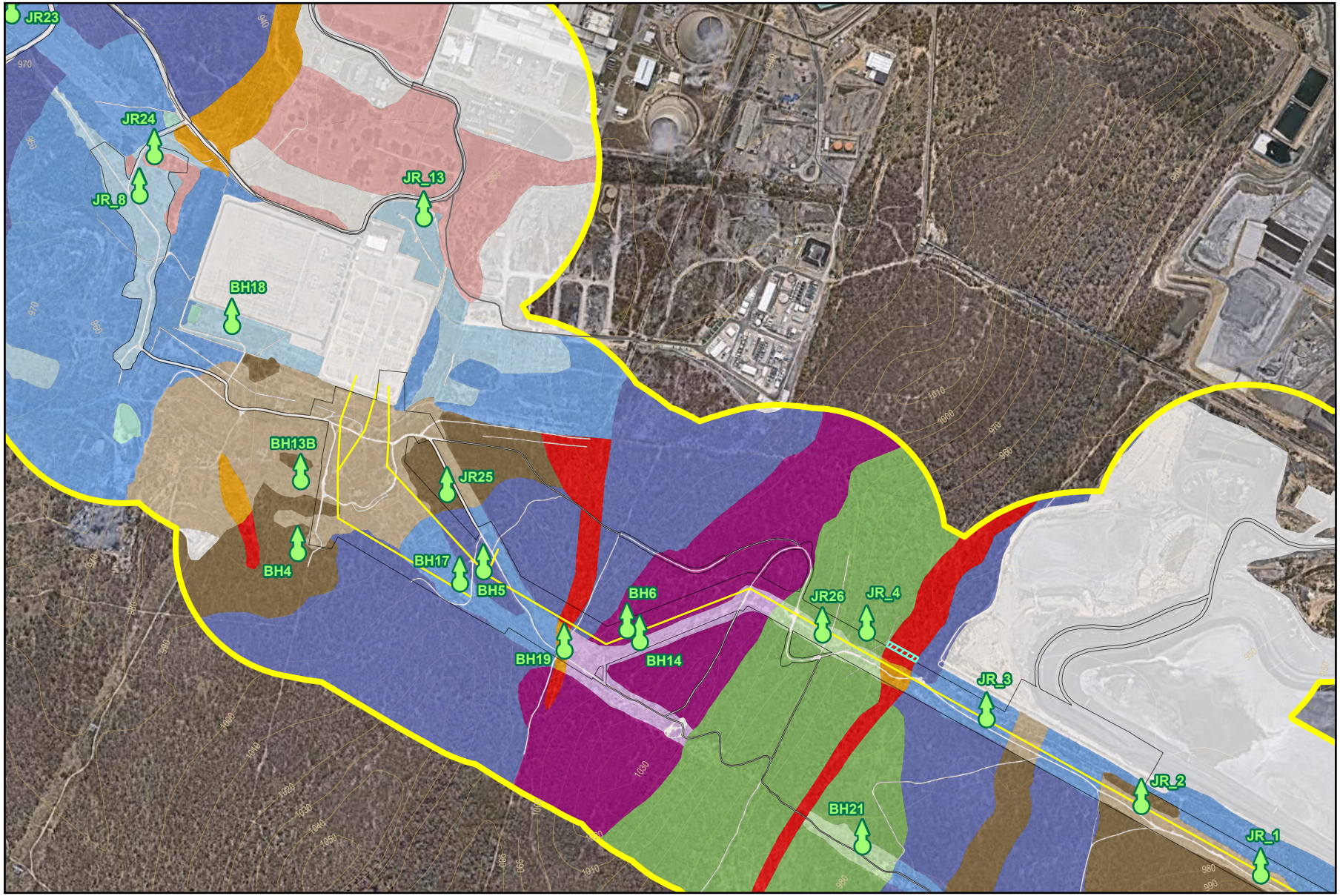
Vegetation

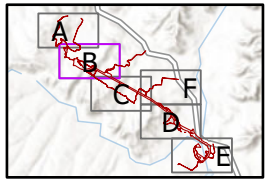
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 4.1A

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR003_Vegetation
Print date: 17 Jul 2025 - 12:23

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

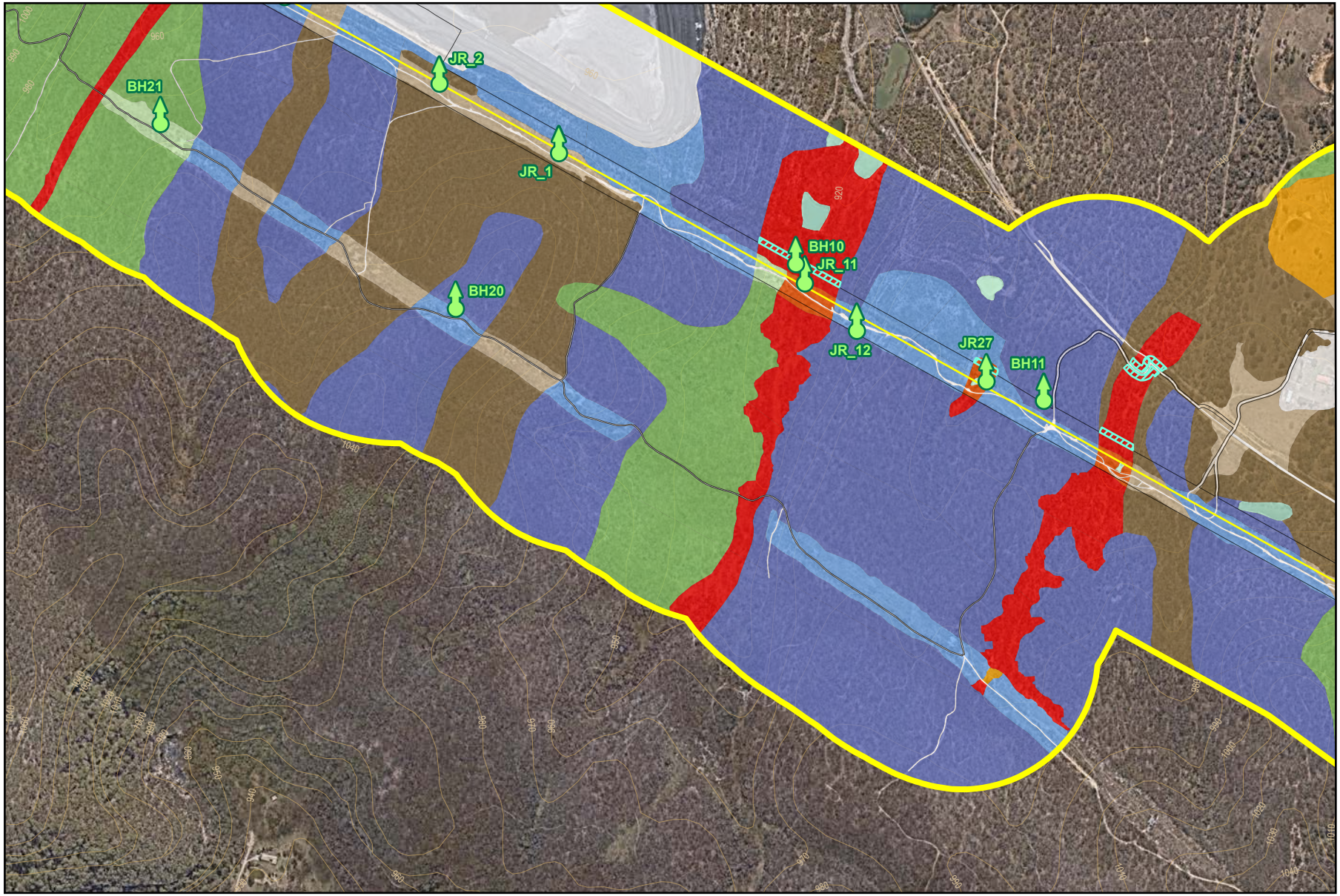
Vegetation

Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 4.1B

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR003_Vegetation
Print date: 17 Jul 2025 - 12:23

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan



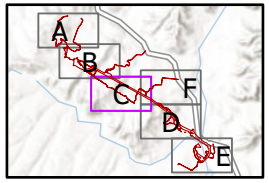
Subject land
Indirect Impact Area
Proposed transmission line
Contour (10m)
Vegetation integrity plot

Vegetation zones

1-3369_Good_Central Tableland Ranges Peppermint-Gum Grassy Forest
2-3369_Shrubland_Central Tableland Ranges Peppermint-Gum Grassy Forest
3-3385_Good_Southern Tableland Creekflat Swamp Woodland
4-3385_Moderate_Southern Tableland Creekflat Swamp Woodland
6-3385_Poor_Southern Tableland Creekflat Swamp Woodland
7-3735_Good_Central Tableland Peppermint Shrub-Grass Forest
8-3735_Shrubland_Central Tableland Peppermint Shrub-Grass Forest
9-3747_Good_Southern Tableland Western Hills Scribbly Gum Forest
11-3747_Shrubland_Southern Tableland Western Hills Scribbly Gum Forest

Other vegetation

Non-native
Waterbody



Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

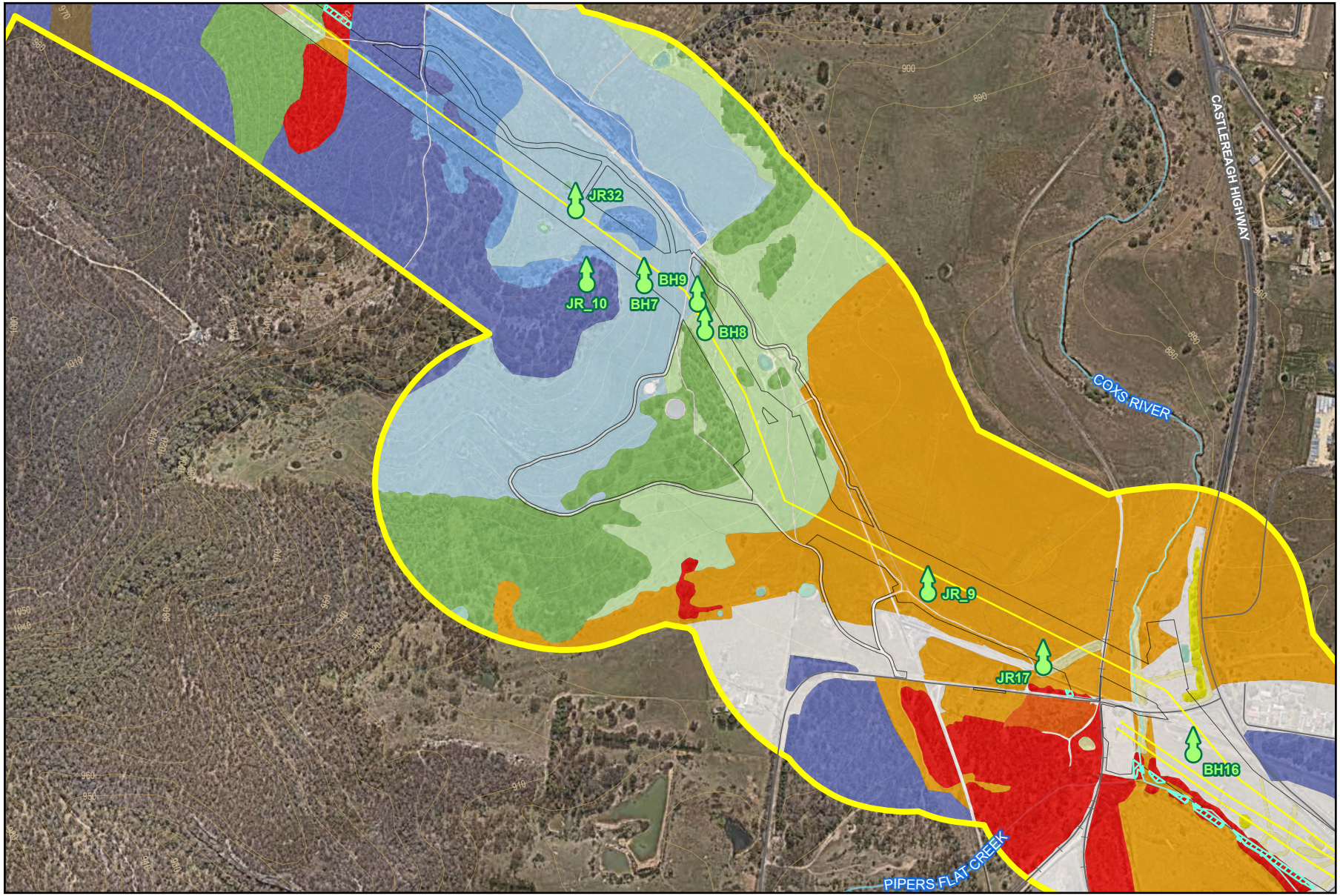
Vegetation

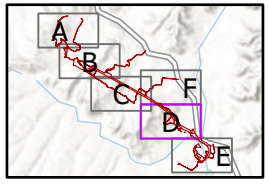
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 4.1C

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR003_Vegetation
Print date: 17 Jul 2025 - 12:24

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Paper Size ISO A4

0 100 200 300

Metres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

GHD

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

Vegetation

FIGURE 4.1D

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR003_Vegetation
Print date: 17 Jul 2025 - 12:25

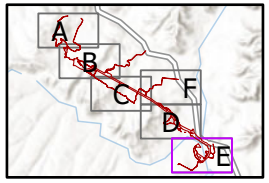
Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan



Subject land
Indirect Impact Area
Proposed transmission line
Railway
Roads
Contour (10m)
Watercourse
Vegetation integrity plot

Vegetation zones
- 3-3385_Good_Southern Tableland Creekflat Swamp Woodland
- 5-3385_Paddock trees_Southern Tableland Creekflat Swamp Woodland
- 6-3385_Poor_Southern Tableland Creekflat Swamp Woodland
- 9-3747_Good_Southern Tableland Western Hills Scribbly Gum Forest
- 14-3932_Moderate_Central and Southern Tableland Swamp Meadow Complex

Other vegetation
- Non-native
- Planted native vegetation
- Waterbody



Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

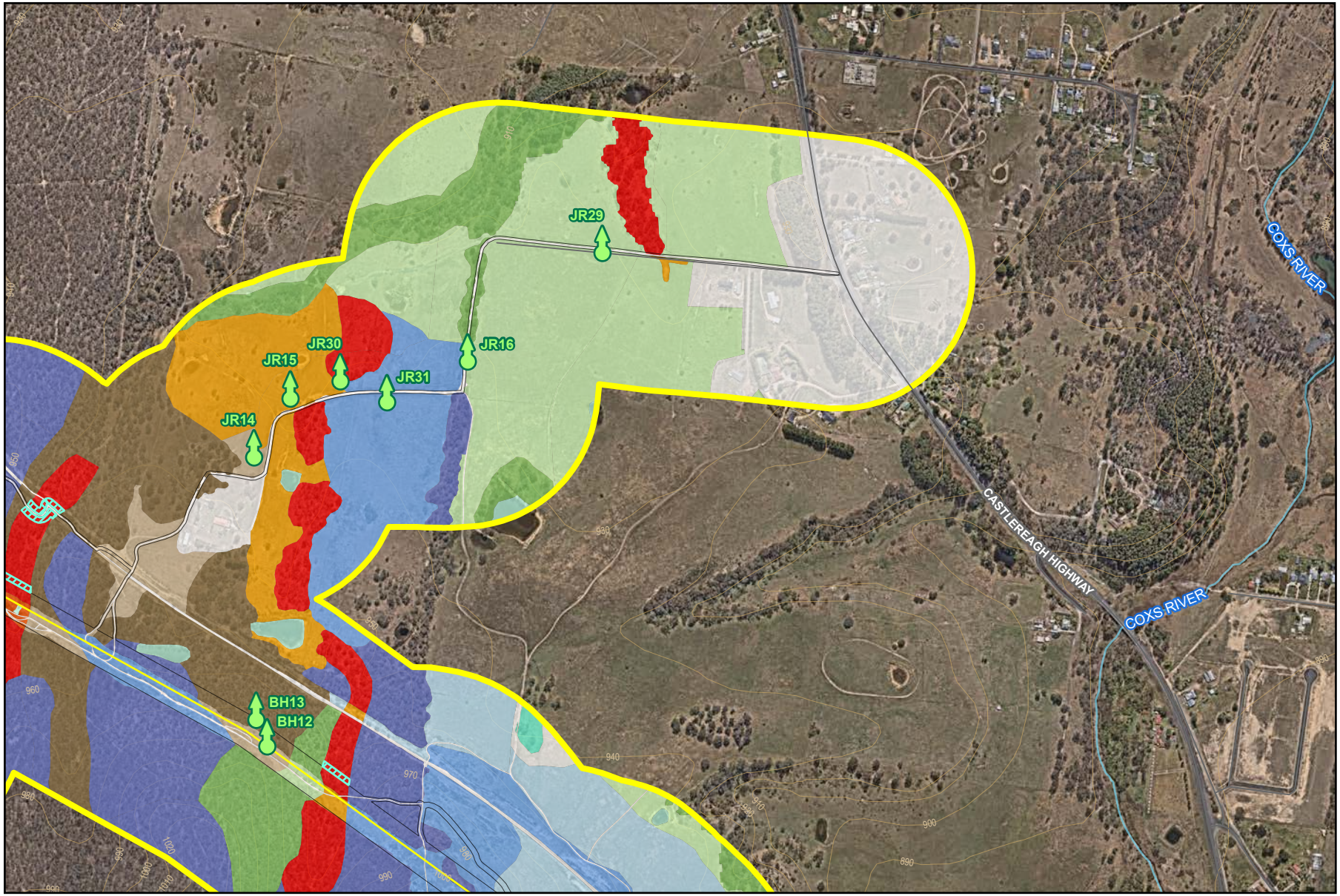
Vegetation

Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 4.1E

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR003_Vegetation
Print date: 17 Jul 2025 - 12:26

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan



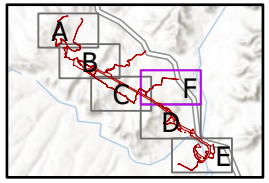
Subject land
Indirect Impact Area
Proposed transmission line
Roads
Contour (10m)
Watercourse
Vegetation integrity plot

Vegetation zones

1-3369_Good_Central Tableland Ranges Peppermint-Gum Grassy Forest
2-3369_Shrubland_Central Tableland Ranges Peppermint-Gum Grassy Forest
3-3385_Good_Southern Tableland Creekflat Swamp Woodland
4-3385_Moderate_Southern Tableland Creekflat Swamp Woodland
6-3385_Poor_Southern Tableland Creekflat Swamp Woodland
7-3735_Good_Central Tableland Peppermint Shrub-Grass Forest
8-3735_Shrubland_Central Tableland Peppermint Shrub-Grass Forest
9-3747_Good_Southern Tableland Western Hills Scribbly Gum Forest
10-3747_Poor_Southern Tableland Western Hills Scribbly Gum Forest
11-3747_Shrubland_Southern Tableland Western Hills Scribbly Gum Forest
BG-3376_Moderate_Southern Tableland Grassy Box Woodland

Other vegetation

Non-native
Waterbody



Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

Vegetation

Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 4.1F

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR003_Vegetation
Print date: 17 Jul 2025 - 12:27

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan

4.2 Planted vegetation assessment

Planted native vegetation is present at several locations near the existing Mount Piper 330 kV substation (Figure 4.1) and comprises a mix of locally native shrubs and non-locally native trees. Planted native vegetation at the subject land was compared with the decision-making key in Appendix D.1 of the BAM. A summary of the comparison is provided in Table 4.2.

Table 4.2 Planted vegetation assessment

Number	Question	Answer
Question 1	Does the planted native vegetation occur within an area that contains a mosaic of planted and remnant native vegetation and which can be reasonably assigned to a PCT known to occur in the same IBRA subregion as the project?	No. The plantings in the subject land are comprised of a mix of locally native shrubs and non-locally native trees. The assemblage of canopy species of *Eucalyptus globulus subsp, globulus* (Southern Blue Gum) and *Eucalyptus nicholii* (Narrow-leaved Black Peppermint). Shrub species include *Acacia terminalis* (Sunshine Wattle), *Cassinia aculeata* (Common Cassinia), *Acacia dealbata* (Silver Wattle), and *Lissanthe Strigosa* (Peach Heath). The species assemblage within the vegetation mapped as planted native vegetation is not characteristic of a PCT that occurs in the same IBRA subregion as the project.
Question 2	Is the planted native vegetation: – planted for the purpose of environmental rehabilitation or restoration under an existing conservation obligation listed in BAM Section 11.9(2.), and – the primary objective was to replace or regenerate a plant community type or a threatened flora species population or its habitat?	No. The purpose of planting of the vegetation is not known, however given the species selected for use, environmental rehabilitation or restoration, or recreation of a PCT or threatened species habitat is unlikely. Instead, it is more likely that the species planted were selected for their aesthetic appeal.
Question 3	Is the planted/translocated native vegetation individuals of a threatened species or other native species planted/translocated for the purpose of providing threatened species habitat under one of the following: – species recovery project – Saving our Species project – other types of government funded restoration project – condition of consent for a development approval that required those species to be planted or translocated for the purpose of providing threatened species habitat – legal obligation as part of a condition or ruling of court. This includes regulatory directed or ordered remedial plantings (e.g. Remediation Order for clearing without consent issued under the BC Act or the Native Vegetation Act) – ecological rehabilitation to re-establish a PCT or TEC that was, or is carried out under a mine operations plan, or – approved vegetation management plan (e.g. as required as part of a Controlled Activity Approval for works on waterfront land under the NSW Water Management Act 2000)?	No. As above, the diverse assemblage of species indicates that restoration or compliance with a condition of consent or legal obligation is unlikely to have been the aim of the planting.

Number	Question	Answer
Question 4	Was the planted native vegetation (including individuals of a threatened flora species) undertaken voluntarily for environmental rehabilitation or restoration without a legal obligation to secure or provide for management of the native vegetation?	No. As above, the diverse assemblage of species indicates that restoration is unlikely to have been the aim of the planting.
Question 5	Is the native vegetation (including individuals of a threatened flora species) planted for functional, aesthetic, horticultural or plantation forestry purposes? This includes examples such as: windbreaks in agricultural landscapes, roadside plantings (including street trees, median strips, roadside batters), landscaping in parks, gardens and sport fields/complexes, macadamia plantations or tea-tree farms?	Yes. The species selected were most likely planted for their aesthetic appeal and ability to grow quickly.

Some vegetation near the Mount Piper Substation appears to have been planted for functional and aesthetic purposes as part of EnergyAustralia land management practices (i.e. visual amenity along access roads). Vegetation within this area has not been planted with species that resemble any locally occurring PCTs and cannot be reasonably assigned to a PCT known to occur in the same IBRA subregion as the project.

The BAM notes that vegetation that meets the above criteria does not need to be assessed in line with Chapter 4 or 5 of the BAM, but Appendix D.2 must be applied, and the vegetation must be assessed for threatened species habitat (refer to section 5.1). As such, this area of planted vegetation has not been entered as a vegetation zone in the BAM calculator.

Any opportunistic or incidental sightings of threatened biota within planted native vegetation have been recorded during this assessment, and, where relevant, Section 8.4 of the BAM has been applied and mitigation measures have been recommended for impacts on these species as a result of the project. No threatened species were recorded in or using any of the planted native vegetation at the subject land, or in surrounding areas. Species credits have not been calculated for any such impact, in line with the BAM.

A VI plot (JR24) was sampled in the planted vegetation patch that occurs in the subject land. This data is provided in Appendix D.

4.3 Plant community types

Vegetation within the subject land has been assessed as aligning with the BioNet Vegetation Classification PCTs identified within Table 4.3 and their extent is shown in Figure 4.1.

4.3.1 Overview

The PCTs identified at the subject land are summarised in Table 4.3 and mapped on Figure 4.1. The area of direct impact and indirect impact on PCTs at the subject land is included in Table 4.3. Vegetation profiles for PCTs identified in the subject land and justification for selection of these PCTs are provided in Table 4.4 to Table 4.9. Further discussion of potential threatened ecological communities is provided in sections 4.5 (BC Act) and 5.3.1 (EPBC Act). Calculation of indirect impact areas is discussed in section 9.1.4.

Table 4.3 Plant community types in the subject land

PCT	BC Act status	EPBC Act status	Extent in subject land (ha) (direct impact)	Indirect impact[1] (ha)
PCT 3369 - Central Tableland Ranges Peppermint-Gum Grassy Forest	Does not align with any listed TECs	Does not align with any listed TECs	6.95	0
PCT 3385 - Southern Tableland Creekflat Swamp Woodland	Does not align with any listed TECs	Does not align with any listed TECs	10.98	1.08
PCT 3735 - Central Tableland Peppermint Shrub-Grass Forest	Does not align with any listed TECs	Does not align with any listed TECs	9.22	0
PCT 3747 - Southern Tableland Western Hills Scribbly Gum Forest	Does not align with any listed TECs	Does not align with any listed TECs	22.90	0
PCT 3749 - Western Blue Mountains Scribbly Gum Forest	Does not align with any listed TECs	Does not align with any listed TECs	2.99	0
PCT 3932 - Central and Southern Tableland Swamp Meadow Complex[2]	EEC	-	2.38	0
TOTAL			**55.43**	**1.08**

Notes: 1. The area of residual indirect impact on entities susceptible to edge effects was calculated by applying a 10 m buffer to the subject land. Refer to sections 8.2 and 9.1.4 for detailed assessment.

2. The PCT is associated with a listed EEC, but does not contain the correct geology to comprise this EEC according to the final determination. Further detail for its exclusion as a TEC in the subject land is provided in section 4.5.

4.3.2 Justification of PCT selection

The SVTM (DPE, 2020g) identified the following vegetation units and associated candidate PCTs as potentially occurring within the study area:

– Dry sclerophyll forests along ridges and slopes across the study area mapped as:
  - PCT 3747 Southern Tableland Western Hills Scribbly Gum Forest
  - PCT 3732 Capertee Uplands Enriched Stringybark Forest
  - PCT 3749 Western Blue Mountains Scribbly Gum Forest
  - PCT 3695 Western Blue Mountains Peppermint Sheltered Forest
  - PCT 3510 Capertee Slopes Stringybark-Box Forest
  - PCT 3738 Goulburn-Lithgow Tableland Hills Grassy Forest.
– Grassy woodlands along slopes and damp drainage flats across the study area mapped as:
  - PCT 3367 Central Tableland Granites Grassy Box Woodland
  - PCT 3385 Southern Tableland Creekflat Swamp Woodland
  - PCT 3369 Central Tableland Ranges Peppermint-Gum Grassy Forest
  - PCT 3347 Southern Tableland Creekflat Ribbon Gum Forest.
– Forested wetlands in sheltered gullies in the study area mapped as:
  - PCT 4083 Southeast Tableland Rocky Riparian Scrub.
– Heathlands on exposed rocky ridges across the study area mapped as:
  - PCT 3862 Newnes Plateau Rockplate Heath.

Plot data, review of aerial photography and other site observations were considered against these candidate PCTs. Characteristic species, vegetation structure, soil type and landscape position were evaluated and compared with the descriptions of candidate PCTs (NSW DCCEEW, 2025c) in the BioNet vegetation classification. The majority of the study area is located in the Capertee Plateau Mitchell landscape. Higher elevation parts of the study area extend into the Newnes Plateau Mitchell landscape (DPIE, 2016; pers. obs.). These landscapes contain shales and sandstones and associated geomorphic features such as undulating mountains and shallow swampy streams (DECC, 2002). The presence of these landscapes and associated soil types and geomorphic features was confirmed during field surveys.

The evidence used to confirm the selection of the best matching PCTs for the PCTs identified at the subject land is detailed below.

Table 4.4 PCT 3369 justification

PCT 3369 Central Tableland Ranges Peppermint-Gum Grassy Forest		
Justification of PCT selection	**Search Term**	**Selection**
	IBRA Bioregion	South-eastern highlands
	IBRA Subregion	Capertee Uplands
	Vegetation Formation	Grassy Woodlands
		Dry Sclerophyll Forests (Shrub/grass sub-formation)
	Vegetation Class	Southern Tableland Grassy Woodlands
		Southern Tableland Dry Sclerophyll Forests
	Upper Stratum	*Eucalyptus macrorhyncha, Eucalyptus mannifera, Eucalyptus dalrympleana, Eucalyptus dives*
	Mid stratum	*Cassinia longifolia, Cassinia aculeata, Acacia buxifolia, Acacia Dorothea, Lissanthe strigosa*
	Longlist	Returned a longlist of PCT 3369, 3738, 3367, 3735, 3534, 3347, 3734, 3732
	Landscape Position	Occurs on clay loam soils with a sandstone substrate derived from basalt or sedimentary substrates on sheltered hillslopes in the study area.
	Selection	PCT 3367 was discarded as this PCT is dominated by *Eucalyptus bridgesiana* with *Eucalyptus viminalis* and *Eucalyptus melliodora,* and occurs on soils derived from granitoid, rhyolite, quartzite or quartz diorite. PCT 3735 was discarded as this PCT predominately occurs on dry slopes and broad crests of rolling hill country, where as this patch of vegetation in the subject land occurs on more sheltered slopes that are moderately sloping. PCT 3534 was discarded as this PCT is dominated by *Eucalyptus goniocalyx* with *Eucalyptus polyanthemos*, both species were not recorded in this vegetation zone. PCT 3347 was discarded as dominant canopy species of this PCT includes *Eucalyptus viminalis*, *Eucalyptus pauciflora*, *Eucalyptus stellulata*, and *Eucalyptus rubida*. This PCT also occurs on creek flats and gentle foot slopes. PCT 3734 contains a high occurrence of *Eucalyptus macrorhyncha*, however was discarded as it also has high occurrence of *Eucalyptus goniocalyx, Eucalyptus bridgesiana, Eucalyptus melliodora*, and *Eucalyptus polyanthemos* (absent from study area). PCT 3732 was discarded as this PCT is dominated by *Eucalyptus cannonii, Eucalyptus melliodora, Eucalyptus punctata* and *Eucalyptus blaxlandii*. PCT 3369 and 3738 both contain similar dominant Eucalypt canopy species. *Eucalyptus dives* and *Eucalyptus dalrympleana* are typically more dominant in PCT 3369, whereas co-dominance *of Eucalyptus mannifera, Eucalyptus dives* and *Eucalyptus macrorhyncha* is typical of PCT 3738. *Acacia dealbata* and/or *Acacia melanoxylon* commonly occur in PCT 3369, however these acacias are not known to occur in PCT 3738. *Acacia dealbata* and *Acacia melanoxylon* were both recorded in this vegetation zone across the study

PCT 3369 Central Tableland Ranges Peppermint-Gum Grassy Forest		
		area. PCT 3369 typically occurs on more gentle, undulating to rolling hill landscapes, whereas PCT 3369 typically occurs on sheltered slopes. Hence, PCT 3369 was selected as the most appropriate PCT for this vegetation zone as *Acacia dealbata* and *Acacia melanoxylon* is present in the upper stratum and a good fit with the specific Landscape Position description in the study area.

Table 4.5 PCT 3385 justification

PCT 3385 Southern Tableland Creekflat Swamp Woodland		
Justification of PCT selection	**Search Term**	**Selection**
	IBRA Bioregion	South-eastern highlands
	IBRA Subregion	Capertee Uplands
	Vegetation Formation	Grassy Woodlands
	Vegetation Class	Southern Tableland Grassy Woodlands
		Subalpine Woodlands
	Upper Stratum	*Eucalyptus aggregata*, *Eucalyptus rubida*
	Shortlist	Returned a shortlist of PCT 3347, 3385
	Landscape Position	Occurs on alluvium soils along damp drainage flats and creek lines across the study area.
	Selection	PCT 3347 was discarded as the dominant species for this PCT does not include *Eucalyptus aggregata*. PCT 3385 was selected as *Eucalyptus aggregata* and *Eucalyptus rubida* are dominant species in the upper stratum and a good fit with the specific Landscape Position description.

Table 4.6 PCT 3735 justification

PCT 3735 Central Tableland Peppermint Shrub-Grass Forest		
Justification of PCT selection	**Search Term**	**Selection**
	IBRA Bioregion	South-eastern highlands
	IBRA Subregion	Capertee Uplands
	Vegetation Formation	Dry Sclerophyll Forests (Shrubby sub-formation)
	Vegetation Class	Southern Tableland Dry Sclerophyll Forests
	Upper Stratum	*Eucalyptus dives, Eucalyptus dalrympleana*
	Shortlist	Returned a shortlist of PCT 3738, 3735, 3734, 3732
	Landscape Position	Occurs on sedimentary substrates on gentle hillslopes and broad flats across the study area.
	Selection	PCT 3734 was discarded as the dominant upper stratum species does not include *Eucalyptus dives* or *Eucalyptus dalrympleana.* PCT 3732 was discarded as the dominant upper stratum species does not include *Eucalyptus dives* or *Eucalyptus dalrympleana* and contained various other upper stratum species not recorded in the study area. PCT 3738 and 3735 both contain similar dominant Eucalypt canopy species. *Eucalyptus dives* and *Eucalyptus dalrympleana* with *Eucalyptus mannifera* and *Eucalyptus macrorhyncha* are characteristic of PCT 3735. Co-dominance of *Eucalyptus dives, Eucalyptus mannifera*, and *Eucalyptus macrorhyncha* with *Allocasuarina littoralis* and *Acacia decurrens* is typical of PCT 3738. *Eucalyptus cannonii* is known to occasionally occur in PCT 3735, not PCT 3738. *Eucalyptus cannonii* has been recorded in various locations across the study area, including in mapped areas of PCT 3735. Hence, PCT 3375 was selected as the most appropriate PCT for this vegetation zone.

Table 4.7 PCT 3747 justification

PCT 3747 Southern Tableland Western Hills Scribbly Gum Forest		
Justification of PCT selection	**Search Term**	**Selection**
	IBRA Bioregion	South-eastern highlands
	IBRA Subregion	Capertee Uplands
	Vegetation Formation	Dry Sclerophyll Forests (Shrub/grass sub-formation)
		Grassy Woodlands
	Vegetation Class	Southern Tableland Dry Sclerophyll Forests
		Southern Tableland Grassy Woodlands
	Upper Stratum	*Eucalyptus macrorhyncha, Eucalyptus mannifera, Eucalyptus rossii, Eucalyptus agglomerata, Acacia dealbata, Acacia parramattensis*
	Shortlist	Returned a shortlist of PCT 3747, 3369, 3738
	Landscape Position	Occurs on sedimentary soils with a shale or sandstone substrate on hillslopes and hillcrests across the study area.
	Selection	PCT 3369 was discarded as the dominant upper stratum species is comprised of *Eucalyptus dives* and *Eucalyptus dalrympleana*. The landscape position of PCT 3369 is on sheltered slopes, the vegetation zone in the study area is located on hillslopes and hillcrests. PCT 3747 and 3738 both contain similar dominant Eucalypt canopy species. *Eucalyptus macrorhyncha, Eucalyptus rossii* and *Eucalyptus mannifera* with *Acacia dealbata and Eucalyptus agglomerata* are characteristic of PCT 3747. Whereas a co-dominance of *Eucalyptus dives, Eucalyptus mannifera*, and *Eucalyptus macrorhyncha* with *Allocasuarina littoralis* and *Acacia decurrens* is typical of PCT 3738. Both *Acacia dealbata* and *Acacia parramattensis* occur in PCT 3747, not PCT 3738. Therefore PCT 3747 was selected as the most appropriate PCT for this vegetation zone.

Table 4.8 PCT 3749 justification

PCT 3749 Western Blue Mountains Scribbly Gum Forest		
Justification of PCT selection	**Search Term**	**Selection**
	IBRA Bioregion	South-eastern highlands
	IBRA Subregion	Capertee Uplands
	Vegetation Formation	Dry Sclerophyll Forests (Shrubby sub-formation)
		Dry Sclerophyll Forests (Shrub/grass sub-formation)
		Grassy Woodlands
	Vegetation Class	Southern Tableland Dry Sclerophyll Forests
		Central Gorge Dry Sclerophyll Forests
		Southern Tableland Grassy Woodlands
	Upper Stratum	*Eucalyptus mannifera, Eucalyptus rossii, Eucalyptus macrorhyncha, Eucalyptus sparsifolia, Eucalyptus cannonii*
	Shortlist	Returned a shortlist of PCT 3731, 3749, 3732
	Landscape Position	Occurs on upper hillslopes and ridges with a sandstone substrate across the study area.
	Selection	PCT 3731 was discarded as the dominant upper stratum species is comprised of *Eucalyptus punctata* with *Eucalyptus rossii, Eucalyptus sparsifolia* and *Eucalyptus cannonii*. The landscape position of PCT 3731 is on dry quartz-rich Permian sediments exposed on foothill ranges of the Capertee and Wolgan valleys, the vegetation zone in the study area is located on hillslopes and ridges.

PCT 3749 Western Blue Mountains Scribbly Gum Forest		
		PCT 3732 was discarded as the dominant upper stratum species is comprised of *Eucalyptus cannonii, Eucalyptus melliodora* and *Eucalyptus punctata.* The landscape position of PCT 3732 is on sheltered slopes and minor gullies, the vegetation zone in the study area is located on hillslopes and ridges. PCT 3749 was selected as the upper stratum of this PCT is dominated by *Eucalyptus rossii*, *Eucalyptus mannifera*, *Eucalyptus sparsifolia* with *Eucalyptus macrorhyncha* and *Eucalyptus cannonii,* and occurs on higher elevation sandstone ridges, which fits well with the plot data and study area landscape.

Table 4.9 PCT 3932 justification

PCT 3932 Central and Southern Tableland Swamp Meadow Complex		
Justification of PCT selection	**Search Term**	**Selection**
	IBRA Bioregion	South-eastern highlands
	IBRA Subregion	Capertee Uplands
	Vegetation Formation	Freshwater Wetlands
	Upper Stratum	*Eucalyptus aggregata*
	Landscape Position	Occurs on alluvial soils along creek lines and low-lying waterlogged areas across the study area.
	Shortlist	Did not return a shortlist of any PCTs
	Selection/discussion	No shortlist PCTs were returned matching the above selection criteria.
	IBRA Bioregion	South-eastern highlands
	IBRA Subregion	Wollemi
	Vegetation Formation	Filters retained as above
	Upper Stratum	
	Shortlist	Returned a shortlist of only PCT 3932
	Selection/discussion	The boundary of the Wollemi IBRA subregion occurs about 4 km east of this vegetation zone in the study area. Changing the IBRA subregion criteria from Capertee Uplands to Wollemi returned a shortlist of just one PCT, PCT 3932. *Eucalyptus aggregata* is known to occur in PCT 3932, particularly around the margins of waterlogged areas. PCT 3932 occurs on permanently waterlogged fertile alluvial deposits, which fits well with the plot data and landscape where this vegetation zone occurs.

4.4 Vegetation zones

4.4.1 Overview

PCTs identified at the subject land during field surveys were further split into broad condition classes resulting in the vegetation zones as shown in Figure 4.1 and summarised in Table 4.10. Vegetation zones were further split based on direct and indirect impacts. These additional vegetation zones are summarised in Table 4.10.

The structure, species composition and condition of the vegetation zones within the subject land are described in section 4.4.3. Note that separate descriptions are not provided for the two management zones that are included to account for indirect impacts. Plant species lists are provided in Appendix C and plot data is provided in Appendix D along with benchmark values for each PCT.

Table 4.10 Vegetation zones and other map units in the subject land

Zone ID	PCT ID	PCT name	Condition / other defining feature	Area (ha)	Vegetation class	Patch size class	No. vegetation integrity plots required	Vegetation integrity plots sampled
Direct Impacts								
1	3369	Central Tableland Ranges Peppermint-Gum Grassy Forest	Good	1.47	Southern Tableland Grassy Woodlands	>100 ha	1	JR4, BH9, JR16, JR22
2	3369	Central Tableland Ranges Peppermint-Gum Grassy Forest	Shrubland	5.48	Southern Tableland Grassy Woodlands	>100 ha	3	BH8, BH21, JR18, JR26, JR29
3	3385	Southern Tableland Creekflat Swamp Woodland	Good	2.59	Subalpine Woodlands	>100 ha	2	JR6, BH10, JR30
4	3385	Southern Tableland Creekflat Swamp Woodland	Moderate	0.83	Subalpine Woodlands	>100 ha	1	JR11, JR27
5	3385	Southern Tableland Creekflat Swamp Woodland	Paddock trees	0.61	Subalpine Woodlands	>100 ha	1	BH1
6	3385	Southern Tableland Creekflat Swamp Woodland	Poor	6.94	Subalpine Woodlands	>100 ha	3	BH2, BH3, JR9, BH19, JR15
7	3735	Central Tableland Peppermint Shrub-Grass Forest	Good	1.69	Southern Tableland Dry Sclerophyll Forest	>100 ha	1	BH4, BH13, JR25
8	3735	Central Tableland Peppermint Shrub-Grass Forest	Shrubland	7.53	Southern Tableland Dry Sclerophyll Forest	>100 ha	3	JR1, JR2, BH12, BH13B, JR14
9	3747	Southern Tableland Western Hills Scribbly Gum Forest	Good	4.65	Southern Tableland Dry Sclerophyll Forest	>100 ha	2	BH5, JR10, BH11, JR21
10	3747	Southern Tableland Western Hills Scribbly Gum Forest	Poor	5.96	Southern Tableland Dry Sclerophyll Forest	>100 ha	3	JR8, BH7, JR13, BH18, JR32
11	3747	Southern Tableland Western Hills Scribbly Gum Forest	Shrubland	12.30	Southern Tableland Dry Sclerophyll Forest	>100 ha	3	JR3, JR12, BH17, BH20, JR23, JR31
12	3749	Western Blue Mountains Scribbly Gum Forest	Good	1.64	Southern Tableland Dry Sclerophyll Forest	>100 ha	1	BH6 JR20
13	3749	Western Blue Mountains Scribbly Gum Forest	Shrubland	1.35	Southern Tableland Dry Sclerophyll Forest	>100 ha	1	BH14, JR4B, JR19
14	3932	Central and Southern Tableland Swamp Meadow Complex	Moderate	2.38	Montane Bogs and Fens	>100 ha	2	JR5, JR17, JR28

Zone ID	PCT ID	PCT name	Condition / other defining feature	Area (ha)	Vegetation class	Patch size class	No. vegetation integrity plots required	Vegetation integrity plots sampled
Indirect impacts								
MZ3I (16)[1,2]	3385	Southern Tableland Creekflat Swamp Woodland	Good	1.03	Subalpine Woodlands	>100 ha	1	JR6, BH10, JR30
MZ4I (17)[1,2]	3385	Southern Tableland Creekflat Swamp Woodland	Moderate	0.05	Subalpine Woodlands	>100 ha	1	JR11, JR27
Other vegetation								
15	0[3]	Non-native	Non-native	29.96	N/A	N/A	N/A	JR7, JR7B, BH15, BH16
N/A	N/A	Planted vegetation	Planted	0.27	N/A	N/A	N/A	JR24
N/A	N/A	Waterbody	Waterbody	0.78	N/A	N/A	N/A	N/A

Notes: 1. MZ = management zone created for the purpose of calculating indirect impacts.
2. Vegetation zone ID entered in the BAM-C for the purpose of calculating credits for indirect impacts separately from the direct impact vegetation zones.
3. For the purpose of calculating a VI score and species credits (if necessary) non-native vegetation in the subject land was assigned to PCT 3385 in BAM-C (vegetation zone 15) 3385_non-native (refer to section 4.1).

4.4.2 Vegetation integrity (vegetation condition)

Vegetation integrity scores calculated for the vegetation zones in the subject land for direct and indirect impacts are presented in Table 4.11 below. Calculation of the VI scores for indirect impacts is detailed in section 8.2.

Table 4.11 Vegetation integrity scores

Zone ID	Vegetation zone	Composition condition score	Structure condition score	Function condition score (where relevant)	Vegetation integrity score	Hollow bearing trees present?
Direct Impacts						
1	3369_Good	53.4	89.7	88.9	75.3	Yes
2	3369_Shrubland	41.9	52.8	12.2	30.0	No
3	3385_Good	74.4	97.1	76	81.9	Yes
4	3385_Moderate	79.9	70.7	18.1	46.8	No
5	3385_Paddock Trees	27.3	31.5	49	34.8	No
6	3385_Poor	29.7	41.9	2.6	14.8	No
7	3735_Good	91.4	95.5	87.6	91.5	Yes
8	3735_Shrubland	70.1	54.3	14.7	38.3	No
9	3747_Good	73.8	90.8	76.1	79.9	Yes
10	3747_Poor	25.1	32.8	7.6	18.4	No
11	3747_Shrubland	71.8	52.3	22.1	43.6	No
12	3749_Good	95.3	84.5	52.6	75.1	Yes
13	3749_Shrubland	81.2	53.1	13.6	38.8	No
14	3932_Moderate	39.8	60.1	-	48.9	No
Indirect Impacts						
MZ3I	3385_Good	74.4	97.1	76	81.9	Yes
MZ4I	3385_Moderate	79.9	70.7	18.1	46.8	No
Other Vegetation						
15	3385_non-native[1]	0.9	1.8	2.1	1.6	No

Note: 1. For the purpose of calculating a VI score and species credits non-native vegetation in the subject land was assigned to PCT 3385 in BAM-C (vegetation zone 15) 3385_non-native (refer to section 4.1).

4.4.3 Vegetation zone descriptions

The structure, species composition and condition of the vegetation zones within the subject land are described in Table 4.12 to Table 4.25. This includes information on the condition for each vegetation zone, assessment against the benchmark scores for species composition, function and vegetation structure for each PCT, attributes used to assess ecosystem function and percentage cover of high threat weeds (HTW). Locations of vegetation integrity plots are shown in Figure 4.1.

Table 4.12 Description of PCT 3369 Good within the subject land

Zone 1 – PCT 3369 Central Tableland Ranges Peppermint - Gum Grassy Forest – Good	
Plant community type	Central Tableland Ranges Peppermint-Gum Grassy Forest
PCT ID	3369
Photos	 ***Photo 4.2 PCT 3369_Good (Plot BH9)***
Survey effort	JR4, BH9, JR16, JR22
Conservation significance	Native vegetation, not a TEC.
Patch size	>100 ha
Area (ha)	1.47
Condition	Good – Tree composition was variable but generally at benchmark level – Shrub, grass, fern and forb composition was slightly below the benchmark – Other growth forms below the benchmark – Tree, shrub and grass cover was on average well above benchmark – Forbs structure below benchmark – Up to 51.5 m of fallen logs present – Up to 66% leaf litter recorded – 3 hollow-bearing trees recorded – All tree stem classes present – Moderate HTW cover.

Zone 1 – PCT 3369 Central Tableland Ranges Peppermint - Gum Grassy Forest – Good	
Current vegetation integrity score	75.3
Landscape position	Occurs on clay loam soils with a sandstone substrate on sheltered hillslopes throughout the study area.
Structure	Tall open forest dominated by Red Stringybark (*Eucalyptus macrorhyncha),* with scattered trees and a mixed understory of native and exotic species.
Over-storey	Dominated by Red Stringybark (*Eucalyptus macrorhyncha*), Brittle Gum (*Eucalyptus mannifera*) with patches of Mountain Gum (*Eucalyptus dalrympleana*), Apple Box (*Eucalyptus bridgesiana*) and Broad-leaved Peppermint (*Eucalyptus dives*). Low cover of Silver Wattle (*Acacia dealbata*)
Mid-storey	Dominated by Dolly bush (*Cassinia aculeata*) with low abundance of Dorothy's Wattle (*Acacia dorothea*), Narrow-leaved Geebung (*Persoonia linearis*), *Indigofera* sp., and Sifton Bush (*Cassinia sifton*). Low cover of Hickory Wattle (*Acacia falciformis*) and *Bursaria spinosa*
Groundcover	Forbs: Moderate species diversity and generally low cover of *Opercularia sp.,* Stinking Pennywort (*Hydrocotyle laxiflora*), *Acaena echinata* var. *echinata*, *Goodenia* sp., Blueberry Lilly (*Dianella revoluta*), Native Geranium (*Geranium solanderi*), Swamp Dock (*Rumex brownii*) and Trailing Speedwell (*Veronica plebeia*). Grasses: High cover of *Poa* sp. and Smooth-flower Wallaby Grass (R*ytidosperma pilosum*), moderate cover of Wattle Mat-Rush (*Lomandra filiformis*) and *Rytidosperma* sp., sparse patches of Forest Hedgehog Grass (*Echinopogon ovatus*) and *Eragrostis* sp.
Exotic species	Moderate cover of Cocksfoot (*Dactylis glomerata*) with low cover of other exotics Smooth Catsear (*Hypochaeris glabra*), Spear Thistle (*Cirsium vulgare*), Ribwort Plantain (*Plantago lanceolata*), Flatweed (*Hypochaeris radicata*) and Viper's Bugloss (*Echium vulgare*). HTW: High abundance of Harding Grass (*Phalaris aquatica*); low cover of Moth Vine (*Araujia sericifera*), Browntop Bent (*Agrostis capillaris*), Hawthorn (*Crataegus monogyna*), Briar rose (R*osa rubiginosa*) and *Paspalum dilatatum*

Table 4.13 Description of PCT 3369 shrubland within the subject land

Zone 2 – PCT 3369 Central Tableland Ranges Peppermint - Gum Grassy Forest – Shrubland	
Plant community type	Central Tableland Ranges Peppermint-Gum Grassy Forest
PCT ID	3369
Photos	 *Photo 4.3 PCT 3369_Shrubland (Plot BH8)*
Survey effort	BH8, BH21, JR18, JR26, JR29
Conservation significance	Native vegetation, not a TEC.
Patch size	>100 ha
Area (ha)	5.48
Condition	Shrubland – Overall tree, shrub, grass, forb, fern and other growth was below the benchmark – Shrub and grass structure was highly variable – Tree and forb structure was well below benchmark – Fern cover was well above benchmark – Up to 26.5m of fallen logs were present – Up to 7% cover of leaf litter present – No hollow-bearing trees present – Tree stem class of 0-10 cm present – Up to 12.5% HTW cover present.
Current vegetation integrity score	30
Landscape position	Occurs on lower slopes of the study site where the original woodland has been cleared for a transmission line
Structure	Low abundance of small trees, dominated by *Cassinia longifolia* with a mostly native understory.

Zone 2 – PCT 3369 Central Tableland Ranges Peppermint - Gum Grassy Forest – Shrubland	
Over-storey	N/A
Mid-storey	Low abundance of Silver Wattle (*Acacia dealbata*) and Blackwood (*Acacia melanoxylon*).
Groundcover	Forbs: Moderate diversity but generally low abundance of *Plantago* sp., *Monotaxis linifolia*, Silky Purple-flag (*Patersonia sericea*), *Veronica* sp., Forest Goodenia (*Goodenia hederacea*), Blueberry Lilly (*Dianella revoluta*). Shrubs: Dominated by *Cassinia longifolia* with patches of Peach Heath (*Lissanthe strigosa*), Box-Leaf Wattle (*Acacia buxifolia*), *Dillwynia* sp., Heath Phyllota (*Phyllota phylicoides*), Clustered Bush-pea (*Pultenaea dentata*) and *Gaudium parvifolium*. Grasses: Moderate cover of Kangaroo Grass (*Themeda triandra*) with small patches of *Rytidosperma* sp., Wattle Mat-rush (*Lomandra filiformis*), *Austrostipa* sp., *Aristida* sp. and *Poa sieberiana*. Ferns: Common Bracken (*Pteridium esculentum*)
Exotic species	Very low cover of exotics including Smooth Catsear (*Hypochaeris glabra*), *Conyza* sp., Stink Grass (*Eragrostis cilianensis*), Spear Thistle (*Cirsium vulgare*) HTW: St John's-wort (*Hypericum perforatum*) and Blackberry (*Rubus fruticosus* sp. agg.)

Table 4.14 Description of PCT 3385 Good within the subject land

Zone 3 – PCT 3385 Southern Tableland Creekflat Swamp Woodland – Good	
Plant community type	Southern Tableland Creekflat Swamp Woodland
PCT ID	3385
Photos	 ***Photo 4.4 PCT 3385_Good (Plot BH10)***
Survey effort	JR6, BH10, JR30
Conservation significance	Native vegetation, not a TEC.
Patch size	>100 ha
Area (ha)	2.59

Zone 3 – PCT 3385 Southern Tableland Creekflat Swamp Woodland – Good	
Condition	Good – Tree composition was at benchmark level – Shrub and grass composition on average was below benchmark – Forb and other growth composition was highly variable – Tree structure was well above benchmark – Shrub structure was well below benchmark – Grass structure was at or just below benchmark – Forb structure was highly variable – Up to 40 m of fallen logs were present – Moderate cover of leaf litter up to 59% – Tree stem classes between 0-80 cm present. – Highly variable HTW cover.
Current vegetation integrity score	81.9
Landscape position	Occurs on alluvium soils along damp drainage flats at the bottom of slopes and creek lines across the study area.
Structure	Tall open woodland with a mixed canopy of Silver wattle (*Acacia dealbata subsp. dealbata*), Snow Gum (*Eucalyptus pauciflora*), Manna Gum (*Eucalyptus viminalis*), Black Gum (*Eucalyptus aggregata*) and Candlebark (*Eucalyptus rubida*). Mixed understory of native and exotic species.
Over-storey	Good species diversity in over-storey with Silver wattle (*Acacia dealbata* subsp*. dealbata*), Snow Gum (*Eucalyptus pauciflora*), Manna Gum (*Eucalyptus viminalis*), Black Gum (*Eucalyptus aggregata*) and Candlebark (*Eucalyptus rubida*).
Mid-storey	Minimal mid-storey, low abundance of Black wattle (*Acacia decurrens*)
Groundcover	Forbs: Extremely high diversity of forbs, high abundance *of Gonocarpus tetragynus*, Small St. John's Wort (*Hypericum gramineum*), Rough Bedstraw (*Galium gaudichaudii*), Stinking Pennywort (*Hydrocotyle laxiflora*), Variable Stinkweed (*Opercularia varia*), Button Everlasting (*Coronidium scorpioides*), Trailing Speedwell (*Veronica plebeia*), Common Everlasting (*Chrysocephalum apiculatum*), *Poranthera microphylla*, Bidgee-widgee (*Acaena novae-zelandiae*), Creeping Mint (*Mentha satureioides*) and low abundance of Native Violet (*Viola betonicifolia*), Variable Stink Weed (*Opercularia varia*), Native Geranium (*Geranium solanderi*) and Australian Carraway (*Oreomyrrhis eriopoda*) Shrubs: Sifton Bush (*Cassinia Sifton*), Peach Heath (*Lissanthe strigose*) and *Dillwynia* spp. Grasses: moderate to high cover of Wattle Mat-rush (L*omandra filiformis*), Tussock (*Poa labillardierei* var*. labillardierei*), Spiny-headed Mat-rush (L*omandra longifolia*), Ringed Wallaby Grass (*Rytidosperma caespitosum*) and *Poa sieberiana*. Lower abundance of Common Reed (*Phragmites australis*), *Lomandra multiflora*, *Echinopogon caespitosus*, *Dichelachne micrantha* and *Austrostipa rudis* subsp*. nervosa*. Others: Slender Tick-trefoil (*Grona varians*), *Glycine clandestine*, *Glycine tabacina* and *Glycine microphylla*
Exotic species	Exotics: moderate infestation of Sweet Vernal Grass (*Anthoxanthum odoratum*) sparse cover of Scarlet Pimpernel (*Lysimachia arvensis*), Plantain (*Plantago lanceolata*), Black-berry Nightshade (*Solanum nigrum*) and Flatweed (*Hypochaeris radicata*). HTW: Johnson Grass (*Sorghum halepense*), Serrated Tussock (*Nassella trichotoma*), Blackberry (*Rubus fruticosus* sp. agg), St. John's Wort (*Hypericum perforatum*), African Lovegrass (*Eragrostis curvula*).

Table 4.15 Description of PCT 3385 Moderate within the subject land

Zone 4 – PCT 3385 Southern Tableland Creekflat Swamp Woodland – Moderate	
Plant community type	Southern Tableland Creekflat Swamp Woodland
PCT ID	3385
Photos	 *Photo 4.5 PCT 3385_Moderate (Plot JR11)*
Survey effort	JR11, JR27
Conservation significance	Native vegetation, not a TEC.
Patch size	>100 ha
Area (ha)	0.83
Condition	Moderate – Tree, grass and forb composition was below benchmark – shrub, other and fern composition was well below benchmark – Grass and Forb structure was well above benchmark – Tree and shrub structure was below benchmark – Up to 14 m of fallen logs present – Up to 11% leaf litter cover – Tree stem class of 5-10 cm present – Minimal HTW cover up to 1.1%.
Current vegetation integrity score	46.8
Landscape position	Occurs in damp drainage flats that have been disturbed through clearing of woodland throughout the study site.
Structure	Juvenile eucalyptus present, dominated by Tussock (*Poa labillardierei var. labillardierei*) and Native Geranium (G*eranium solanderi*). Mixed understory of natives and exotics.
Over-storey	None present
Mid-storey	None present

Zone 4 – PCT 3385 Southern Tableland Creekflat Swamp Woodland – Moderate	
Groundcover	Trees: Low cover of saplings, Candlebark (*Eucalyptus rubida*), Apple Box (*Eucalyptus bridgesiana*), Black Gum (*Eucalyptus aggregata*) Forbs: Dominated by Native Geranium (G*eranium solanderi*), *Oxalis perennas, Gonocarpus tetragynus.* Lower cover of Slender Mint (*Mentha diemenica*), Cotton Fireweed (*Senecio quadridentatus*), Stinking Pennywort (*Hydrocotyle laxiflora*), *Euchiton sphaericus*, *Geranium homeanum*, Small St. John's Wort (*hypericum gramineum*), Swamp Isotome (*Isotoma fluviatilis*). Shrubs: Minimal cover of Sifton Bush (*Cassinia sifton*). Grasses: High cover of Tussock (*Poa labillardierei var. labillardierei*), *Juncus usitatus*, moderate cover of Brown's Lovegrass (*Eragrostis brownii*), *Carex inversa*, *Juncus spp*., low cover of Shorthair Plumegrass (*Dichelachne micrantha*), *Austrostipa pubescens*.
Exotic species	Exotic: High cover of Cocksfoot (*Dactylis glomerata*), Sweet Vernal Grass (*Anthoxanthum odoratum*), Lamb's Tongues (*plantago lanceolata*), Spear Thistle (*Cirsium vulgare*), Dandelion (*Taraxacum officinale*), Common Centaury (*Centaurium erythraea*), Purpletop (*Verbena bonariensis*), *Galium leptogonium*, White Clover (*Trifolium repens*), Scarlet Pimpernel (*Lysimachia arvensis*), Crowsfoot Grass (*Eleusine indica*), Fleabane (*Conyza bonariensis*) HTW: low abundance of Blackberry (*Rubus fruticosus* sp. agg), and Paspalum (*Paspalum dilatatum*).

Table 4.16 Description of PCT 3385 Paddock Trees within the subject land

Zone 5 – PCT 3385 Southern Tableland Creekflat Swamp Woodland – Paddock trees	
Plant community type	Southern Tableland Creekflat Swamp Woodland
PCT ID	3385
Photos	 ***Photo 4.6 PCT 3385_Paddock trees (Plot BH1)***
Survey effort	BH1
Conservation significance	Native vegetation, not a TEC.
Patch size	>100 ha
Area (ha)	0.61

Zone 5 – PCT 3385 Southern Tableland Creekflat Swamp Woodland – Paddock trees	
Condition	Paddock trees – Tree, shrub, grass and forb composition was all below benchmark – Tree cover was well above benchmark – Shrub, grass and forb cover were well below benchmark – Moderate leaf litter up to 31% cover – No fallen timber present – All tree stem classes present besides 30-50 cm. – High level of HTW cover up to 65%.
Current vegetation integrity score	34.8
Landscape position	Occurs in damp drainage flats which have been disturbed in the riparian corridor along the Coxs River.
Structure	Sparse cover of Black Gum (*Eucalyptus aggregata*) and Candlebark (*Eucalyptus rubida*). Mixed understory of native and exotic species.
Over-storey	Low cover of Black Gum (*Eucalyptus aggregata*), Candlebark (*Eucalyptus rubida*)
Mid-storey	Absent
Groundcover	Forbs: Low cover of Bidgee-widgee (*Acaena novae-zelandiae*), Acaena (*Acaena ovina*) and *Oxalis perennans*, Grasses: Moderate diversity but generally low cover of C*arex breviculmis*, *Carex longebrachiata*, Wattle Matt-rush (*Lomandra filiformis*), Many-flowered Mat-rush (*Lomandra multiflora* subsp. *multiflora*), Woodrush (*Luzula flaccida*), Weeping Grass (*Microlaena stipoides*), *Themeda triandra*
Exotic species	Exotic: moderate cover of Perennial Ryegrass (*Lolium perenne*) and low cover of Bearded Oats (*Avena barbata*), Soft Brome (*Bromus molliformis*), Kikuyu Grass (*Cenchrus clandestinus*), Cocksfoot (*Dactylis glomerata*), Patterson's Curse (*Echium plantagineum*), Barley Grass (*Hordeum leporinum*), Catsear (*Hypochaeris radicata*), Lamb's Tongues (*Plantago lanceolata*), Common Chickweed (*Stellaria media)* HTW: High cover of Kikuyu grass (*Cenchrus clandestinus*) and low cover of Sheep Sorrel (*Acetosella vulgaris*), St. John's Wort (*Hypericum perforatum*), Chilean Needle Grass (*Nassella neesiana*), Serrated Tussock (*Nassella trichotoma*), Phalaris (*Phalaris aquatica*), Blackberry (*Rubus fruticosus* sp. agg.)

Table 4.17 Description of PCT 3385 Poor within the subject land

Zone 6 – PCT 3385 Southern Tableland Creekflat Swamp Woodland – Poor	
Plant community type	Southern Tableland Creekflat Swamp Woodland
PCT ID	3385
Photos	 *Photo 4.7 PCT 3385_Poor (Plot BH19)*
Survey effort	BH2, BH3, JR9, BH19, JR15
Conservation significance	Native vegetation, not a TEC.
Patch size	>100 ha
Area (ha)	6.94
Condition	Poor – Grass and forb composition was highly variable – Tree, shrub, other and fern composition was well below benchmark – Grass and Forb structure was highly variable – Tree and shrub structure well below benchmark – Up to 14m of fallen logs present – Up to 11% leaf litter cover – Tree stem class of 5-10cm present – HTW cover was highly variable, up to 53% cover.
Current vegetation integrity score	14.8
Landscape position	Occurs on damp drainage flats that have been disturbed through agriculture, grazing and construction of the former Wallerawang Power station.
Structure	Sub-mature trees present, dominated by Couch (*Cynodon dactylon*) and a mixed understory of native and exotic species.
Over-storey	Sub-mature eucalyptus present in small patches Black Gum (E*ucalyptus aggregata*), Apple Box (*Eucalyptus bridgesiana*), Manna Gum (*Eucalyptus viminalis*), Silver Wattle (A*cacia dealbata*) and Candlebark (*Eucalyptus rubida*).
Mid-storey	None present

Zone 6 – PCT 3385 Southern Tableland Creekflat Swamp Woodland – Poor	
Groundcover	Forbs: Dominated by Pennywart (*Hydrocotyle tripartite*) *Oxalis perennans*, *Gonocarpus tetragynus*, Stinking Pennywort (*Hydrocotyle laxiflora*), *Haloragis heterophylla*. Lower cover of Slender Mint (*Mentha diemenica*), Cotton Fireweed (*Senecio quadridentatus*), *Geranium homeanum*, *Euchiton sphaericus* and *Tricoryne elatior*. Shrubs: moderate cover of Sifton Bush (*Cassinia sifton*). Grasses: High cover of Couch (*Cynodon dactylon*) with moderate cover of Brown's Lovegrass (*Eragrostis brownii*), *Carex inversa*, *Juncus spp*., low cover of weeping grass (*Microlaena stipoides), rytidosperma leave, Poa sieberiana, lomandra longifolia, Lomandra multiflora* and *Schoenus apogon*
Exotic species	Exotic: High cover of (*Vulpia myuros*), Sweet Vernal Grass (*Anthoxanthum odoratum*), Cudweed (*Gamochaeta americana*), Flatweed (*Hypochaeris radicata*), Cocksfoot (*Dactylis glomerata*), Plantain (*Plantago lanceolata*). HTW: Moderate cover of African Lovegrass (*Eragrostis curvula*), Kikuyu Grass (*Cenchrus clandestinus*), *Phalaris aquatica*, lower abundance of Blackberry (*Rubus fruticosus* sp. agg), Briar Rose (*Rosa rubiginosa*) and St. John's Wort (*Hypericum perforatum*).

Table 4.18 Description of PCT 3735 Good within the subject land

Zone 7 – PCT 3735 Central Tableland Peppermint Shrub-Grass Forest – Good	
Plant community type	Central Tableland Peppermint Shrub-Grass Forest
PCT ID	3735
Photos	 ***Photo 4.8 PCT 3735_Good (Plot BH13)***
Survey effort	BH4, BH13, JR25
Conservation significance	Native vegetation, not a TEC.
Patch size	>100 ha
Area (ha)	1.69

Zone 7 – PCT 3735 Central Tableland Peppermint Shrub-Grass Forest – Good	
Condition	Good – Tree composition was on average at the benchmark level – Shrub and Grass composition was highly variable – Forb cover was above benchmark – Fern and other growth forms where variable. – Tree and forb structure was below benchmark – Shrub structure was well above benchmark – Grass structure was highly variable – Moderate leaf litter up to 68% cover – Fallen logs up to 61 m present – All stem classes present – Very low HTW cover, up to 1%.
Current vegetation integrity score	91.5
Landscape position	Occurs on sedimentary substrates on gentle hillslopes and broad flats across the study area.
Structure	Tall, dry, open forest found on moderate slopes, patchy layer of acacia underneath the Eucalyptus canopy and characterized by generally low species richness.
Over-storey	Dominated by Broad-leaved Peppermint (*Eucalyptus dives*), Mountain Gum (*Eucalyptus dalrympleana*) with lower cover of Apple Box (*Eucalyptus bridgesiana*), Parramatta Wattle (*Acacia parramattensis*), Red Stringybark (*Eucalyptus macrorhyncha*), Silver Wattle (*Acacia dealbata* subsp. *dealbata*)
Mid-storey	Low cover and abundance of Box-leaved Wattle (*Acacia buxifolia*) Swamp Wattle (*Acacia elongata*) Parramatta Wattle (*Acacia parramattensis*), Black Wattle (*Acacia decurrens*)
Groundcover	Shrubs: High cover of Sifton Bush *(Cassinia Sifton)*, generally low cover of *Monotoca scoparia*, *Pultenaea microphylla*, Cherry Ballart (*Exocarpos cupressiformis*), Cough Bush (*Cassinia laevis*), Daphne Heath (*Brachyloma daphnoides*), Dolly Bush (*Cassinia aculeata*), Dwarf Wedge Pea (*Gompholobium minus*), Hoary Guinea Flower (*Hibbertia obtusifolia*), Narrow-leaved Geebung (*Persoonia linearis*), Native Blackthorn (*Bursaria spinosa* subsp. *lasiophylla*), Parrot-pea (*Dillwynia phylicoides*), Peach Heath (*Lissanthe strigosa*), Pyramid Flower (*Comesperma ericinum*). Forbs: High diversity but low cover of *Leucochrysum albicans* subsp. *albicans*, *Goodenia* spp., *Hovea heterophylla*, *Plantago varia*, *Oxalis perennans, Acaena echinata* var. *echinata*, *Vittadinia cuneata* var. *cuneata*, Blueberry Lily (*Dianella revoluta*), Button Everlasting (*Coronidium scorpioides*), Ivy Goodenia (*Goodenia hederacea*), Native Pennyroyal (*Mentha satureioides*), Native Violet (*Viola betonicifolia*), Poverty Raspwort (*Gonocarpus tetragynus*), Rough Bedstraw (*Galium gaudichaudii*), Small St John's Wort (*Hypericum gramineum*), Spike Centaury (*Schenkia spicata*), Stinking Pennywort (*Hydrocotyle laxiflora*), *Patersonia* spp., Trailing Speedwell (*Veronica plebeian*), Tufted Bluebell (*Wahlenbergia communis*), Variable Raspwort (*Haloragis heterophylla*), Variable Stinkweed (*Opercularia varia*). Grasses*:* High cover of *Austrostipa scabra,* low cover of *Lomandra filiformis* subsp. *filiformis*, *Lomandra cylindrica*, *Austrostipa rudis* subsp. *nervosa*, Brown's Lovegrass (*Eragrostis brownii*), Bushy Hedgehog-grass (*Echinopogon caespitosus*), Common Wheatgrass (*Elymus scaber*), Pale Mat-rush (*Lomandra glauca*), Redanther Wallaby Grass (*Rytidosperma pallidum*), Smooth-flowered Wallaby Grass (*Rytidosperma pilosum*), *Poa sieberiana*, *Austrostipa scabra*, Wattle Matt-rush (*Lomandra filiformis* subsp. *coriacea*), Others: Low cover of False Sarsaparilla (*Hardenbergia violacea*), Small-leaf Glycine (*Glycine microphylla*), Twining glycine (*Glycine clandestina*) Ferns: Low cover of Rock Fern (*Cheilanthes sieberi*)
Exotic species	Exotic*:* Low cover of *Setaria parviflora*, Common Centaury (*Centaurium erythraea*), Spear Thistle (*Cirsium vulgare*). HTW: Low cover of Moth Vine (*Araujia sericifera*), St. John's Wort (*Hypericum perforatum*), Sweet Briar (*Rosa rubiginosa*)

Table 4.19 Description of PCT 3735 Shrubland within the subject land

Zone 8 – PCT 3735 Central Tableland Peppermint Shrub-Grass Forest – Shrubland	
Plant community type	Central Tableland Peppermint Shrub-Grass Forest
PCT ID	3735
Photos	 *Photo 4.9 PCT 3735_Shrubland (Plot BH13B)*
Survey effort	JR1, JR2, BH12, BH13B, JR14
Conservation significance	Native vegetation, not a TEC.
Patch size	>100 ha
Area (ha)	7.53
Condition	Shrubland – Tree and shrub composition was below benchmark – Grass and forb composition was above benchmark – Tree structure was well below benchmark – Shrub and Grass structure was well above benchmark – Forb structure was variable – Moderate leaf litter cover up to 41% – Fallen logs where variable, up to 36 m – Tree stem class of 5-10 cm present – Very low HTW cover up to 0.7%.
Current vegetation integrity score	38.3
Landscape position	Occurs on sedimentary substrates on broad flats across the study area where woodland has been cleared for construction.
Structure	Sub mature eucalyptus dominated by Manuka (*Leptospermum scoparium*) and Sifton Bush (*Cassinia Sifton*). Mixed native and exotic understory.
Over-storey	Apple Box (*Eucalyptus bridgesiana*), Mountain Gum (*Eucalyptus dalrympleana*), Broad-leaved peppermint (*Eucalyptus dives*).
Mid-storey	Silver Wattle (*Acacia dealbata),* Paramatta Wattle *(Acacia parramattensis),* Silver Wattle *(Acacia dealbata* subsp*. dealbata),* Box Leaf Wattle (*Acacia buxifolia),* Green Wattle *(Acacia deanei)*
Groundcover	Forbs: Generally high diversity but low cover of Blueberry Lily (*Dianella revoluta*), *Leucochrysum albicans*, *Gonocarpus tetragynus*, *Plantago varia*, *Haloragis heterophylla*, *Acaena novae-zelandiae*, *Goodenia hederacea*, *Euchiton sphaericus*, Stinking Pennywort (*Hydrocotyle laxiflora*), *Schenkia australis*, Yellow Autumn-lily (*Tricoryne elatior*), Common Everlasting (*Chrysocephalum apiculatum*), Variable Stinkweed (*Opercularia varia*), *Bossiaea prostrata*, *Vittadinia muelleri.*

Zone 8 – PCT 3735 Central Tableland Peppermint Shrub-Grass Forest – Shrubland	
	Shrubs: Dominated by Manuka (*Leptospermum scoparium*), Sifton Bush (*Cassinia Sifton*) with low cover of *Bossiaea buxifolia*, Peach Heath (*Lissanthe strigose*), Prickly Currant Bush (*Coprosma quadrifida*), Rough Guinea Flower (*Hibbertia aspera*), *Platylobium montanum* subsp*. montanum*, *Leptospermum polygalifolium*, *Leptospermum arachnoides*. Grasses: High cover of Kangaroo Grass (*Themeda triandra*), *Poa sieberiana*, Wattle Mat-rush (*Lomandra filiformis*), *Austrostipa* sp.*,* Speargrass (*Austrostipa scabra* subsp. *scabra*), Silvertop Wallaby Grass (*Rytidosperma pallidum*), Paddock Lovegrass (*Eragrostis leptostachya*), Hairy Panic (*Panicum effusum*). Low cover of Brown's Lovegrass (*Eragrostis brownii*), Common Bog-rush (*Schoenus apogon*), Two-colour Panic (*Panicum simile*).
Exotic species	Exotic: Few exotic species present, low cover of Smooth Catsear (*Hypochaeris glabra*), Plantain (*Plantago lanceolata*), Stinkgrass (*Eragrostis cilianensis*), Common Centaury (*Centaurium erythraea*), Flatweed (*Hypochaeris radicata*), Paterson's Curse (*Echium plantagineum*). HTW: St John's Wart (*Hypericum perforatum*), Blackberry (*Rubus fruticosus* sp. agg), Serrated Tussock (*Nassella trichotoma*).

Table 4.20 Description of PCT 3747 Good within the subject land

Zone 9 – PCT 3747 Southern Tableland Western Hills Scribbly Gum Forest – Good	
Plant community type	Southern Tableland Western Hills Scribbly Gum Forest
PCT ID	3747
Photos	 ***Photo 4.10 PCT 3747_Good (Plot BH5)***
Survey effort	BH5, JR10, BH11, JR21

Zone 9 – PCT 3747 Southern Tableland Western Hills Scribbly Gum Forest – Good	
Conservation significance	Native vegetation, not a TEC.
Patch size	>100 ha
Area (ha)	4.65
Condition	Good – Tree, grass and fern composition was below benchmark – Shrub, forb and other growth form composition was variable – Grass cover was below benchmark – Tree, shrub and forb cover was below benchmark – Grass cover was highly variable – Leaf litter cover was very high, up to 90% – Fallen logs were present up to 51 m. – All tree stem classes were present – No HTW recorded.
Current vegetation integrity score	79.9
Landscape position	Occurs on sedimentary soils with a shale or sandstone substrate on hillslopes and hillcrests across the study area.
Structure	Moderatly tall, dry, open forest on rocky slopes. Moderatly dense canopy interspersed with a shrubby layer of *Acacia* underneath. Moderatly dense underlayer of native forbs and grasses.
Over-storey	High cover of Inland Scribbly Gum (*Eucalyptus rossii*) and Brittle Gum (*Eucalyptus mannifera*), interspersed with Parramatta Wattle (*Acacia parramattensis*), Silver Wattle(*Acacia dealbata*), Blue-leaved Stringybark (*Eucalyptus agglomerata*), Red Stringybark (*Eucalyptus macrorhyncha*), Broad-leaved Peppermint (*Eucalyptus dives*),
Mid-storey	Moderately dense mid-storey containing Box-leaved Wattle (*Acacia buxifolia*), Swamp Wattle (*Acacia elongata*), Ploughshare Wattle (*Acacia gunnii*), Hickory Wattle (*Acacia implexa*), Sunshine Wattle (*Acacia terminalis*)
Groundcover	Shrubs: Moderate cover of shrubs including Prickly Moses (*Acacia ulicifolia*), Small-leaved Boronia (*Boronia microphylla*), *Bossiaea buxifolia*, *Cassinia longifolia*, *Cassinia sifton*, *Dillwynia* spp., Cherry Ballart (*Exocarpos cupressiformis*), Pale Wedge Pea (*Gompholobium huegelii*), Rough Guinea Flower (*Hibbertia aspera*), Hoary Guinea Flower (*Hibbertia obtusifolia*), Australian Indigo (*Indigofera australis*), Peach Heath (*Lissanthe strigosa*), *Monotoca ledifolia*, Narrow-leaved Geebung (*Persoonia linearis*), *Platysace ericoides*, *Pultenaea microphylla.* Forbs: High diversity but generally low cover of Common Everlasting (*Chrysocephalum apiculatum*), Clustered Everlasting *(Chrysocephalum semipapposum*), Button Everlasting (*Coronidium scorpioides*), Blueberry Lily (*Dianella revoluta*), *Dipodium roseum*, Star Cudweed (*Euchiton sphaericus*), Poverty Raspwort (*Gonocarpus tetragynus*), *Goodenia bellidifolia* subsp. *bellidifolia*, Ivy Goodenia (*Goodenia hederacea*), Blue Bottle-daisy (*Lagenifera stipitata*), Common Lagenophora (*Lagenophora stipitata*), Variable Stinkweed (*Opercularia varia*), *Patersonia* spp., Small Poranthera (*Poranthera microphylla*), Prawn Greenhood (*Pterostylis pedoglossa*), *Senecio diaschides*, Hairy Speedwell (*Veronica calycina*), Trailing Speedwell (*Veronica plebeian*), Tufted Bluebell (*Wahlenbergia communis*), Sprawling Bluebell (*Wahlenbergia gracilis*), Tall Bluebell (*Wahlenbergia stricta*), Sticky Everlasting (*Xerochrysum viscosum*). Grasses: Dominated by *Austrostipa pubescens*, *Austrostipa scabra* and *Lomandra filiformis* subsp. *filiformis* with lower cover of Purple Wiregrass (*Aristida ramosa*), Common Couch (*Cynodon dactylon*), *Lomandra cylindrica*, Pale Mat-rush (*Lomandra glauca*), Many-flowered Mat-rush (*Lomandra multiflora* subsp. *multiflora*), *Poa sieberiana*, Ringed Wallaby Grass (*Rytidosperma caespitosum*), Wallaby Grass (*Rytidosperma erianthum*), Redanther Wallaby Grass (*Rytidosperma pallidum*), Smooth-flowered Wallaby Grass (*Rytidosperma pilosum*), Wallaby Grass (*Rytidosperma racemosum* var. *racemosum*). Other: Low cover of Hairy Apple Berry *(Amyema pendula)*, *Billardiera scandens*, *Cassytha glabella*, Variable Glycine (*Glycine tabacina*), False Sarsaparilla (*Hardenbergia violacea.*)
Exotic species	Exotics: Low abundance and cover of Common Centaury (*Centaurium erythraea*), *Gamochaeta americana*, Catsear (*Hypochaeris radicata*), Sheep Sorrel (*Rumex acetosella*). HTW: None recorded

Table 4.21 Description of PCT 3747 Poor within the subject land

Zone 10 – PCT 3747 Southern Tableland Western Hills Scribbly Gum Forest – Poor	
Plant community type	Southern Tableland Western Hills Scribbly Gum Forest
PCT ID	3747
Photos	 *Photo 4.11 PCT 3747_Poor (Plot JR13)*
Survey effort	JR8, BH7, JR13, BH18, JR32
Conservation significance	Native vegetation, not a TEC.
Patch size	>100 ha
Area (ha)	5.96
Condition	Poor – Tree, shrub, grass and forb composition all below benchmark – Tree, shrub and forb cover below benchmark – Grass cover was highly variable – Leaf litter was very low, up to 11% cover – No fallen logs present – Tree stem class of 5-10 cm present – Moderate HTW cover up to 23.4%.
Current vegetation integrity score	18.4
Landscape position	Occurs on sedimentary soils with a shale or sandstone substrate on hillslopes and hillcrests across the study area which have been cleared of woodland and heavily disturbed.
Structure	Open grassland with no overstory, dominated by native grass *Bothriochloa macra,* moderate cover of Sifton Bush (*Cassinia sifton*) with sub mature Silver Wattle (*Acacia dealbata*). Mixed exotic and native understory.

Zone 10 – PCT 3747 Southern Tableland Western Hills Scribbly Gum Forest – Poor	
Over-storey	Not present
Mid-storey	Sub mature Silver Wattle (*Acacia dealbata*) present.
Groundcover	Forbs: Generally low cover and abundance of other forbs Snow Daisy (*Celmisia longifolia*), Rough Raspwort (*Haloragis heterophylla*), Native Flax (*Linum marginale*), Cotton Fireweed (*Senecio quadridentatus*), *Oxalis perennans,* Bidgee-widgee (*Acaena novae-zelandiae*), Black-seeded Daisy (*Brachyscome melanocarpa*). Shrubs: Moderate cover of Sifton bush (*Cassinia sifton*) and low cover of *Cryptandra spinescens.* Grasses: Dominated *by (Bothriochloa macra)* and Smallflower Wallaby grass with low cover of *Rytidosperma setaceum*, Brown's Lovegrass (*Eragrostis brownii*), Windmill Grass (*Chloris truncata*), Wallaby Grass (*Rytidosperma fulvum*), *Austrostipa pubescens*, Smooth-flower Wallaby Grass (*Rytidosperma pilosum*), *Carex breviculmis,* Couch (*Cynodon dactylon*), *Juncus usitatus.*
Exotic species	Extensive invasion by exotic species French Flax (*Linum trigynum*), White clover (*Trifolium repens*), Salad Burnet (*Sanguisorba minor*), Plantago (*Plantago lanceolata*), Smooth Catsear (*Hypochaeris glabra*), Common Centuary (*Centaurium erythraea*), Pincushion (*Sixalix atropurpurea*), Flatweed (*Hypochaeris radicata*), *Vulpia muralis*, Cocksfoot (*Dactylis glomerata*), Soft Brome (*Bromus molliformis*), Spear Thistle (*Cirsium vulgare*), Lamb's Tongues (*Plantago lanceolata*), Scarlet Pimpernel (*Lysimachia arvensis*), Perennial Ryegrass (*Lolium perenne*), Bearded Oats (*Avena barbata*), *Setaria parvifloral.* HTW: High cover of St. John's Wart (Hypericum perforatum) and Phalaris (*Phalaris aquatica*), Paspalum (*Paspalum dilatatum*), Briar Rose (*Rosa rubiginosa*), Blackberry (*Rubus fruticosus* sp. agg.), African Lovegrass (*Eragrostis curvula*).

Table 4.22 Description of PCT 3747 Shrubland within the subject land

Zone 11 – PCT 3747 Southern Tableland Western Hills Scribbly Gum Forest – Shrubland	
Plant community type	Southern Tableland Western Hills Scribbly Gum Forest
PCT ID	3747
Photos	 *Photo 4.12 PCT 3747_Shrubland (Plot BH17)*
Survey effort	JR3, JR12, BH17, BH20, JR23, JR31
Conservation significance	Native vegetation, not a TEC.
Patch size	>100 ha
Area (ha)	12.30
Condition	Shrubland – Tree, shrub and forb composition was below the benchmark – Grass composition was well above benchmark – Fern and other growth forms where variable – Tree structure was well below benchmark – Shrub and grass cover was significantly above benchmark – Forb cover was variable – Leaf litter was variable up to 52% – Fallen logs present up to 97.5 m – Stem classes between 5-20c m present – Very low HTW cover up to 0.2%.
Current vegetation integrity score	43.6

Zone 11 – PCT 3747 Southern Tableland Western Hills Scribbly Gum Forest – Shrubland	
Landscape position	Occurs on sedimentary soils with a shale or sandstone substrate on hillslopes and hillcrests across the study area which have been cleared of woodland.
Structure	Open shrubland with low canopy cover of small to moderate trees, high species richness of shrubs and grasses.
Over-storey	Low cover of Silver Wattle (*Acacia dealbata*), Inland Scribbly Gum (*Eucalyptus rossii*)
Mid-storey	Low cover of Box-leaf Wattle (*Acacia buxifolia*), Dorothy's Wattle (*Acacia Dorothea*)
Groundcover	Forbs: High diversity but generally low cover of *Gonocarpus tetragynus*, *Leucochrysum albicans* subsp. *albicans*, Small St. John's Wart (*Hypericum gramineum*), Variable Stinkweed (*Opercularia varia*), *Oxalis perennans*, Kidney Weed (*Dichondra repens*), Raspwort (*Gonocarpus teucrioides*), *Goodenia bellidifolia*, Blueberry Lily (*Dianella revoluta*), Cotton Fireweed (*Senecio quadridentatus*), *Goodenia hederacea*, Stinking Pennywort (*Hydrocotyle laxiflora*). Shrubs: Dominated by Sifton bush (*Cassinia sifton), Cassinia arcuata* and *Cassinia longifolia* with lower cover of Peach Heath (*Lissanthe strigose*), Spreading-bush Pea (*Pultenaea microphylla*), Sunshine Wattle (*Acacia terminalis*), *Bossiaea buxifolia*, *Dillwynia phylicoides, Leucopogon esquamatus, Platylobium montanum* subsp*. montanum, Leptospermum arachnoides* Grasses: Dominated by Many-flowered Mat-rush (*Lomandra multiflora*) and Speargrass (*Austrostipa scabra*), Purple Wiregrass (*Aristida ramose*), Wallaby Grass (*Rytidosperma fulvum*), *Dichelachne micrantha,* Brown's Lovegrass (*Eragrostis brownii*), Couch (*Cynodon dactylon*), Forest Hedgehog Grass (*Echinopogon ovatus*), Red-leg Grass (*Bothriochloa macra*), Wattle Mat-rush (*Lomandra filiformis subsp. filiformis*), Bushy Hedgehog-grass (*Echinopogon caespitosus*), Jericho Wiregrass (*Aristida jerichoensis*), Weeping Grass (*Microlaena stipoides*). Ferns: Low cover of Common Maidenhair (*Adiantum aethiopicum*), Bracken (*Pteridium esculentum*), *Cheilanthes sieberi* Other: Low cover of Purple Coral Pea (*Hardenbergia violacea*), Small-leaf Glycine (*Glycine microphylla*)
Exotic species	Low cover of *Eragrostis cilianensis, Cirsium vulgare, Hypochaeris glabra, Conyza bonariensis, Lysimachia arvensis, Plantago lanceolata, Hypochaeris radicata, Centaurium erythraea, Anthoxanthum odoratum* HTW: High cover of St John's Wart (*Hypericum perforatum*) and Blackberry (*Rubus fruticosus* sp. agg).

Table 4.23 Description of PCT 3749 Good within the subject land

Zone 12 – PCT 3749 Western Blue Mountains Scribbly Gum Forest – Good	
Plant community type	Western Blue Mountains Scribbly Gum Forest
PCT ID	3749
Photos	 *Photo 4.13 PCT 3749_Good (Plot BH6)*
Survey effort	BH6, JR20
Conservation significance	Native vegetation, not a TEC.
Patch size	>100 ha
Area (ha)	1.64
Condition	Good – Tree, shrub and grass composition was at benchmark level – Forbs were slightly below benchmark – Tree and grass cover was above benchmark – Shrub and forb cover was below benchmark – High cover of lead litter present, up to 67% – Fallen logs up to 34.5 m – All tree stem classes present – No HTW recorded.
Current vegetation integrity score	75.1
Landscape position	Occurs on upper hillslopes and ridges with a sandstone substrate across the study area.
Structure	Tall open forest dominated by Inland Scribbly Gum (*Eucalyptus rossii*) with a moderate shrubby midstorey. Diverse native understory.

Zone 12 – PCT 3749 Western Blue Mountains Scribbly Gum Forest – Good	
Over-storey	High cover of Capertee Stringybark (*Eucalyptus cannonii*), Red Stringybark (*Eucalyptus macrorhyncha*), Brittle Gum (*Eucalyptus mannifera*), Inland Scribbly Gum (*Eucalyptus rossii*) and Narrow-leaved Stringybark (*Eucalyptus sparsifolia*).
Mid-storey	Moderate diversity but lower cover of Box-leaved Wattle (*Acacia buxifolia*), Swamp Wattle (*Acacia elongata*), Sydney Golden Wattle (*Acacia longifolia* subsp. *longifolia*) and Sunshine Wattle (*Acacia terminalis*).
Groundcover	Forbs: Moderate diversity but lower cover of; Button Everlasting (*Coronidium scorpioides*), Blueberry Lily (*Dianella revoluta*), Poverty Raspwort (*Gonocarpus tetragynus*), *Goodenia bellidifolia*, *Hovea heterophylla*, Stinking Pennywort (*Hydrocotyle laxiflora*), Cotton Fireweed (*Senecio quadridentatus*), Tall Bluebell (*Wahlenbergia stricta*), Sticky Everlasting (*Xerochrysum viscosum*), Shrubs: Low cover of Daphne Heath (*Brachyloma daphnoides*), *Cassinia sifton*, Parrot-pea (*Dillwynia phylicoides*), Peach Heath (*Lissanthe strigosa*), Narrow-leaved Geebung (*Persoonia linearis*), Prickly Shaggy Pea (*Podolobium ilicifolium*) *Bossiaea buxifolia*, Grasses: Speargrass (*Austrostipa scabra*), *Lomandra cylindrica*, Wattle Matt-rush (*Lomandra filiformis*), Pale Mat-rush (*Lomandra glauca*), Spiny-headed Mat-rush (*Lomandra longifolia*) Redanther Wallaby Grass (*Rytidosperma pallidum*), Fluke Bogrush (*Schoenus apogon*), False Sarsaparilla (*Hardenbergia violacea*), Rock Fern (*Cheilanthes sieberi*)
Exotic species	Exotics: Catsear (*Hypochaeris radicata*) HTE: None recorded

Table 4.24 Description of PCT 3747 Shrubland within the subject land

Zone 13 – PCT 3749 Western Blue Mountains Scribbly Gum Forest – Shrubland	
Plant community type	Western Blue Mountains Scribbly Gum Forest
PCT ID	3749
Photos	 ***Photo 4.14 PCT 3749_Shrubland (Plot BH14)***

Zone 13 – PCT 3749 Western Blue Mountains Scribbly Gum Forest – Shrubland	
Survey effort	BH14, JR4B, JR19
Conservation significance	Native vegetation, not a TEC.
Patch size	>100 ha
Area (ha)	1.35
Condition	Shrubland – Tree and shrub composition was below benchmark – Grass, fern and other composition was above benchmark – Forb cover was highly variable – Tree and forb cover was below benchmark – Shrub and grass cover was above benchmark – Leaf litter was variable, up to 48% cover – Up to 97.5 m of fallen logs present – No tree stem classes above 5 cm present – Minimal HTW present, 0.1% cover.
Current vegetation integrity score	38.8
Landscape position	Occurs on upper hillslopes and ridges with a sandstone substrate cleared of original woodland.
Structure	Sub mature eucalyptus present, dominated by *Cassinia sifton* with a mostly native groundcover.
Over-storey	Inland Scribbly Gum (*Eucalyptus rossii*), Narrow-leaved Stringybark (*Eucalyptus sparsifolia*), Silver Wattle (*Acacia dealbata*)
Mid-storey	Absent
Groundcover	Forbs: Star Cudweed (*Euchiton involucratus*), Poverty Raspwort (*Gonocarpus tetragynus*), *Goodenia bellidifolia*, Small St John's Wort (*Hypericum gramineum*), Button Everlasting (*Coronidium scorpioides*), *Oxalis perennans*, *Leucochrysum albicans* subsp. *albicans*, Common Everlasting (*Chrysocephalum apiculatum*), Cotton Fireweed (*Senecio quadridentatus*), Showy Copper-wire Daisy (*Podolepis jaceoides*), Small Poranthera (*Poranthera microphylla*), Grass Triggerplant (*Stylidium graminifolium*), A Fuzzweed (*Vittadinia cuneata*), Pennywort (*Hydrocotyle tripartita*), Stinking Pennywort (*Hydrocotyle laxiflora*), Variable Stinkweed (*Opercularia varia*), Silky Purple-Flag (*Patersonia sericea*) Shrubs: *Cassinia sifton*, Narrow-leaved Geebung (*Persoonia linearis*), Sunshine Wattle (*Acacia terminalis*), Peach Heath (*Lissanthe strigosa*), Prickly Shaggy Pea (*Podolobium ilicifolium*), *Monotoca scoparia*, Daphne Heath (*Brachyloma daphnoides*) Grasses: Jericho Wiregrass (*Aristida jerichoensis*), Brown's Lovegrass (*Eragrostis brownii*), Silvertop Wallaby Grass (*Rytidosperma pallidum*), Spiny-headed Mat-rush (*Lomandra longifolia*), Paddock Lovegrass (*Eragrostis leptostachya*), Weeping Grass (*Microlaena stipoides* var. *stipoides*), *Lomandra filiformis* subsp. *filiformis*, Snowgrass (*Poa sieberiana*), Smooth-flowered Wallaby Grass (*Rytidosperma pilosum*), Pale Mat-rush (*Lomandra glauca*), Rough Speargrass (*Austrostipa scabra* subsp. *scabra*) Fern: Rock Fern (*Cheilanthes sieberi*) Others: False Sarsaparilla (*Hardenbergia violacea*), Small-leaf Glycine (*Glycine microphylla*)
Exotic species	Catsear (*Hypochaeris radicata*), Common Centaury (*Centaurium erythraea*) HTW: Blackberry complex (*Rubus fruticosus* sp. agg)

Table 4.25 Description of PCT 3932 Moderate within the subject land

Zone 14 – PCT 3932 Central and Southern Tableland Swamp Meadow Complex – Moderate	
Plant community type	Central and Southern Tableland Swamp Meadow Complex
PCT ID	3932
Photos	 *Photo 4.15 PCT 3932_Moderate (Plot JR5)*
Survey effort	JR5, JR17, JR28
Conservation significance	This PCT is associated with the endangered ecological community (EEC) listed under the BC Act, Montane Peatlands and Swamps of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South-eastern Highlands and Australian Alps bioregions and EEC listed under the EPBC Act, Temperate Highland Peat Swamps on Sandstone. This PCT within the study area does not comprise of the BC Act and EPBC Act listed EEC due to the study area not containing the associated geology this community occurs on. Refer to section 4.5 for detailed assessment of this EEC.
Patch size	>100 ha
Area (ha)	2.38
Condition	Moderate – Tree composition was at the benchmark – Shrub, grass, forb and fern composition was below benchmark – Tree, forb and grass structure was above benchmark – Shrub composition was below benchmark – Low leaf litter at 7.2% cover – No fallen logs present – Tree stem class of 5-10 cm present – Very high HTW cover of 95%.
Current vegetation integrity score	48.9
Landscape position	Occurs on alluvial soils along creek lines and low-lying waterlogged areas across the study area.
Structure	Open grassland with sparse cover of small trees and shrubs, moderate ground cover of mixed native and exotics.
Over-storey	Black Gum (*Eucalyptus aggregata*)

Zone 14 – PCT 3932 Central and Southern Tableland Swamp Meadow Complex – Moderate	
Mid-storey	Manuka (*Leptospermum scoparium*)
Groundcover	Forbs: Small St John's Wort (*Hypericum gramineum*), *Oxalis perennans,* Knotweed (*Persicaria* spp.), Grasses: Dominated by Common Reed (*Phragmites australis*) and Kangaroo Grass (*Themeda triandra*). Moderate cover of *Carex* spp., Common Couch (*Cynodon dactylon*), Tussock (*Poa labillardierei* var. *labillardierei*) and *Rytidosperma* spp.
Exotic species	Dominated by Lamb's Tongues (*Plantago lanceolata),* Meadow Fescue (*Festuca pratensis*), Cocksfoot (*Dactylis glomerata*) and Sweet Vernal Grass (*Anthoxanthum odoratum*). Low cover of Cranesbill Geranium (*Geranium molle* subsp. *molle*), Smooth Catsear (*Hypochaeris glabra*), Scarlet Pimpernel (*Lysimachia arvensis*), A Medic (*Medicago* spp.), Sheep's Burnet (*Sanguisorba minor* subsp. *muricata*), Prickly Sowthistle (*Sonchus asper*), Common vetch (*Vicia sativa*). HTW: High cover of Phalaris (*Phalaris aquatica*), Blackberry complex (*Rubus fruticosus* sp. agg.) and *Salix spp*.

4.5 Threatened ecological communities

Four TECs are associated with two PCTs identified within study area according to the TBDC (see Table 4.26). No TECs were recorded in the subject land. One TEC is present in the study area (refer to section 4.5.1 and 4.5.2 below). There is no risk of direct or indirect impacts to any TECs.

Table 4.26 Associated TECs within the study area

TEC Name	Profile ID (from TBDC)	BC Act status	EPBC Act status	Associated PCT (from TBDC)
Montane Peatlands and Swamps of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South-eastern Highlands and Australian Alps bioregions	10936	EEC	-	PCT 3932
Temperate Highland Peat Swamps on Sandstone	20389	-	EEC	PCT 3932
White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South-eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions	10837	CEEC	-	PCT 3376
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	-	-	CEEC	PCT 3376

Key: CEEC: critically endangered ecological community; EEC: endangered ecological community

PCT 3376 Southern Tableland Grassy Box Woodland was recorded in the study area during vegetation mapping surveys (refer to section 2.5.1). Due to PCT 3376 not occurring in the subject land, no VI plots were sampled in the patch of PCT 3376. At the time of the vegetation mapping, the patch of PCT 3376 contained an overstory dominated by Blakely's Red Gum (*Eucalyptus blakelyi*) and Apple Box (*Eucalyptus bridgesiana*) (Photo 4.16). The patch has been subject to on-going agricultural grazing with no mid-story present and a very low diversity and cover of native forbs and grasses in the understory. A high cover of exotic species including Harding Grass (*Phalaris aquatica*), Spear Thistle (Cirsium vulgare), Smooth Catsear (*Hypochaeris glabra*), Ribwort Plantain (*Plantago lanceolata*) and Blackberry (*Rubus fruticosus* sp. agg.).



Photo 4.16 PCT 3376 in the study area

4.5.1 TECs listed under the BC Act

White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South-eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions

PCT 3376 Southern Tableland Grassy Box Woodland is potentially associated with *White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South-eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions* listed under the BC Act. This PCT occurs as a small patch around 200 m to the north of the subject land within mostly cleared agricultural land (Figure 5.1). An assessment of the vegetation zone that is floristically similar to this community against the diagnostic and condition criteria specified in the final determination for the BC Act listed critically endangered ecological community (CEEC) (NSW Scientific Committee, 2020) is provided in Table 4.27 below. The assessment concluded that the BC Act listed TEC was present in the study area only. No patches of this CEEC occur in the subject land.

Table 4.27 Assessment of PCT 3376 in the study area against the NSW Scientific Committee final determination (2020) for the relevant BC-Act listed TEC

Key Indicators	Response
Is the site within the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South-eastern Highlands or NSW South Western Slopes Bioregions?	Yes, the study area is located in the South-eastern Highlands bioregion.
Is the site between the 400 and 800 mm isohyets extending from the western slopes, at an altitude of 170 m to c 1200 m, on the northern tablelands?	Yes, cumulative rainfall for the preceding 12 months of June 2024 is above 800 mm (Table 2.7). Yes, elevation of the study area ranges from around 800 m to 1100 m.
Are any of the following characteristic tree species present at the site: – *Eucalyptus albens* (White Box) – *Eucalyptus melliodora* (Yellow Box), or – *Eucalyptus blakelyi* (Blakely's Red Gum)	Yes, *Eucalyptus blakelyi* is present in a small patch of woodland identified as PCT 3376 in the study area.
Conclusion	PCT 3376 corresponds to the White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South-eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions in accordance with the final determination. PCT 3376 occurs only within the study area and not within the subject land (see Figure 5.1). The subject land was adjusted to avoid direct and indirect impacts on this CEEC.

Montane Peatlands and Swamps of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South-eastern Highlands and Australian Alps bioregions

PCT 3932 is potentially 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*. An assessment of the vegetation zone that is floristically similar to this community against the diagnostic and condition criteria specified in the listing advice for the BC Act listed CEEC (TSSC, 2020) is provided in Table 4.28 below. The assessment concluded that the BC Act listed TEC was not present in the study area or subject land.

Table 4.28 Assessment of PCT 3932 against TSSC final determination (2005) for the relevant BC-Act listed TEC

Key Indicators	Response
Is the site within the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South-eastern Highlands and Australian Alps bioregions?	Yes, the study area is located in the South-eastern Highlands bioregion.
Does the site occur on undulating tablelands and plateaus, above 400-500 m elevation?	Yes, elevation of the study area ranges from around 800 m to 1100 m.
Does the site contain peaty or organic-mineral sediments on poorly drained flats	No, the site does not contain deep peaty soils and drainage varies from moderate to good.
Conclusion	PCT 3932 in the study area does not contain the correct geology to comprise this EEC accordingly to the final determination. Therefore this EEC does not occur in the study area or subject land.

4.5.2 TECs listed under the EPBC Act

White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland

PCT 3376 Southern Tableland Grassy Box Woodland is potentially associated with *White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland* listed under the EPBC Act. An assessment of the vegetation zone that is floristically similar to this community against the diagnostic and condition criteria specified in the approved conservation advice for the EPBC Act-listed CEEC (Commonwealth DCCEEW, 2023) is provided in Table 4.28 below. The assessment concluded that the EPBC Act listed CEEC is not present in the study area or subject land.

Table 4.29 Assessment of PCT 3376 in the study area against the Approved Conservation Advice under the EPBC Act (DCCEEW, 2023)

Criteria	Response:
Is the site within the Brigalow Belt South, Murray Darling Depression, Nandewar, New England Tableland, NSW North Coast, NSW South Western Slopes, Riverina, South-eastern Queensland, South East Corner, South East Coastal Plain, South-eastern Highlands, Southern Volcanic Plain, Sydney Basin and Victorian Midlands Bioregions?	Yes, the study area is located in the South-eastern Highlands bioregion.
It has, or previously had, an overstorey dominated or co-dominated by: – *Eucalyptus albens* (White Box) and/or *E. melliodora* (Yellow Box) and/or *E. blakelyi* (Blakely's Red Gum); or – in the Nandewar bioregion any of the above three species and/or *E. microcarpa* (Western Grey Box) and/or *E. moluccana* (Grey Box, Coastal Grey Box);5	Yes, *Eucalyptus blakelyi* is present in a small patch of woodland identified as PCT 3376 in the study area.
It has a predominantly native ground layer?	No, the patch of PCT 3376 is heavily degraded due to ongoing agricultural activities and contains less 50% native perennial vegetation cover in the ground layer.
Conclusion	PCT 3376 in the study area does not comprise the CEEC due to the absence of a predominantly native ground layer.

Temperate Highland Peat Swamps on Sandstone

PCT 3932 is potentially associated with *Temperate Highland Peat Swamps on Sandstone*. An assessment of the vegetation zone that is floristically similar to this community against the diagnostic and condition criteria specified in the listing advice for the EPBC Act listed EEC (DEWHA, 2005) is provided in Table 4.30 below. The assessment concluded that the EPBC Act listed EEC is not present in the study area or subject land.

Table 4.30 Assessment of PCT 3932 against the Approved Conservation Advice under the EPBC Act (DEWHA, 2005)

Criteria	Response:
Is the site within the Brigalow Belt South, Murray Darling Depression, Nandewar, New England Tableland, NSW North Coast, NSW South Western Slopes, Riverina, South Eastern Queensland, South East Corner, South East Coastal Plain, South-eastern Highlands, Southern Volcanic Plain, Sydney Basin and Victorian Midlands Bioregions?	Yes, the study area is located in the South-eastern Highlands bioregion.
Does the site occur on sandstone, from around 600-1100 m elevation?	Yes, elevation of the study area ranges from around 800 m to 1100 m with occasional areas of sandstone.
Does the site contain peat swamps?	No, the site does not contain peat swamps and drainage varies from moderate to good.
Conclusion	PCT 3932 in the study area does not contain the correct geology to comprise this EEC accordingly to the approved conservation advice. Therefore, this EEC does not occur in the study area or subject land.

5. Habitat suitability for threatened and migratory species

5.1 Identification of threatened species for assessment

5.1.1 Ecosystem credit species

Based on the bioregional context for the assessment and the PCTs, patch size, vegetation cover and habitat resources present at the subject land, the BAM calculator (BAM-C) generates a list of threatened fauna species that are predicted to utilise the subject land (that is, potential 'predicted threatened species', or potential 'ecosystem credit entities'). The potential for these predicted threatened species to occur within the site was further refined based on the desktop assessment, habitat resources observed during field surveys, records during the surveys, and the knowledge and experience of the assessor. Targeted surveys are not required under the BAM for these species as they are assumed to be present.

Table 5.1 lists all ecosystem credit species that are considered likely to occur on or use the subject land. These species were derived using the following databases and reports:

– BAM-C (Biodiversity Assessment Method Calculator Version 1.5) (OEH, 2024b)
– TBDC (Threatened Biodiversity Data Collection) (NSW DCCEEW, 2025b)
– Previous surveys
– BioNet Atlas threatened flora and fauna records (NSW DCCEEW, 2025a).

Predicted species from the BAM-C auto-populated list may be excluded based on geographic limitations or habitat constraints in accordance with BAM Subsections 5.2.1 and 5.2.2 (DPIE ,2020a). All of the predicted threatened species identified by the BAM-C were retained for further assessment (Table 5.1).

No additional species were added due to being recently listed under the BC Act or EPBC Act and not yet added to the TBDC or revealed by other information sources.

The following predicted ecosystem credit species were recorded during field surveys:

– Black Falcon (*Falco subniger*), lone individuals observed soaring on two occasions above the Gardens of Stone SCA in the subject land
– Dusky Woodswallow (*Artamus cyanopterus cyanopterus*), a pair and a lone individual were observed on separate days in November 2023 and February 2024 foraging by a dam at the former Wallerawang Power Station site in the subject land
– Gang-gang Cockatoo (*Callocephalon fimbriatum*), individuals or groups of up to four individuals, occasionally with likely juveniles and parents, were observed on several occasions during August and November 2023, and January and April 2024 surveys across the northern half of the subject land
– South-eastern Glossy Black-cockatoo (*Calyptorynchus lathami lathami*), probable indirect evidence of this species was observed via possible chewed *Allocasuarina* cones in Gardens of Stone SCA in one location in the subject land.
– Scarlet Robin (*Petroica boodang*), several breeding pairs and individuals identified across the subject land within all survey periods
– Speckled Warbler (*Chthonicola sagittata*), an individual was observed in June 2024 at the northern extent of the subject land, near the Transgrid 500/330 kV substation
– Varied Sittella (*Daphoenositta chrysoptera*), a group of four individuals was observed foraging during the July 2024 survey along a creekline between the two easements in the southern half of the subject land and a pair was observed foraging during the November 2024 survey along the easement in the northern half of the subject land
– White-bellied Sea-eagle (*Haliaeetus leucogaster*), a pair and several individuals were observed during the November 2023 and June 2024 surveys soaring near the southern eastern end of the subject land
– Little Lorikeet (*Glossopsitta pusilla*), a pair observed during October 2024 surveys adjacent to the subject land

– Eastern False Pipistrelle (*Falsistrellus tasmaniensis*), recorded via Anabat analysis at several locations adjacent to the subject land
– Large Bent-winged Bat (*Miniopterus orianae oceanensis*), recorded via Anabat analysis at several locations adjacent to the subject land
– Yellow-bellied Sheathtail Bat (*Saccolaimus flaviventris*), recorded via Anabat analysis at one location in the Gardens of Stone SCA (probable record only) adjacent to the subject land
– Brown Treecreeper (*Climacteris picumnus victoriae*), incidentally recorded during site investigations by Umwelt in 2022.

The locations of recorded predicted ecosystem credit species is shown on Figure 5.2.

Table 5.1 Predicted ecosystem credit species

Common name	Scientific name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID	Sensitivity to gain class
		BC Act	EPBC Act						
Dusky Woodswallow	*Artamus cyanopterus cyanopterus*	V	-	N	BAM-C	Yes	N/A	3369_Good 3369_Shrubland 3385_Good 3385_Poor 3385_Paddock trees 3735_Good 3735_Shrubland 3747_Good 3747_Shrubland 3747_Poor 3749_Good 3749_Shrubland 3385_Moderate	Moderate
Australasian Bittern	*Botaurus poiciloptilus*	E	E	N	BAM-C	Yes	N/A	3932_Mod	Moderate
Gang-gang Cockatoo (foraging)	*Callocephalon fimbriatum*	E	E	Y	BAM-C	Yes	N/A	3369_Good 3369_Shrubland 3385_Good 3385_Poor 3385_Paddock trees 3735_Good 3735_Shrubland 3747_Good 3747_Poor 3747_Shrubland 3749_Good 3749_Shrubland 3385_Moderate	Moderate

Common name	Scientific name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID	Sensitivity to gain class
		BC Act	EPBC Act						
Glossy Black-Cockatoo (foraging)	*Calyptorhynchus lathami*	V	V	Y	BAM-C	Yes	N/A	3369_Good 3369_Shrubland 3385_Good 3385_Poor 3385_Paddock trees 3735_Good 3735_Shrubland 3747_Good 3747_Shrubland 3747_Poor 3749_Good 3749_Shrubland 3385_Moderate	High
Speckled Warbler	*Chthonicola sagittata*	V	-	N	BAM-C	Yes	N/A	3369_Good 3369_Shrubland 3385_Good 3385_Poor 3385_Paddock trees 3735_Good 3735_Shrubland 3747_Good 3747_Shrubland 3747_Poor 3749_Good 3749_Shrubland 3385_Moderate	High

Common name	Scientific name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID	Sensitivity to gain class
		BC Act	EPBC Act						
Spotted Harrier	*Circus assimilis*	V	-	N	BAM-C	Yes	N/A	3369_Good 3369_Shrubland 3385_Good 3385_Poor 3385_Paddock trees 3932_Mod 3385_Moderate	Moderate
Brown Treecreeper (eastern subspecies)	*Climacteris picumnus victoriae*	V	-	N	BAM-C	Yes	N/A	3369_Good 3369_Shrubland 3385_Good 3385_Poor 3385_Paddock trees 3735_Good 3735_Shrubland 3747_Good 3747_Shrubland 3747_Poor 3749_Good 3749_Shrubland 3385_Moderate	High

Common name	Scientific name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID	Sensitivity to gain class
		BC Act	EPBC Act						
Varied Sittella	*Daphoenositta chrysoptera*	V	-	N	BAM-C	Yes	N/A	3369_Good 3369_Shrubland 3385_Good 3385_Poor 3385_Paddock trees 3735_Good 3735_Shrubland 3747_Good 3747_Shrubland 3747_Poor 3749_Good 3932_Mod 3749_Shrubland 3385_Moderate	Moderate
Spotted-tailed Quoll	*Dasyurus maculatus*	V	E	N	BAM-C	Yes	N/A	3369_Good 3369_Shrubland 3385_Good 3385_Poor 3385_Paddock trees 3735_Good 3735_Shrubland 3747_Good 3747_Shrubland 3747_Poor 3749_Good 3932_Mod 3385_Moderate	High

Common name	Scientific name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID	Sensitivity to gain class
		BC Act	EPBC Act						
Black-necked Stork	*Ephippiorhynchus asiaticus*	E	-	N	BAM-C	Yes	N/A	3369_Good 3369_Shrubland 3385_Good 3385_Poor 3385_Paddock trees 3735_Good 3735_Shrubland 3747_Good 3747_Shrubland 3747_Poor 3749_Good 3932_Mod 3749_Shrubland 3385_Moderate	Moderate
White-fronted Chat	*Epthianura albifrons*	V	-	N	BAM-C	Yes	N/A	3932-Mod	Moderate
Black Falcon	*Falco subniger*	V	-	N	BAM-C	Yes	N/A	3369_Good 3369_Shrubland 3385_Good 3385_Poor 3385_Paddock trees 3735_Good 3735_Shrubland 3747_Good 3747_Shrubland 3747_Poor 3749_Good 3749_Shrubland 3385_Moderate	Moderate

Common name	Scientific name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID	Sensitivity to gain class
		BC Act	EPBC Act						
Eastern False Pipistrelle	*Falsistrellus tasmaniensis*	V	-	N	BAM-C	Yes	N/A	3369_Good 3369_Shrubland 3735_Good 3735_Shrubland 3747_Good 3747_Shrubland 3747_Poor 3749_Good 3932_Mod 3749_Shrubland	High
Little Lorikeet	*Glossopsitta pusilla*	V	-	N	BAM-C	Yes	N/A	3369_Good 3369_Shrubland 3735_Good 3735_Shrubland 3747_Good 3747_Shrubland 3747_Poor 3749_Good 3749_Shrubland	High
Painted Honeyeater	*Grantiella picta*	V	V	N	BAM-C	Yes	N/A	3369_Good 3369_Shrubland 3385_Good 3385_Poor 3385_Paddock trees 3735_Good 3735_Shrubland 3747_Good 3747_Shrubland 3747_Poor 3749_Good 3749_Shrubland 3385_Moderate	Moderate

Common name	Scientific name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID	Sensitivity to gain class
		BC Act	EPBC Act						
White-bellied Sea-Eagle (foraging)	*Haliaeetus leucogaster*	V	-	Y	BAM-C	Yes	N/A	3369_Good 3369_Shrubland 3385_Good 3385_Poor 3385_Paddock trees 3735_Good 3735_Shrubland 3747_Good 3747_Shrubland 3747_Poor 3749_Good 3749_Shrubland 3932_Mod 3385_Moderate	High
Black-breasted Buzzard (foraging)	*Hamirostra melanosternon*	V	-	Y	BAM-C	Yes	N/A	3735_Good 3735_Shrubland 3747_Good 3747_Shrubland 3747_Poor 3749_Good 3749_Shrubland	Moderate
Little Eagle (foraging)	*Hieraaetus morphnoides*	V	-	Y	BAM-C	Yes	N/A	3369_Good 3369_Shrubland 3385_Good 3385_Poor 3385_Paddock trees 3735_Good 3735_Shrubland 3747_Good 3747_Shrubland 3747_Poor 3749_Good	Moderate

Common name	Scientific name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID	Sensitivity to gain class
		BC Act	EPBC Act						
								3749_Shrubland 3932_Mod 3749_Shrubland 3385_Moderate	
White-throated Needletail	*Hirundapus caudacutus*	V	V	N	BAM-C	Yes	N/A	3385_Good 3385_Poor 3385_Paddock trees 3735_Good 3735_Shrubland 3747_Good 3747_Shrubland 3747_Poor 3749_Good 3932_Mod 3749_Shrubland 3385_Moderate	High
Swift Parrot (foraging)	*Lathamus discolor*	E	CE	Y	BAM-C	Yes	N/A	3369_Good 3369_Shrubland 3735_Good 3735_Shrubland 3747_Good 3747_Shrubland 3747_Poor 3749_Good 3749_Shrubland	Moderate

Common name	Scientific name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID	Sensitivity to gain class
		BC Act	EPBC Act						
Square-tailed Kite (foraging)	*Lophoictinia isura*	V	-	Y	BAM-C	Yes	N/A	3369_Good 3369_Shrubland 3385_Good 3385_Poor 3385_Paddock trees 3735_Good 3735_Shrubland 3747_Good 3747_Shrubland 3747_Poor 3932_Mod 3749_Shrubland 3385_Moderate	Moderate
Hooded Robin (south-eastern form)	*Melanodryas cucullata cucullata*	E	E	N	BAM-C	Yes	N/A	3369_Good 3369_Shrubland 3385_Good 3385_Poor 3385_Paddock trees 3735_Good 3735_Shrubland 3747_Good 3747_Shrubland 3747_Poor 3749_Good 3932_Mod 3749_Shrubland 3385_Moderate	Moderate

Common name	Scientific name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID	Sensitivity to gain class
		BC Act	EPBC Act						
Black-chinned Honeyeater (eastern subspecies)	*Melithreptus gularis gularis*	V	-	N	BAM-C	Yes	N/A	3369_Good 3369_Shrubland 3735_Good 3735_Shrubland 3747_Good 3747_Shrubland 3747_Poor 3749_Good 3749_Shrubland	Moderate
Large Bent-winged Bat (foraging)	*Miniopterus orianae oceanensis*	V	-	Y	BAM-C	Yes	N/A	3369_Good 3369_Shrubland 3385_Good 3385_Poor 3385_Paddock trees 3735_Good 3735_Shrubland 3747_Good 3747_Shrubland 3747_Poor 3932_Mod 3385_Moderate	High
Blue-billed Duck	*Oxyura australis*	V	-	N	BAM-C	Yes	N/A	3932_Mod	Moderate
Gilbert's Whistler	*Pachycephala inornata*	V	-	N	BAM-C	Yes	N/A	3735_Good 3735_Shrubland 3747_Good 3747_Shrubland 3747_Poor 3749_Good 3749_Shrubland	Moderate
Yellow-bellied Glider	*Petaurus australis*	V	V	N	BAM-C	Yes	N/A	3735_Good 3735_Shrubland	High

Common name	Scientific name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID	Sensitivity to gain class
		BC Act	EPBC Act						
Scarlet Robin	*Petroica boodang*	V	-	N	BAM-C	Yes	N/A	3369_Good 3369_Shrubland 3385_Good 3385_Poor 3385_Paddock trees 3735_Good 3735_Shrubland 3747_Good 3747_Shrubland 3747_Poor 3749_Hood 3932_Mod 3749_Shrubland 3385_Moderate	Moderate
Flame Robin	*Petroica phoenicea*	V	-	N	BAM-C	Yes	N/A	3369_Good 3369_Shrubland 3385_Good 3385_Poor 3385_Paddock trees 3735_Good 3735_Shrubland 3747_Good 3747_Shrubland 3747_Poor 3749_Hood 3932_Mod 3749_Shrubland 3385_Moderate	Moderate

Common name	Scientific name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID	Sensitivity to gain class
		BC Act	EPBC Act						
Grey-headed Flying-fox (foraging)	*Pteropus poliocephalus*	V	V	Y	BAM-C	Yes	N/A	3369_Good 3369_Shrubland 3735_Good 3735_Shrubland 3747_Good 3747_Shrubland 3747_Poor	High
Australian Painted Snipe	*Rostratula australis*	E	E	N	BAM-C	Yes	N/A	3932_Mod	Moderate
Yellow-bellied Sheathtail-bat	*Saccolaimus flaviventris*	V	-	N	BAM-C	Yes	N/A	3747_Good 3747_Shrubland 3747_Poor	High
Diamond Firetail	*Stagonopleura guttata*	V	V	N	BAM-C	Yes	N/A	3369_Good 3369_Shrubland 3385_Good 3385_Poor 3385_Paddock trees 3735_Good 3735_Shrubland 3747_Good 3747_Shrubland 3747_Poor 3385_Moderate	Moderate
Freckled Duck	*Stictonetta naevosa*	V	-	N	BAM-C	Yes	N/A	3932_Mod	Moderate

Common name	Scientific name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID	Sensitivity to gain class
		BC Act	EPBC Act						
Rosenberg's Goanna	*Varanus rosenbergi*	V	-	N	BAM-C	Yes	N/A	3369_Good 3369_Shrubland 3735_Good 3735_Shrubland 3747_Good 3747_Shrubland 3747_Poor 3932_Mod	High

5.1.2 Species credit species

Threatened species that cannot reliably be predicted to occur on a development site based on PCT, distribution and habitat criteria are identified by the TBDC as 'species credit' entities. In some circumstances, the particular habitat components of species assessed for ecosystem credit species, such as the breeding habitat of a cave roosting bat, are also assessed for species credits.

The credit calculator references geographic, vegetation and habitat data for the subject land to generate a list of the species credit entities that are predicted to occur (i.e. the 'potential candidate threatened species'). Searches of threatened species databases were also completed to identify any additional potential candidate threatened species (to those generated by the credit calculator) that are known or predicted to occur in the locality. The likelihood of occurrence of potential candidate threatened species were reviewed, giving consideration to the habitats available in the study area (refer to threatened species for assessment tables in Appendix B).

The list of potential candidate threatened species that could occur in the study area are assessed based on the habitat resources observed during field surveys. 'Confirmed' candidate threatened species require further assessment of species presence and the extent of occupied habitat in accordance with the BAM. Habitat assessment and targeted surveys must extend to areas adjoining the subject land for certain matters, for instance threatened raptor nest trees, because if present a species polygon must be mapped in a buffer area of up to 300 m around the nest tree that includes all PCTs with which the species is associated (NSW DCCEEW, 2025c). A number of species could be reliably discounted as occurring at the subject land or adjoining areas based on the type and quality of habitat resources present and the habitat requirements for the species identified in the TBDC. The list of candidate threatened species is presented in Table 5.2 in accordance with BAM Subsections 5.2.1 and 5.2.2 (DPIE 2020a).

The following habitat types and resources are present at the subject land or adjoining areas and informed the assessment of candidate threatened species:

- Sub-alpine woodland and forest and riparian woodland with extensive areas of mature and hollow-bearing trees
- Grasslands with scattered paddock trees
- Regenerating shrublands within existing easements
- Fallen/standing dead timber including logs
- Living or dead mature trees within suitable vegetation within one km of rivers, lakes, large dams or creeks, wetlands and coastlines, notably associated with the riparian corridor of the Coxs River
- Land within 40 m of riparian woodland on inland waterways/waterholes containing dead or dying eucalypts
- Hollow bearing trees including:
    - living or dead trees with hollows greater than 7 cm diameter and greater than 3 m above the ground
    - living or dead trees with hollows greater than 15 cm diameter and greater than 8 m above the ground
    - living or dead trees with hollows greater than 20 cm diameter and greater than 4 m above the ground
- Within 2 km of rocky areas containing caves, overhangs, escarpments, outcrops, or crevices, or within two km of old mines or tunnels
- Land within 1 km of rocky escarpments, gorges, steep slopes, boulder piles, rock outcrops or cliff lines
- Woodland and forest including 'nest trees - live (occasionally dead) large old trees within vegetation'
- Within 1 km of wet areas/swamps, waterbodies
- Semi-permanent/ephemeral wet areas
- Waterbodies with permanent pools/stretches 3 m or wider, including rivers, large creeks, billabongs, lagoons, estuaries, dams and other waterbodies, on or within 200 m of the site
- Bursaria spinosa or within 40 m of Bursaria spinosa
- Koala use trees (DPE, 2022d).

The TBDC as accessed via the BAM-C (OEH, 2024b) also listed a number of specific geographic and habitat constraints that apply to potential species credit entities. Where appropriate the justification for excluding species based on geographic and habitat constraints is noted for individual species in Table 5.2.

The Southern Myotis (*Myotis macropus)* was added to the list of candidate species predicted by the BAM-C because this species was recorded during surveys.

The following species credit species have been excluded from further assessment and do not require targeted surveys:

– Giant Burrowing Frog (*Heleioporus australiacus*) – habitat degraded
– Swift Parrot (*Lathamus discolor*) – no mapped important habitat
– Booroolong Frog (*Litoria booroolensis*) – habitat degraded
– Littlejohn's Tree Frog (*Litoria littlejohni*) – habitat degraded
– Stuttering Frog (*Mixophys balbus*) – habitat degraded
– Brush-tailed Rock Wallaby (*Petrogale penicillata*) – habitat degraded
– Red-crowned Toadlet (*Pseudophryne australis*) – habitat degraded.

Further justification for exclusion of candidate species is provided in section 5.1.3.

Table 5.2 Candidate species credit species

Common name	Scientific name	Listing status		Source	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
		BC Act	EPBC Act				
Bynoe's Wattle	*Acacia bynoeana*	E	V	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	3747_Good 3747_Shrubland 3747_Poor
Acacia meiantha	*Acacia meiantha*	E	E	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	3747_Good 3747_Shrubland 3747_Poor
Bush Stone-curlew	*Burhinus grallarius*	E	-	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	3747_Good 3747_Shrubland 3747_Poor
Gang-gang Cockatoo (Breeding)	*Callocephalon fimbriatum*	E	E	☒ BAM-C ☐ TBDC ☐ Previous survey ☒ Current survey	Yes	N/A	3369_Good 3369_Shrubland 3385_Good 3385_Moderate 3385_Paddock_trees 3385_Poor 3735_Good 3735_Shrubland 3747_Good 3747_Shrubland 3747_Poor 3749_Good 3749_Shrubland 3932_Moderate

Common name	Scientific name	Listing status		Source	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
		BC Act	EPBC Act				
South-eastern Glossy Black-Cockatoo (Breeding)	*Calyptorhynchus lathami*	V	V	☒ BAM-C ☐ TBDC ☐ Previous survey ☒ Current survey	Yes	N/A	3369_Good 3369_Shrubland 3385_Good 3385_Moderate 3385_Paddock_trees 3385_Poor 3735_Good 3735_Shrubland 3747_Good 3747_Shrubland 3747_Poor 3749_Good 3749_Shrubland
Eastern Pygmy-possum	*Cercartetus nanus*	V	-	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	3369_Good 3369_Shrubland 3385_Good 3385_Moderate 3385_Paddock_trees 3385_Poor 3735_Good 3735_Shrubland 3747_Good 3747_Shrubland 3747_Poor 3749_Good 3749_Shrubland 3932_Moderate

Common name	Scientific name	Listing status		Source	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
		BC Act	EPBC Act				
Large-eared Pied Bat	*Chalinolobus dwyeri*	V	E	☒ BAM-C ☐ TBDC ☐ Previous survey ☒ Current survey	Yes	N/A	3369_Good 3369_Shrubland 3735_Good 3735_Shrubland 3747_Good 3747_Shrubland 3747_Poor 3749_Good 3749_Shrubland 3932_Moderate
Black Gum	*Eucalyptus aggregata*	V	V	☒ BAM-C ☐ TBDC ☐ Previous survey ☒ Current survey	Yes	N/A	3385_Good 3385_Moderate 3385_Paddock_trees 3385_Poor 3932_Moderate
Capertee Stringybark	*Eucalyptus cannonii*	V	-	☒ BAM-C ☐ TBDC ☐ Previous survey ☒ Current survey	Yes	N/A	3369_Good 3369_Shrubland 3735_Good 3735_Shrubland 3747_Good 3747_Shrubland 3747_Poor

Common name	Scientific name	Listing status		Source	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
		BC Act	EPBC Act				
White-bellied Sea-Eagle (breeding)	*Haliaeetus leucogaster*	V	-	☒ BAM-C ☐ TBDC ☐ Previous survey ☒ Current survey	Yes	N/A	3369_Good 3369_Shrubland 3385_Good 3385_Moderate 3385_Paddock_trees 3385_Poor 3735_Good 3735_Shrubland 3747_Good 3747_Shrubland 3747_Poor 3749_Good 3749_Shrubland 3932_Moderate
Black-breasted Buzzard (breeding)	*Hamirostra melanosternon*	V	-	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	3735_Good 3735_Shrubland 3747_Good 3747_Shrubland 3747_Poor 3749_Good 3749_Shrubland
Giant Burrowing Frog	*Heleioporus australiacus*	V	V	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	No	Absence of suitable breeding habitat. Further justification detailed below in section 5.1.3 and Table 5.3	N/A

Common name	Scientific name	Listing status		Source	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
		BC Act	EPBC Act				
Little Eagle (breeding)	*Hieraaetus morphnoides*	V	-	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	3369_Good 3369_Shrubland 3385_Good 3385_Moderate 3385_Paddock_trees 3385_Poor 3735_Good 3735_Shrubland 3747_Good 3747_Shrubland 3747_Poor 3749_Good 3749_Shrubland 3932_Moderate
Swift Parrot (breeding)	*Lathamus discolor*	E	E	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	No	Important habitat not mapped within subject land	N/A
Hoary Sunray	*Leucochrysum albicans* subsp. *tricolor*	E	E	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	3747_Good 3747_Shrubland 3747_Poor
Green and Golden Bell Frog	*Litoria aurea*	E	V	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	3369_Good 3369_Shrubland 3932_Moderate
Booroolong Frog	*Litoria booroolongensis*	E	E	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	No	Absence of suitable breeding habitat. Further justification detailed in section 5.1.3 and Table 5.3	N/A

Common name	Scientific name	Listing status		Source	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
		BC Act	EPBC Act				
Littlejohn's Tree Frog	*Litoria littlejohni*	E	E	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	No	Absence of suitable breeding habitat. Further justification detailed in section 5.1.3 and Table 5.3	N/A
Square-tailed Kite (breeding)	*Lophoictinia isura*	V	-	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	3369_Good 3369_Shrubland 3385_Good 3385_Moderate 3385_Paddock_trees 3385_Poor 3735_Good 3735_Shrubland 3747_Good 3747_Shrubland 3747_Poor 3749_Good 3749_Shrubland 3932_Moderate
Large Bent-winged Bat (Breeding)	*Miniopterus orianae oceanensis*	V	-	☒ BAM-C ☐ TBDC ☐ Previous survey ☒ Current survey	Yes	N/A	3369_Good 3369_Shrubland 3385_Good 3385_Moderate 3385_Paddock_trees 3385_Poor 3735_Good 3735_Shrubland 3747_Good 3747_Shrubland 3747_Poor 3932_Moderate

Common name	Scientific name	Listing status		Source	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
		BC Act	EPBC Act				
Stuttering Frog	*Mixophyes balbus*	E	V	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	No	Absence of suitable breeding habitat. Further justification detailed in section 5.1.3 and Table 5.3	N/A
Southern Myotis	*Myotis macropus*	V	-	☐ BAM-C ☐ TBDC ☒ Previous survey ☒ Current survey	Yes	N/A	3369_Good 3369_Shrubland 3385_Good 3385_Moderate 3385_Paddock_trees 3385_Poor 3735_Good 3735_Shrubland 3747_Good 3747_Shrubland 3747_Poor 3749_Good 3749_Shrubland 3932_Moderate
Barking Owl (Breeding)	*Ninox connivens*	V	-	☒ BAM-C ☐ TBDC ☐ Previous survey ☒ Current survey	Yes	N/A	3369_Good 3369_Shrubland 3385_Good 3385_Moderate 3385_Paddock_trees 3385_Poor 3735_Good 3735_Shrubland 3747_Good 3747_Shrubland 3747_Poor 3749_Good 3749_Shrubland

Common name	Scientific name	Listing status		Source	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
		BC Act	EPBC Act				
Powerful Owl (breeding)	*Ninox strenua*	V	-	☒ BAM-C ☐ TBDC ☐ Previous survey ☒ Current survey	Yes	N/A	3369_Good 3369_Shrubland 3385_Good 3385_Moderate 3385_Paddock_trees 3385_Poor 3735_Good 3735_Shrubland 3747_Good 3747_Shrubland 3747_Poor 3749_Good 3749_Shrubland
Purple Copper Butterfly	*Paralucia spinifera*	E	V	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	3369_Good 3369_Shrubland 3385_Good 3385_Moderate 3385_Paddock_trees 3385_Poor 3735_Good 3735_Shrubland 3747_Good 3747_Shrubland 3747_Poor 3749_Good 3749_Shrubland

Common name	Scientific name	Listing status		Source	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
		BC Act	EPBC Act				
Clandulla Geebung	*Persoonia marginata*	V	V	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	3369_Good 3369_Shrubland 3747_Good 3747_Shrubland 3747_Poor 3749_Good 3749_Shrubland
Southern Greater Glider	*Petauroides volans*	E	E	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	3369_Good 3369_Shrubland 3385_Good 3385_Moderate 3385_Paddock_trees 3385_Poor 3735_Good 3735_Shrubland 3747_Good 3747_Shrubland 3747_Poor 3749_Good 3749_Shrubland
Squirrel Glider	*Petaurus norfolcensis*	V	-	☒ BAM-C ☐ TBDC ☐ Previous survey ☒ Current survey	Yes	N/A	3369_Good 3369_Shrubland 3735_Good 3735_Shrubland 3747_Good 3747_Shrubland 3747_Poor 3932_Moderate

Common name	Scientific name	Listing status		Source	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
		BC Act	EPBC Act				
Brush-tailed Rock-wallaby	*Petrogale penicillata*	E	V	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	No	Absence of suitable rocky habitat. Further justification detailed below in section 5.1.3	N/A
Brush-tailed Phascogale	*Phascogale tapoatafa*	V	-	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	3735_Good 3735_Shrubland 3747_Good 3747_Shrubland 3747_Poor
Koala	*Phascolarctos cinereus*	E	E	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	3369_Good 3369_Shrubland 3735_Good 3735_Shrubland 3747_Good 3747_Shrubland 3747_Poor 3932_Moderate
Red-crowned Toadlet	*Pseudophryne australis*	V	-	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	No	Absence of suitable breeding habitat. Further justification detailed in section 5.1.3 and Table 5.3	N/A
Grey-headed Flying-fox (breeding)	*Pteropus poliocephalus*	V	V	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	3369_Good 3369_Shrubland 3735_Good 3735_Shrubland 3747_Good 3747_Shrubland 3747_Poor

Common name	Scientific name	Listing status		Source	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
		BC Act	EPBC Act				
Masked Owl (breeding)	*Tyto novaehollandiae*	V	-	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	3369_Good 3369_Shrubland 3735_Good 3735_Shrubland 3747_Good 3747_Shrubland 3747_Poor 3749_Good 3749_Shrubland
Veronica blakelyi	*Veronica blakelyi*	E	-	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	3369_Good 3369_Shrubland

5.1.3 Justification for exclusion of candidate species credit entities

Under Section 5.2.3.2 of the BAM, a candidate species credit species is considered unlikely to occur on the subject land (or specific vegetation zones) if one of the following applies:

– The assessor determines that microhabitats required by a species are absent from the subject land (or specific vegetation zone). The assessor must include a description of the microhabitats assessed as being required by the species in the BAR. This must be based on evidence such as published literature, or
– The assessor determines that the habitat constraints or microhabitats are degraded to the point that the species is unlikely to use the subject land (or specific vegetation zones) or,
– An expert report (prepared as per Box 3) states that the species is unlikely to be present on the subject land or specific vegetation zones.

Where no suitable habitat is present, no further assessment is required. However, the assessor must justify why suitable habitat is unlikely to occur on the subject land and/or specific vegetation zones.

Frogs

According to the *NSW Survey Guide for Threatened Frogs* (DPIE, 2020c), surveys to detect target frog species within the subject land are required only if suitable breeding as defined in Chapter 3 of the guide and/or non-breeding habitat is located within breeding migration distance of breeding habitat is present (DPIE, 2020c).

Breeding habitat assessments were conducted in accordance with the *NSW Survey Guide for Threatened Frogs* (DPIE, 2020c). To provide additional certainty, targeted Aural-visual (AV) surveys of potential breeding habitat was also conducted in multiple seasons and weather conditions as follows:

– Nine person-days in August-September 2023 coinciding with the initial fauna habitat assessment, spotlighting surveys and surveys for spring-breeding threatened frog species across the study area.
– Ten person-days in October 2023 coinciding with additional detailed assessment and mapping of fauna habitat features and resources and spotlighting surveys across the study area.
– January to February 2023 coinciding with the planning and delivery of targeted surveys for summer-breeding threatened frog species.

Frog AV transects were sampled for at least one hour each night along <250 m reaches of potential breeding habitat in accordance with the guide (DPIE, 2020c).

A detailed description of specific consideration of breeding habitat characteristics of threatened frog species, and justification for the exclusion of relevant frog species from further assessment based on an absence of breeding habitat is provided in Table 5.3.

Photographs Plate 5.1 to Plate 5.4 show the general habitats superficially considered suitable habitat for frog species which were excluded from further assessment.

Table 5.3 Threatened frog breeding habitat assessment and targeted survey effort

Candidate species	Associated PCTs within subject land	Breeding habitat description[1]	Extent of breeding habitat at the study area and reason for exclusion from assessment	Survey effort employed
Giant Burrowing Frog *Heleioporus australiacus*	3749, 3932	Suitable breeding habitat consists of ephemeral flowing streams that have permanent pools, or in upland swamps, and are located within native vegetation. Most typically breeding occurs in streams with a bed width of up to 5 m (e.g. 2nd order and 3rd order streams) and upland swamps located on suitable geologies. Non-breeding habitat is native vegetation adjacent to the breeding sites. Non-breeding habitat is any area of PCT on the subject land that is located within 300 m of suitable breeding habitat (DPIE, 2020c). Most individuals have been recorded around the Sydney Basin Bioregion on the Hawkesbury sandstone formation (Gillespie & Hines 1999). Suitable geologies for the species (northern population) are also associated with Narrabeen sandstone, Nowra sandstone, Snapper Point sandstone and ….'*undifferentiated sediments, indicating a geologic preference for sandy substrates*' (Daly, 2019). Giant Burrowing Frog recorded within non-breeding habitat predominantly occur on sandy clay loam and sandy loam sites, with sandy soils rarely comprising non-breeding habitat for the species (Penman et. al., 2005).	No breeding habitat occurs within PCT 3749 or within 300 m of this PCT. The reach of the Coxs River that flows through and adjacent to patches of PCT 3932 at the study area does not comprise habitat on suitable geologies, noting it is a large permanent lowland stream on alluvium, surrounded by grassy swamp woodland and extensively cleared farmland. PCT 3932 falls within the upland swamps vegetation class but is a grass and sedge dominated community on heavy alluvial clay soils at the study area and is not consistent with the upland swamps on sandy soils or sandstone bedrock that are recognised as breeding habitat for the species. The Cth DCCEEW Species of National Environmental Significance dataset within the SPRAT profile for the species (Cth DCCEEW, 2024a), maps the subject land approximately 1.5 km to the west outside areas where the species may occur and 11 km to the west where the species is likely to occur. The Australian Frog Atlas (Cutajar et al., 2022) shows the distribution range of the species occurs within the subject land only at the former Wallerawang Power Station and the Coxs River, but as mentioned above, suitable geology for the species required for breeding in this location is not present.	No targeted survey effort required. Targeted surveys of potential breeding habitat employed in association with frog AV surveys for Green and Golden Bell Frog. Over 70 person-hours of frog AV transects (T1, T2, T3, T4, T5, T6, T7, T8A, T8B, T10, T11, T11a, T12, T13, T14, T17, T18, T20A, T20B) over four nights in February 2024.
Stuttering Frog *Mixophyes balbus*	3369, 3385, 3747, 3749, 3932	Suitable breeding habitat consists of permanent or ephemerally flowing streams with permanent pools located within areas of rainforest and wet, tall open forest in the foothills and escarpment on the eastern side of the Great Dividing Range (DPIE, 2020c). Streams are typically precipitous, have steep banks with deep leaf litter and/or dense riparian vegetation cover (Mahony et al., 1996). Non-breeding habitat is native vegetation located within 500 m of a breeding site; the species is known to move long distances from breeding sites (DPIE, 2020c).	No steep or precipitous streams with permanent pools located near areas of rainforest and wet sclerophyll forest. No rainforest vegetation present. The Australian Frog Atlas (Cutajar et al., 2022) shows the distribution range of the species does not intersect the subject land, but occurs within 700m of the former Wallerawang Power Station, where potential breeding habitat is absent. The closest Bionet records occur over 65 km away at Mount Coricudgy to the north-east (NSW DCCEEW, 2025a).	No targeted survey effort required.

Candidate species	Associated PCTs within subject land	Breeding habitat description[1]	Extent of breeding habitat at the study area and reason for exclusion from assessment	Survey effort employed
Booroolong Frog *Litoria booroolensis*	3369, 3932	The species requires permanent, or near permanent river environment with rocky structures (bedrock or cobble). Suitable breeding habitat consists of rocky structures in shallow water along the riparian zone, and non-breeding habitat is any habitat within the riparian zone (generally within 50 m of the high water mark) (DPIE, 2020c). Surveys of the species in the nearby Bathurst Regional Council LGA (Turon River, Macquarie River and Fish River) found the species tended to occur in association with cobble banks or large boulders within the river banks (Hansen and Crosby, 2016).	None present. No permanent aquatic environments are present within PCT 3369. No cobble or boulder habitat is associated with ephemeral creeklines that occur within this PCT. The Coxs River is associated with PCT 3932 but does not comprise bedrock or cobble confined creek beds required by this species for breeding. Known to occur and likely breed within the Turon River (NSW DCCEEW, 2025a) which is a western flowing river. The easterly flowing Coxs River is not hydrologically-related to the Turon River. Closest Bionet records occur over 15 km to the north within Turon National Park (NSW DCCEEW, 2025a).	No targeted survey effort required. Targeted surveys of potential breeding habitat employed comprising 8.5 person hours of frog AV transects in October 2024 across four nights at T5 and T6.
Littlejohn's Tree Frog *Litoria littlejohni*	3932	The species breeds in the upper reaches of permanent streams and in perched swamps, being rock pools and sandstone, and peaty pools. The species prefers dams and pools in some parts of its range and rocky streams in other parts. Non-breeding habitat is heath-based forests and woodlands where individuals shelter under leaf litter and low vegetation. Suitable breeding habitat consists of a range of still or slow-moving waterbodies including permanent streams, pools, ponds, swamps and dams, located within areas of suitable native vegetation. Non-breeding habitat is native vegetation located within 300 m of breeding sites, through which the species can migrate to locate non-breeding habitat (DPIE, 2020c).	Broadly suitable breeding habitat in dams where adjacent native vegetation is present and mostly confined to Gardens of Stone SCA, however PCT 3932 does not occur near or adjacent to dams within adjacent native vegetation. This potential breeding habitat does not contain potholes/lateral rock bars that are either completely isolated from surrounding water bodies or larger connected pools known to be used by the species (Mahony et al., 2020). The species does not occur in areas of cleared native forest, such as farmland or forest plantations (Gillespie et al., 2016) and would not occur within the study area along large sections of the Coxs River, where leaf litter is generally scarce. The Cth DCCEEW Species of National Environmental Significance dataset within the SPRAT profile for the species (Cth DCCEEW, 2024b) maps the subject land approximately 4 km to the west of areas where the species may occur and 8 km to the west of where the species is likely to occur. Distribution mapping for the species is heavily influenced by a solitary record from 2013 from a dam within Newnes Plateau (-33.376603, 150.185168) and 40 km west of the subject land in south-eastern Wollemi National Park (NSW DCCEEW, 2024a). The Australian Frog Atlas (Cutajar et al. 2022) shows the distribution range of the species does not intersect the subject land, but occurs within 300m at the former Wallerawang Power Station, where potential breeding habitat is absent.	No targeted survey effort required. Targeted surveys of potential breeding habitat employed in association with spotlighting surveys for arboreal mammals. Over 2.5 person hours of frog AV transects over two nights in July 2024 at T19 and T20. An additional 8.5 person hours of frog AV transects were undertaken in October 2024 across four nights at T5 and T6.

Candidate species	Associated PCTs within subject land	Breeding habitat description[1]	Extent of breeding habitat at the study area and reason for exclusion from assessment	Survey effort employed
Red-crowned Toadlet *Pseudophryne australis*	3932	The species is found only on Triassic sandstones, and within that area, it uses areas of heathland and woodland. Suitable breeding habitat consists of ephemeral streams or pools located within areas of native vegetation on Triassic sandstones. Non-breeding habitat is native vegetation within 100 m of suitable breeding habitat (DPIE, 2020c).	None present. No ephemeral streams or pools within native vegetation on Triassic sandstone in or within 100 m of associated PCT (NSW DCCEEW, 2025c). The subject land would comprise the most western record of the species (if present). The closest Bionet records occur over 20 km to the north-east within South Wollemi National Park (NSW DCCEEW, 2025a).	No targeted survey effort required.

Note: 1. Characteristics of breeding habitat for threatened frogs and migration buffers as identified in Chapter 3 of the guideline (DPIE, 2020c).




Plate 5.1 Coxs River south and north of Brays Lane respectively. Note emergent vegetation within waterway.




Plate 5.2 Coxs River floodplain with ponded areas and emergent vegetation at the former Wallerawang Power Station




Plate 5.3 Farm dams in agricultural land between Brays Lane and Gardens of Stone SCA



Plate 5.4 ***Ponded depressions and ephemeral drainage line along the forested easement (between Mount Piper 330 kV substation and agricultural land at Lidsdale)***

Brush-tailed Rock Wallaby

The Brush-tailed Rock Wallaby has been excluded from further assessment based on degraded habitat constraints. Habitat constraints for the species according to the TBDC comprise land within 1 km of rocky escarpments, gorges, steep slopes, boulder piles, rock outcrops or cliff lines. Escarpments occur around 1 km from the subject land, on the south-east side of the Gardens of Stone SCA between Portland and Wallerawang. The conclusion of the degraded habitat constraint is based on the lack of escarpment and cliff habitat within and adjacent to the subject land. A moderately-sized outcrop of embedded rock up to 10 m high occurs within agricultural land directly adjacent to the subject land (see Figure 5.2) and superficially comprises refuge habitat for the species, with small under hangs or caves, but is not considered structurally complex and is not directly connected to higher quality habitat around 1 km away.

Preferred rocky habitat such as loose piles of large boulders containing a maze of subterranean holes and passageways, cliffs with many mid-level ledges and with some caves and/or ledges covered by overhangs and isolated rock stacks, usually sheer-sided and often girdled with fallen boulders (Short 1982) is not present in the study area. A daytime habitat survey assessing the suitability of the habitat resource for Brush-tailed Rock Wallaby did not find any signs of activity including scats, tracks in the sand within caves or in rock ledges that have been worn smooth from regular use by rock wallabies over time. Daytime searches for signs and habitat resources have previously been considered an adequate form of survey method for detecting the Brush-tailed Rock Wallaby (Reside, 1988.; Wong, 1994).

The rock outcrop adjacent to the subject land occurs within a small patch of native canopy vegetation which is isolated from vegetation associated with Gardens of Stone SCA to the north and west. The rock outcrop occurs within agricultural land, which is subject to impacts from predation by foxes and cats, as well as disturbance by grazing cattle and the nearby coal conveyor. Predation by introduced predators, such as the Red Fox is a significant threat to the Brush-tailed Rock-wallaby (Hill, 1991.; EACT, 1999.; Waldegrave-Knight & Stevens, 2003). The species has generally disappeared from the tablelands of the Great Dividing Range but remains relatively common in the protected valleys and gorges of the eastern scarp of the Great Dividing Range (Menkhorst & Hynes, 2011). The National Recovery Plan for the species notes Wollemi National Park and Jenolan Caves as populations important to the survival of the species and have been supplemented with reintroductions to maintain the subpopulation (Menkhorst & Hynes, 2011). This population would occur up to 40 km to the north-east of the subject land in escarpments and is likely a stronghold (due to its distance from agricultural land) and where fox control may be most effective (Menkhorst & Hynes, 2011).

The Commonwealth DCCEEW Species of National Environmental Significance dataset within the SPRAT profile for the species (Commonwealth DCCEEW, 2025a), maps the subject land approximately 5 km to the west outside areas where the species may occur and 15 km to the west where the species is likely to occur.

No evidence of the Brush-tailed Rock Wallaby was recorded during multiple surveys at this location. No suitable rocky habitat with caves and ledges occurs elsewhere within the study area.



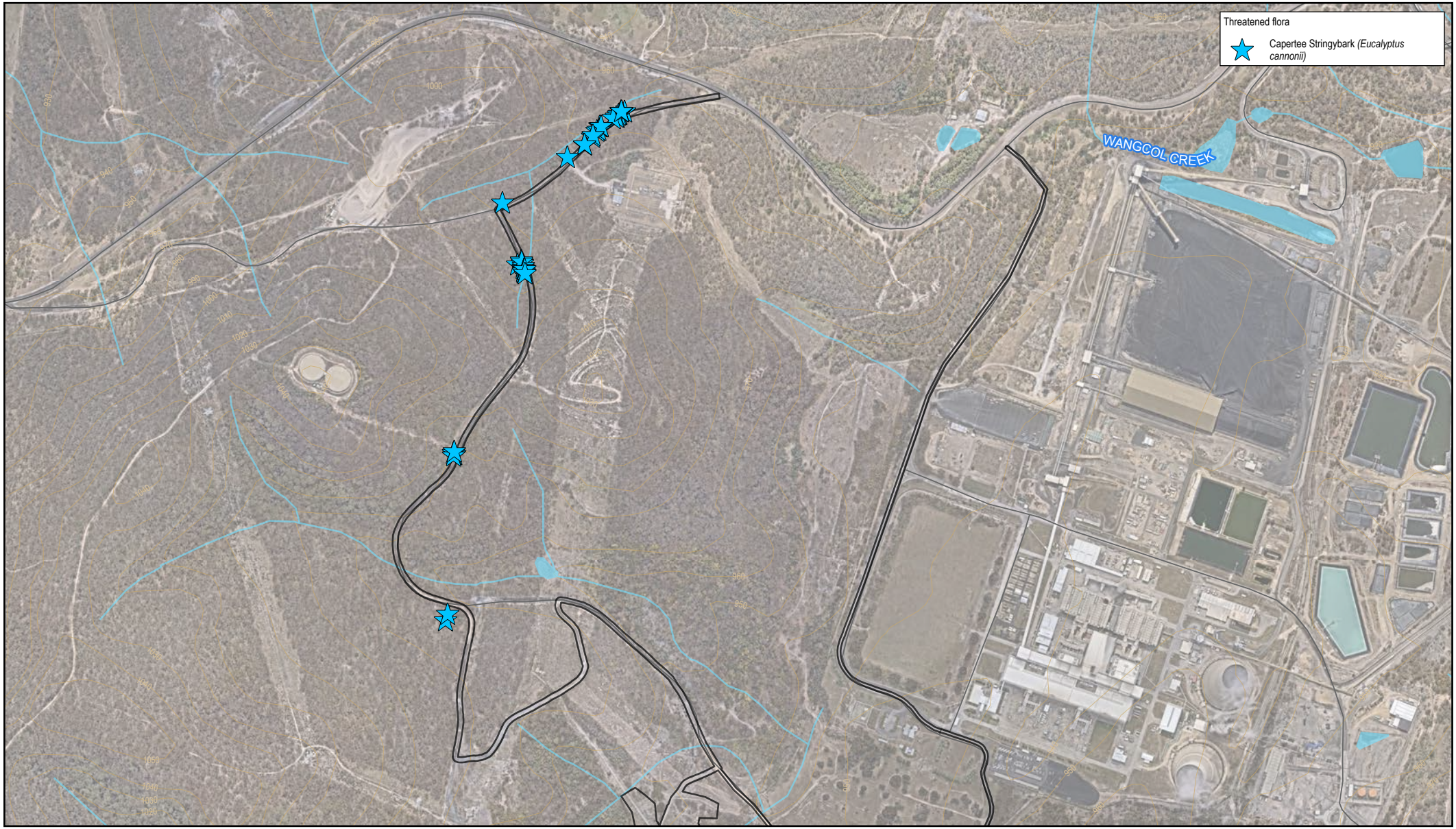
Plate 5.5 Rock outcrop with small crevices/underhangs within agricultural land in the study area

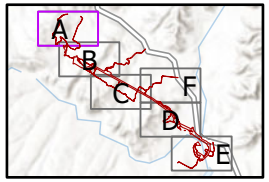


Plate 5.6 Small cave in rock outcrop



Plate 5.7 Rock outcrop occurring on the edge of agricultural land





Legend

- Subject land
- Roads
- Contour (10m)
- Watercourse
- Waterbody

Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

Threatened flora and threatened ecological communities

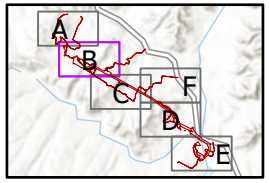
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.1A

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR004_ThreatenedFlora
Print date: 17 Jul 2025 - 12:33

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Legend

- Subject land
- Proposed transmission line
- Roads
- Contour (10m)
- Watercourse
- Waterbody

Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

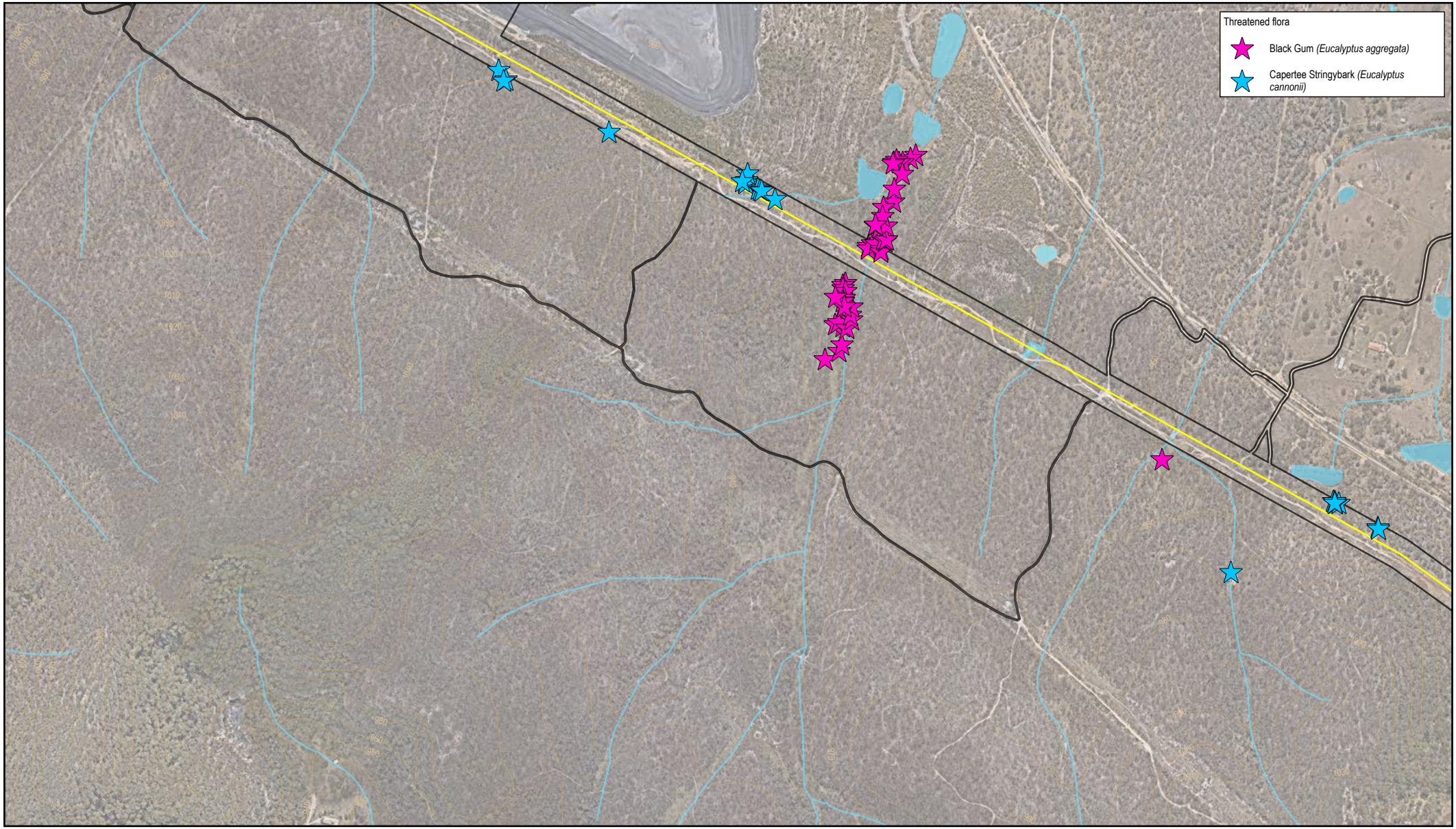
Threatened flora and threatened ecological communities

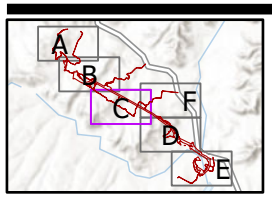
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.1B

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR004_ThreatenedFlora
Print date: 17 Jul 2025 - 12:33

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Legend

- Subject land
- Proposed transmission line
- Contour (10m)
- Watercourse
- Waterbody

Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

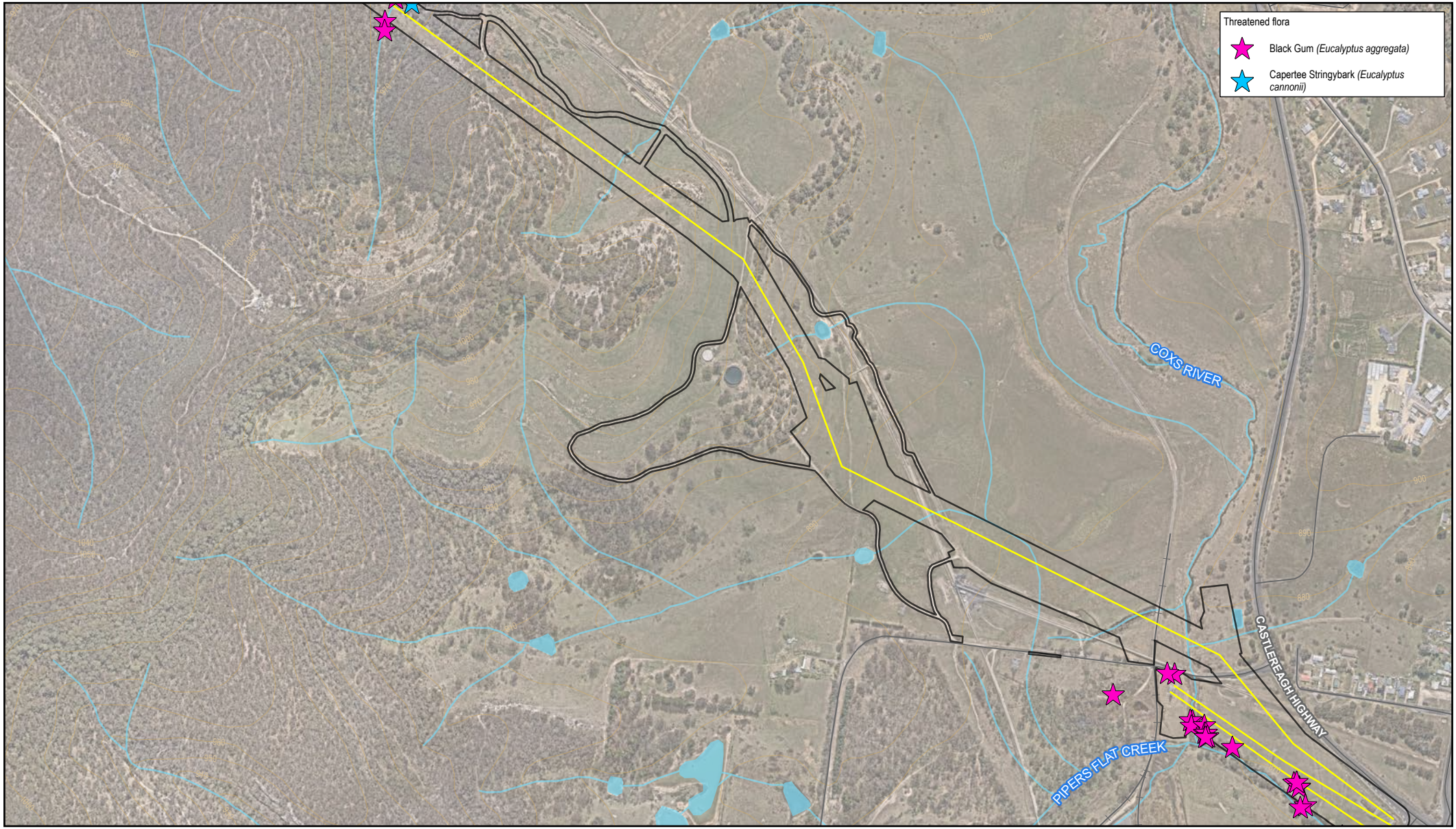
Threatened flora and threatened ecological communities

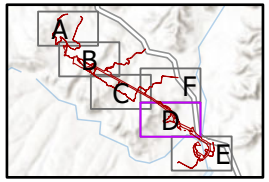
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.1C

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR004_ThreatenedFlora
Print date: 17 Jul 2025 - 12:34

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Legend

- Subject land
- Proposed transmission line
- Railway
- Roads
- Contour (10m)
- Watercourse
- Waterbody

Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

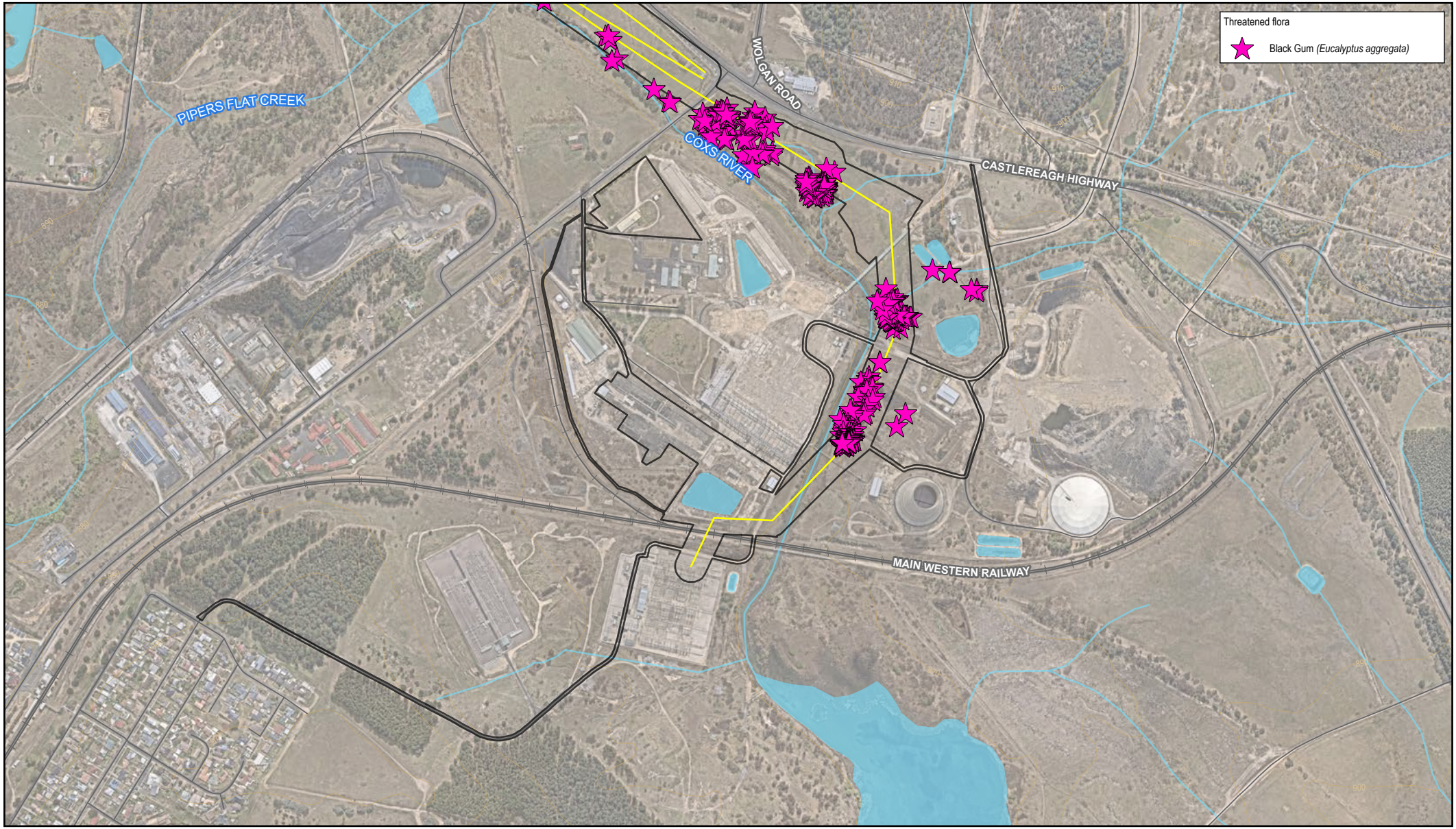
Threatened flora and threatened ecological communities

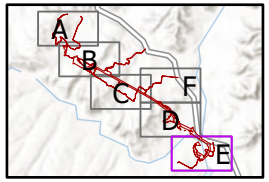
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.1D

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR004_ThreatenedFlora
Print date: 17 Jul 2025 - 12:34

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Legend

- Subject land
- Proposed transmission line
- Railway
- Roads
- Contour (10m)
- Watercourse
- Waterbody

Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

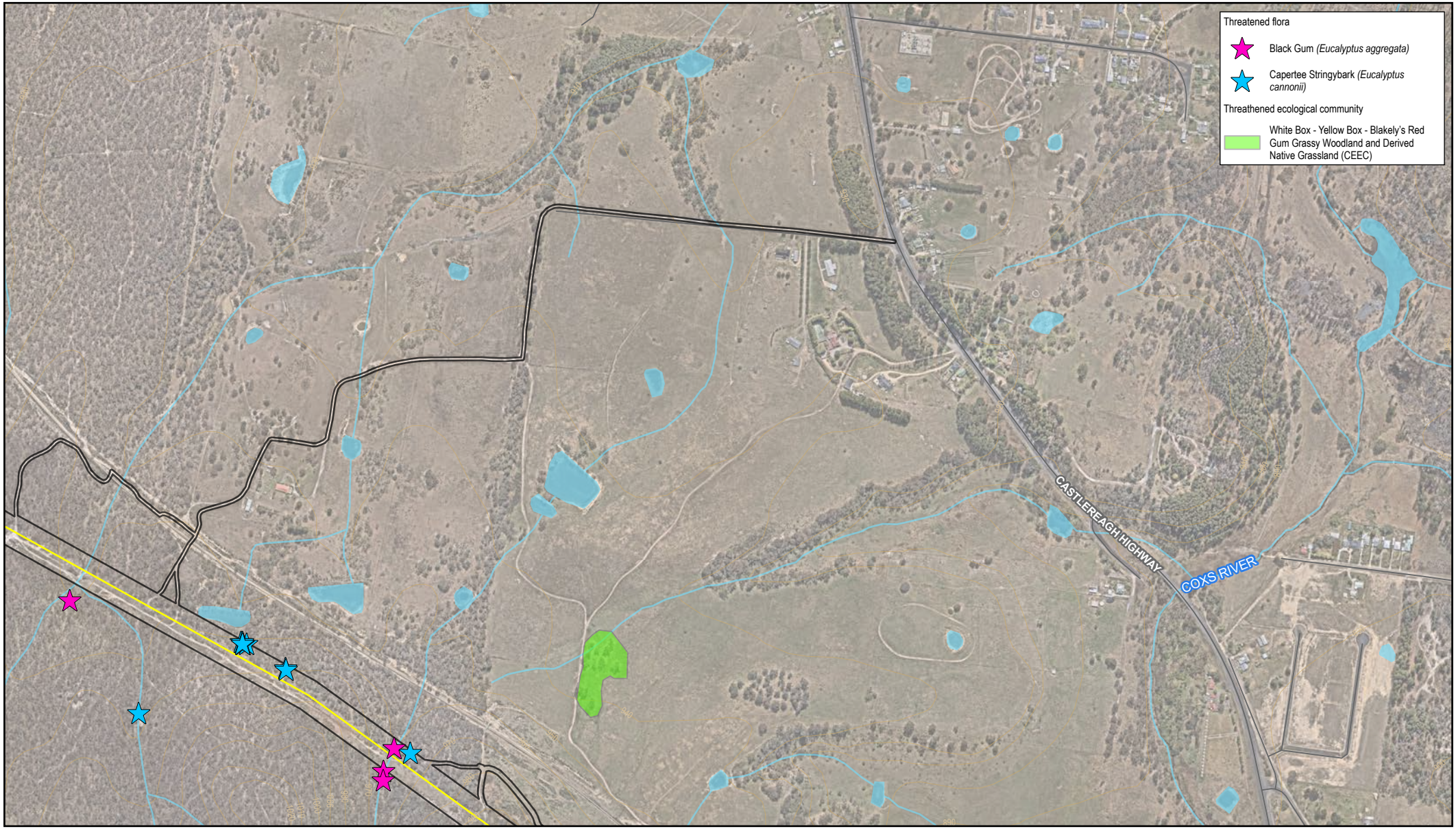
Threatened flora and threatened ecological communities

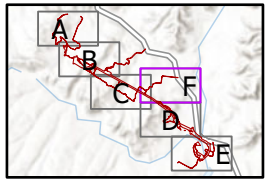
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.1E

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR004_ThreatenedFlora
Print date: 17 Jul 2025 - 12:35

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Legend

- Subject land
- Proposed transmission line
- Roads
- Contour (10m)
- Watercourse
- Waterbody

Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

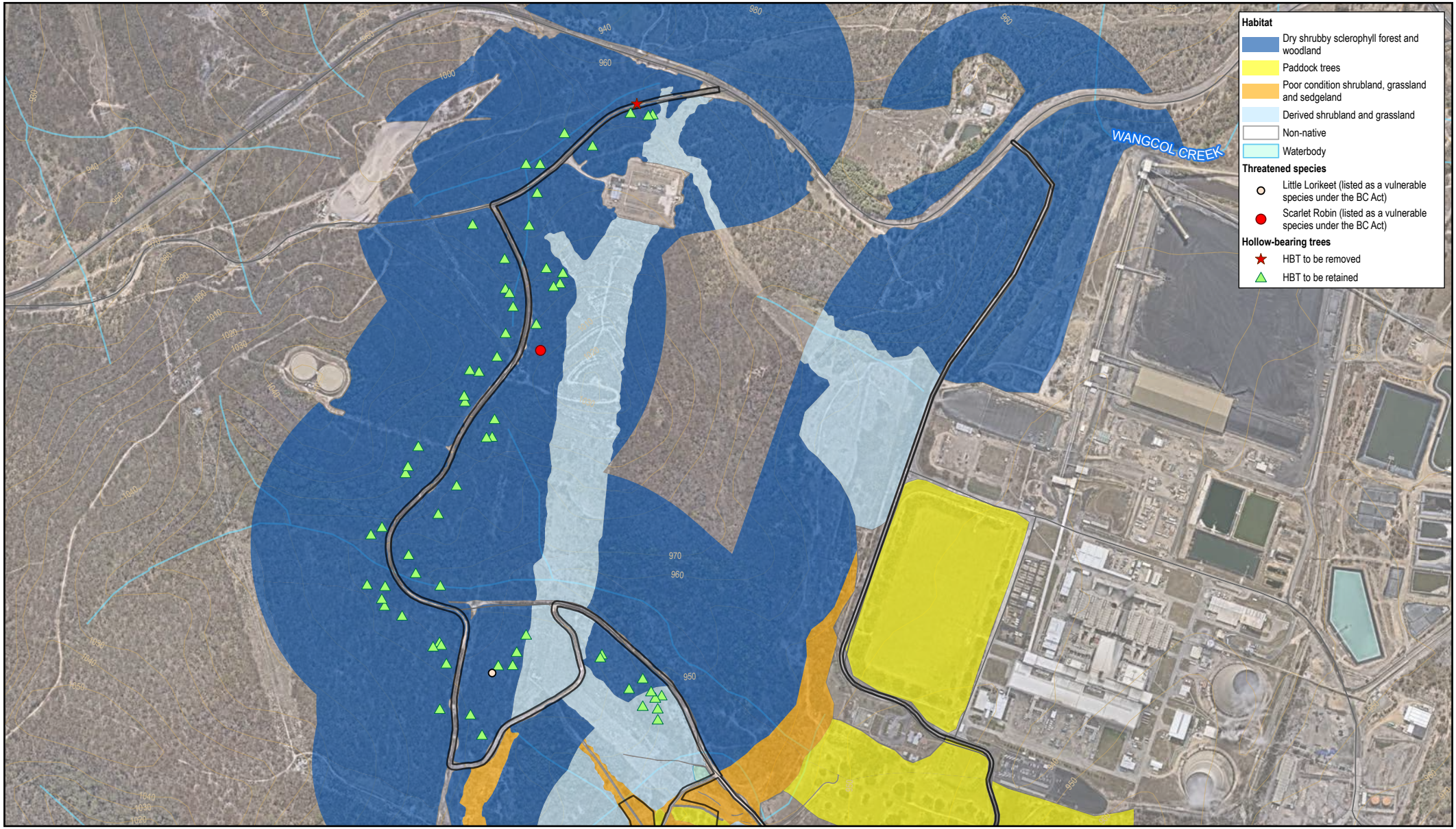
Threatened flora and threatened ecological communities

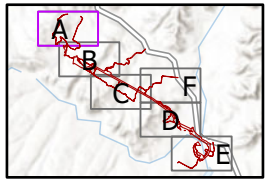
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.1F

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR004_ThreatenedFlora
Print date: 17 Jul 2025 - 12:35

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Legend

- Subject land
- Roads
- Contour (10m)
- Watercourse

Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

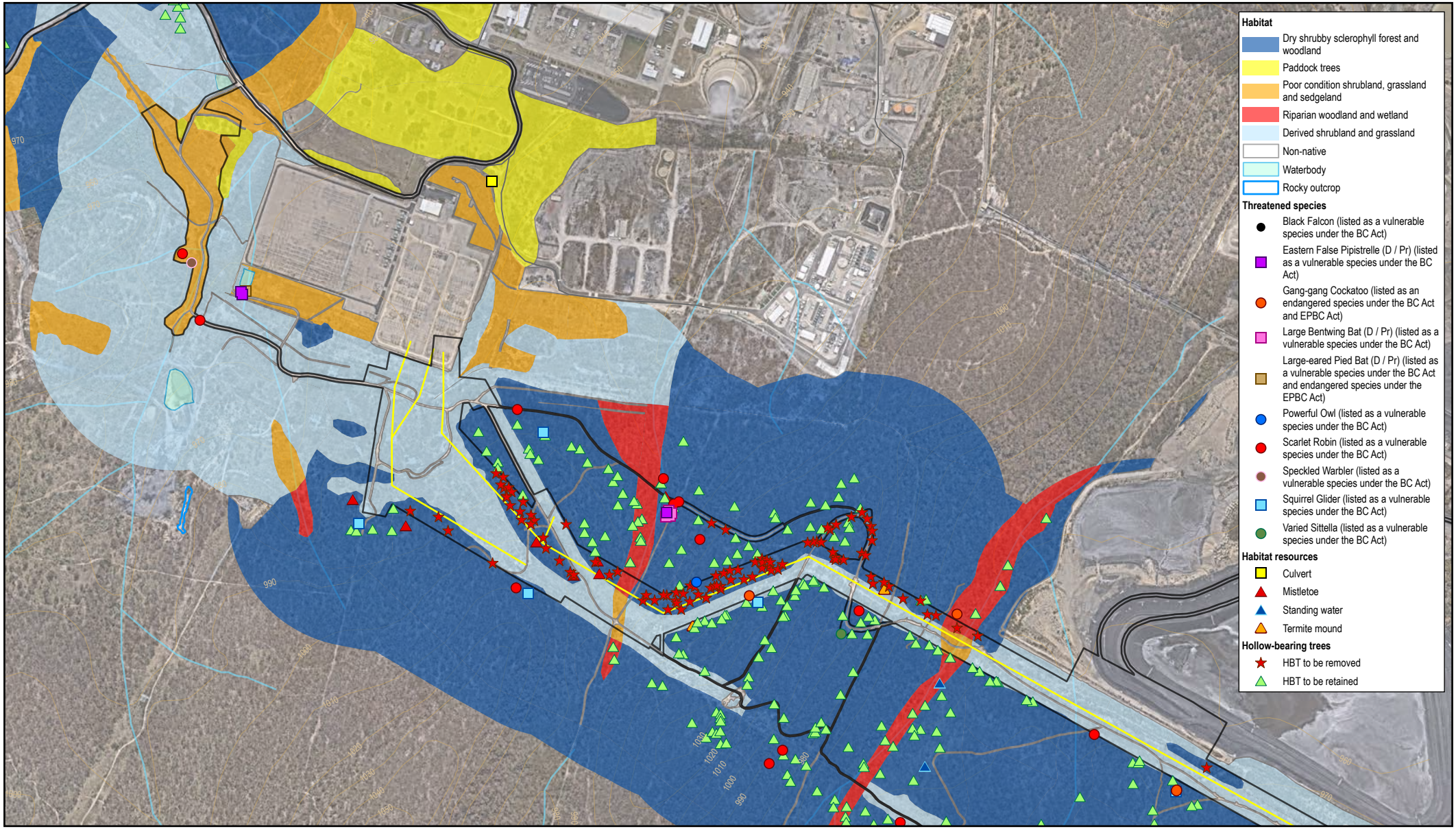
Threatened and migratory fauna and habitat resources

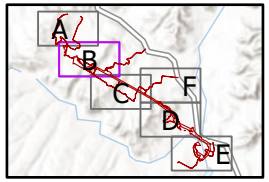
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.2A

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR005_ThreatenedFauna
Print date: 17 Jul 2025 - 12:56

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Legend

- Subject land
- Proposed transmission line
- Roads
- Contour (10m)
- Watercourse

Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

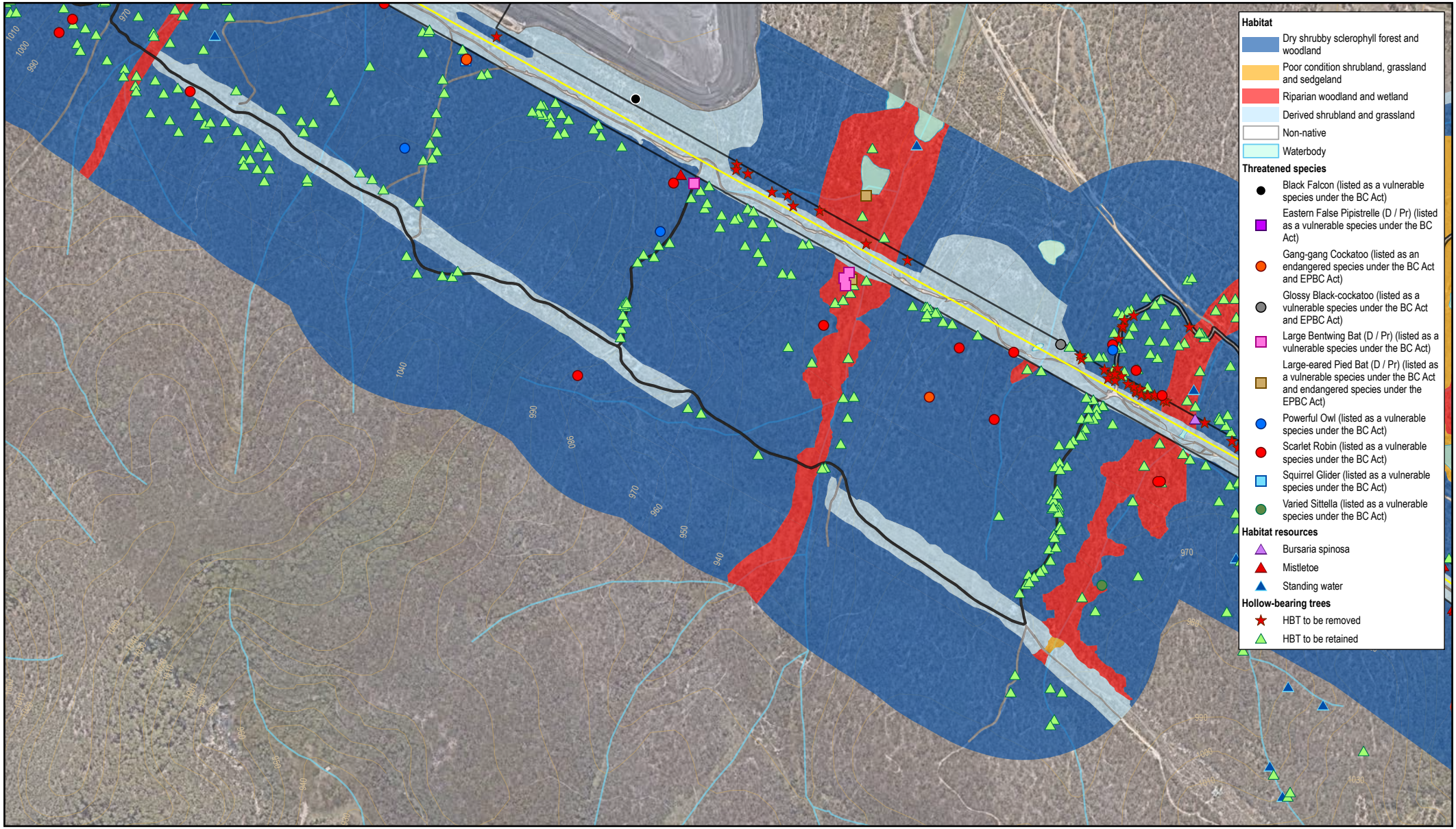
Threatened and migratory fauna and habitat resources

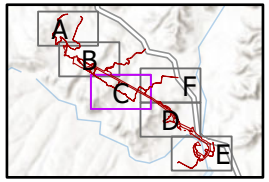
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.2B

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR005_ThreatenedFauna
Print date: 17 Jul 2025 - 12:56

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Legend

- Subject land
- Proposed transmission line
- Contour (10m)
- Watercourse

Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

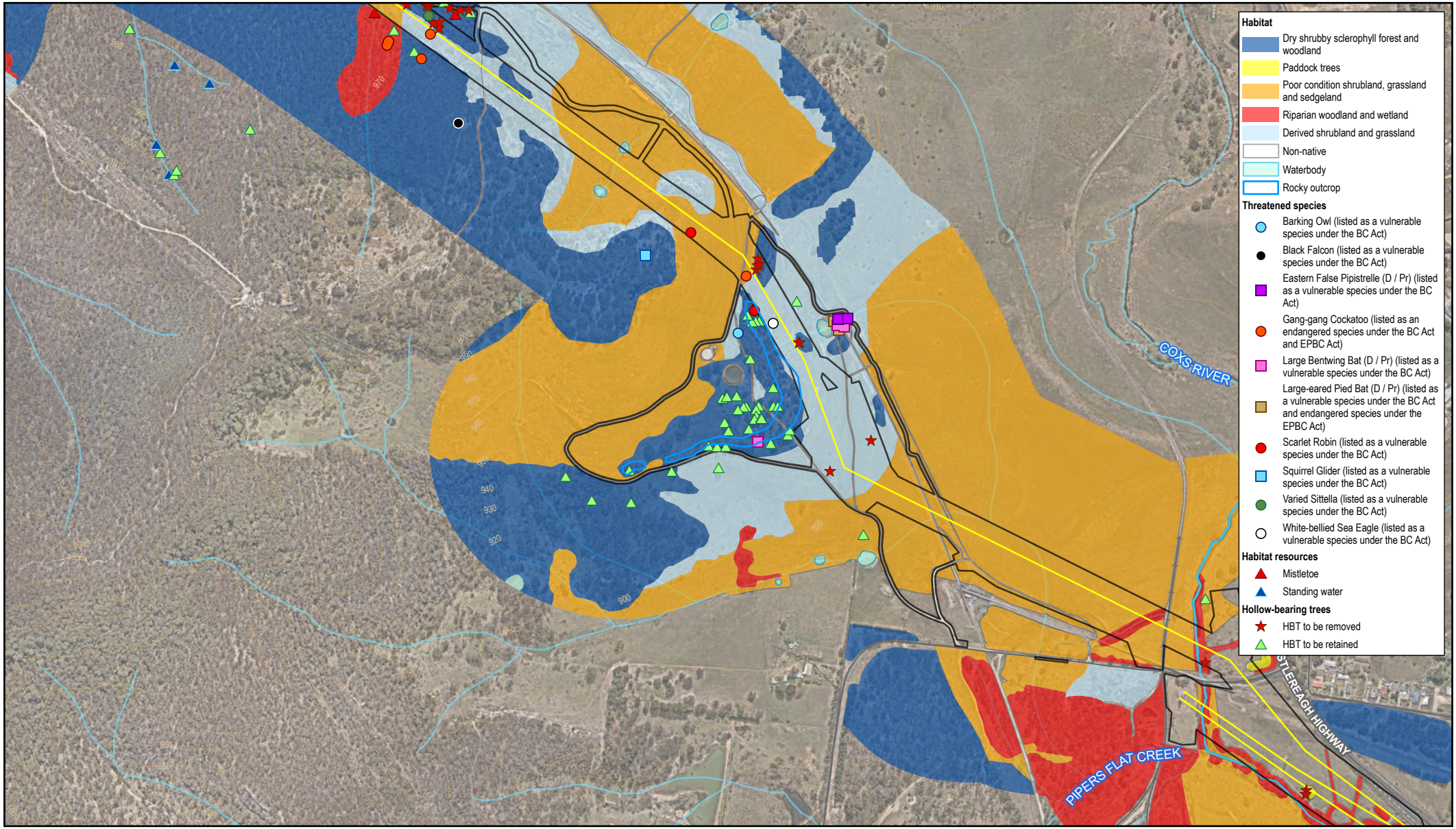
Threatened and migratory fauna and habitat resources

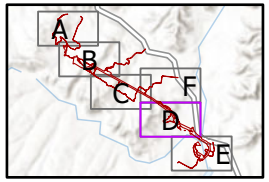
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.2C

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR005_ThreatenedFauna
Print date: 17 Jul 2025 - 12:57

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Legend

- Subject land
- Proposed transmission line
- Railway
- Roads
- Contour (10m)
- Watercourse

Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

Threatened and migratory fauna and habitat resources

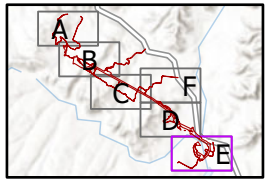
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.2D

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR005_ThreatenedFauna
Print date: 17 Jul 2025 - 12:57

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Legend

- Subject land
- Proposed transmission line
- Railway
- Roads
- Contour (10m)
- Watercourse

Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

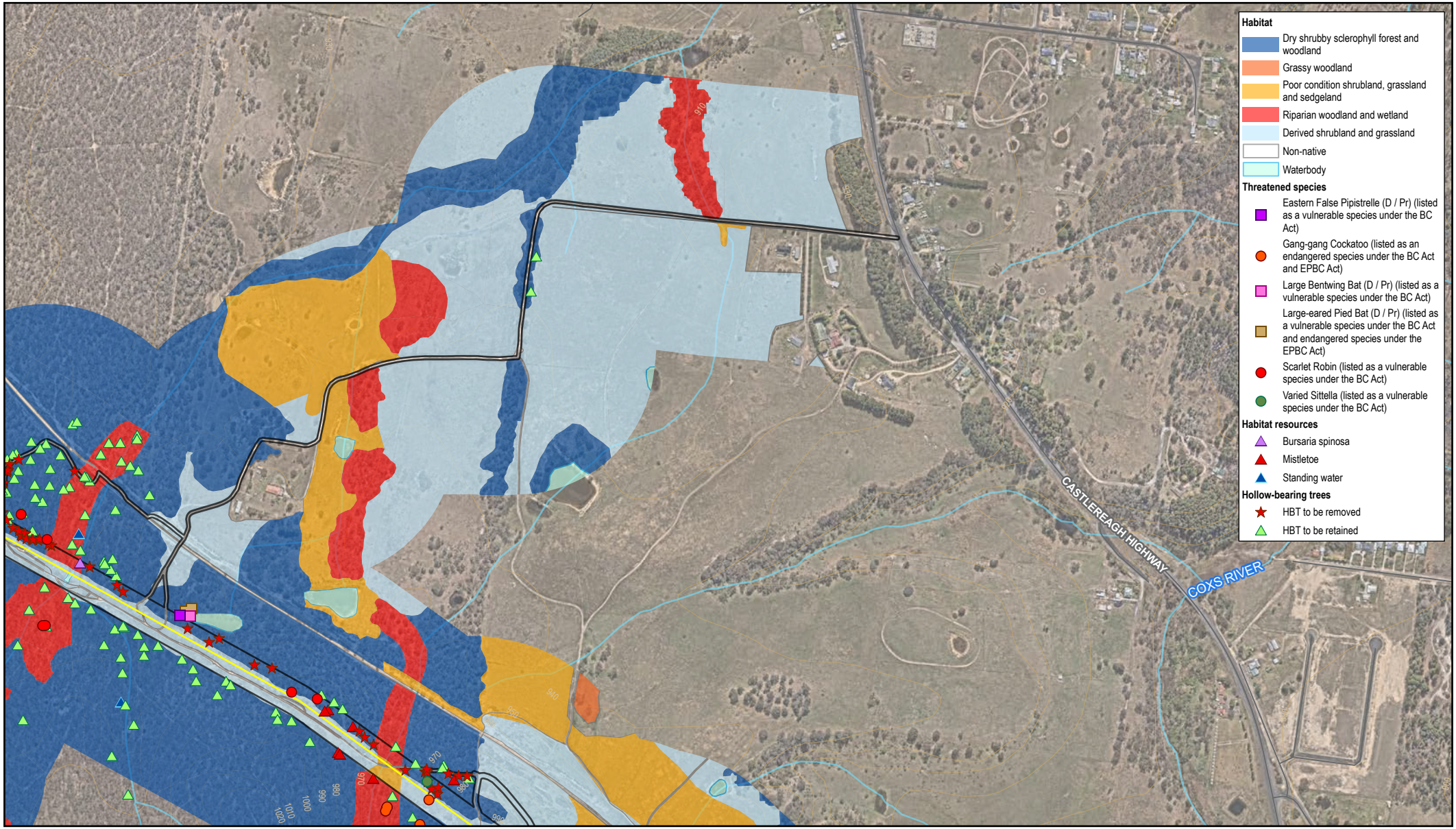
Threatened and migratory fauna and habitat resources

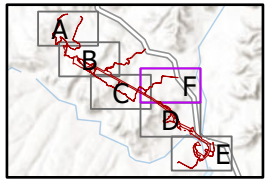
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.2E

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR005_ThreatenedFauna
Print date: 17 Jul 2025 - 12:58

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Legend

- Subject land
- Proposed transmission line
- Roads
- Contour (10m)
- Watercourse

Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

Threatened and migratory fauna and habitat resources

Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.2F

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR005_ThreatenedFauna
Print date: 17 Jul 2025 - 12:59

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan

5.2 Presence of candidate species credit species

5.2.1 Survey effort and results

Table 5.8 identifies the confirmed candidate species credit species requiring assessment in accordance with BAM Subsection 5.2.4, the method used to confirm their presence and the outcome of targeted surveys. The methods employed during field surveys in accordance with relevant guidelines are described in section 2.5 and 2.6. A summary of the type and total effort of the targeted surveys completed is provided in Table 5.4 along with an assessment of the suitability of conditions for targeted survey based on the species targeted and associated survey guidelines. Daily details of weather conditions throughout survey periods are provided in Table 2.8. Targeted survey techniques and effort are summarised in Table 5.4, Table 5.8 and Table 5.9. Figure 5.3 to Figure 5.6 show survey effort for candidate threatened species. Scanned field data sheets and GPS tracklogs demonstrating survey effort and coverage of the study area have been submitted for approval along with this BDAR.

A summary of the survey results as related to species credit calculations, including those species which were recorded and which do not require species polygons is presented below.

Table 5.4 Targeted species credit matter survey techniques and effort

Survey type	Survey timing and effort	Suitability of conditions for targeted surveys
Systematic threatened flora traverse	**Targeting threatened flora** Seasonal systematic parallel walking traverses for threatened flora in suitable habitat throughout the subject land. 5 m to 10 m spaced traverses conducted by two people over four days (14 to 17 August 2023) 5 m to 10 m spaced traverses conducted by five people over four days (12 to 15 September 2023) 5 to 10 m spaced traverses, 20 m spaced traverses in areas of PCT 3385, conducted by five people over four days (20 to 23 November 2023) 5 m to 10 m spaced traverses conducted by four people over four days (29 January to 01 February 2024) 5 m to 10 m spaced traverses conducted by three people over four days (11 to 14 June 2024) 5 m to 10 m spaced traverses, 20 m spaced traverses in areas of PCT 3385, conducted by two people over three days (14 to 16 October 2024) 5 m to 10 m spaced traverses conducted by two people over one day (5 November 2024) 5 m to 10 m spaced traverses, conducted by two people over three days (28 to 30 January 2025) **Total effort =** Coverage of the entire subject land over multiple survey seasons as appropriate to candidate flora species.	**Overall: Good** Average rainfall during 2023 lead to good survey conditions for the August, September and November survey rounds. 2024 started with heavy rainfall in January leading to high coverage of native forbs and grasses during the June and October 2024 and January 2025 surveys. Visibility was generally good across all surveys, and the entire footprint was accessible for all survey rounds.

Survey type	Survey timing and effort	Suitability of conditions for targeted surveys
Diurnal bird surveys and nest tree census	**Targeting threatened birds / nest sites for dual credit species** Nest tree census primarily conducted over subject land between 28/08/2023 and 01/09/2023. Further nest tree census conducted over gaps in October 2023 and again in June 2024 and October 2024 to survey revised access track areas, brake and winch sites and revised subject land. Nest tree census of medium to large hollows was conducted in July 2024 along drainage lines between subject land and access tracks between northern and southern easement within Gardens of Stone SCA and EnergyAustralia land in conjunction with diurnal bird surveys. 1 bird survey totalling up to 40 person mins 28/08/2023 2 bird surveys totalling up to 340 person mins 29/08/2023 3 bird surveys totalling up to 250 person mins 30/08/2023 3 bird surveys totalling up to 330 person mins 31/08/203 1 bird survey totalling up to 140 person mins 01/09/2023 1 bird survey totalling up to 120 person mins 26/10/2023 1 bird survey totalling up to 60 person mins 04/03/2024 2 bird surveys totalling up to 240 person mins 05/03/2024 1 bird survey totalling up to 120 person mins 06/03/2024 1 bird survey totalling up to 120 person mins 07/03/2024 2 bird surveys totalling up to 180 person mins 08/03/2024 1 bird survey totalling up to 120 person mins 06/05/2024 1 bird survey totalling up to 110 person mins 14/06/2024 2 bird surveys totalling up to 340 person mins 02/07/2024 2 bird surveys totalling up to 670 person mins 03/07/2024 3 bird surveys totalling up to 690 person mins 04/07/2024 1 bird survey totalling up to 120 person mins 05/07/2024 1 bird survey totalling up to 460 person mins 14/10/2024 2 bird surveys totalling up to 445 person mins 15/10/2024 2 bird surveys totalling up to 240 person mins 16/10/2024 1 bird survey totalling up to 458 person mins 17/10/2024 1 bird survey totalling up to 360 person mins 18/10/2024 **Total survey effort: 99.2 person hours over 22 days.**	**Overall: Good** August 2023: Surveys ranged between 7.5-19 °C with calm winds and dry conditions. Some gusty winds on 30 August with a storm forming at the end of the survey. October 2023: Surveys ranged between 10.7-10.9 °C with occasional light breezes and light drizzles. March 2024: Surveys ranged between 15.4-20 °C with light wind and dry conditions. July 2024: Surveys were mostly calm and dry conditions ranging between 6-12.5 °C. Very light rain briefly occurred on the 2nd, 4th and 5th July. October 2024: Surveys ranged from 12.5-22.2 °C, with light wind and light rain.
Microbat surveys	**Targeting threatened microbats** Roost assessment of potential cave habitat (for Large-eared Pied Bat) between 28/08/2024 and 01/09/2024 and on 30/01/2025. 4 Anabat deployments between 23 and 27 October 2023. This included one Anabat which failed to collect data. A total of 7 nights of survey effort was captured across 3 locations. 4 Anabat deployments between 19 and 23 February 2024. A total of 14 nights of survey effort was captured across 4 locations. 7 Anabat deployments between 29 January and 2 February 2024. A total of 16 nights of survey effort was captured across 7 locations. **Total survey effort: 38 survey nights across 14 locations.**	**Overall: Moderate** October 2023: Surveys ranged between 0.9-10.6 °C nightly with occasional light breezes and light drizzles. Approximately 5 mm of rainfall occurred at the end of the survey period. January 2024: Survey ranged between 13.1-19.4 °C nightly with mild breezes. A small (>0.1 mm) amount of rain fell on 1 January. February 2024: Surveys ranged between 11.7-14 °C nightly with light breezes. Minor rainfall (>1 mm) fell on the 19 and 21 February.

Survey type	Survey timing and effort	Suitability of conditions for targeted surveys
Call playback and spotlighting	**Targeting threatened owls, Koala, Squirrel Glider, Greater Glider, Eastern Pygmy Possum and Bush-stone Curlew** Five dedicated owl call playback sampling station locations (spaced 1.5 km apart) for threatened owls developed for June-July 2024 surveys. Call playback and spotlighting during surveys prior to this also targeted owls but were conducted prior to the new guidelines being released. 15 transects over two nights totalling 5.61 km of dedicated spotlighting for Koala. See Table 5.6 for detailed survey effort for Koala. Spotlighting also includes surveys relevant for other threatened nocturnal birds and mammals. **Spotlighting:** 1 survey of up to 120 person mins 28/08/23 1 survey of up to 150 person mins 29/08/23 1 survey of up to 160 person mins 30/08/23 1 survey of up to 210 person mins 31/08/23 1 survey of up to 200 person mins 23/10/23 1 survey of up to 330 person mins 24/10/23 1 survey of up to 180 person mins 25/10/23 1 survey of up to 180 person mins 26/10/2023 2 surveys of up to 120 person mins 04/03/24 2 surveys of up to 300 person mins 05/03/24 4 surveys of up to 230 person mins 06/03/24 2 surveys of up to 180 person mins 07/03/24 1 survey of up to 360 person mins 11/6/24 1 survey of up to 120 person mins 12/6/24 1 survey of up to 50 person mins 01/07/2024 1 survey of up to 30 person mins 02/07/24 2 surveys of up to 320 person mins 03/07/2024 2 surveys of up to 620 person mins 04/07/2024 1 survey of up to 140 person mins 15/10/2024 1 survey of up to 120 person mins 16/10/2024 2 surveys of up to 120 person mins 17/10/2024 **Call Playback (inclusive of broadcasting and spotlighting):** 1 replicate (20 person mins) 28/08/2023 1 replicate (50 person mins) 29/08/2023 1 replicate (30 person mins) 30/08/2023 1 replicate (20 person mins) 31/08/2023 1 replicate (30 person mins) 23/10/2023 1 replicate (30 person mins) 24/10/2023 1 replicate (30 person mins) 25/10/2023 2 replicates (60 person mins) 4/03/2024 2 replicates (60 person mins) 5/03/2024 3 replicates (100 person mins) 6/03/2024 2 replicates (40 person mins) 7/03/2024 1 replicate (240 person mins) 12/06/2024 2 replicates (240 & 145 person mins) 13/06/2024 4 replicates (2x240 & 2x160 person mins) 01/07/2024 4 replicates (2x240 & 2x160 person mins) 02/07/2024 2 replicates (1x240 & 1x160 person mins) 03/07/2024 1 replicate (240 person mins) 04/07/2024	**Overall: Moderate** August 2023: Surveys ranged between 3.3-8.7 °C with up to 100% cloud cover and occasional rain on 28 August. Occasional drizzle at start of survey on 30 August. October 2023: Calm and dry conditions between 10.1-23.5 °C. However partially windy with constant drizzle and low temperatures (8.2-8.8 °C) on 26 October. No call-playbacks were performed during 26 October due to wind. March 2024: 13.1-21.7 °C with calm and mostly dry nights. May 2024: Calm, cool and dry between 4.5-8.8 °C. Occasional drizzle on 11th June. June 2024: Surveys ranged between 4.5-8.8 °C nightly with light breezes and no rain. July 2024 surveys: Calm and dry conditions between 4.7-10.5 °C October 2024 surveys: Conditions varied between surveys, with temperatures ranging 8.5-18.8 °C. Surveys had calm to light winds and dry to constant rain.

Survey type	Survey timing and effort	Suitability of conditions for targeted surveys
	Total survey effort **General spotlighting:** 70.8 person hours across 30 surveys over 21 nights. **Targeted Owl survey:** 16 replicates totalling 240 person minutes over 11 nights. 41.5 person hours across 14 replicates over 6 nights. **Targeted Koala survey:** ~1120 person minutes across 5.61 km over two nights	
Frog surveys	**Targeting threatened frogs** Assessment of potential breeding habitat (wetlands, rivers and drainage lines) between August 2023 and February 2024. Dedicated Frog Aural Visual (AV) surveys conducted over 4 consecutive nights within the same locations in February 2024. Frog Aural Visual (AV) surveys for 110 person minutes on 24/10/2023 Frog AV surveys for 1110 person minutes on 19/02/2024 Frog AV surveys for 1120 person minutes on 20/02/2024 Frog AV surveys for 860 person minutes on 21/02/2024 Frog AV surveys for 1130 person minutes on 22/02/2024 Frog AV surveys for 90 person minutes on 3/07/2024 Frog AV surveys for 140 person minutes on 14/10/2024 Frog AV surveys for 130 person minutes on 15/10/2024 Frog AV surveys for 120 person minutes on 16/10/2024 Frog AV surveys for 120 person minutes on 17/10/2024 **Total survey effort** **Frog aural/visual surveys:** 81.5 person hours across 10 nights.	**Overall: Good** October 2023: Cool temperatures approximately 6.0 °C with no wind or rain. February 2024: Surveys were performed in very good conditions. Slightly cool temperatures ranging from 12.5-19.3 °C and 69-90% relative humidity nightly, but very wet (5 mm rain within the week) and high frog activity. A heavy storm occurred earlier in the day of 19 February. July 2024: Between 0.2-3.8 mm of rainfall per day, with humidity ranging between 87-94%. Temperatures were cold (between -0.7 to 6.6 °C), though target species for this month are not negatively impacted by colder conditions. October 2024: Surveys were performed in suitable conditions for targeted species. Temperatures ranged from 9.5-18.0 °C, with humidity between 68.1-100%. Conditions varied from light wind to calm and dry to constant rain.
Koala SAT	**Targeting Koala** Spot Assessment Technique (SAT) search areas targeting Koala in August and October 2023. Section 4.1.3 of Biodiversity Assessment Method Survey Guide (DPE, 2022c) recommends 250 m spacing in suitable habitat <50 ha, which would require up to 7 Koala SATs to be undertaken for this project in all vegetation zones comprising a canopy. Given the habitat connectivity from the subject land to large areas of intact native vegetation associated with Gardens of Stone SCA, an additional 14 SATs were completed 1 SAT search areas on 29/08/2023 1 SAT search areas on 30/08/2023 1 SAT search areas on 31/08/2023 4 SAT search areas on 24/10/2023 6 SAT search areas on 25/10/2023 6 SAT search areas on 26/10/2023 2 SAT search areas on 27/10/2023 **Total survey effort** **Spot Assessment Technique:** 21 SAT searches over 32 ha of suitable habitat.	**Overall: Moderate** August 2023: Surveys had daily temperatures ranging between 14.7-19.2 °C, with gentle wind. No rainfall was recorded in the last 72 hours prior to or during the survey period until the afternoon of 31 August (6.6 mm), after surveys had been completed, in accordance with appropriate weather for conducting SAT searches under with BAM Koala survey guidelines. October 2023: Daily temperatures ranged between 12.1-27 °C, with light breezes. No rainfall was recorded in the last 72 hours prior to or during the survey period until the afternoon of the 27th, when 5 mm of rainfall occurred after surveys had been completed, in accordance with appropriate weather for conducting SAT searches under with BAM Koala survey guidelines.

Survey type	Survey timing and effort	Suitability of conditions for targeted surveys
Motion-activated camera traps	**Targeting Squirrel Glider, Greater Glider, Brush-tailed Phascogale and Eastern Pygmy-possum** 36 remote cameras were set between 19 and 20 February and were collected between 16 and 17 April 2024. The TBDC does not provide standardised camera trap survey guidelines for the Squirrel Glider, Greater Glider and Eastern Pygmy-possum although it can be a justified approach in surveying these species. Camera survey effort was conducted with reference to the survey guidelines in the TBDC for the Brush-tailed Phascogale and only canopied habitat was surveyed. Referencing these guidelines, up to 34 cameras over ~16ha would be required within the subject land. **Total survey effort of remote cameras:** 1780 survey nights from 36 devices between February and April 2023.	**Overall: Good** Conditions were generally suitable across all three survey months. Heavier rainfall was recorded on several nights, which may have contributed to false recordings, particularly for the survey period, listed for each month below. Late February 2024: Temperatures ranged between 11.7 to 19 °C nightly, with mostly light winds (4-9 km/h). Significant rainfall occurrences: 24 Feb (2.8 mm) March 2024: Temperatures ranged between 6.2 to 15.9 °C nightly, with winds averaging calm to 6 km/h. Rainfall occurrences: 17 Mar (13.6 mm) 18 Mar (8.6 mm) 24 Mar (5.2 mm) April 2024: Temperatures ranged between 1.3 to 12.7 °C with winds typically calm to light, though winds did reach 17 km/h and 11 km/h for the nights of 7 and 10 April, respectively, which may have contributed to false recordings. Rainfall occurrences: 3 Apr (12.4 mm) 5 Apr (31.6 mm) 6 Apr (79.0 mm) 10 Apr (7.6 mm)
Audiomoths	**Targeting Koala, Powerful Owl, Masked Owl, Barking Owl, Gang-gang Cockatoo, Glossy Black-cockatoo and Bush-stone Curlew** 15 audiomoths configured to record between 5:45pm and 7am were deployed for up to 20 nights in June-July 2024. Schedule set to record primarily nocturnal species but also nesting cockatoos which may be more vocal at dawn and dusk. **Total survey effort** 216 survey nights from 15 devices across June to July.	**Overall: Good** Conditions were generally suitable for the acoustic detection of targeted species during the survey period. Temperatures ranged nightly between -3.9 to 8.2 °C with winds calm to ~10 km/h. The ambient noise caused by some wind and rainfall events may have contributed to false recordings, identified below: Stronger wind events: 7 June (13 km/h) 12 June (13 km/h) Heavier rainfall events: 15 June (9.4 mm) 16 June (2.2 mm)
Habitat surveys for insects	**Targeting Purple Copper Butterfly** Several very localised patches on potential habitat (i.e. *Bursaria spinosa*) were surveyed between 28/8/2024 and 01/09/2024 Active area search in identified habitat for 30 person minutes on 31/9/2023 at one location (one day prior to commencement of survey season) Active area searches in identified habitat for 170 person minutes on 25/10/2023 at two locations and 24/10/2023 for 60 person minutes at one location	**Overall: Good** Survey conditions were suitable for detecting the presence of this species on both days of targeted survey. 31 September 2023 Mostly sunny with a light breeze. Temperature was just below 15 °C. 24 October 2023: No cloud cover was observed with a light breeze (13 km/h), no rainfall and temperatures ranging between 21-29 °C.

Survey type	Survey timing and effort	Suitability of conditions for targeted surveys
	Total survey effort: ~4 person hours within 3 locations across two days in appropriate conditions. 30 person minutes at one location just outside the survey period and preferred temperature.	25 October 2023: No cloud cover was present, with a light breeze (9 km/h). No rainfall was observed, with temperatures ranging between 15-29 °C.

Acacia meiantha

The species was not detected during surveys. The majority of targeted threatened flora traverse survey effort for *Acacia meiantha* was conducted in September 2023 (Figure 5.3), comprising systematic 5 m-spaced traverses in accordance with the techniques specified for the species in the BAM threatened flora survey guidelines (DPIE 2020b). Due to project related time constraints, the remaining areas of potential *Acacia meiantha* habitat was surveyed in November 2023 (Figure 5.3). According to the TBDC (NSW DCCEEW, 2025b), the nominal survey period for this species is July to October. However, the TBDC also notes that the species can still be surveyed at any time of the year (NSW DCCEEW, 2025b).

The basis for the July to October survey period for *Acacia meiantha* is the species would be in flower and is more easily identified during this time. Previous detailed assessments conducted on the distribution and ecology of *Acacia meiantha* included surveys conducted during January (Medd, 2020). The species was detectable and high numbers of the species were recorded (Medd, 2020).

Similarly, the Blackheath to Little Hartley project (Transport for NSW, 2023) surveyed for *Acacia meiantha* outside the nominal survey period in accordance with the techniques specified for the species in the BAM threatened flora survey guidelines (DPIE, 2020b). The project obtained an expert report for *Acacia meiantha* due to surveying outside the nominal survey period. The expert report noted “whilst it is preferable that any surveys for this species occur when it is flowering, simply because this increases the prospects of detection and of correct identification, I do not consider flowering to be essential for detection of the species” (Dr Steven Douglas, 2022).

The systematic traverses of the subject land under suitable conditions in November 2023 is likely to have been appropriate to detect *Acacia meiantha* if present, noting:

– no candidate *Acacia meiantha* species were detected (i.e. Acacias with similar crowded, linear phyllodes that would require flowers or fruit in the appropriate season in order to correctly identify the species)
– extensive survey of the majority of the subject land did not detect any individuals of the species
– the TBDC notes the species can still be surveyed at any time of the year
– site conditions and groundcover species composition in November 2024 was similar to September 2023 when targeted surveys were conducted within the survey window in the TBDC.

Based on the above the *Acacia meiantha* has been excluded from occurring at the subject land or requiring calculation of species credits through ‘Targeted threatened species survey’. Partial coverage of the subject land was completed in September 2023, aligning with the TBDC survey period (NSW DCCEEW, 2025b).The completion of systematic survey coverage outside of the period nominated for the *Acacia meiantha* has been noted in the BAM-C and Table 5.8 below.

Black Gum

274 individuals recorded within the subject land (Figure 5.1). 127 individuals were also recorded outside the subject land, including a large population along a creek line through the Stone SCA and the Centennial Springvale Coal Services facility that intersects the subject land.

Capertee Stringybark

142 individuals recorded within the subject land (Figure 5.1). 84 individuals were also recorded incidentally outside the subject land within EnergyAustralia lands, and the Gardens of Stone SCA.

Other threatened flora species

No other threatened flora species were recorded during targeted searches conducted in accordance with the TBDC and the threatened flora survey guidelines.

Forest owls

The Powerful Owl was detected through targeted survey within Gardens of Stone SCA on several occasions. A Barking Owl flew into the subject land in response to call playback conducted in privately leased agricultural land within Centennial owned properties north of Brays Lane on one occasion.

General habitat assessments identifying the presence of suitable (>20 cm diameter) hollows for forest owls within associated PCTs, in addition to opportunistic searches, were conducted in August to October 2023, and May, June and July 2024 (Figure 5.5 and Figure 5.6).Up to 24 candidate nest trees was recorded in the subject land, with a further 133 candidate nest trees recorded in the broader study area with suitably sized hollows.

Survey effort targeting threatened owls through call playback and spotlighting was modified in April 2024, following the release of new survey guidelines for these species through the TBDC in March 2024. The study area was stratified into 1500 m diameter circles with centrally located call playback stations, matching the survey effort requirement for greater than 1000 ha of suitable habitat in accordance with the TBDC (NSW DCCEEW, 2025b). The locations of these set call playback monitoring stations was aligned to locations of previous call playback locations as far as possible. Where two teams were present in a monitoring period, dedicated owl call playback was scheduled during the night so that teams were at least 3 km apart, and unlikely to interfere with sampling from another call playback station and potentially avoid repeat counts of the same individual from adjacent sites.

At least six nights of dedicated call playback within set monitoring stations was conducted between August 2023 and July 2024, within the recommended survey period for these species. Following the introduction of the new guidelines this comprised up to 40 minutes of dedicated survey effort per owl species at each monitoring station per night with a:

– 10 minute listening period
– 15 minutes of intermittent call playback with listening sequences
– 15 minutes of spotlighting within the immediate area of the monitoring station.

This was supplemented by additional spotlighting following call playback within the recommended survey season (see Figure 5.5 and Figure 5.6). Table 5.5 shows the dates of dedicated call playback conducted within standardised owl circle sampling stations. Given the detection of the Barking Owl and Powerful Owl, it is also likely that the Masked Owl would also have been detected (if present within and around the subject land), even though only five replicates were conducted within Owl monitoring location ID 4. The Masked Owl was excluded from occurring throughout the entire subject site based on targeted survey.

Table 5.5 Threatened owl call playback targeted survey effort

Owl monitoring location ID	Location	Dates of dedicated call playback prior to release of survey guidelines within recommended survey period	Dates of dedicated call playback following release of survey guidelines within recommended survey period	Total nights of call playback
1	North-eastern portion of subject land at Blackmans Flat. Includes Ivanhoe Coal and EnergyAustralia lands	15/08/2023 30/08/2023 05/03/2024	01/07/2024 02/07/2024 03/07/2024 04/07/2024	7
2	North-eastern portion of subject land at Blackmans Flat. Includes Gardens of Stone SCA, Centennial Coal properties and EnergyAustralia lands	17/08/2023 28/08/2023 31/08/2023 24/10/2023 20/02/2024 05/03/2024	01/07/2024 02/07/2024	8
3	Central portion of subject land at Lidsdale. Includes Gardens of Stone SCA and privately leased agricultural land within Centennial Coal properties	29/08/2023 04/03/2024 06/03/2024	01/07/2024 02/07/2024 03/07/2024	6

Owl monitoring location ID	Location	Dates of dedicated call playback prior to release of survey guidelines within recommended survey period	Dates of dedicated call playback following release of survey guidelines within recommended survey period	Total nights of call playback
4	South-east corner of subject land at Lidsdale. Includes former Wallerawang Power Station lands, Coxs River and privately leased agricultural land within Centennial Coal properties	04/03/2024[1] 06/03/2024[1]	13/06/2024 01/07/2024 02/07/2024	5
5	South-east corner of subject land at Wallerawang. Includes former Wallerawang Power Station lands, Coxs River and privately leased agricultural land within Centennial Coal properties	23/10/2023 20/02/2024 07/03/2024 13/06/2024	11/06/2024 12/06/2024 01/07/2024 02/07/2024	8

Note: 1. Call playback at multiple locations within dedicated owl sampling location on the same night up to ~450 m from dedicated owl call playback point location.

Koala

The Koala was not detected during surveys.

Suitable habitat for the Koala is defined as those PCTs that are associated with the Koala in the TBDC and that have a minimum of one Koala use tree present (DPE, 2022d). An assessment of habitat suitability for the Koala was conducted in accordance with Section 3.2.2 of the BAM Koala Survey Guidelines (DPE, 2022d) and the TBDC was used to find PCTs associated with the species. Koala habitat assessments conducted in association with vegetation integrity assessments and threatened flora traverses conducted in September and November 2023 allowed ecologists to exclude vegetation zones where the growth form was entirely absent. This included observers traversing 20-40 m parallel to each other in all vegetation zones, and noting Koala use trees in the region as per Appendix C of the Guide.

Fifteen transects of dedicated spotlighting for the Koala (ranging between 200-650 m) across 5.61 km were sampled in accordance with the BAM guidelines for spotlighting this species (as shown on Figure 5.5 and Figure 5.6), focussing on treed habitats. This effort is above the requirements of the Koala survey guide (2 x 200 m of transect length per 5 ha of suitable habitat), i.e. 5.61 km of transects across 32 ha of suitable habitat (minimum number of transects required is 32/2.25=14 x 200 m transects or 2.8 km of koala transects).

Dedicated Koala spotlighting transects were surveyed over three nights in March, four nights in July and three nights in October 2024. Koala spotlighting transects were often completed between general spotlighting surveys on the same night. Koala transect 3 and 4 were replicated over three nights instead of two. Table 5.6 below provides timing and survey effort for each dedicated Koala transect.

Table 5.6 Dedicated spotlighting transects for Koala

Koala transect	Length of transect (m)	Dates of completed survey effort	Survey effort season	Associated PCTs surveyed
KSpot 1	400	Replicate 1: 4/03/2024 Replicate 2: 6/03/2024	Autumn / Winter	3369_Good
KSpot 2	650	Replicate 1: 3/07/2024 Replicate 2: 17/10/2024	Autumn / Winter	3369_Good
KSpot 3	300	Replicate 1: 2/07/2024 Replicate 2: 3/07/2024 Replicate 3: 17/10/2024	Autumn / Winter / Spring	3735_Good
KSpot 4	300	Replicate 1: 4/03/2024 Replicate 2: 3/07/2024 Replicate 3: 17/10/2024	Autumn / Winter / Spring	3747_Good

Koala transect	Length of transect (m)	Dates of completed survey effort	Survey effort season	Associated PCTs surveyed
KSpot 5	350	Replicate 1: 6/03/2024 Replicate 2: 1/07/2024	Autumn / Winter	3385_Good, 3747_Good
KSpot 6	230	Replicate 1: 6/03/2024 Replicate 2: 3/07/2024	Autumn / Winter	3747_Good
KSpot 7	280	Replicate 1: 5/03/2024 Replicate 2: 4/07/2024	Autumn / Winter	3735_Good, 3747_Good
KSpot 8	250	Replicate 1: 5/03/2024 Replicate 2: 4/07/2024	Autumn / Winter	3358_Good, 3747_Shrubland
KSpot 9	650	Replicate 1: 5/03/2024 Replicate 2: 4/07/2024	Autumn / Winter	3735_Good, 3747_Shrubland
KSpot 10	300	Replicate 1: 5/03/2024 Replicate 2: 4/07/2024	Autumn / Winter	3749_Good
KSpot 11	350	Replicate 1: 5/03/2024 Replicate 2: 3/07/2024	Autumn / Winter	3735_Good
KSpot 12	500	Replicate 1: 15/10/2024 Replicate 2: 16/10/2024	Spring	3747_Good
KSpot 13	250	Replicate 1: 15/10/2024 Replicate 2: 16/10/2024	Spring	3747_Good
KSpot 14	200	Replicate 1: 15/10/2024 Replicate 2: 16/10/2024	Spring	3369_Good
KSpot 15	600	Replicate 1: 15/10/2024 Replicate 2: 16/10/2024	Spring	3747_Good, 3749_Good

Spotlighting conducted during targeted survey effort for threatened nocturnal birds and other mammals (refer to Table 5.5) would also have contributed to the overall survey effort for the Koala.

Twenty-one Koala Spot Assessment Technique (SAT) search areas were conducted over 7 days across August and October 2023, described above in Table 5.6.

Two supplementary methods also targeted the Koala:

– 36 arboreal camera traps deployed between February and April 2024
– 15 audiomoths configured to record between 5:45pm and 7am were deployed for up to 20 nights in June-July 2024.

These, combined with the dedicated Koala spotlight transects and SATs above, surpassed the minimum survey effort required for detecting the presence of the Koala.

Microbats

Three candidate species credit species were recorded during surveys:

– Southern Myotis
– Large-eared Pied Bat
– Eastern Bent-wing Bat.

The Southern Myotis was recorded along the Coxs River (see Figure 5.2). The species is likely to forage along the Coxs River and other waterbodies including dams within the entire length of the subject land. Large numbers of hollow-bearing trees occur in and adjacent to the subject land that could provide breeding habitat.

The Large-eared Pied Bat was recorded in vegetated lands along the existing easement and also along the Coxs River. No escarpment or cave habitat is present within the subject land. A small rock outcrop within Centennial owned privately leased agricultural land adjacent to the subject land is not considered suitable breeding habitat for the species. The structure of Large-eared Pied Bat maternity roosts appears to be very specific. Caves need to have indentations in the roof and be high and deep enough to allow juvenile bats to learn to fly inside. Roosting

bats cluster in the indentations, which most likely allow the capture of heat (Pennay, 2008). This small overhang is around 20 m long as part of a larger rocky outcrop that extends around 400 m. Given the location of the overhang near the ground surface, lack of depth and lack of flying space, breeding is unlikely to occur. This overhang was inspected and no evidence of use found (no guano). It is located adjacent to cleared agricultural land used for cattle grazing. No other crevices or caves occur in the remainder of the rocky outcrop. Good quality potential breeding habitat is present in escarpments located around 1 km from the subject land.

The Eastern Bentwing Bat was detected throughout the subject land in a variety of habitats including intact native vegetation, the Coxs River floodplain and also agricultural land. Two of the three survey rounds used Anabat detectors in months aligning with the survey period nominated for the species. The species was recorded during all Anabat survey rounds (see Figure 5.2). Several low quality potential roost sites occur adjacent to the subject land that could be used by individuals on a transient basis. No high quality breeding habitat occurs within 100 m of the subject land that would support > 500 individuals.

An arched rail bridge comprising of brick and sandstone is present in the subject land at the former Wallerawang Power Station in the south-east of the project footprint. This bridge has limited roost habitat given the lack of overhangs or crevices with suitable shelter. This rail bridge is the main line and subject to regular rail traffic and an existing access track is present under the bridge. Various disused buildings are located outside the subject land, including the Wallerawang cooling tower (over 100 m from the subject land) and other buildings at the former power station. These areas are or have been subject to regular noise and vibration through use of access tracks, train movements, cattle grazing, and previously the operation of the power station, and are unlikely to support breeding habitat for microbat species.

The locations of each Anabat is shown on Figure 5.5 and Figure 5.6, with overall microbat species diversity in the subject land provided in Appendix C and Appendix G.

Gliders and other arboreal mammals

The Squirrel Glider (*Petaurus norfolcensis*) was recorded in the subject land during spotlighting surveys in vegetated EnergyAustralia land. The species is likely in low density within the subject land. Motion-activated camera trap surveys also positively identified this species in five more locations, with the sympatric Krefft's Glider (*Petaurus notatus*) (formerly included within the Sugar Glider (*Petaurus breviceps*)) regularly recorded. Suitable habitat for the Squirrel Glider is present between Blackmans Flat and Lidsdale, where large tracts of native vegetation is connected (see section 5.2.2 and Table 5.4 for further detail). No evidence of the species was recorded in fragmented habitat on the Coxs River floodplain, south of Brays Lane, Lidsdale.

The Sugar Glider has recently been split into three distinct species following a recent integrative taxonomic investigation (Cremona et al., 2021). Two of these species are known from the east coast of Australia (Sugar Glider and Krefft's Glider) and may overlap in distribution in the study area. The Sugar Glider occurs up to 130 km from the coast, approximately between the Sunshine Coast in Queensland and Eden in far southern NSW and on the eastern side of the Great Dividing Range. In comparison Krefft's Glider has a wider distribution, occurring further inland extending from South Australia to North Queensland (Cremona et al., 2021).

Given the overlap in distribution between the Sugar Glider and Kreffts Glider, it is possible that the study area contains either or both species. Cremona et al (2021) notes these species are likely to co-occur at the boundary of their distributions.

The following general morphological features noted during camera trap analysis and spotlighting were used to distinguish the Squirrel Glider from the Sugar/Kreffts Glider:

– Facial features: Squirrel Gliders have a longer and more pointed snout, with more prominent ears. Sugar/Kreffts Glider have a snub-nosed face with a rounded head (Traill, 1998).
– Tail width: Squirrel Gliders have a 'bushier tail' and are wider than the base of its body for the majority of the length of the tail. Sugar/Kreffts Glider have tails only as wide than the base of its body, which rapidly taper and are much narrower in length in comparison (Traill, 1998).
– White tail tip: Squirrel Gliders have never been recorded with a white-tail tip. All individuals with white tail tips were identified as Sugar/Kreffts Glider (Traill, 1998).

No evidence of the Greater Glider (*Petauroides volans*), Eastern Pygmy-possum (*Cercartetus nanus*) or Brush-tailed Phascogale (*Phascogale tapoatafa*) was recorded despite the substantial spotlighting and motion-activated camera trap survey effort.

Cockatoos

Gang-gang Cockatoos were recorded on multiple occasions within the Gardens of Stone SCA and are known to traverse and likely forage within the subject land. The Glossy Black-cockatoo was possibly recorded (possible chewed cones) (see below).

General habitat assessments identifying the presence of eucalypt tree species with hollows >3 m above the ground and with hollow greater than 7 cm diameter for the Gang-gang Cockatoo and living or dead tree with hollows > 8 m above ground and hollows greater than 15 cm diameter for the Glossy Black-cockatoo within associated PCTs, in addition to diurnal bird surveys and opportunistic searches, were conducted in August to October 2023, and May, June and July 2024 (Table 5.8). A large number of suitable hollows for both species was recorded in the subject land and study area and potential breeding habitat for both species was assumed following habitat assessment.

Foraging habitat for the Gang-gang Cockatoo is associated with large tracts of eucalypt forest and woodland on both sides of the existing easements in the subject land. The Gang-gang Cockatoo is likely to be a seasonal altitudinal migrant to the subject land, where it is known to breed at higher altitudes in the summer months including sub alpine snow gum woodlands. A species polygon buffering a hollow-bearing tree likely to represent occupied breeding habitat is recommended for the species. However, no evidence of breeding was recorded, despite a large number of records being known from the locality and the species recorded on several occasions in the subject land. Given the difficulties of surveying all potential nest trees within a large area of contiguous habitat, the species polygon was mapped to include all suitable forest habitat that could provide breeding habitat.

Possible chewed cones at the base of a small patch of planted *Allocasuarina* recorded in one location just outside Gardens of Stone SCA within the Centennial Springvale Coal Services facility may indicate the presence of Glossy Black-cockatoo within the subject land. However stands of *Allocasuarina* and *Casuarina* in the subject land is very scarce and potential foraging habitat for the species is severely limited. The species is known to spend as much as 88 per cent of each day foraging (Clout, 1989). It has also been recorded on average nesting within 200 m of a water source and on average within 3 km of important feeding areas (Garnett et al., 1999). In the locality, only a few individuals have been recorded, however there is a large population known to occur to the east within native vegetation associated with the escarpment and the Blue Mountains (NSW DCCEEW, 2024a). Given the scarcity of potential foraging habitat for the species, the inconclusive nature of the sign recorded (potentially chewed cones), lack of other observations of the species, and the absence of occupied potential breeding habitat, it is unlikely that the Glossy Black-cockatoo would use the subject land for breeding.

White-bellied Sea-eagle and other raptors

Nest tree census and diurnal bird surveys was used to record potential habitat for the White-bellied Sea-eagle (*Haliaeetus leucogaster*) within the subject land. The species was detected in agricultural land and the former Wallerawang Power Station adjacent to Lake Wallace and the Coxs River as soaring individuals. No large stick nests indicative of large raptors were recorded in the study area or additional evidence of breeding such as begging birds of any age or sex, or an occupied nest, despite systematic nest tree census in August-October 2023 and in July 2024. The species was not detected more than 700 m away from major waterways, such as within intact native vegetation associated with Gardens of Stone SCA or EnergyAustralia land in the central and north-western portions of the subject land (see Figure 5.2). The species shows high site fidelity to successful nesting trees (TSSC, 2016a., Marchant & Higgins, 1993), which are absent in the study area.

Targeted surveys for the species were conducted within and outside the nominal survey period for the species. Surveys outside the nominal breeding period for the species was considered appropriate considering:

– The nest itself is generally large and conspicuous. The size of White-bellied Sea-eagle nests have been recorded as being 2.5 m wide and up to 4.5 m deep (Parks and Wildlife Service Tasmania, 2003).
– The nest tree is generally taller than surrounding trees, making them more conspicuous. For example Thurstans (2009a) showed that 68 per cent of nest-tree heights were taller than the height class of the forest surrounding the nest tree, 20 per cent were equal to the surrounding canopy, and only 12 per cent lower than the nest tree. Thurstans (2009b) also showed that 37 per cent of nest trees were the tallest in the area.
– Nest abandonment is uncommon. Studies have noted nest abandonment is infrequent over time. For example Thurston (2009b) showed that 28 per cent of nests recorded in the late 1970s in Tasmania had been abandoned and/or had disappeared by 2003 (20+ years), with 50 per cent of nest abandonment due to natural causes (e.g. tree/nest fell).

Given this information, it is therefore likely that any the nest tree census conducted outside the nominal survey period for the species, would have detected potential nests used in the breeding season prior. Given the lack of any large stick nests, breeding habitat is absent from the subject land. Similarly, no stick nests suitable for the Black-breasted Buzzard (*Hamirostra melanosternon*), Little Eagle (*Hieraaetus morphnoides*) or Square-tailed Kite (*Lophoictinia isura*) were recorded during the nest tree censuses and no individuals of these species were recorded.

Green and Golden Bell Frog

The Green and Golden Bell Frog was not detected during surveys.

Frog surveys including breeding habitat assessments and aural-visual surveys were conducted in accordance with the *NSW Survey Guide for Threatened Frogs* (DPIE, 2020c). Surveys to detect the target species within the subject land are required if suitable breeding as defined in Chapter 3 of the guide and/or non-breeding habitat located within breeding migration distance of breeding habitat is present (DPIE, 2020c).

A breeding habitat assessment was undertaken and confirmed the identification of potential breeding habitat for the Green and Golden Bell Frog in multiple seasons and weather conditions as follows:

– Nine person-days in August-September 2023 coinciding with the initial fauna habitat assessment, spotlighting surveys and surveys for Spring-breeding threatened frog species across the study area.
– Ten person-days in October 2023 coinciding with additional detailed assessment and mapping of fauna habitat features and resources and spotlighting surveys across the study area.
– January-February 2023 coinciding with the planning and delivery of targeted surveys for Summer-breeding threatened frog species.

According to DPIE 2020c, potentially suitable breeding and non-breeding shelter habitat for the species consists of any waterbody with emergent aquatic vegetation and without the plague minnow (*Gambusia holbrooki*), although the species will still occasionally breed in sites with this introduced pest fish. Foraging habitat and migratory habitat are areas of native and non-native vegetation within 200 m of breeding habitat.

Potential breeding habitat for the species was identified as <1000 m of macrophyte beds adjacent to the Coxs River and dams and floodplain depressions throughout the study area mostly associated with PCT 3932. Potential breeding habitat is limited in the upper reaches and occur as vegetated ponded depressions at the base of steep slopes and small dams in easement with macrophytes in Gardens of Stone (GOS) SCA and vegetated EnergyAustralia Lands as shown on Figure 5.2 and adjacent to track logs for frog AV surveys shown in Figure 5.6.

Frog AV transects were sampled along reaches of potential breeding habitat in accordance with the guide (DPIE, 2020). Over 70 person hours of frog AV transects (T1, T2, T3, T4, T5, T6, T7, T8A, T8B, T10, T11, T11a, T12, T13, T14, T17, T18, T20A, T20B) was conducted over four nights in February 2024. The location and length of the frog AV transect lengths are provided in Table 5.7 and shown in Figure 5.5 and Figure 5.6.

Table 5.7 Dedicated aural-visual surveys for Green and Golden Bell Frog

FrogAV transect ID	Length of transect (m)	Minimum survey effort required (mins)	Location	Surveyed in Winter/Autumn	Surveyed in Spring/Summer
FAV T1	400	384	Cox's Creek along the former Wallerawang Power Station	No	Yes
FAV T2	650	624	Cox's Creek along the former Wallerawang Power Station	No	Yes
FAV T3	250	240	Cox's Creek along private agricultural land south of Brays Lane	No	Yes
FAV T4	250	240	Grassland and drainage lines within private agricultural land south of Brays Lane	No	Yes

FrogAV transect ID	Length of transect (m)	Minimum survey effort required (mins)	Location	Surveyed in Winter/Autumn	Surveyed in Spring/Summer
FAV T5	200	192	Cox's Creek along private agricultural land north of Brays Lane	No	Yes
FAV T6	100	96	Wetland within private agricultural land north of Brays Lane	No	Yes
FAV T7	50	48	Dam in private agricultural land north of Brays Lane	No	Yes
FAV T8A	25	24	Dam in private agricultural land north of Brays Lane	No	Yes
FAV T8B	25	24	Dam in private agricultural land north of Brays Lane	No	Yes
FAV T10	100	96	Dam in GOS SCA	No	Yes
FAV T11	200	192	Drainage line and concrete dam in GOS SCA	No	Yes
FAV T11A	50	48	Dam in GOS SCA	No	Yes
FAV T12	50	48	Dam in GOS SCA	No	Yes
FAV T13	250	240	Drainage line and dam in GOS SCA	No	Yes
FAV T14	150	144	Drainage line in. EnergyAustralia lands	No	Yes
FAV T17	50	48	Wet vegetated patch in EnergyAustralia lands	No	Yes
FAV T18	50	48	Wet vegetated patch in EnergyAustralia lands	No	Yes
FAV T20A	75	72	Drainage line in EnergyAustralia lands	Yes	Yes
FAV T20B	75	72	Drainage line in EnergyAustralia lands	Yes	Yes

Purple Copper Butterfly

The Purple Copper Butterfly was not detected during surveys. Searches for *Bursaria spinosa* were conducted during vegetation and habitat mapping surveys in August 2023 and incidentally during the September 2023 threatened flora searches. Several small patches of *Bursaria spinosa* were identified and surveyed in the appropriate season and no individuals recorded.

A summary of the targeted survey effort employed for each candidate species credit species and survey results as related to species credit calculations is presented below in Table 5.8.

Table 5.8 Determining the presence of candidate species credit species on the subject land

Common name	Scientific name	Method used to determine presence	Present?	Survey method	Survey months	Timing of survey – within recommended period? (BAM-C / TBDC)	Effort
Bynoes's Wattle	*Acacia bynoeana*	Targeted threatened species survey	No	Parallel threatened flora traverses	All year	☒ Yes ☐ No	Systematic coverage of all potential habitat in the subject land with 5 m to 10 m spaced traverses in the nominal TBDC survey season (NSW DCCEEW, 2025d) in September 2023, November 2023, and October and November 2024.
Acacia meiantha	*Acacia meiantha*	Targeted threatened species survey	No	Parallel threatened flora traverses	July – October	☒ Yes ☐ No See section 5.2.1 above regarding survey adequacy	Systematic coverage of part of the potential habitat with 5 m to 10 m spaced traverses in the nominal TBDC survey season (NSW DCCEEW, 2025d) in September 2023. Systematic coverage of revised subject land with 5m to 10m spaced traverses in the nominal TBDC survey season (NSW DCCEEW, 2025d) in October 2024. Systematic coverage of part of the potential habitat with 5m to 10m spaced traverses in November 2023.
Bush Stone-curlew	*Burhinus grallarius*	Targeted threatened species survey	No	Call playback and spotlighting, Audiomoth detectors	All year	☒ Yes ☐ No	Call playback and spotlighting for 4 nights in August 2023, 4 nights in October 2023, 4 nights in March 2024, 2 nights in June 2024, 4 nights in July 2024 and 3 nights in October 2024. Fifteen Audiomoth detectors out for up to 20 nights between June and July 2024.

Common name	Scientific name	Method used to determine presence	Present?	Survey method	Survey months	Timing of survey – within recommended period? (BAM-C / TBDC)	Effort
Gang-gang Cockatoo (nesting)	*Callocephalon fimbriatum*	Targeted threatened species survey	Yes	Diurnal bird survey and nest tree census	October – January	☒ Yes ☐ No	Diurnal bird surveys and associated nest tree census within the nominal TBDC survey season (NSW DCCEEW, 2025d) over 1 day in October 2023 and 5 days in October 2024. Diurnal bird survey outside nominal TBDC survey season (NSW DCCEEW, 2025d) over 4 days in August 2023, 1 day in September 2023, 4 days in March 2024, 1 day in June 2024 and 4 days in July 2024.
Glossy Black-Cockatoo (nesting)	*Calyptorhynchus lathami*	Targeted threatened species survey	No	Diurnal bird survey and nest tree census	April – August	☒ Yes ☐ No	Diurnal bird surveys and associated nest tree census within the nominal TBDC survey season (NSW DCCEEW, 2025d) over 4 days in August 2023, 1 day in June 2024 and 4 days in July 2024. Additional diurnal bird survey outside nominal TBDC survey season (NSW DCCEEW, 2025d) over 1 day in September 2023,1 day in October 2023, 4 days in March 2024 and 5 days in October 2024.

Common name	Scientific name	Method used to determine presence	Present?	Survey method	Survey months	Timing of survey – within recommended period? (BAM-C / TBDC)	Effort
Eastern Pygmy-possum	*Cercartetus nanus*	Targeted threatened species survey	No	Spotlighting and motion-activated camera traps	January – March, October – December	☒ Yes ☐ No	36 camera traps deployed between February and April 2024 and spotlighting over 4 nights in October 2023, 4 nights in March 2024 and 3 nights in October 2024 within the nominal TBDC survey season (NSW DCCEEW, 2025d). Spotlighting over 4 nights in August 2023, 2 nights in June 2024 and 4 nights in July 2024 outside the nominal TBDC survey season (NSW DCCEEW, 2025d).
Large-eared Pied Bat (foraging)	*Chalinolobus dwyeri*	Targeted threatened species survey	Yes	Anabat detectors	January, November and December	☒ Yes ☐ No	Up to 16 survey nights in January 2024 within the nominal TBDC survey season (NSW DCCEEW, 2025d). Up to 21 survey nights in October 2023 and February 2024 outside the nominal TBDC survey season (NSW DCCEEW, 2025d). No harp trapping conducted given lack of suitable breeding habitat.
Black Gum	*Eucalyptus aggregata*	Targeted threatened species survey	Yes	Parallel threatened flora traverses	All year	☒ Yes ☐ No	Systematic coverage of all potential habitat in the subject land with 10 to 20m spaced traverses in the nominal TBDC survey season (NSW DCCEEW, 2025d) in August 2023, September 2023, November 2023, January 2024, June 2024, October and November 2024, and January 2025.

Common name	Scientific name	Method used to determine presence	Present?	Survey method	Survey months	Timing of survey – within recommended period? (BAM-C / TBDC)	Effort
Capertee Stringybark	*Eucalyptus cannonii*	Targeted threatened species survey	Yes	Parallel threatened flora traverses	All year	☒ Yes ☐ No	Systematic coverage of all potential habitat in the subject land with 10 to 20 m spaced traverses in the nominal TBDC survey season (NSW DCCEEW, 2025d) in August 2023, September 2023, November 2023, January 2024, June 2024, October and November 2024, and January 2025.
White-bellied Sea-Eagle (nesting)	*Haliaeetus leucogaster*	Targeted threatened species survey	No	Diurnal bird survey and nest tree census	July - December	☒ Yes ☐ No	Diurnal bird surveys and associated nest tree census within the nominal TBDC survey season (NSW DCCEEW, 2025d) over 4 days in July 2024, 4 days in August 2023, 1 day in September 2023, 1 day in October 2023 and 5 days in October 2024. Diurnal bird survey and nest tree census outside nominal TBDC survey season (NSW DCCEEW, 2025d) over 4 days in March 2024 and 1 day in June 2024.

Common name	Scientific name	Method used to determine presence	Present?	Survey method	Survey months	Timing of survey – within recommended period? (BAM-C / TBDC)	Effort
Black-breasted Buzzard (nesting)	*Hamirostra melanosternon*	Targeted threatened species survey	No	Diurnal bird survey and nest tree census	September – November	☒ Yes ☐ No	Diurnal bird surveys and associated nest tree census within the nominal TBDC survey season (NSW DCCEEW, 2025d) over 1 day in September 2023, 1 day in October 2023 and 5 days in October 2024. Diurnal bird survey and nest tree census outside nominal TBDC survey season (NSW DCCEEW, 2025d) over 4 days in July 2024, 4 days in August 2023, 4 days in March 2024 and 1 day in June 2024.
Little Eagle (nesting)	*Hieraaetus morphnoides*	Targeted threatened species survey	No	Diurnal bird survey and nest tree census	August - October	☒ Yes ☐ No	Diurnal bird surveys and associated nest tree census within the nominal TBDC survey season (NSW DCCEEW, 2025d) over 4 days in August 2023, 1 day in September 2023,1 day in October 2023 and 5 days in October 2024. Diurnal bird survey and nest tree census outside nominal TBDC survey season (NSW DCCEEW, 2025d) over 4 days in July 2024, 4 days in March 2024 and 1 day in June 2024.
Hoary Sunray	*Leucochrysum albicans subsp. tricolor*	Targeted threatened species survey	No	Parallel threatened flora traverses	January – April, September – December	☒ Yes ☐ No	Systematic coverage of all potential habitat in the subject land with 5 m to 10 m spaced traverses in the nominal TBDC survey season (NSW DCCEEW, 2025d) in September 2023, November 2023, and October and November 2024.

Common name	Scientific name	Method used to determine presence	Present?	Survey method	Survey months	Timing of survey – within recommended period? (BAM-C / TBDC)	Effort
Green and Golden Bell Frog	*Litoria aurea*	Targeted threatened species survey	No	Frog aural-visual surveys	January – March, November and December	☒ Yes ☐ No	Frog aural-visual surveys within the nominal TBDC survey season (NSW DCCEEW, 2025d) over 4 days in February 2024 comprising over 70 person hours of frog AV transects (T1, T2, T3, T4, T5, T6, T7, T8, T10, T11, T11a, T12, T13, T15, T18, T20). Frog aural-visual surveys outside the nominal TBDC survey season (NSW DCCEEW, 2025d) over 1 day in October 2023.
Square-tailed Kite (nesting)	*Lophoictinia isura*	Targeted threatened species survey	No	Diurnal bird survey and nest tree census	January, September – December	☒ Yes ☐ No	Diurnal bird surveys and associated nest tree census within the nominal TBDC survey season (NSW DCCEEW, 2025d) over 1 day in September 2023, 1 day in October 2023 and 5 days in October 2024. Diurnal bird survey and nest tree census outside nominal TBDC survey season (NSW DCCEEW, 2025d) over 4 days in August 2023, 4 days in July 2024, 4 days in March 2024 and 1 day in June 2024.

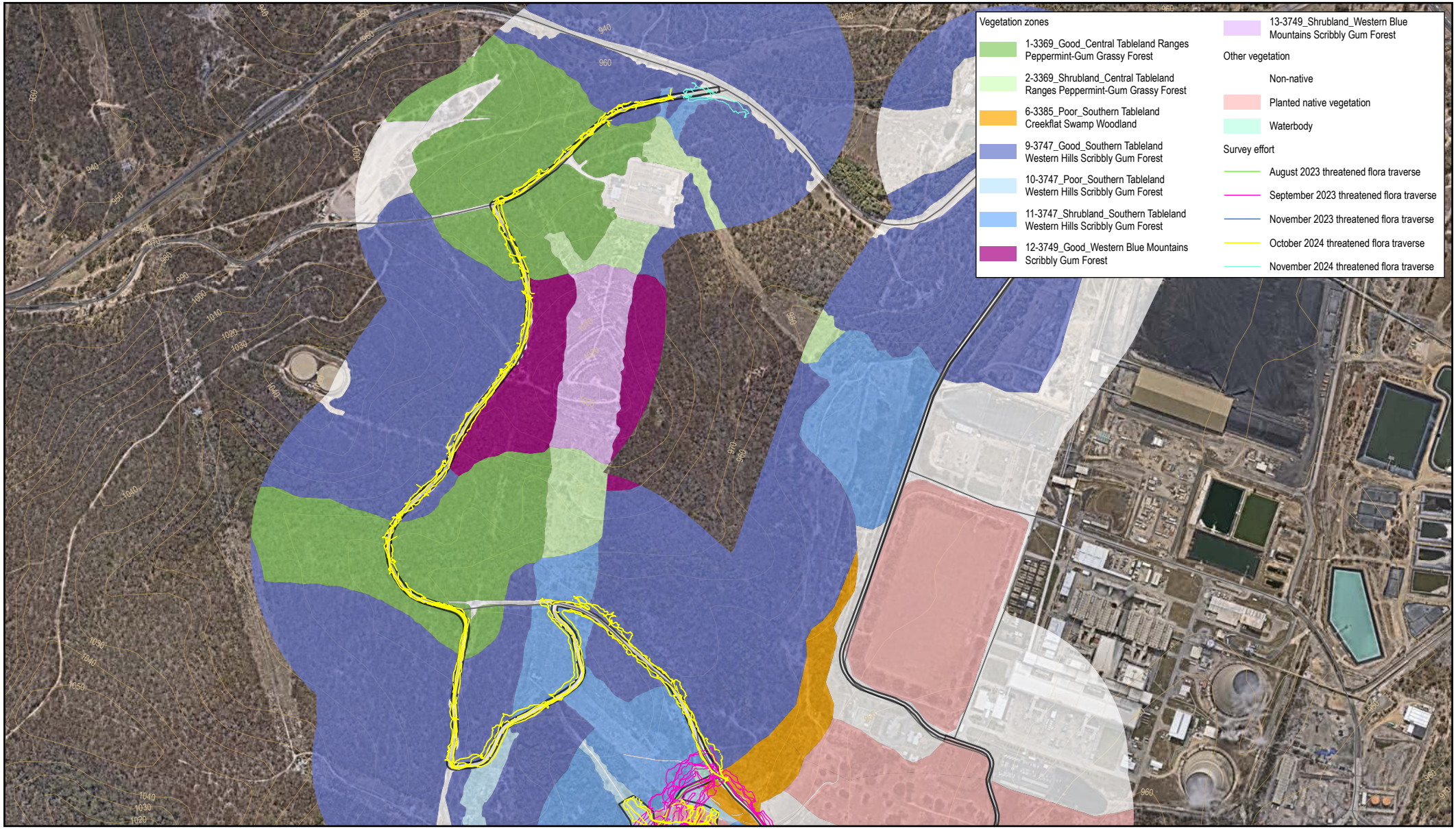
Common name	Scientific name	Method used to determine presence	Present?	Survey method	Survey months	Timing of survey – within recommended period? (BAM-C / TBDC)	Effort
Large Bent-winged Bat (foraging)	*Miniopterus orianae oceanensis*	Targeted threatened species survey	Yes	Anabat detectors and diurnal roost inspection	January, February and December	☒ Yes ☐ No	Up to 30 survey nights in January and February 2024 within the nominal TBDC survey season (NSW DCCEEW, 2025d). Up to 7 survey nights in October 2023 outside the nominal TBDC survey season (NSW DCCEEW, 2025d). No harp trapping conducted given lack of suitable breeding habitat.
Southern Myotis	*Myotis macropus*	Targeted threatened species survey	Yes	Anabat detectors and diurnal roost inspection	January – March, October – December	☒ Yes ☐ No	Up to 37 survey nights in October 2023 and January and February 2024 within the nominal TBDC survey season (NSW DCCEEW, 2025d).
Barking Owl	*Ninox connivens*	Targeted threatened species survey	Yes	Call playback and spotlighting	All year	☒ Yes ☐ No	Diurnal bird surveys and associated nest tree census within the nominal TBDC survey season (NSW DCCEEW, 2025d) over 1 day in September 2023, 1 day in October 2023, 5 days in October 2024, 4 days in August 2023, 4 days in July 2024, 4 days in March 2024 and 1 day in June 2024. Dedicated spotlighting and call playback for the species over 5 nights in August 2023, 1 night in February 2024, 4 nights in March 2024, 3 nights in June 2024 and 4 nights in July 2024.
Powerful Owl	*Ninox strenua*	Targeted threatened species survey	Yes	Call playback and spotlighting	All year	☒ Yes ☐ No	See notes above for Barking Owl

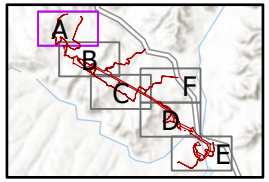
Common name	Scientific name	Method used to determine presence	Present?	Survey method	Survey months	Timing of survey – within recommended period? (BAM-C / TBDC)	Effort
Purple Copper Butterfly	*Paralucia spinifera*	Targeted threatened species survey	No	Habitat surveys	September, October and December	☒ Yes ☐ No	Active area searches for 230 person minutes in three locations in October 2023.
Clandulla Geebung	*Persoonia marginata*	Targeted threatened species survey	No	Parallel threatened flora traverses	January – March	☒ Yes ☐ No	Systematic coverage of all potential habitat in the subject land with 5 m to 10 m spaced traverses in the nominal TBDC survey season (NSW DCCEEW, 2025d) in January 2024, February 2024 and January 2025.
Southern Greater Glider	*Petauroides volans*	Targeted threatened species survey	No	Spotlighting and motion-activated camera traps	All year	☒ Yes ☐ No	36 camera traps deployed between February and April 2024 and spotlighting over 4 nights in August 2023, 4 nights in October 2023 and 4 nights in March 2024, 2 nights in June 2024, 4 nights in July 2024 and 3 nights in October 2024 within the nominal TBDC survey season (NSW, DCCEEW 2025d).
Squirrel Glider	*Petaurus norfolcensis*	Targeted threatened species survey	Yes	Spotlighting and motion-activated camera traps	All year	☒ Yes ☐ No	36 camera traps deployed between February and April 2024 and spotlighting over 4 nights in August 2023, 4 nights in October 2023 and 4 nights in March 2024, 2 nights in June 2024, 4 nights in July 2024 and 3 nights in October 2024 within the nominal TBDC survey season (NSW, DCCEEW 2025d).

Common name	Scientific name	Method used to determine presence	Present?	Survey method	Survey months	Timing of survey – within recommended period? (BAM-C / TBDC)	Effort
Brush-tailed Phascogale	*Phascogale tapoatafa*	Targeted threatened species survey	No	Spotlighting and motion-activated camera traps	January – June, December	☒ Yes ☐ No	36 camera traps deployed between February and April 2024 and spotlighting over 4 nights in March 2024, 2 nights in June 2024 within the nominal TBDC survey season (NSW DCCEEW, 2025d). Spotlighting over 4 nights in August 2023, 4 nights in October 2023, 4 nights in July 2024 and 3 nights in October 2024 outside the nominal TBDC survey season (NSW DCCEEW, 2025d).
Koala	*Phascolarctos cinereus*	Targeted threatened species survey	No	Koala SATS and spotlighting	All year	☒ Yes ☐ No	21 Koala SATs over 7 days across August and October 2023 in addition to spotlighting along dedicated koala transects over two nights in March and July and three nights in October 2024
Grey-headed Flying-fox	*Pteropus poliocephalus*	Targeted threatened species survey	No	Nest tree/roost camp census	October – December	☒ Yes ☐ No	Roost camp census within the nominal TBDC survey season (NSW DCCEEW, 2025d) over 1 day in October 2023 (combined with nest tree census) and 5 days in October 2024 (associated with diurnal bird surveys). Roost camp census outside nominal TBDC survey season (NSW DCCEEW, 2025d) over 4 days in August 2023, 1 day in September 2023 and 4 days in July 2024, 4 days in March 2024 and 1 day in June 2024.

Common name	Scientific name	Method used to determine presence	Present?	Survey method	Survey months	Timing of survey – within recommended period? (BAM-C / TBDC)	Effort
Masked Owl	*Tyto novaehollandiae*	Targeted threatened species survey	No	Call playback and spotlighting	May – August	☒ Yes ☐ No	Diurnal bird surveys and associated nest tree census within the nominal TBDC survey season (NSW DCCEEW, 2025d) over 1 day in September 2023, 1 day in October 2023, 5 days in October 2024, 4 days in August 2023, 4 days in July 2024, 4 days in March 2024 and 1 day in June 2024. Dedicated spotlighting and call playback for the species over five nights in August 2023, 1 night in February 2024, 4 nights in March 2024, 3 nights in June 2024 and 4 nights in July 2024.
Veronica blakelyi	*Veronica blakelyi*	Targeted threatened species survey	No	Parallel threatened flora traverses	January, February and December	☒ Yes ☐ No	Systematic coverage of all potential habitat in the subject land with 5m to 10m spaced traverses in the nominal TBDC survey season (NSW DCCEEW, 2025d) in January 2024, February 2024 and January 2025.

Notes: 'Parallel threatened flora traverses' comprise systematic traverses with 5-10m wide and 10-20m (where applicable) spacing through all areas of suitable habitat in associated PCTs according to the TBDC (DCCEEW, 2024a). Includes general observations and additional broadly spaced traverses conducted through areas of potentially associated PCTs and unsuitable habitat such as bare earth or dense patches of non-target species within associated PCTs.





Legend

- Subject land
- Roads
- Contour (10m)

Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

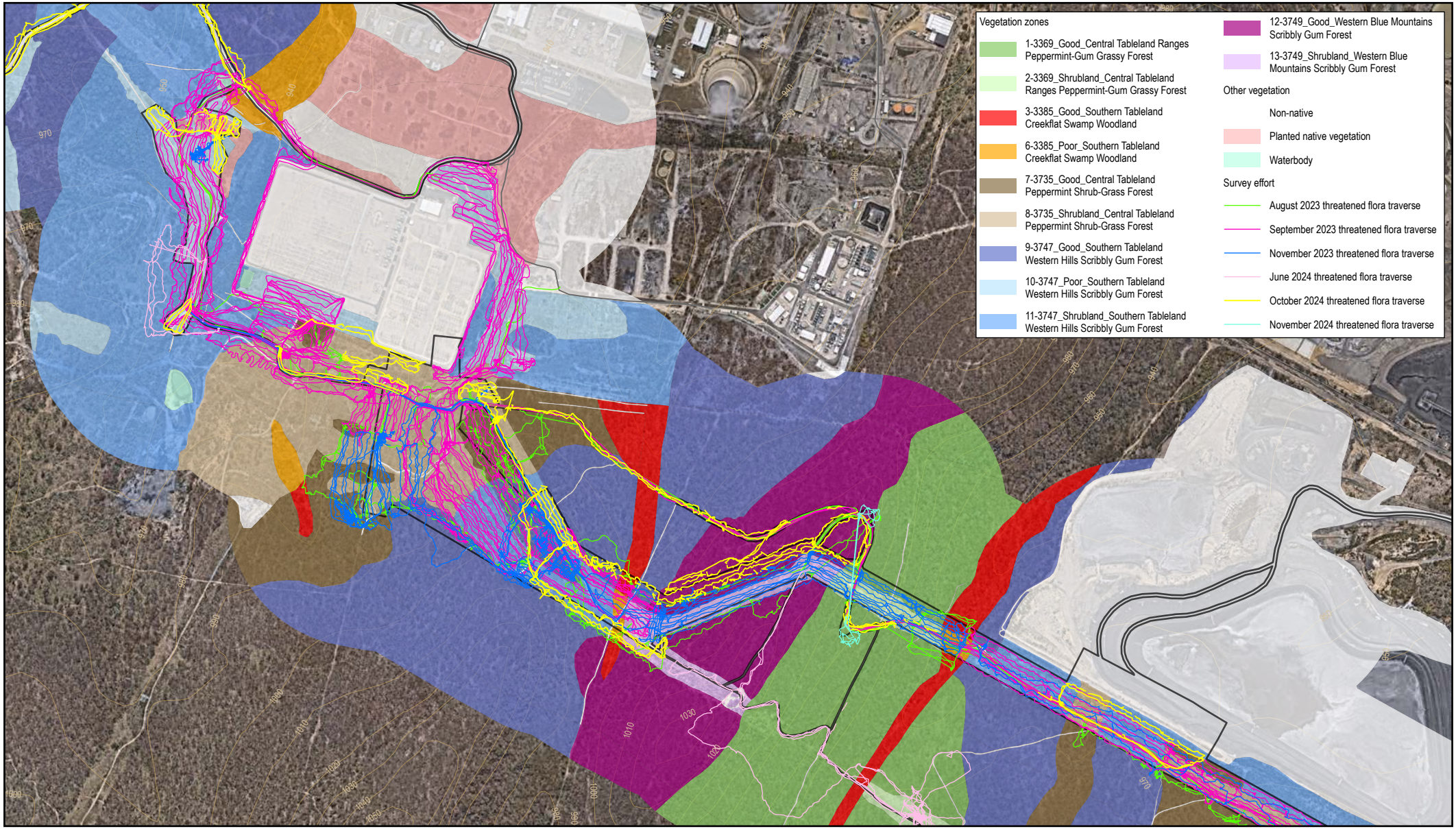
Threatened flora survey effort (June to November)

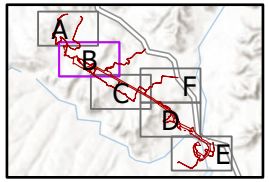
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.3A

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR006a_FloraSurveyEffort_Jun-Nov
Print date: 17 Jul 2025 - 12:37

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Legend

- Subject land
- Roads
- Contour (10m)

Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

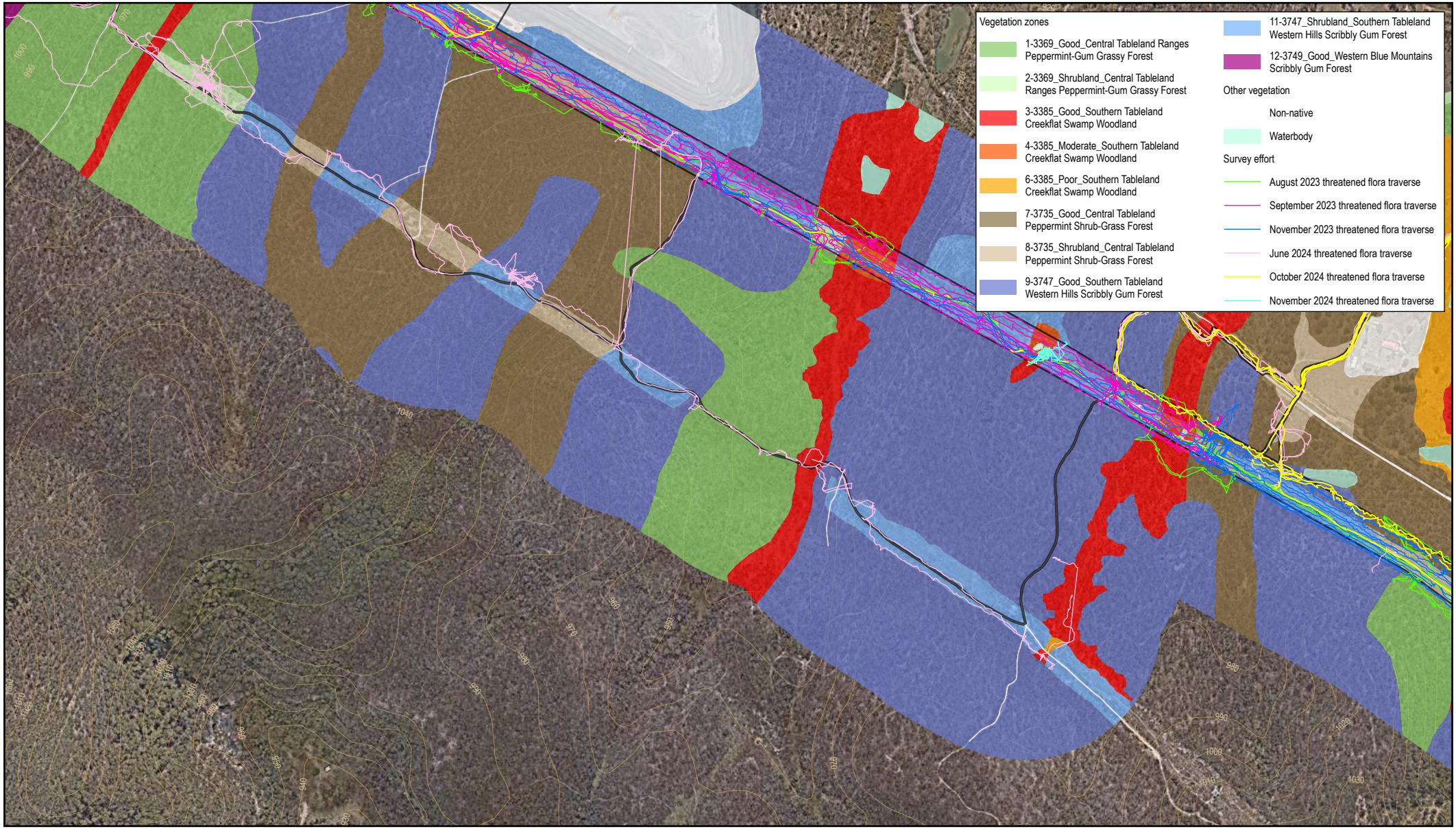
Threatened flora survey effort (June to November)

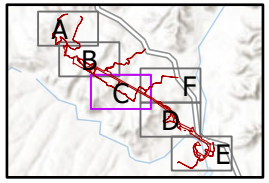
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.3B

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR006a_FloraSurveyEffort_Jun-Nov
Print date: 17 Jul 2025 - 12:37

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Legend

Subject land

Contour (10m)

Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

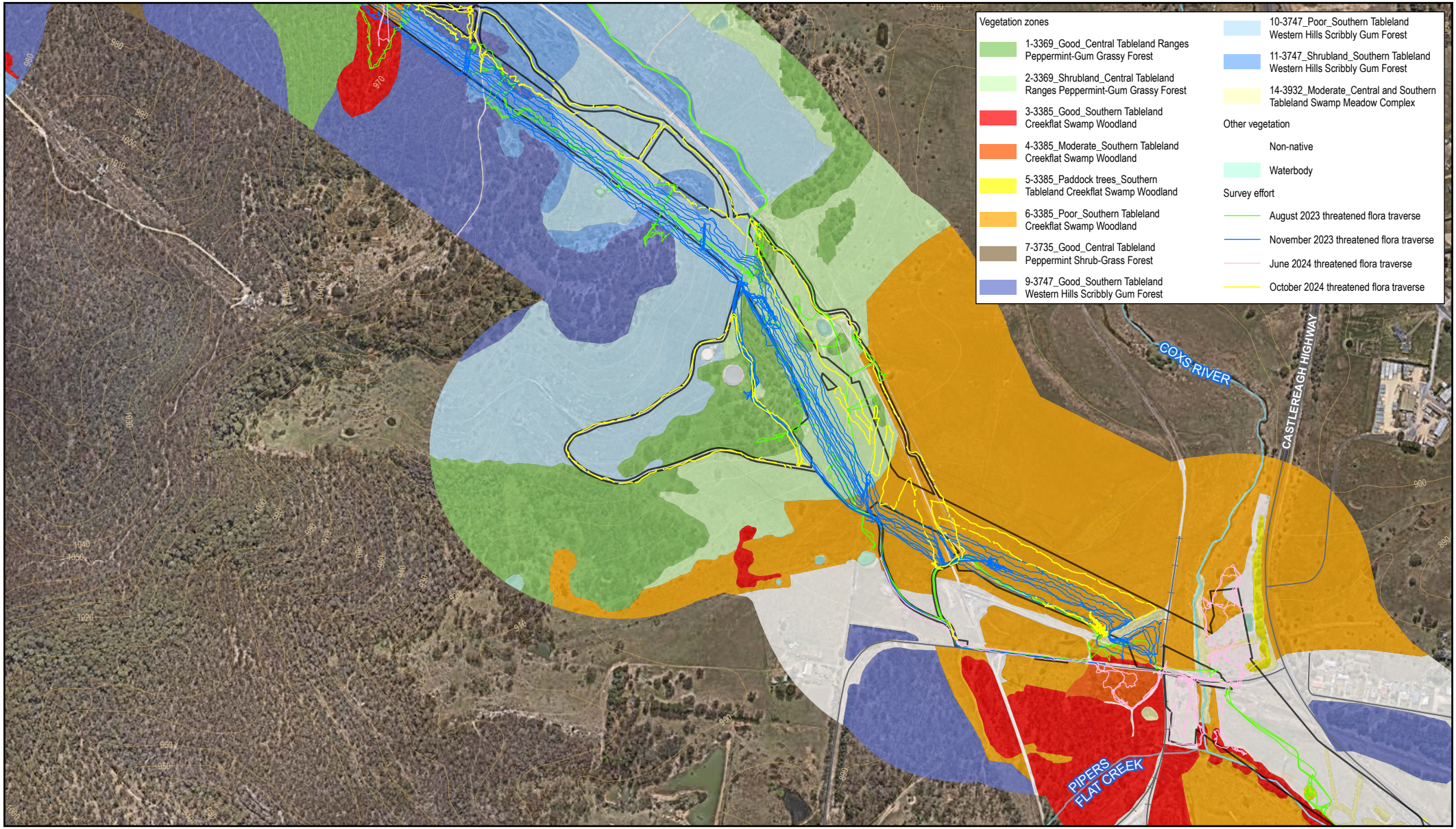
Threatened flora survey effort (June to November)

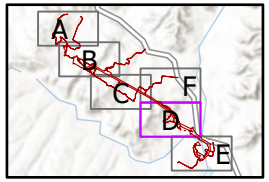
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.3C

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR006a_FloraSurveyEffort_Jun-Nov
Print date: 17 Jul 2025 - 12:37

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Legend

- Subject land
- Railway
- Roads
- Contour (10m)
- Watercourse

Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

Threatened flora survey effort (June to November)

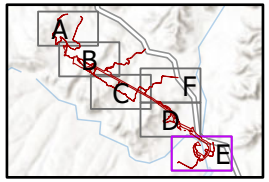
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.3D

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR006a_FloraSurveyEffort_Jun-Nov
Print date: 17 Jul 2025 - 12:38

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Legend

- Subject land
- Railway
- Roads
- Contour (10m)
- Watercourse

Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

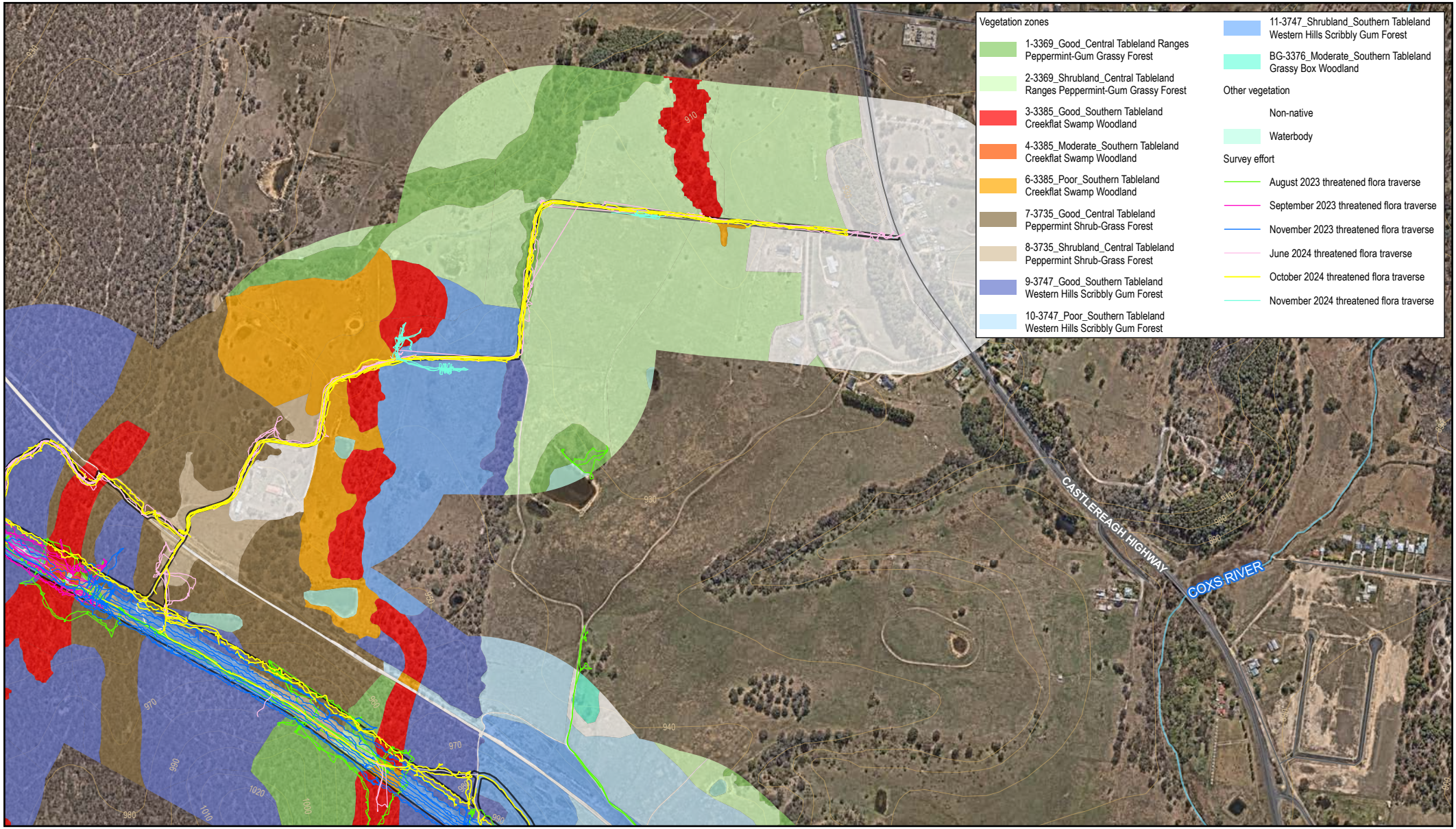
Threatened flora survey effort (June to November)

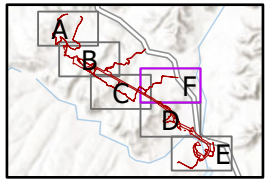
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.3E

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR006a_FloraSurveyEffort_Jun-Nov
Print date: 17 Jul 2025 - 12:39

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Legend

- Subject land
- Roads
- Contour (10m)
- Watercourse

Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

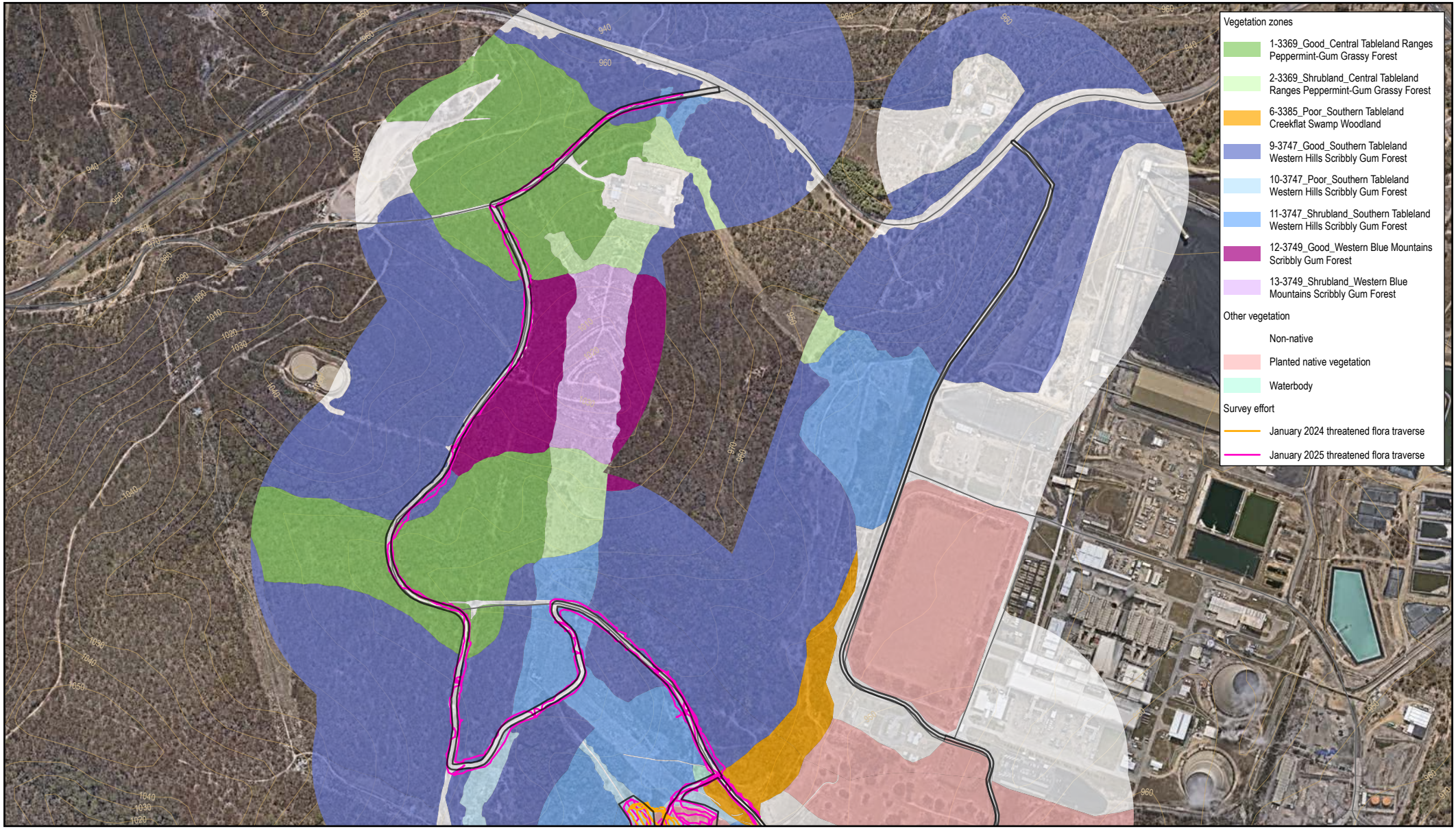
Threatened flora survey effort (June to November)

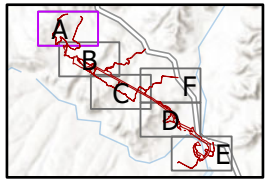
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.3F

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR006a_FloraSurveyEffort_Jun-Nov
Print date: 17 Jul 2025 - 12:39

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Legend

- Subject land
- Roads
- Contour (10m)

Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

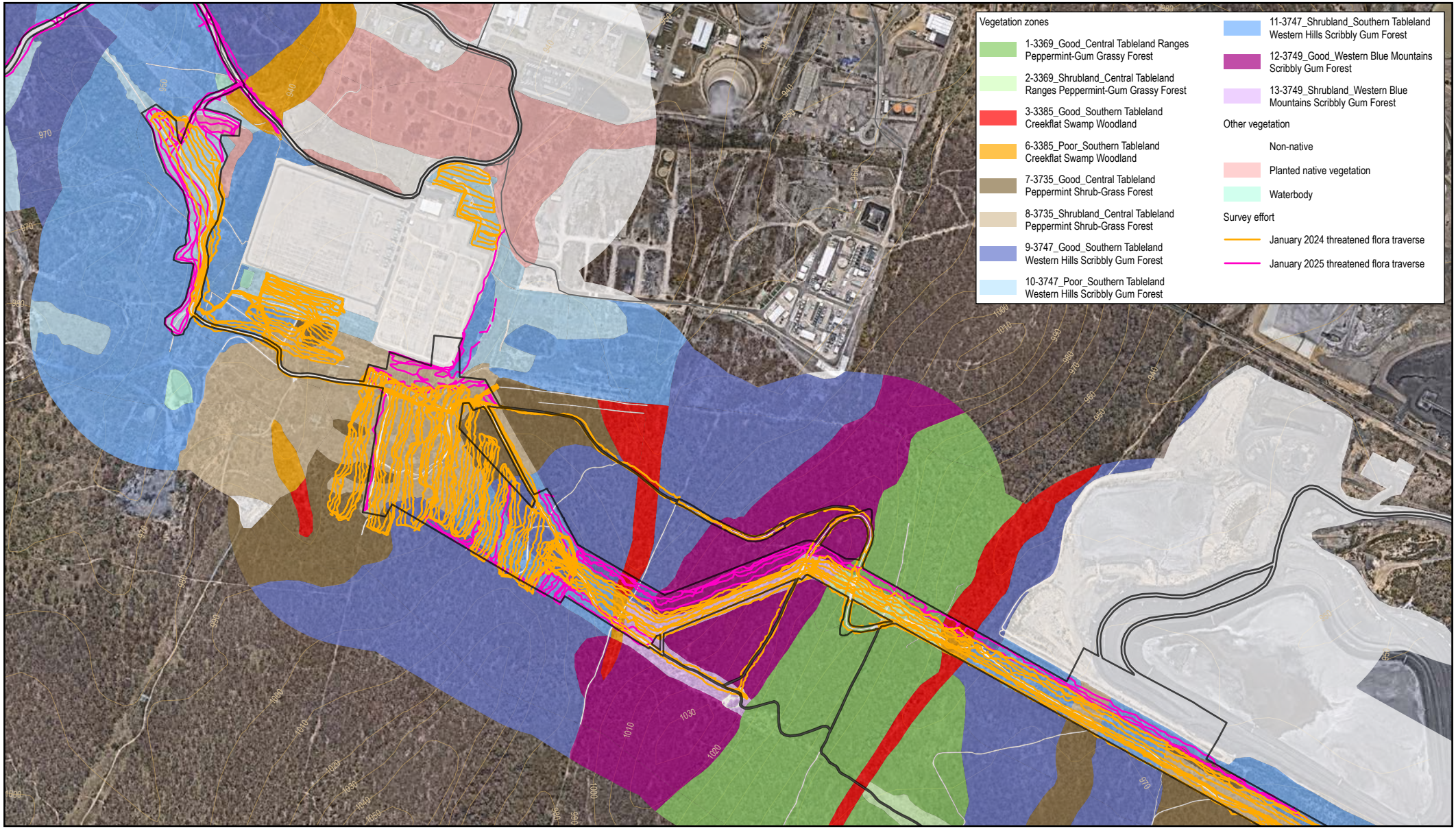
Threatened flora survey effort (January to February)

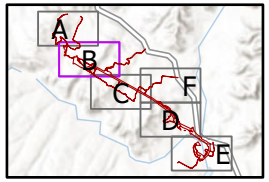
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.4A

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR006b_FloraSurveyEffort_Jan-Feb
Print date: 17 Jul 2025 - 13:04

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Legend

- Subject land
- Roads
- Contour (10m)

Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

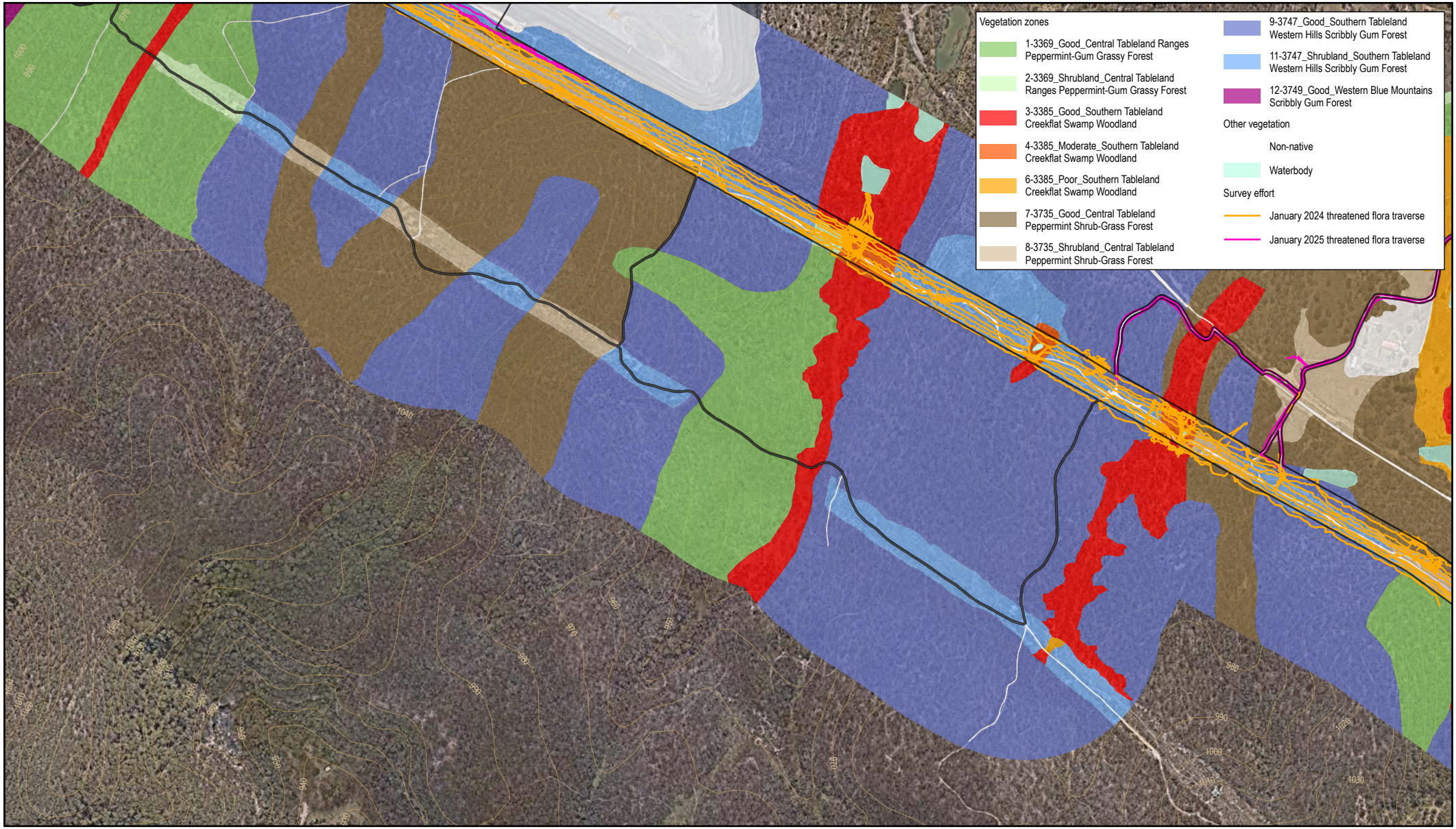
Threatened flora survey effort (January to February)

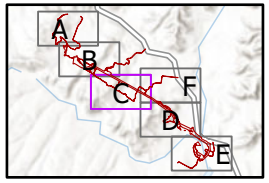
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.4B

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR006b_FloraSurveyEffort_Jan-Feb
Print date: 17 Jul 2025 - 13:04

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Legend

Subject land

Contour (10m)

Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

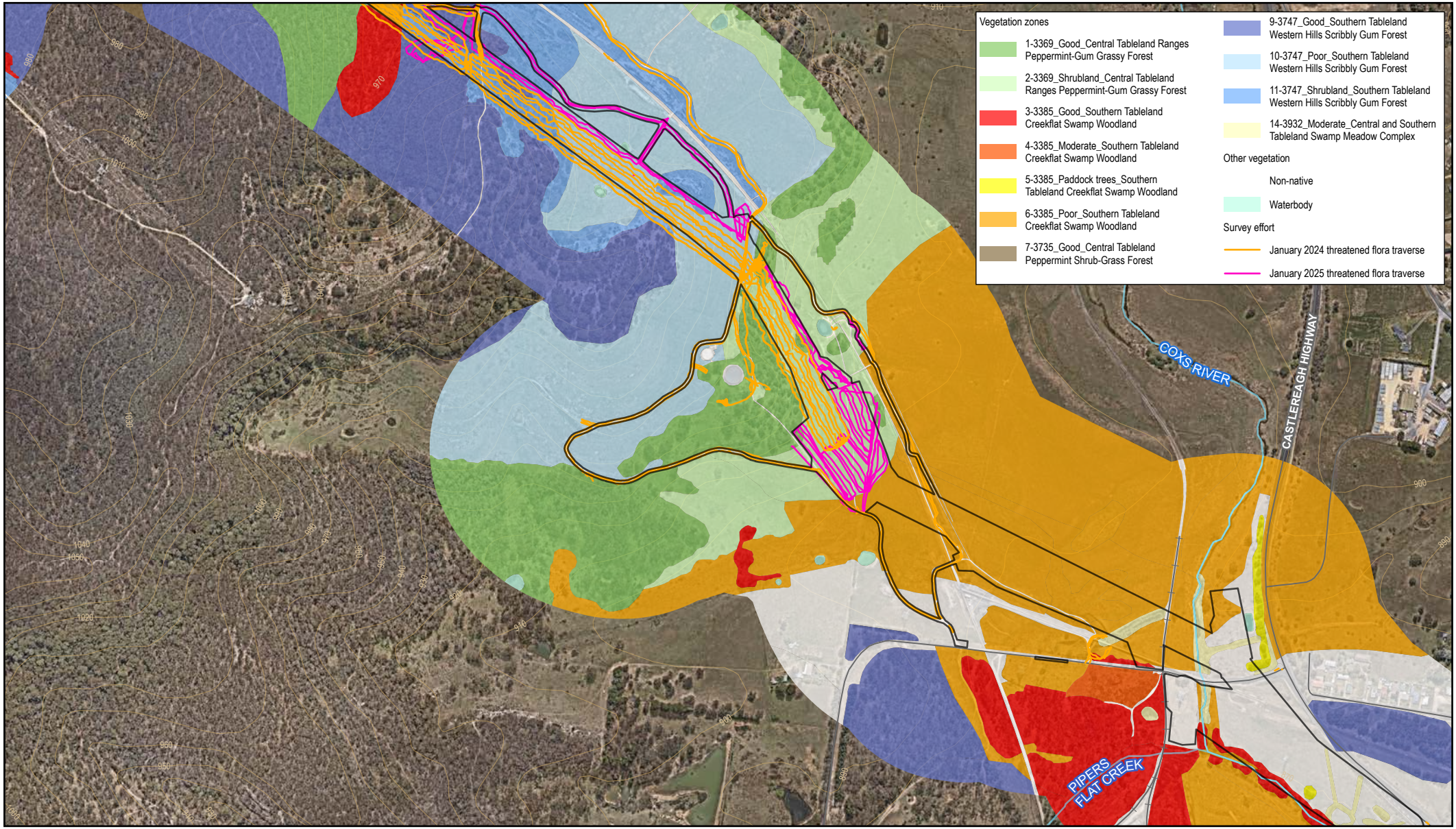
Threatened flora survey effort (January to February)

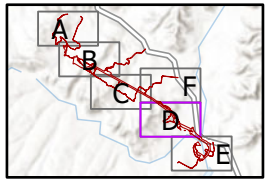
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.4C

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR006b_FloraSurveyEffort_Jan-Feb
Print date: 17 Jul 2025 - 13:05

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Legend

- Subject land
- Railway
- Roads
- Contour (10m)
- Watercourse

Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

Threatened flora survey effort (January to February)

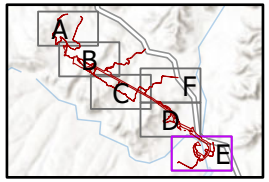
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.4D

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR006b_FloraSurveyEffort_Jan-Feb
Print date: 17 Jul 2025 - 13:06

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Legend

- Subject land
- Railway
- Roads
- Contour (10m)
- Watercourse

Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

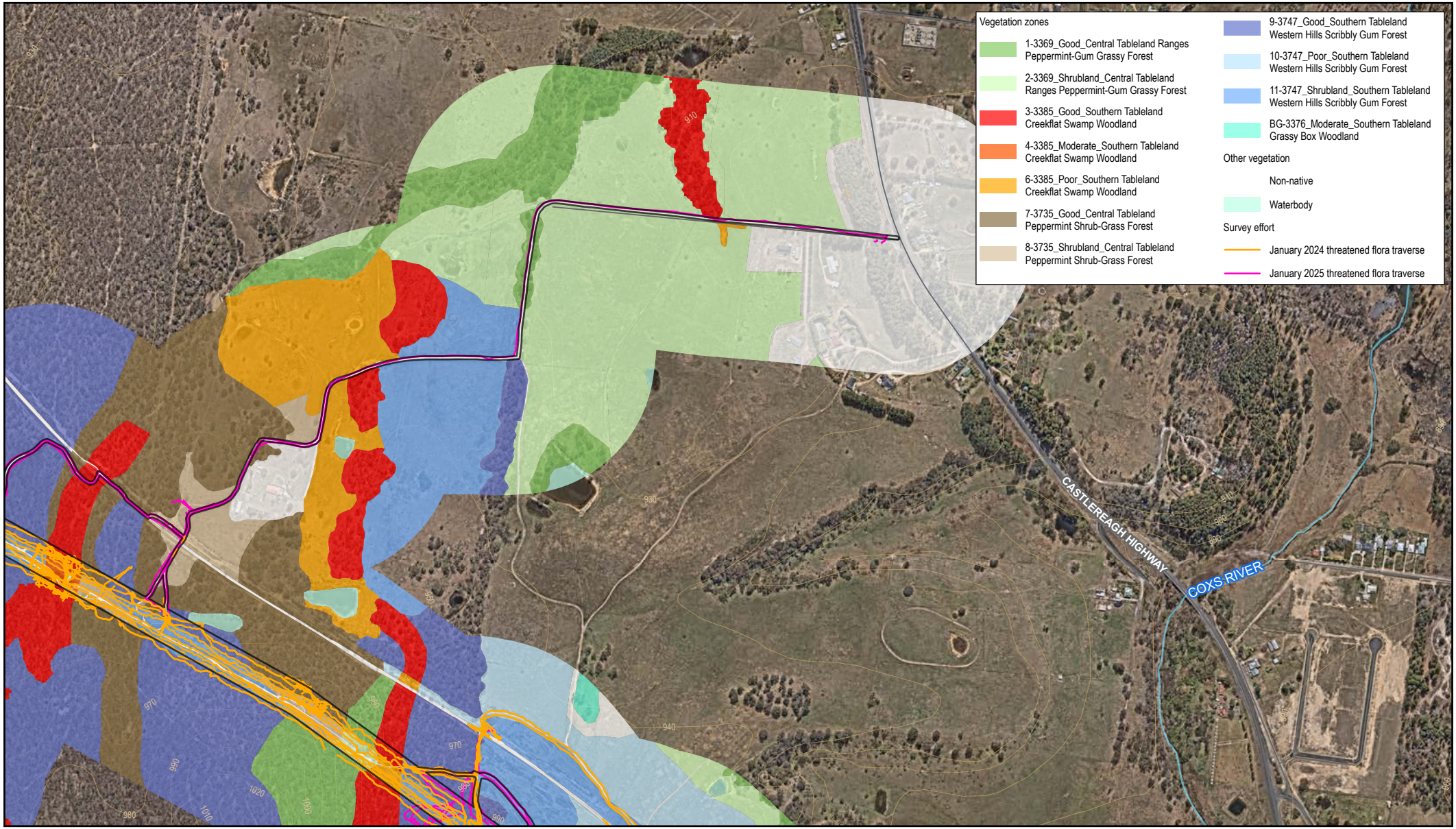
Threatened flora survey effort (January to February)

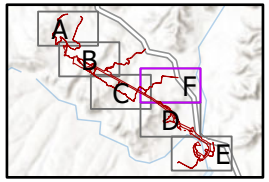
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.4E

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR006b_FloraSurveyEffort_Jan-Feb
Print date: 17 Jul 2025 - 13:06

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Legend

- Subject land
- Roads
- Contour (10m)
- Watercourse

Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

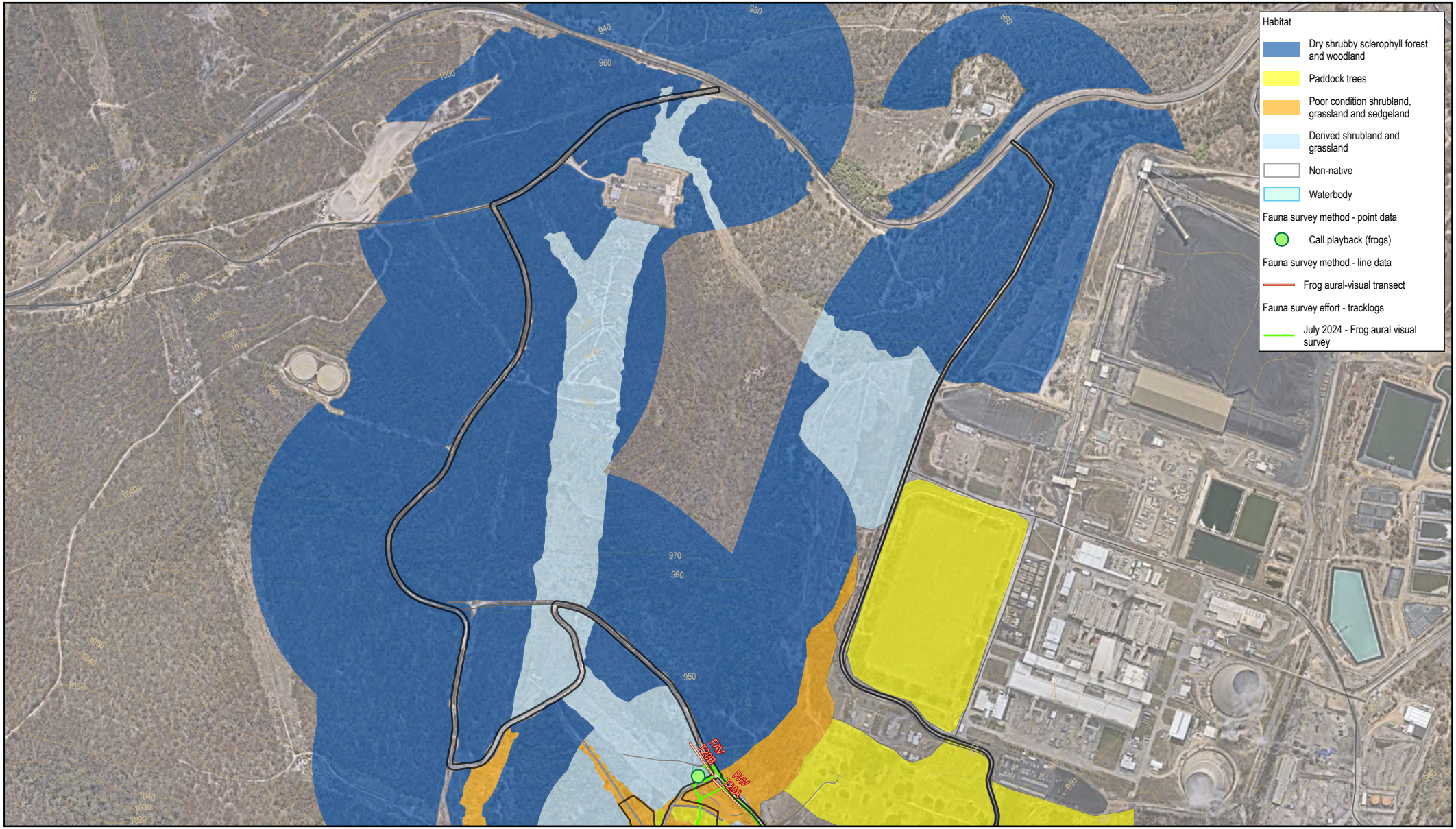
Threatened flora survey effort (January to February)

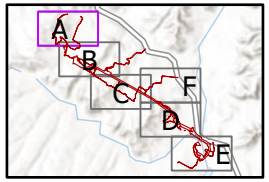
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.4F

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR006b_FloraSurveyEffort_Jan-Feb
Print date: 17 Jul 2025 - 13:07

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Legend

- Subject land
- Roads
- Contour (10m)

Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

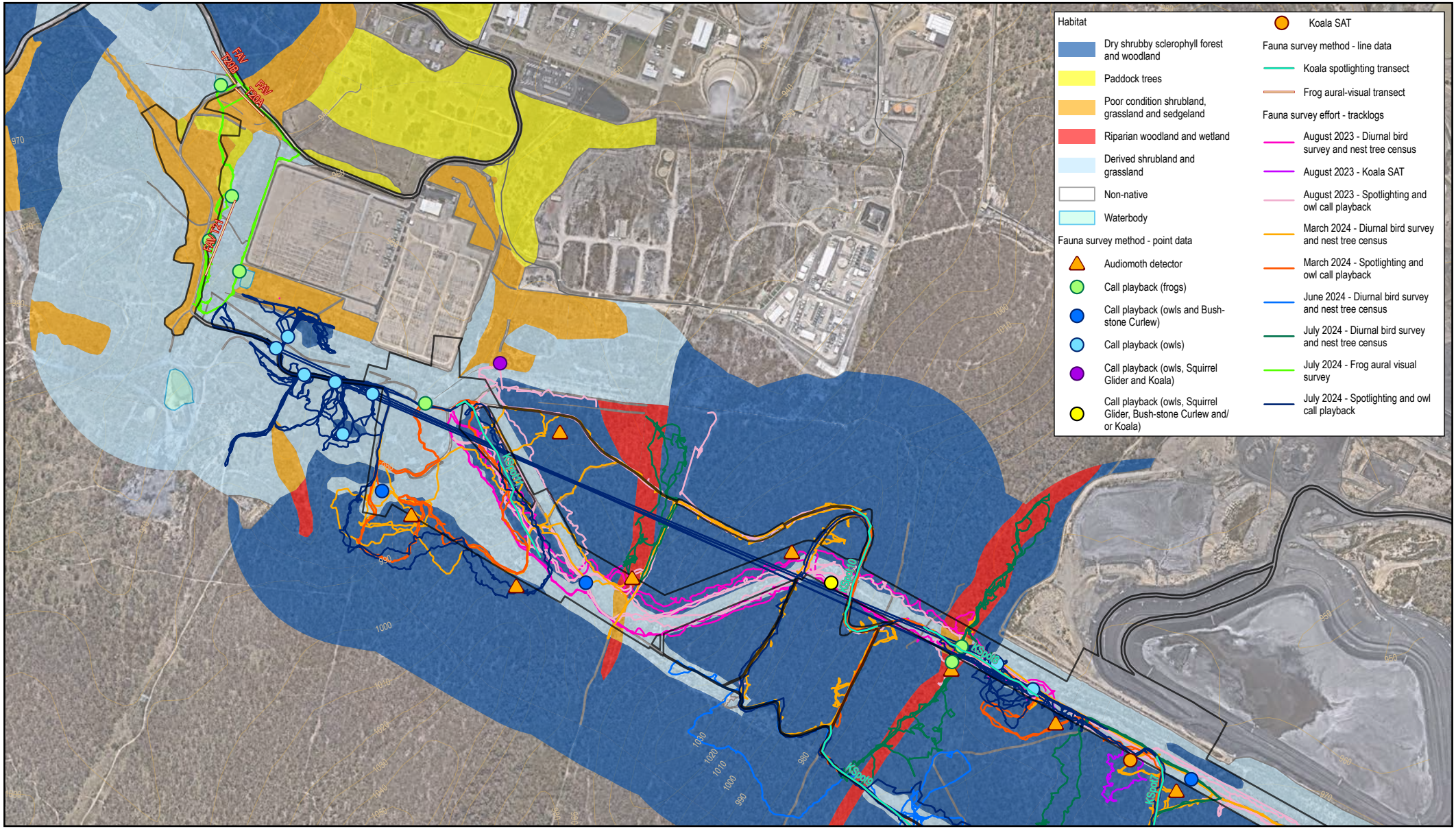
Fauna survey effort Winter/Autumn

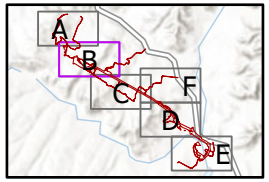
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.5A

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR007b_FaunaSurveyEffort_WinterAutumn
Print date: 17 Jul 2025 - 13:00

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Legend

- Subject land
- Roads
- Contour (10m)

Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

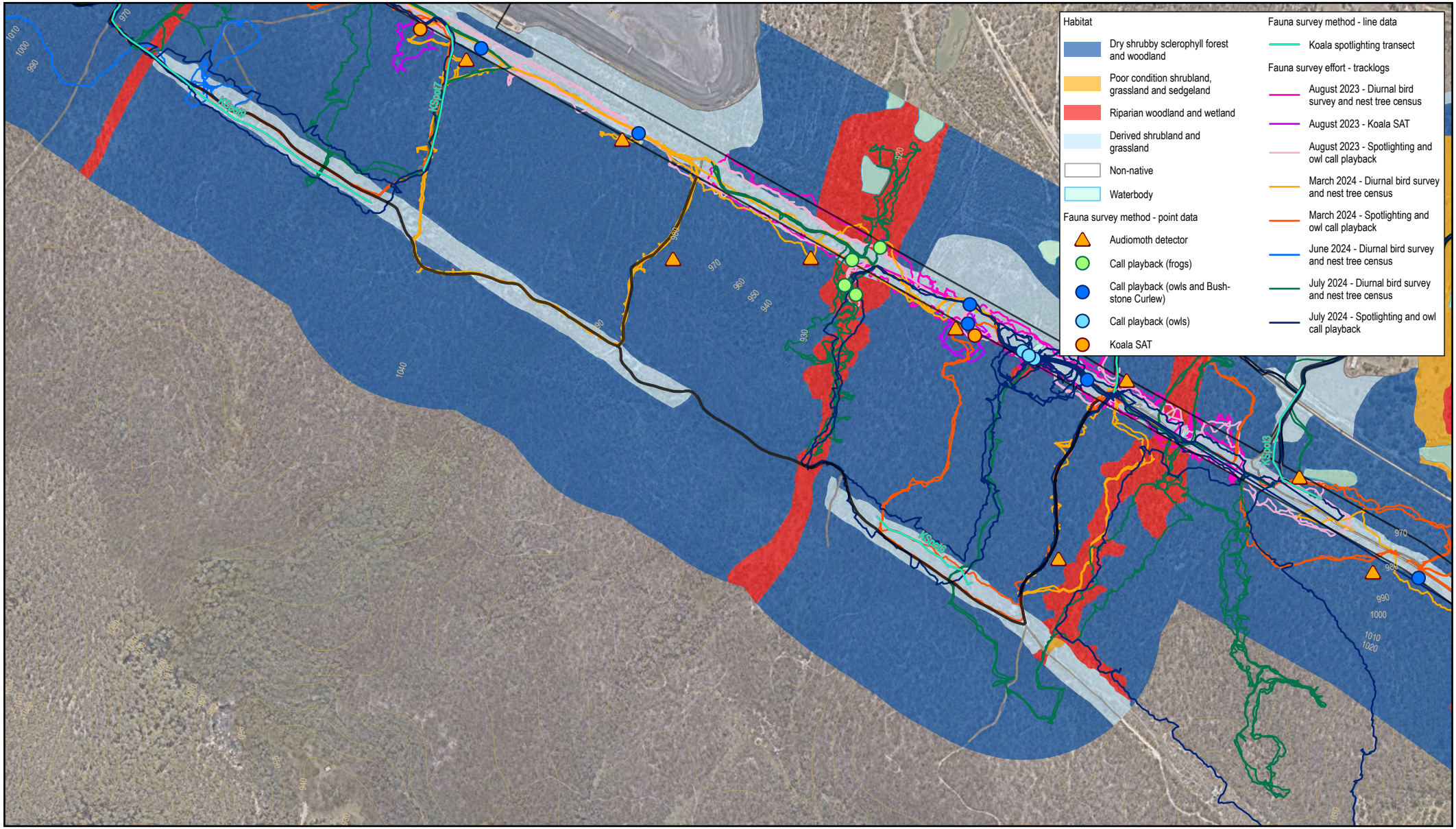
Fauna survey effort Winter/Autumn

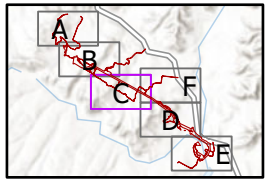
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.5B

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR007b_FaunaSurveyEffort_WinterAutumn
Print date: 17 Jul 2025 - 13:01

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Legend

Subject land

Contour (10m)

Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

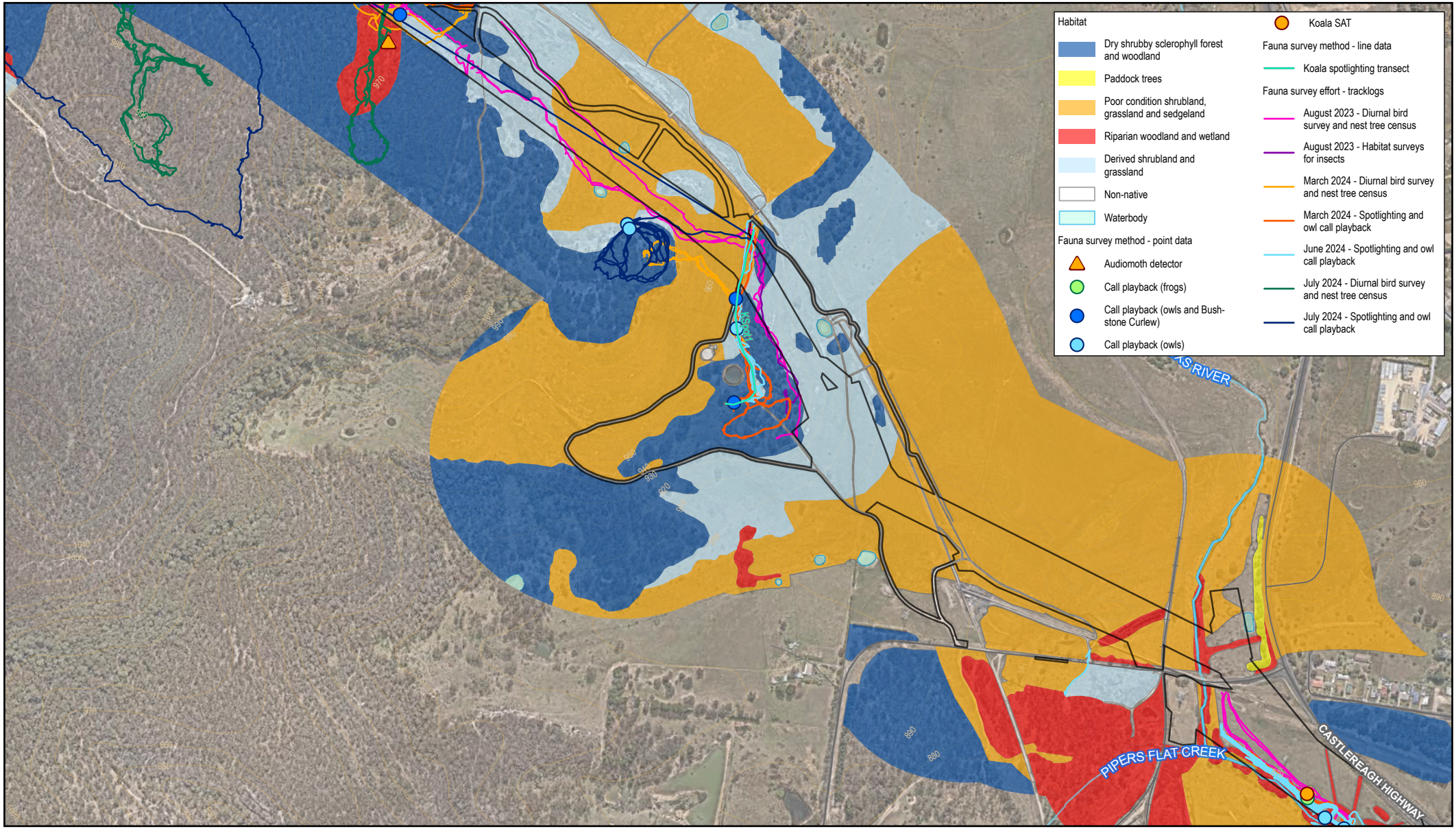
Fauna survey effort Winter/Autumn

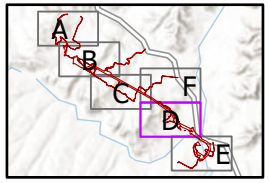
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.5C

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR007b_FaunaSurveyEffort_WinterAutumn
Print date: 17 Jul 2025 - 13:01

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Legend

- Subject land
- Railway
- Roads
- Contour (10m)
- Watercourse

Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

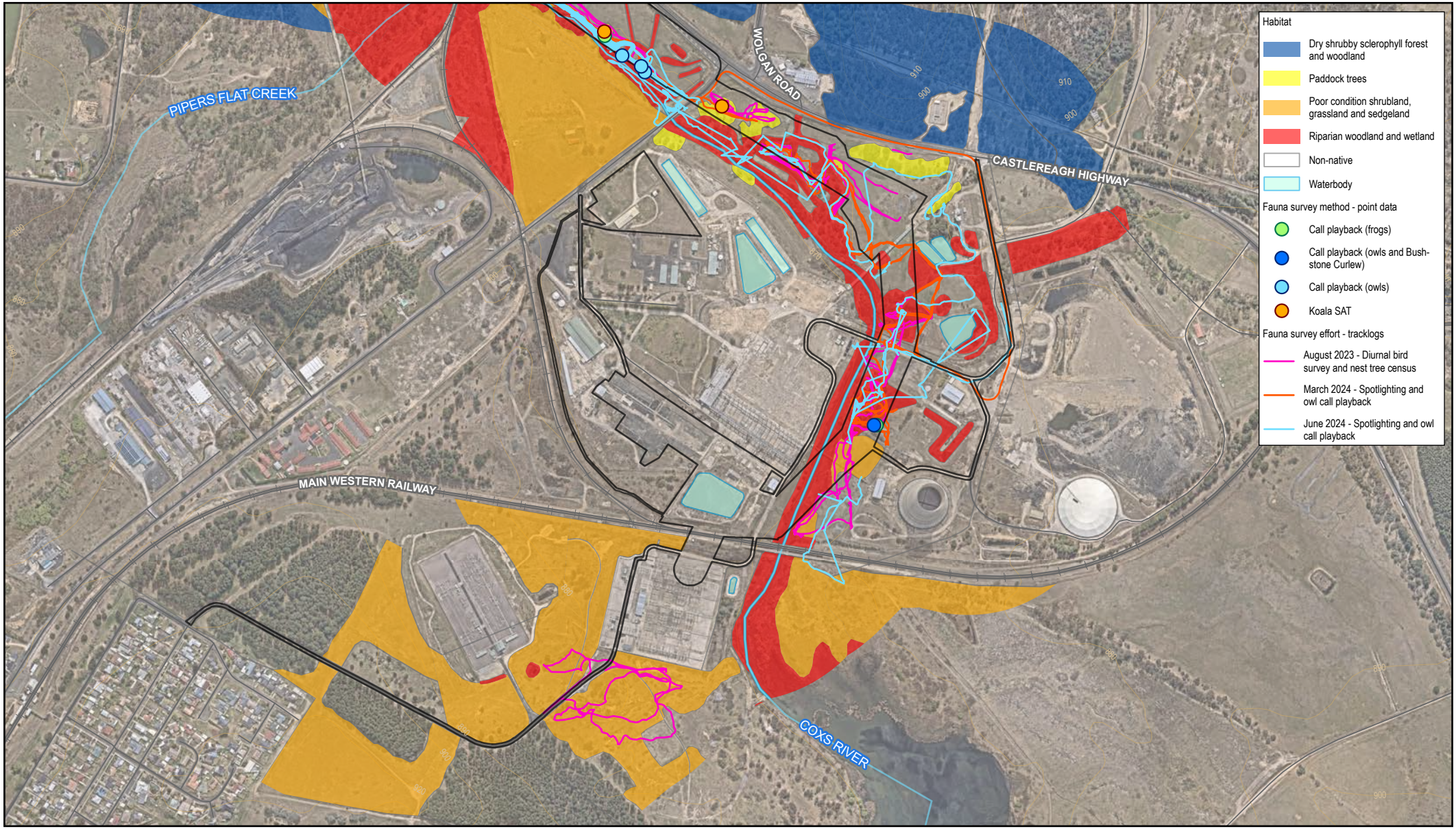
Fauna survey effort Winter/Autumn

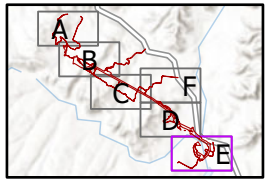
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.5D

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR007b_FaunaSurveyEffort_WinterAutumn
Print date: 17 Jul 2025 - 13:02

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Legend

- Subject land
- Railway
- Roads
- Contour (10m)
- Watercourse

Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

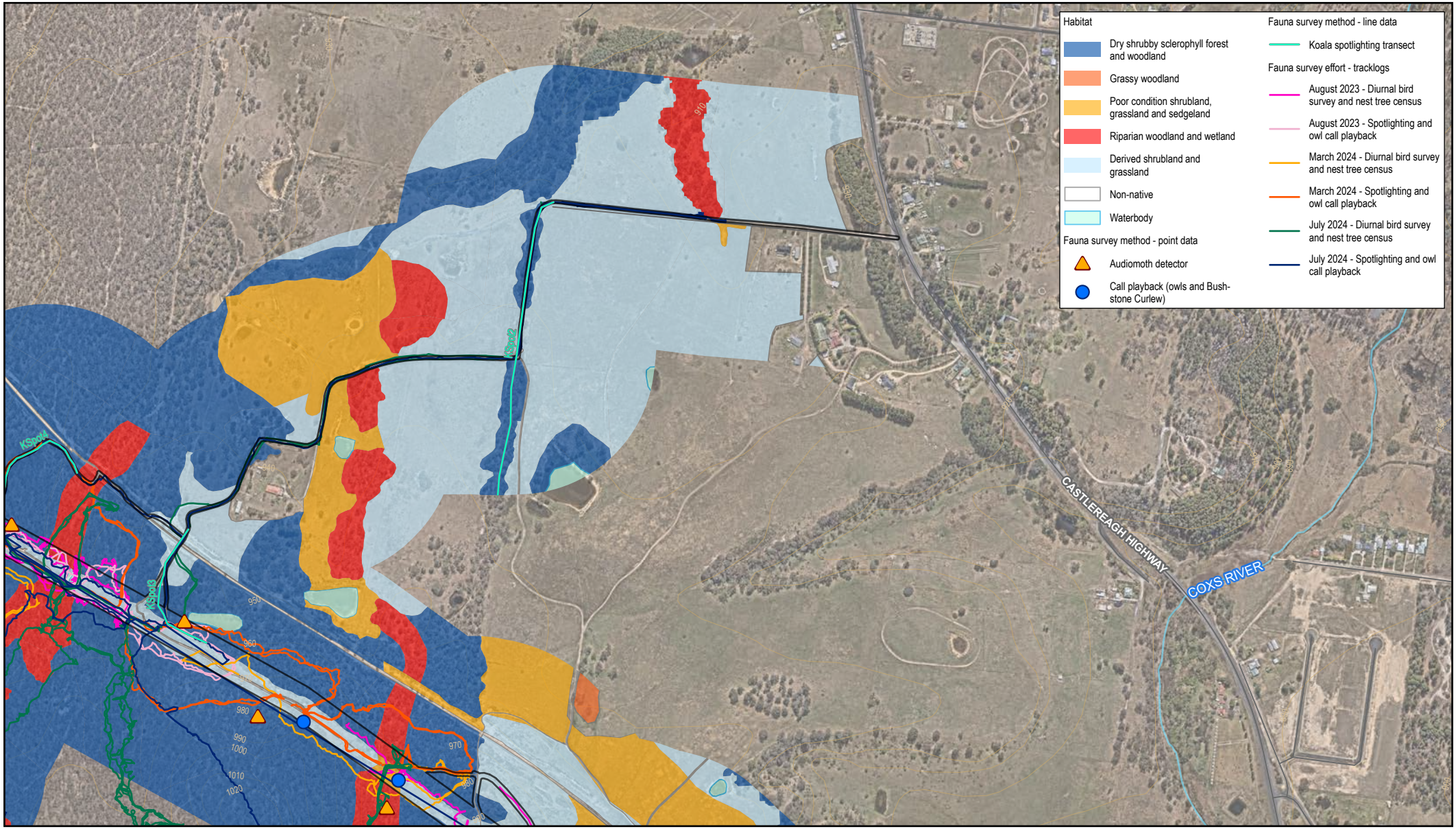
Fauna survey effort Winter/Autumn

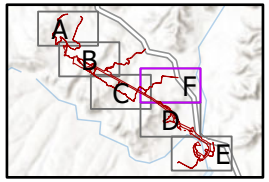
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.5E

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR007b_FaunaSurveyEffort_WinterAutumn
Print date: 17 Jul 2025 - 13:02

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Legend

- Subject land
- Roads
- Contour (10m)
- Watercourse

Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

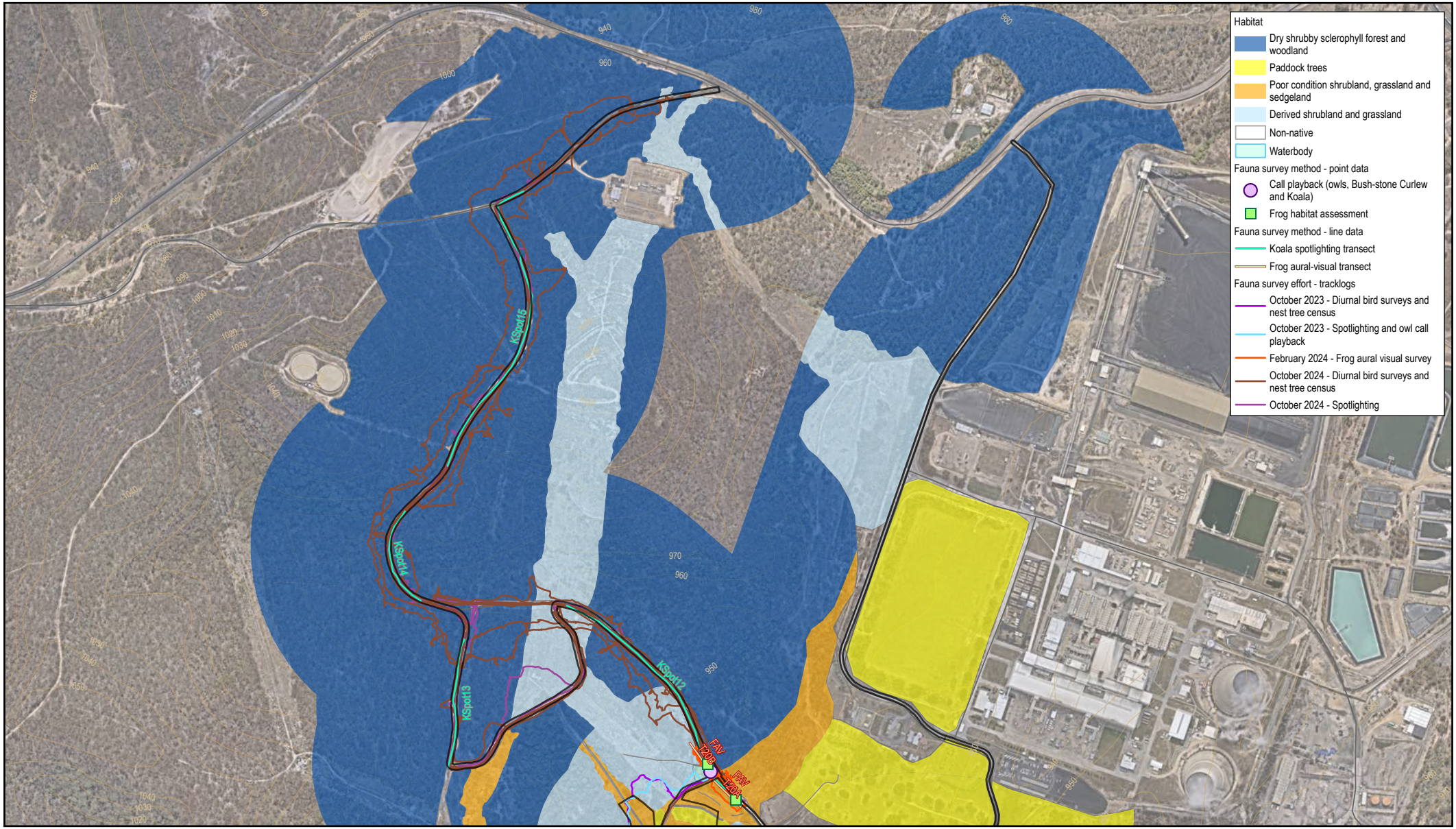
Fauna survey effort Winter/Autumn

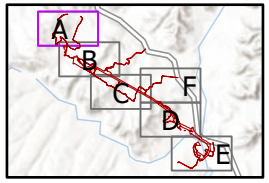
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.5F

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR007b_FaunaSurveyEffort_WinterAutumn
Print date: 17 Jul 2025 - 13:03

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Legend

- Subject land
- Roads
- Contour (10m)

Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

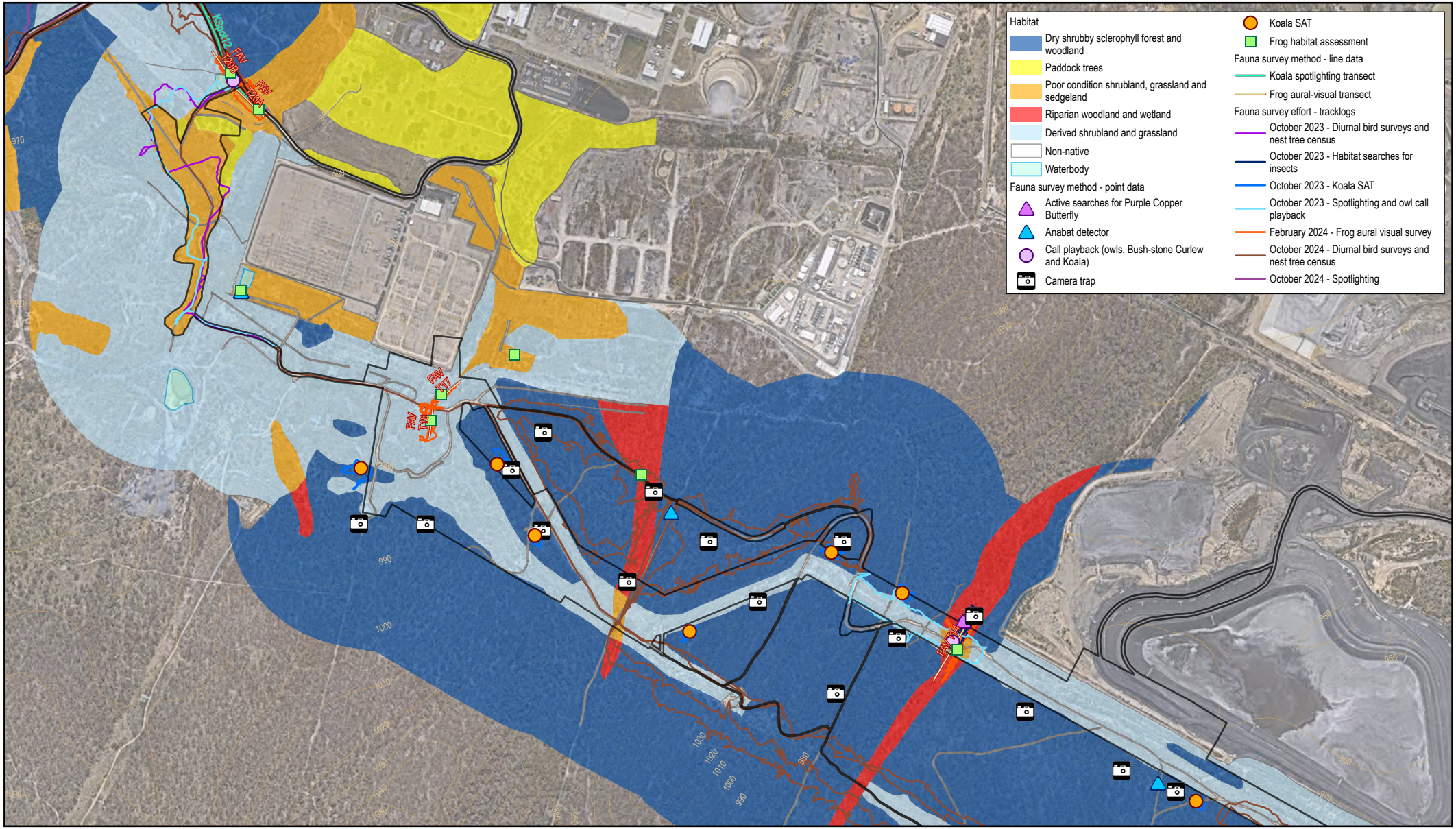
Fauna survey effort Spring/Summer

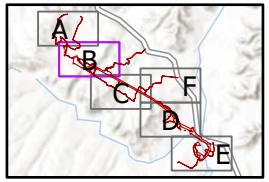
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.6A

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR007a_FaunaSurveyEffort_SpringSummer
Print date: 17 Jul 2025 - 13:09

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Legend

- Subject land
- Roads
- Contour (10m)

Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

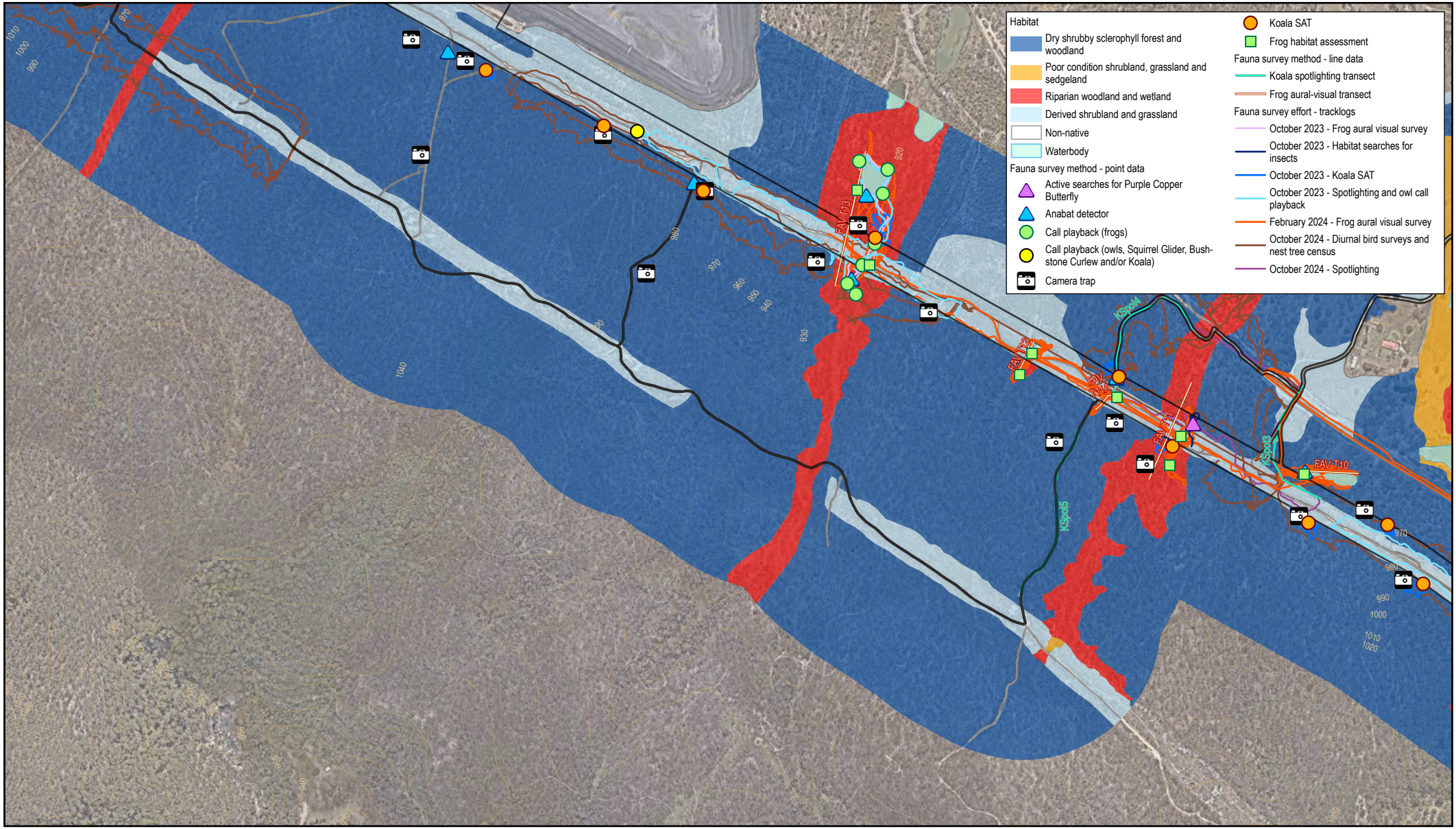
Fauna survey effort Spring/Summer

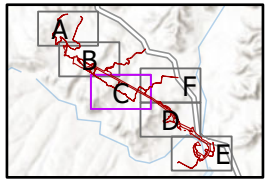
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.6B

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR007a_FaunaSurveyEffort_SpringSummer
Print date: 17 Jul 2025 - 13:09

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Legend

Subject land

Contour (10m)

Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

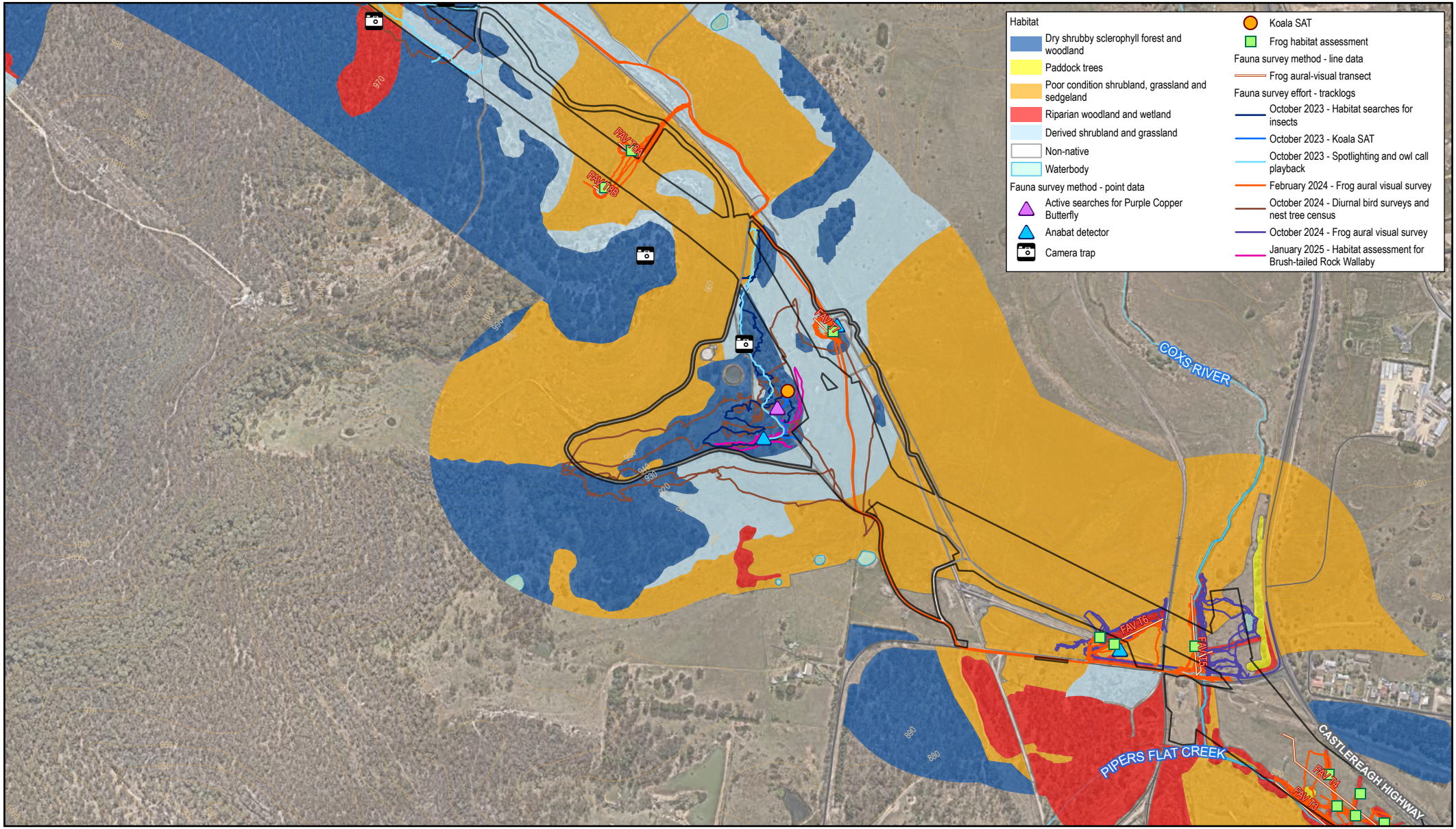
Fauna survey effort Spring/Summer

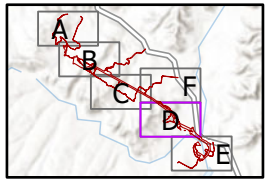
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.6C

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR007a_FaunaSurveyEffort_SpringSummer
Print date: 17 Jul 2025 - 13:09

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Legend

- Subject land
- Railway
- Roads
- Contour (10m)
- Watercourse

Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

Fauna survey effort Spring/Summer

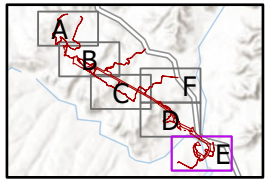
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.6D

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR007a_FaunaSurveyEffort_SpringSummer
Print date: 17 Jul 2025 - 13:10

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Legend

- Subject land
- Railway
- Roads
- Contour (10m)
- Watercourse

Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

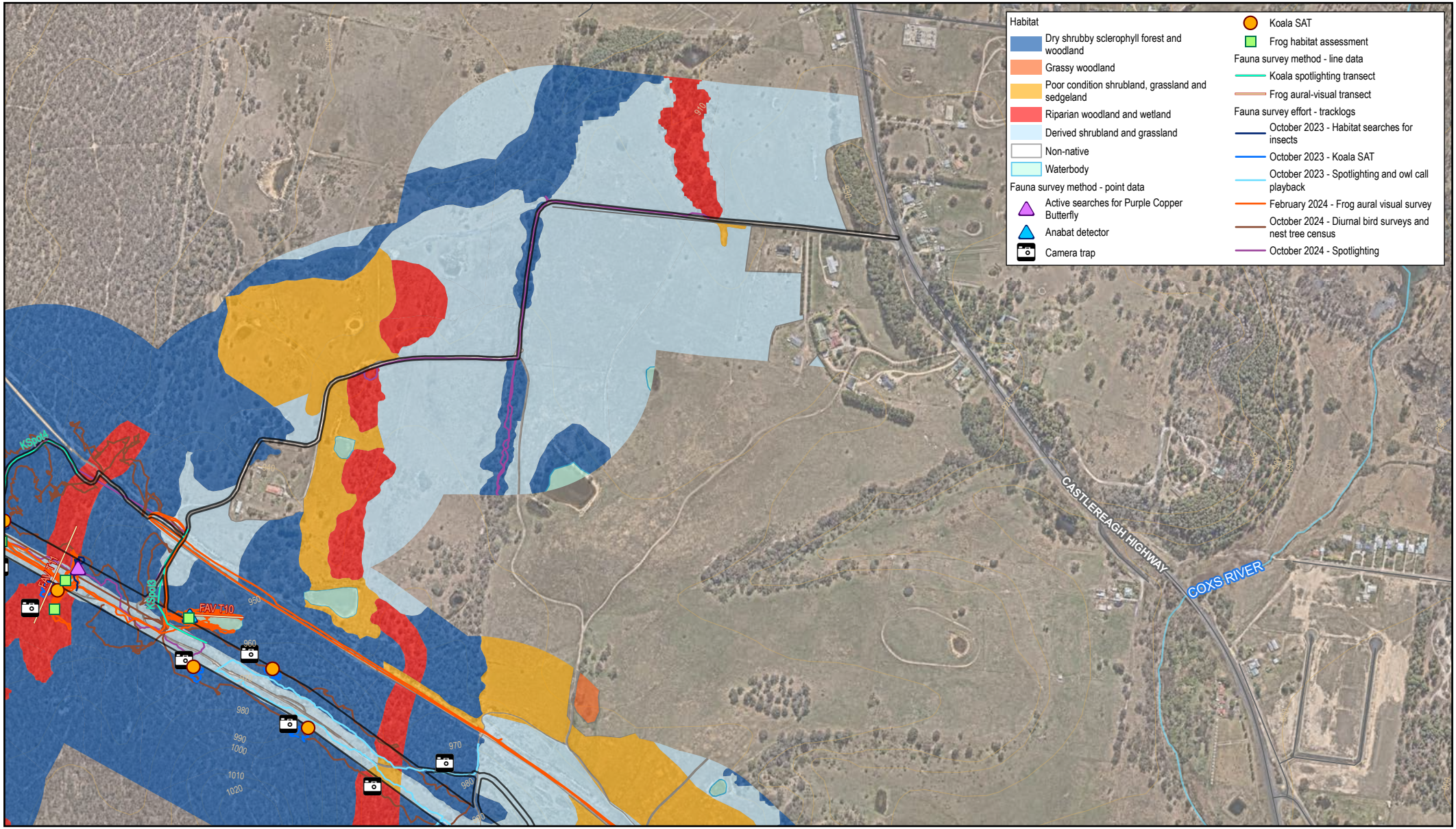
Fauna survey effort Spring/Summer

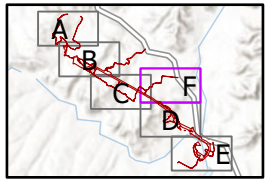
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.6E

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR007a_FaunaSurveyEffort_SpringSummer
Print date: 17 Jul 2025 - 13:11

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Legend

- Subject land
- Roads
- Contour (10m)
- Watercourse

Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

Fauna survey effort Spring/Summer

Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.6F

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR007a_FaunaSurveyEffort_SpringSummer
Print date: 17 Jul 2025 - 13:11

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan

5.2.2 Mapping of species polygons

Species polygons were mapped for species which were recorded and in accordance with the BAM and generally with reference to requirements of individual species presented in the TBDC (see Table 5.9 below). Additional discussion of approach to species polygon mapping is provided below, particularly where an assessor's use of judgement has been used and where species polygon mapping differs from the TBDC or other guidance documents. Species polygon mapping has also included indirect impact areas for species where relevant.

Eucalypts

Species polygons for 274 Black Gum and 142 Capertee Stringybark are mapped in accordance with BAM Section 5.2.5.3 and as shown on Figure 5.7 and Figure 5.8. The species polygons for both species includes areas within PCTs that the species is not associated with according to the TBDC due to mapping of the 30 m buffer of individuals. This includes PCT 3385, PCT 3932 and non-native vegetation for the Black Gum and PCT 3369, PCT 3385, PCT 3735, PCT 3747 and non-native vegetation for the Capertee Stringybark.

A total of 10 Black Gum individuals are located in non-native vegetation in a slashed easement in the former Wallerawang Power station that is assumed to comprise PCT 3385 for the purposes of calculating VI and Black Gum species credits (vegetation zone 15- 3385_non-native).

Large-eared Pied Bat

A 'foraging' species polygon for the Large-eared Pied Bat has been mapped with reference to the TBDC and 'BAM Threatened Bat Survey Guide' as shown on Figure 5.9. A desktop assessment of potential breeding habitat using aerial imagery and NSW basemaps, identified several cliff lines about 1 km to the south of the subject land, between Mount Piper and the existing 500 kV transmission easement. The cliff lines occur from Mount Piper and extend in a south-west direction to the Wallerawang Sewage Treatment Plant. The location of this potential breeding habitat was buffered by 2 km with all associated PCTs and associated vegetation zones included in the species polygon. PCT 3385 is not associated with the species but is also included in the species polygon as it represents contiguous habitat between associated PCTs, as it would mostly likely be used as a movement corridor and as foraging habitat. It is likely that the species would forage throughout the subject land, including the fertile floodplain associated with the Coxs River.

No confirmed breeding habitat is present within 100 m of the subject land. Human-made structures within the study area are not considered suitable breeding habitat for the species. However, a small cave within a rock outcrop adjacent to the subject land (Figure 5.2) has been conservatively assumed as potential breeding habitat for the species (based on consultation with NSW DCCEEW). A 'breeding' species polygon has been mapped within 100m of the cave (Figure 5.2).

Southern Myotis

A species polygon for the Southern Myotis has been mapped in accordance with the TBDC and 'Threatened Bat Survey Guide' as shown on Figure 5.10 and Figure 5.12. The species polygon has been mapped to include all PCTs recorded in the subject land within a 200 m buffer of mapped waterbodies (foraging habitat).

Barking Owl and Powerful Owl

Species polygons for the Powerful Owl and Barking Owl have been mapped with reference to the TBDC and as shown on Figure 5.11. A moderate density of large hollows >20cm diameter (22 trees) were recorded within the subject land, which may comprise breeding habitat for the species. Potential habitat is present for these species along the entire edge given the linear nature of development to the north of Brays Lane, where intact native vegetation is present. Habitat for these species is not present within fragmented patches of PCT 3385 south of Brays Lane, or PCT 3932. A conservative approach has been used for these species, considering the habitat connectivity of the subject land to other areas of Gardens of Stone SCA, the generally intact nature of vegetation in the broader locality, and the presence of large suitably sized nesting hollows particularly in the SCA. These species were confidently excluded from occurring in the eastern end of the subject land given they were not detected during targeted surveys and because the former Wallerawang Power Station site and adjacent agricultural lands comprise mostly isolated paddock trees, small patches of fragmented canopy vegetation or planted vegetation along the Coxs River.

Gang-gang Cockatoo

A species polygon for the Gang-gang Cockatoo has been mapped with reference to the TBDC and as shown on Figure 5.13. Several individual and groups of Gang-gang Cockatoos were recorded during surveys, including a male in November 2023 in the western portion of the alignment through the SCA, a family group in February 2024 near the Water NSW water tank to the south-east of the SCA (north-west of Brays Lane), and several records at the eastern edge of the SCA in the alignment. Assessors identified lone adult males during the breeding season as per step 1 of the TBDC guidelines. Potential nest trees were then identified throughout the subject land as per step 2 of the TBDC. Up to 110 candidate nest trees with suitable hollows >5cm were recorded within the subject land. The high number of potential nest trees resulted in follow up survey effort unable to confirm the presence of any actual nest trees in the nominal survey period for the species and develop species polygons in accordance with the TBDC. As such, while the presence of breeding habitat has been assumed, the species polygon does not reflect buffers from actual nest trees.

Gang-gang Cockatoo pairs utilise multiple nest trees over different years. Only about half of known nest trees are utilised each year (Davey & Mulvaney, 2020), but individuals may use the same roosting and nesting site for multiple years (Higgins, 1999). The species nests in the hollows of tree trunks and limbs, or within the dead sprout of large, living eucalypts (Higgins, 1999.; Gibbons, 1999.; Gibbons & Lindenmayer, 2000). Nesting and roosting sites are often near water (Beruldsen, 1980), where larger hollow-bearing trees can be more common. Breeding aggregations are reliant on stands of suitable hollow-bearing trees (Davey & Mulvaney, 2020). Multiple nests tend to be situated within a few hundred metres of each other.

A species polygon has been mapped to include all good condition vegetation zones associated with the species as per the TBDC. Diurnal bird surveys did not record the species on the Coxs River flats or in small stands of trees within the areas associated with the former Wallerawang Power Station site. These areas are fragmented, degraded native vegetation without appropriately sited potential nest trees. Therefore, no species polygons have been mapped in these areas.

Squirrel Glider

Species polygons for the Squirrel Glider initially included all habitat in associated PCTs where hollow-bearing trees are present. This was then modified to include appropriately sited and better condition PCT 3385 and PCT 3749, which occur in small patches of associated habitat only at the western end of the subject land. The small woodland and forest patches at the former Wallerawang Power Station end of the subject land were excluded from the species polygon as it has only scattered trees that are generally fragmented and with limited habitat connectivity to better patches. Species polygons have been mapped accordingly as shown on Figure 5.14.

Species recorded that do not require species polygons

A species polygon for the Large Bent-winged Bat has not been mapped based on an absence of suitable breeding habitat in the subject land. The small rock outcrop recorded adjacent to the subject land in agricultural pastoral land leased by Centennial Springvale Coal Services Facility would not comprise potential breeding habitat for the species as it is comprised of lithic sandstone with few small openings and does not contain the limestone substrate required by maternity colonies of the species, and no guano or use of the outcrop was recorded. The BAM survey guidelines (OEH, 2018) for the species requires breeding habitat to be identified within 100 m of the subject land. Potential breeding habitat for the species comprises '*caves, tunnels, mines or other structures known or suspected to be used by M. orianae oceanensis 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. All breeding habitat including the cave, or other features used for breeding, and the area immediately surrounding this feature*' (OEH, 2018). Currently, the Bionet Altas does not have records of the species with these restrictions/constraints within 100 m of the subject land and ground-truthing of the subject land supports this. Based on the above the Eastern Bent-winged Bat has been excluded from requiring calculation of species credits through 'Targeted threatened species survey' and species polygons have not been generated.

A species polygon for the White-bellied Sea-eagle has not been mapped as no large stick nests or duetting adults were recorded (see section 5.1.2).

A species polygon for the Glossy Black-cockatoo has not been mapped, as the species was recorded through the presence of possible chewed cones in one location. *Casuarina* and *Allocasuarina* in the study area is generally scarce and breeding is unlikely to occur. No active nests trees have been identified, and no individuals of the species have been observed despite targeted diurnal bird surveys over two years between 2023 and 2025.

Table 5.9 Candidate species credit matters recorded in the subject land

Common name	Scientific name	SAII entity	Habitat constraints (TBDC)	Species / population presence in the subject land	TBDC / threatened species survey guidelines requirements for species polygons	Associated PCTs at the subject land	Extent of impact
Species credit entity recorded; species credits required							
Black Gum	*Eucalyptus aggregata*	No	N/A	The species has been confirmed as absent from the majority of the potential habitat at the study area through targeted survey. 274 individuals recorded within EnergyAustralia lands, Centennial Springvale Coal Services, Centennial Coal lands, Gardens of Stone SCA and former Wallerawang Power Station.	Unit of measure = Count of individuals. Species polygon shows extent of occupied habitat. Species polygons were mapped according to Section 5.2.5.3 of the BAM as a buffer area of 30 m from the point locations of individual threatened plants.	3385 3932 Additional PCT 3385_Non-native	Up to 274 individual *Eucalyptus aggregata* to be cleared (including up to 60 seedlings and resprouting individuals occurring within an existing maintained easement following slashing). 548 species credits generated Up to 5.89 ha of suitable habitat impacted
Capertee Stringybark	*Eucalyptus cannonii*	No	N/A	The species has been confirmed as absent from the majority of the potential habitat at the study area through targeted survey. 142 individuals recorded within vegetated EnergyAustralia lands and Centennial Springvale lands	Unit of measure = Count of individuals. Species polygon shows extent of occupied habitat. Species polygons were mapped according to Section 5.2.5.3 of the BAM as a buffer area of 30 m from the point locations of individual threatened plants.	3369 3747	Up to 142 individual *Eucalyptus cannonii* to be cleared 214 species credits generated Up to 7.21 ha of suitable habitat impacted

Common name	Scientific name	SAII entity	Habitat constraints (TBDC)	Species / population presence in the subject land	TBDC / threatened species survey guidelines requirements for species polygons	Associated PCTs at the subject land	Extent of impact
Large-eared Pied Bat	*Chalinolobus dwyeri*	Yes (only if breeding habitat is identified within 100 m of the subject land)	Within 2 km of rocky areas containing caves, overhangs, escarpments, outcrops, or crevices, or within 2 km of old mines or tunnels.	Recorded at six locations over ten survey nights including within vegetated EnergyAustralia lands, Centennial Springvale Coal Services, Centennial Coal lands, and leased agricultural land.	Unit of measure = Area (ha). Species polygon shows extent of occupied habitat. The species polygon boundary should align with all PCTs on the subject land that are within 2 km of identified potential roost habitat features, and with which the species is associated (as listed in the TBDC). Where breeding habitat is also present, an additional species polygon for the breeding habitat must include all breeding habitat on or within 100 m of the subject land. The polygon must incorporate the habitat feature and a buffer of at least 100 m wide (or 100 m radius for point locations such as caves) with the breeding habitat features as the centroid (NSW DCCEEW, 2021). As described above, this has been refined to include PCT 3385 which is not normally associated with the species.	3369 3735 3747 3749 3932	55.43 ha of habitat impacted in subject land. A further 1.08 ha of suitable habitat indirectly impacted in indirect impact area. 1,806 species credits generated

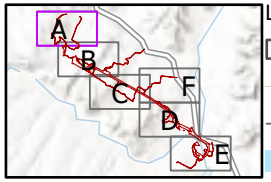
Common name	Scientific name	SAII entity	Habitat constraints (TBDC)	Species / population presence in the subject land	TBDC / threatened species survey guidelines requirements for species polygons	Associated PCTs at the subject land	Extent of impact
Southern Myotis	*Myotis macropus*	No	Waterbodies with permanent pools/stretches 3 m or wider, including rivers, large creeks, billabongs, lagoons, estuaries, dams and other waterbodies, on or within 200m of the site.	Recorded at two locations over four survey nights at along the Coxs River at Main Road and also at the Coxs River Bridge at former Wallerawang Power Station. This species is also considered present along waterbodies throughout the entire subject land in the upper reaches including dams within and adjacent to the subject land in agricultural land and woodland and forest.	Unit of measure = Area (ha). Species polygon shows extent of occupied habitat. The species polygon boundary should align with all PCTs on the subject land with which the species is associated (as listed in the TBDC) that occur within 200 m of the high bank, or high tide mark of creeks, rivers or other waterbodies mapped. If the species was recorded in any additional PCTs on the subject land these PCTs should also be included in the species polygon (NSW DCCEEW, 2021).	3369 3385 3735 3747 3749 3932	26.72 ha of habitat impacted in subject land. A further 0.95 ha of suitable habitat indirectly impacted in indirect impact area. 541 species credits generated
Powerful Owl	*Ninox strenua*	No	Living or dead trees with a hollow >20 cm diameter that occurs >4 m above the ground.	Recorded at three locations within Gardens of Stone SCA.	The species polygon boundary must be drawn to include all vegetation zones; 1. within 800 m (being the approximate home range) from the location of a detected owl, and 2. containing a living or dead tree with a hollow >20 cm diameter that occurs >4 m above the ground. As described above, this has been refined to include consideration of records and habitat condition.	3369 3385 3735 3747 3749	10.39 ha of habitat impacted in subject land. A further 0.52 ha of suitable habitat indirectly impacted in indirect impact area. 420 species credits generated

Common name	Scientific name	SAII entity	Habitat constraints (TBDC)	Species / population presence in the subject land	TBDC / threatened species survey guidelines requirements for species polygons	Associated PCTs at the subject land	Extent of impact
Barking Owl	*Ninox connivens*	No	Living or dead trees with a hollow >20 cm diameter that occurs >4 m above the ground	Recorded at one location within leased agricultural land.	The species polygon boundary must be drawn to include all vegetation zones; 1. within 800 m (being the approximate home range) from the location of a detected owl, and 2. containing a living or dead tree with a hollow >20 cm diameter that occurs >4 m above the ground. As described above, this has been refined to include consideration of records and habitat condition.	3369 3385 3735 3747 3749	10.39 ha of habitat impacted in subject land. A further 0.52 ha of suitable habitat indirectly impacted in indirect impact area. 420 species credits generated
Gang-gang Cockatoo	*Callocephalon fimbriatum*	No	Eucalypt tree species with hollows at least 3 m above the ground and with hollow diameter of 7 cm or larger	Recorded in five locations including within vegetated EnergyAustralia lands, Gardens of Stone SCA, Centennial Springvale Coal Services, Centennial Coal lands, and leased agricultural land.	The species polygons must be drawn around actual nest trees (i.e. trees that birds of the species are known to have used for nesting). The species polygons should be circular in shape and must include a buffer radius of 200 m around each actual nest tree. The shape of the buffer can be modified where evidence provided in the Biodiversity Assessment Report indicates an alternative shape would better meet the species needs in the context of the assessment site. For example, extant vegetation is linear, and the nest tree is already located near the edge of the wooded area. As described above, this has been refined to include consideration of difficulties with identifying active nest trees across a large area of suitable habitat, contiguous habitat in the study area, habitat condition and the linear nature of the project.	3369 3385 3735 3747 3749 3932	10.39 ha of habitat impacted in subject land. A further 0.52 ha of suitable habitat indirectly impacted in indirect impact area. 420 species credits generated

Common name	Scientific name	SAII entity	Habitat constraints (TBDC)	Species / population presence in the subject land	TBDC / threatened species survey guidelines requirements for species polygons	Associated PCTs at the subject land	Extent of impact
Squirrel Glider	*Petaurus norfolcensis*	No	N/A	Recorded in one location in vegetated EnergyAustralia lands.	Species polygon considerations are not noted in the TBDC and there are no guidelines for this species. The species polygon has been mapped to include all canopied vegetation north of Brays Lane.	3369 3735 3747 3932	22.69 Ha of habitat impacted in subject land. A further 0.52 ha of suitable habitat indirectly impacted in indirect impact area. 688 species credits generated
Species recorded, species credits not required							
Large Bent-winged Bat	*Miniopterus orianae oceanensis*	Yes	Cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding	Recorded in five locations including within vegetated Gardens of Stone SCA, Centennial Springvale Coal Services, and leased agricultural land.	The species polygon boundary should have a 100 m radius buffer around an accurate GPS point location centred on the cave/feature entrance (NSW DCCEEW, 2021). No breeding habitat identified.	N/A	Nil
White-bellied Sea-eagle	*Haliaeetus leucogaster*	No	Living or dead mature trees within suitable vegetation within 1 km of a rivers, lakes, large dams or creeks, wetlands and coastlines	Recorded in five locations including within Centennial Springvale Coal Services and leased agricultural land as well as former Wallerawang Power Station and Lake Wallace. No active nest trees observed in the study area, or additional evidence of breeding such as begging birds of any age or sex, or an occupied nest, despite systematic nest tree census in August-October 2023 and in July 2024.	Species polygon should be established if breeding habitat is present (live large old trees within 1 km of a rivers, lakes, large dams or creeks, wetlands and coastlines) AND if a large stick nest within tree canopy is present; or an adult with nest material; or adults observed duetting within breeding period. A species polygon should include a circular polygon with a 250 m radius from the breeding site. Where the breeding site is 500 m or more from an urban or peri-urban area, a circular polygon with a 500 m radius from the breeding site is applied. No breeding habitat identified.	N/A	Nil

Common name	Scientific name	SAII entity	Habitat constraints (TBDC)	Species / population presence in the subject land	TBDC / threatened species survey guidelines requirements for species polygons	Associated PCTs at the subject land	Extent of impact
Glossy Black-cockatoo	*Calyptorhynchus lathami*	No	Living or dead tree with hollows greater than 15 cm diameter and higher than 8 m above ground. Presence of *Allocasuarina* and *Casuarina* species	Possible chewed *Allocasuarina* cones were recorded in one location in planted vegetation in Gardens of Stone SCA and adjacent to an operational coal mine. No individuals of the species observed during any surveys. No active nest trees observed in the study area, or additional evidence of breeding such as begging birds of any age or sex, or an occupied nest, despite systematic nest tree census in August 2023 and June and July 2024.	If actual nest trees are confirmed on site, then the species polygons are to be drawn around those actual nest trees (i.e. trees that birds of the species are known to have used for nesting). The species polygons should be circular in shape and must include a buffer radius of 200 m around each actual nest tree. The purpose of the buffer is to identify the essential area for breeding and minimise disturbance/avoid clearing for a development application, or conserve and improve habitat for a biodiversity stewardship agreement. The shape of the buffer can be modified where evidence provided in the Biodiversity Assessment Report indicates an alternative shape would better meet the species needs in the context of the assessment site. No breeding habitat identified. Species unlikely to breed in the area given limited extent of suitable foraging habitat.	N/A	Nil





Legend

- Subject land
- Contour (10m)
- Roads
- Waterbody

Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

Black Gum species polygons

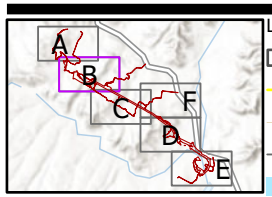
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.7A

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR014_SpeciesPoly_EucAggregata
Print date: 17 Jul 2025 - 14:45

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;World Hillshade: Esri, Geoscience Australia, NASA, NGA, USGS;Nearmap WMS Server: . Created by: lmanasan





Legend

- Subject land
- Proposed transmission line
- Contour (10m)
- Roads
- Waterbody

Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

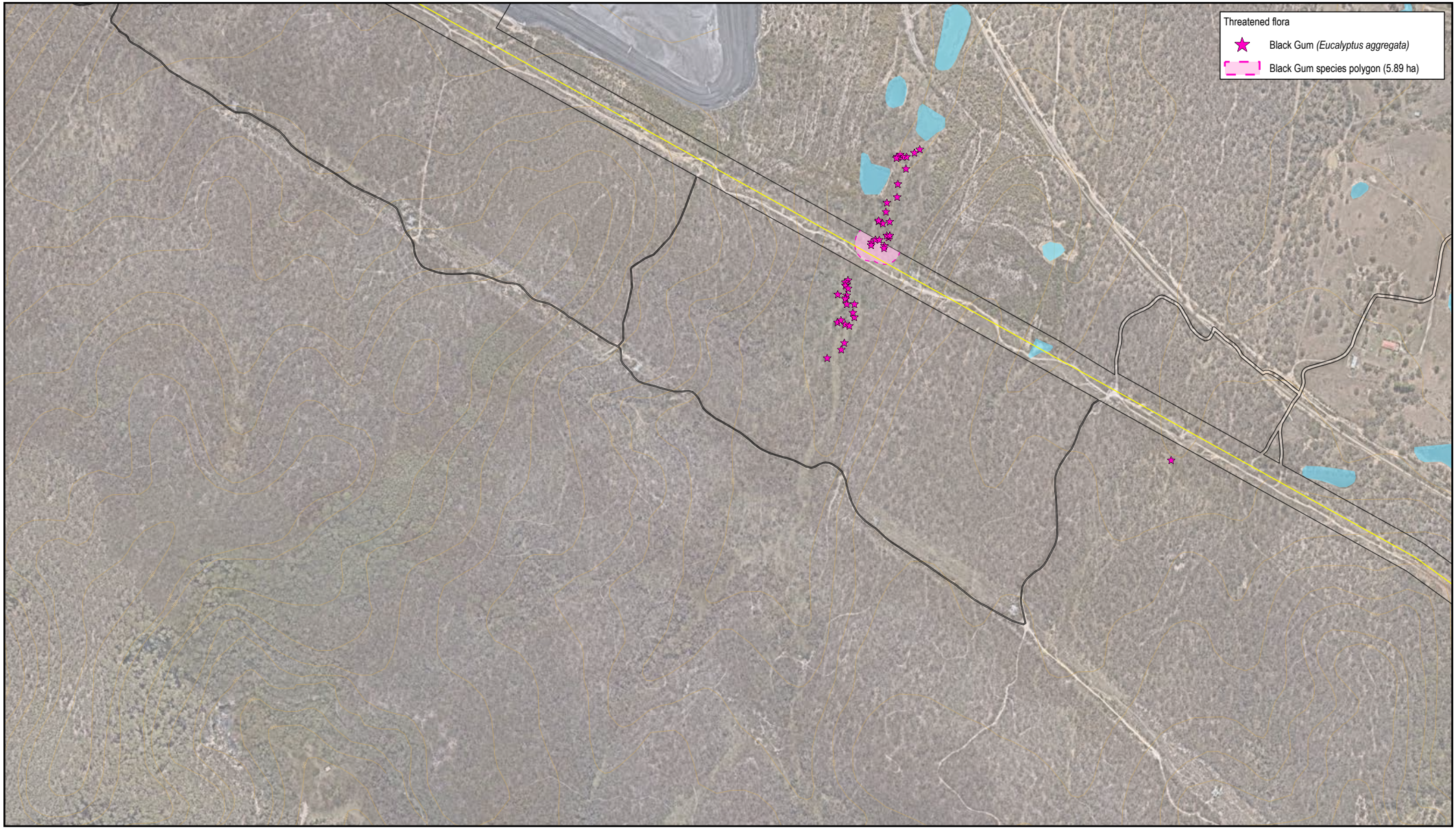
Black Gum species polygons

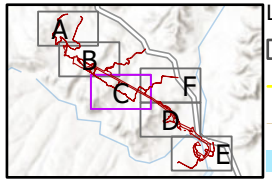
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.7B

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR014_SpeciesPoly_EucAggregata
Print date: 17 Jul 2025 - 14:32

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Legend

- Subject land
- Proposed transmission line
- Contour (10m)
- Waterbody

Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

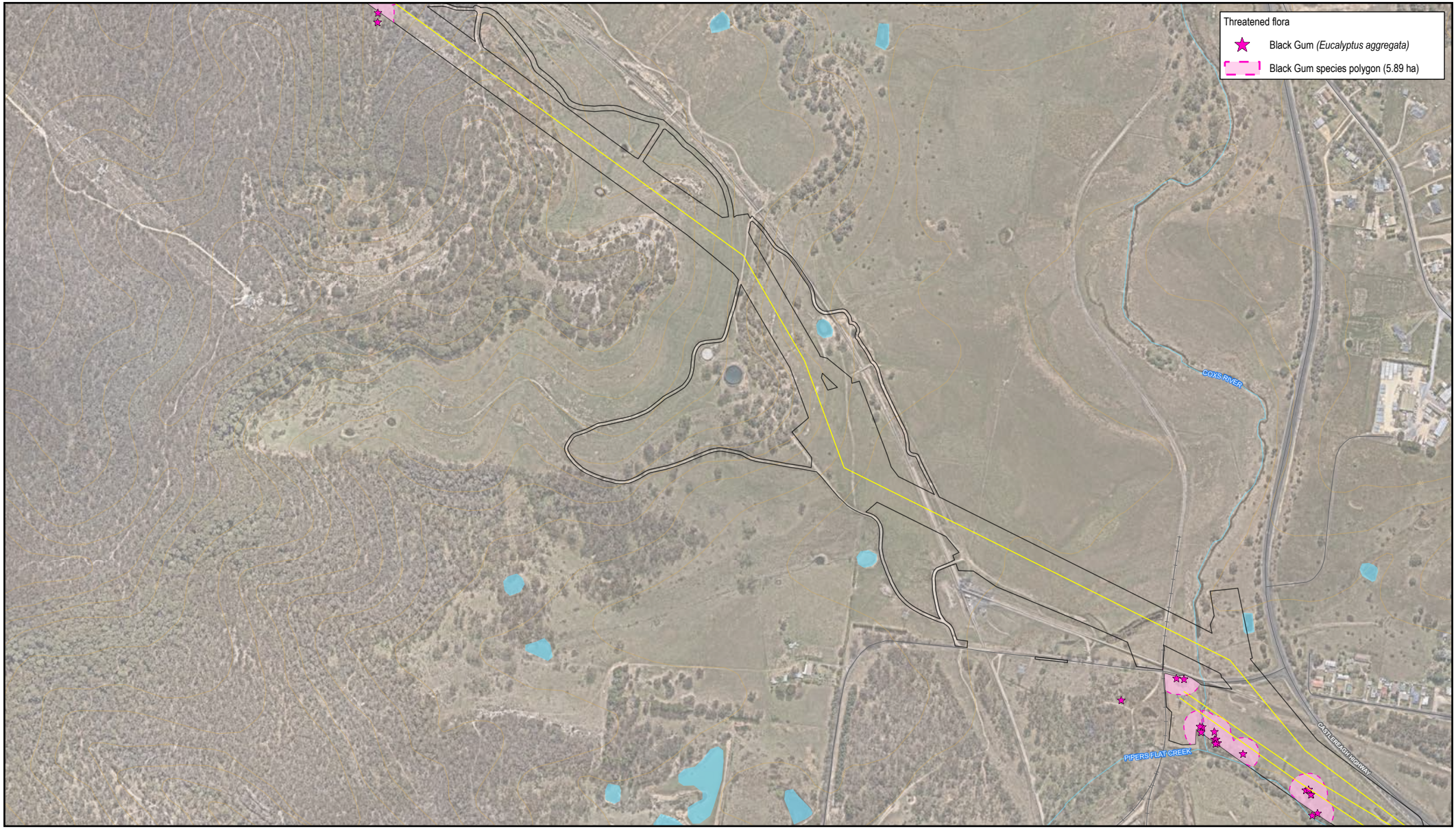
Black Gum species polygons

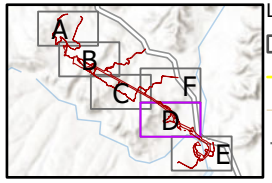
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.7C

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR014_SpeciesPoly_EucAggregata
Print date: 17 Jul 2025 - 14:33

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Legend

- Subject land
- Proposed transmission line
- Contour (10m)
- Railway
- Roads
- Watercourse
- Waterbody

Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

Black Gum species polygons

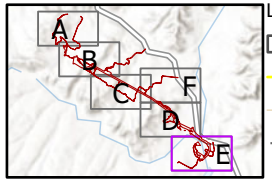
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.7D

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR014_SpeciesPoly_EucAggregata
Print date: 17 Jul 2025 - 14:33

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Legend

- Subject land
- Proposed transmission line
- Contour (10m)
- Railway
- Roads
- Watercourse
- Waterbody

Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

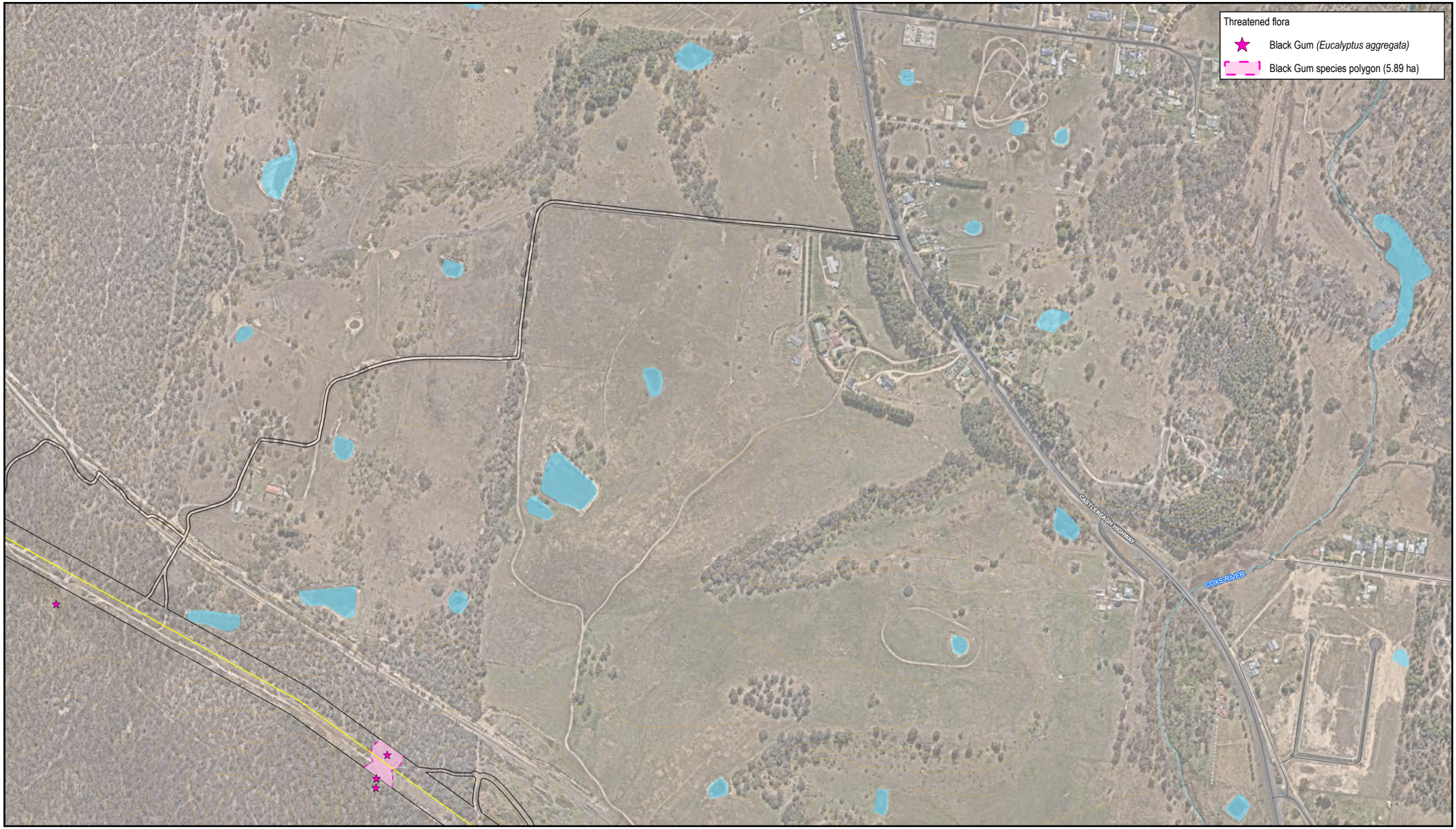
Black Gum species polygons

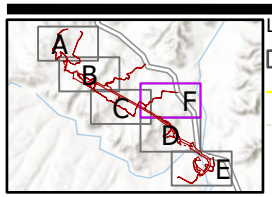
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.7E

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR014_SpeciesPoly_EucAggregata
Print date: 17 Jul 2025 - 14:34

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Legend

- Subject land
- Proposed transmission line
- Contour (10m)
- Roads
- Watercourse
- Waterbody

Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

Black Gum species polygons

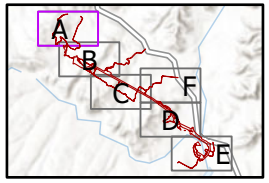
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.7F

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR014_SpeciesPoly_EucAggregata
Print date: 17 Jul 2025 - 14:34

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Legend

- Subject land
- Roads
- Contour (10m)
- Waterbody

Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

Capertee Stringybark species polygons

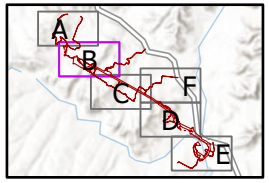
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.8A

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR015_SpeciesPoly_EucCanonni
Print date: 17 Jul 2025 - 13:27

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Legend
- Subject land
- Proposed transmission line
- Roads
- Contour (10m)
- Waterbody

Paper Size ISO A4

0 100 200 300

Metres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

Capertee Stringybark species polygons

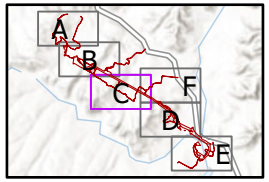
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.8B

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR015_SpeciesPoly_EucCanonni
Print date: 17 Jul 2025 - 13:27

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Legend

- Subject land
- Proposed transmission line
- Contour (10m)
- Waterbody

Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

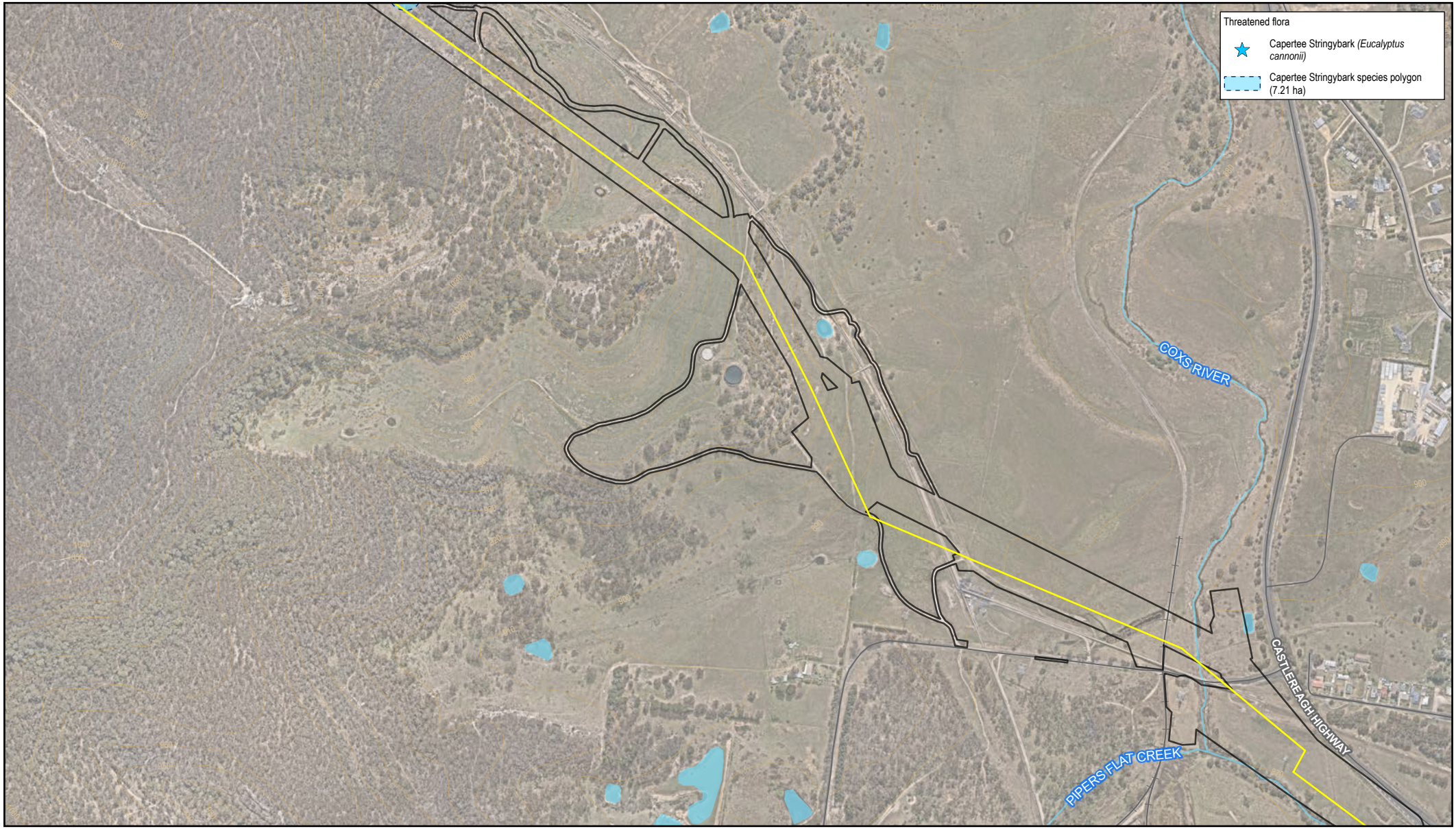
Capertee Stringybark species polygons

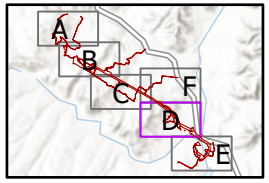
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.8C

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR015_SpeciesPoly_EucCanonni
Print date: 17 Jul 2025 - 13:28

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Legend

- Subject land
- Proposed transmission line
- Railway
- Roads
- Contour (10m)
- Watercourse
- Waterbody

Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

Capertee Stringybark species polygons

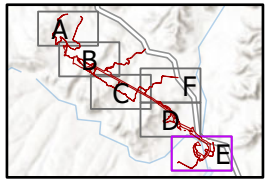
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.8D

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR015_SpeciesPoly_EucCanonni
Print date: 17 Jul 2025 - 13:29

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Legend

- Subject land
- Proposed transmission line
- Railway
- Roads
- Contour (10m)
- Watercourse
- Waterbody

Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

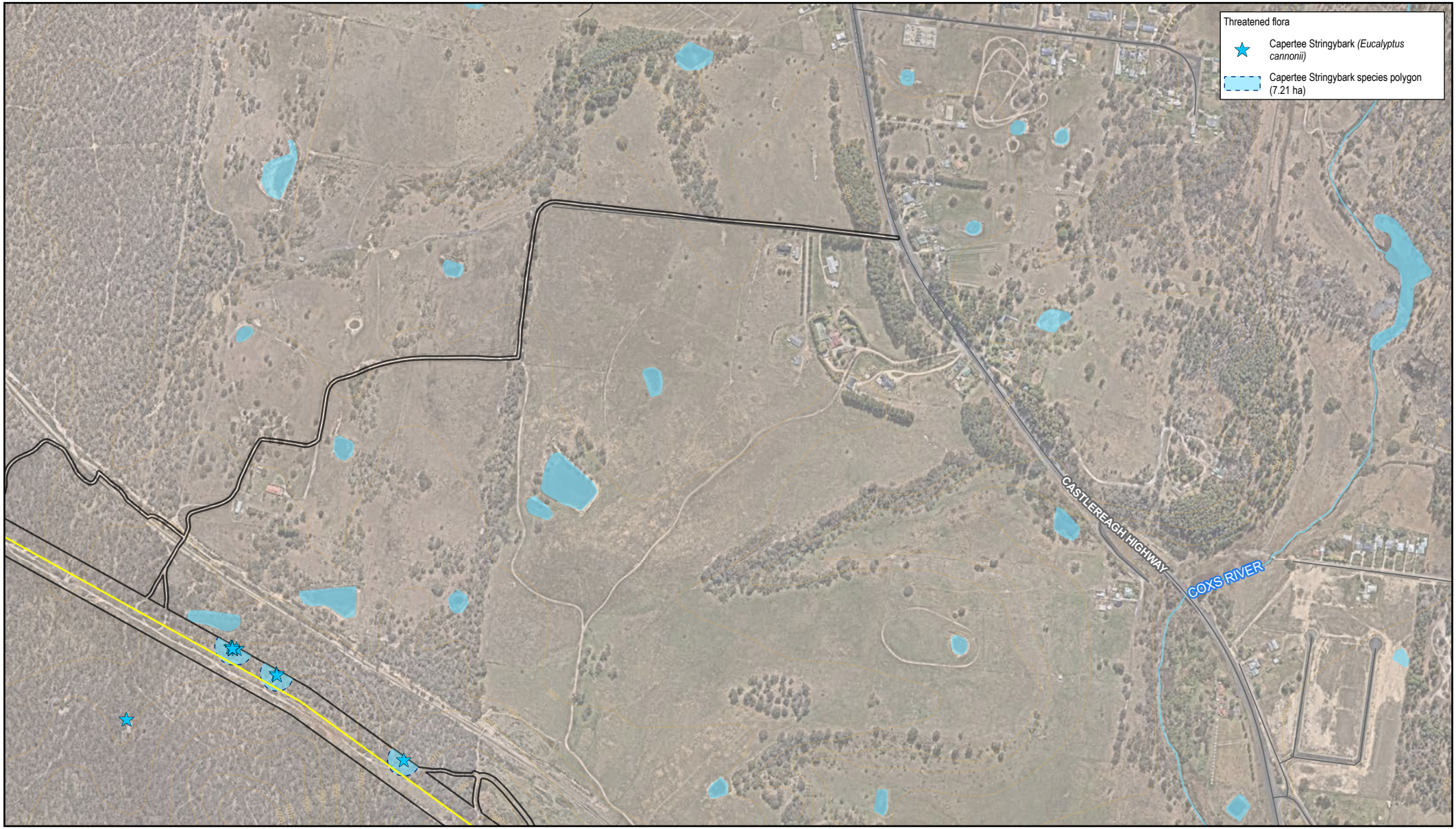
Capertee Stringybark species polygons

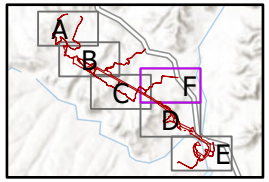
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.8E

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR015_SpeciesPoly_EucCanonni
Print date: 17 Jul 2025 - 13:29

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Legend

- Subject land
- Proposed transmission line
- Roads
- Contour (10m)
- Watercourse
- Waterbody

Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

Capertee Stringybark species polygons

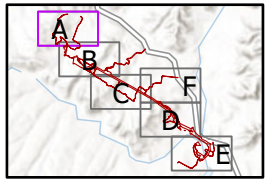
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.8F

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR015_SpeciesPoly_EucCanonni
Print date: 17 Jul 2025 - 13:30

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

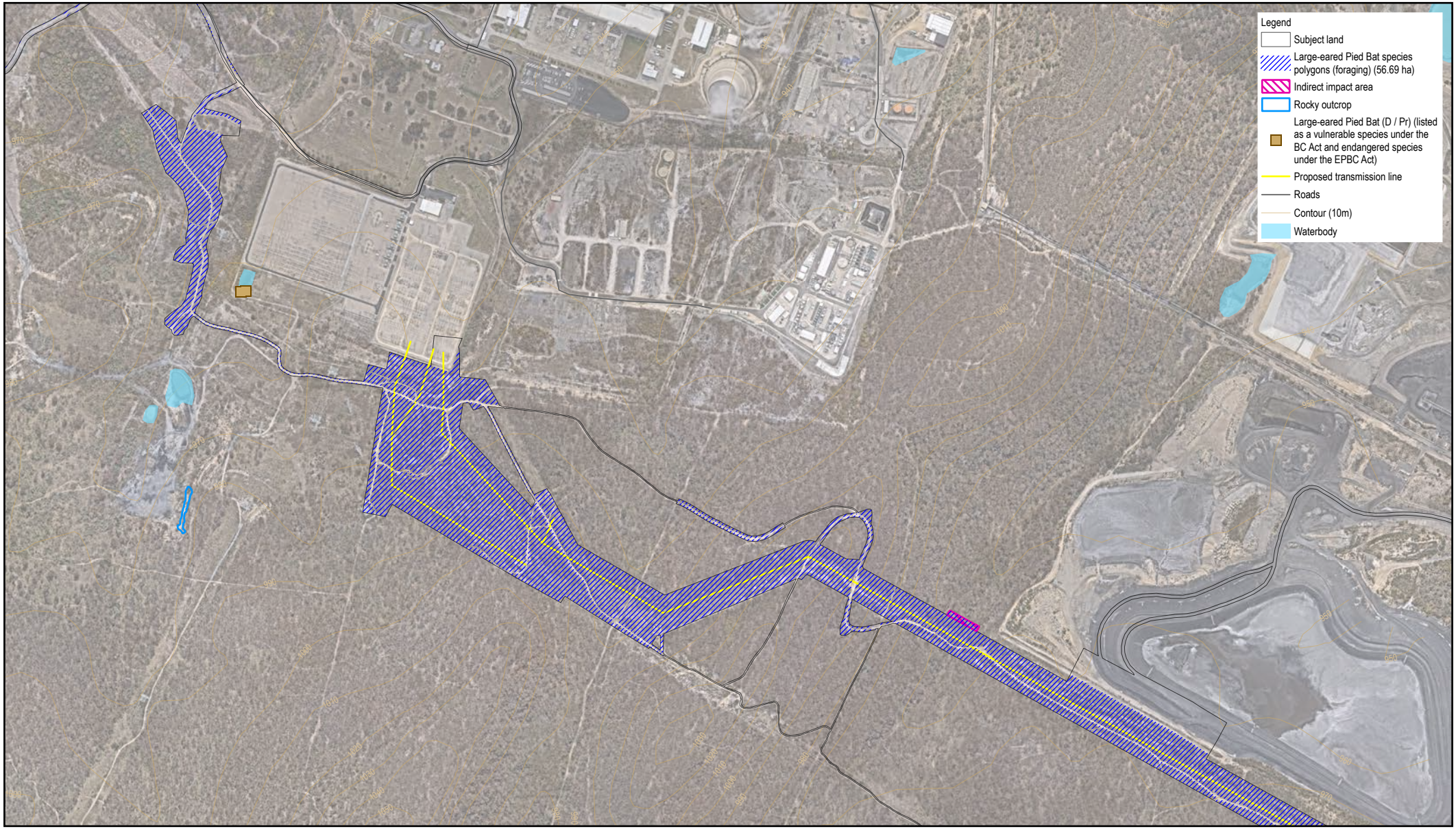
Large-eared Pied Bat species polygons

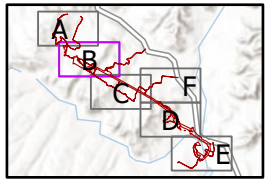
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.9A

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR013_SpeciesPoly_LargeEaredPiedBat
Print date: 17 Jul 2025 - 14:36

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Paper Size ISO A4

0 100 200 300

Metres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

GHD

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

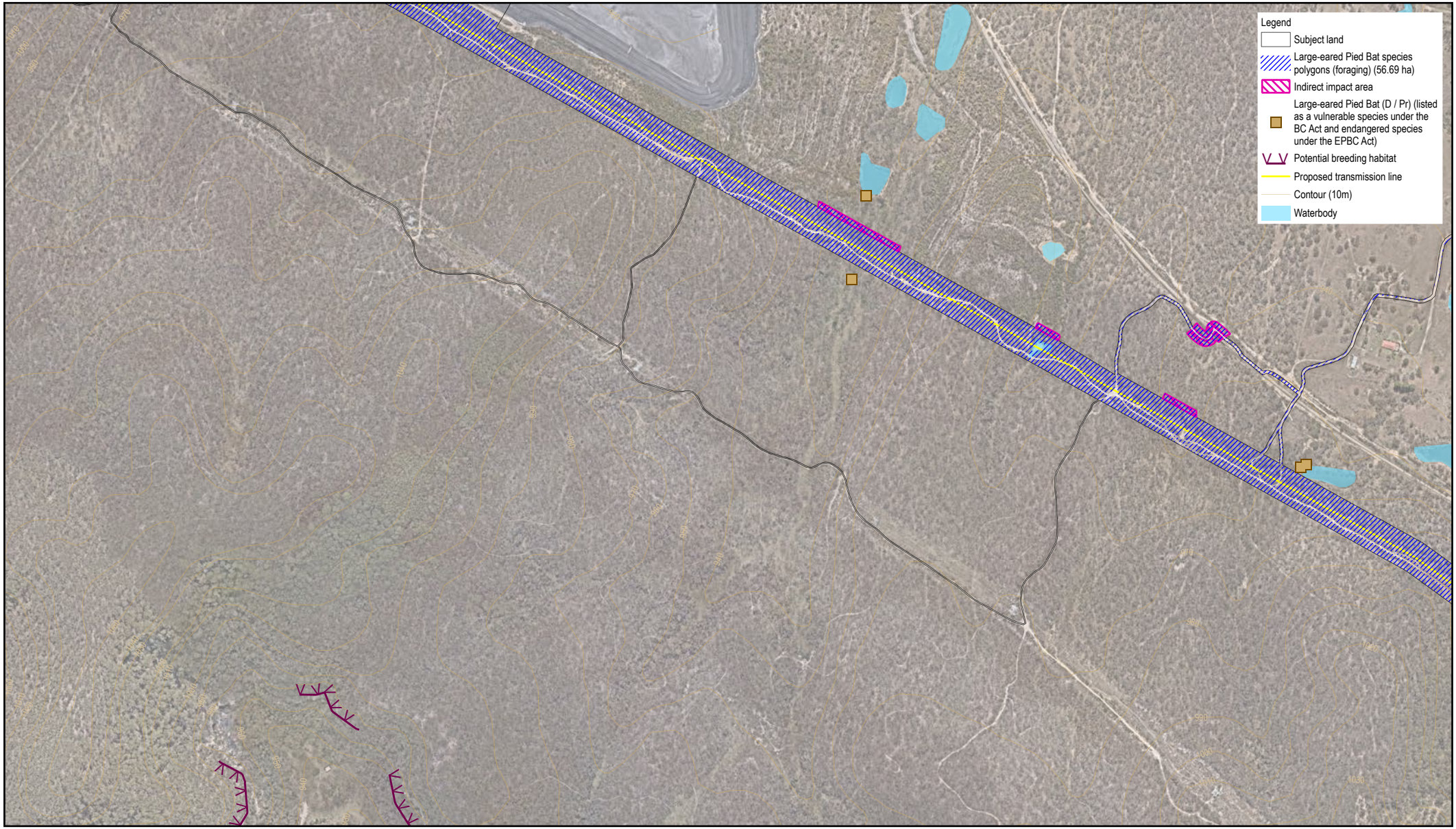
Large-eared Pied Bat species polygons

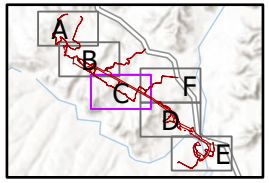
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.9B

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR013_SpeciesPoly_LargeEaredPiedBat
Print date: 17 Jul 2025 - 14:37

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

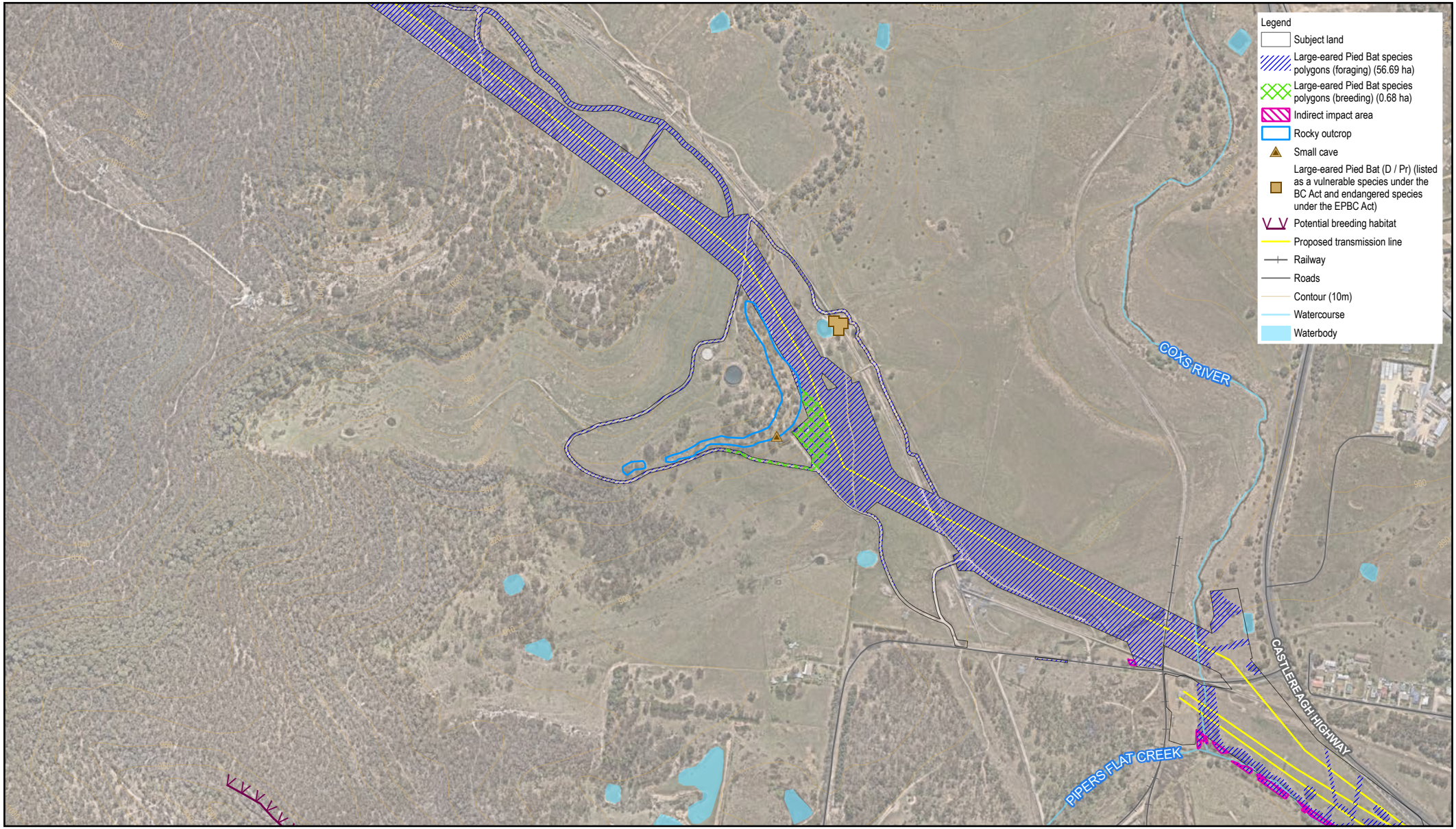
Large-eared Pied Bat species polygons

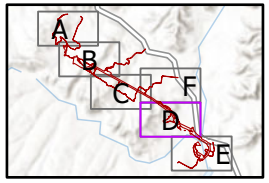
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.9C

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR013_SpeciesPoly_LargeEaredPiedBat
Print date: 17 Jul 2025 - 14:37

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

Large-eared Pied Bat species polygons

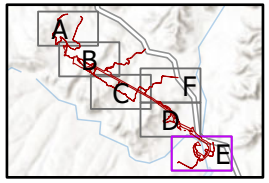
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.9D

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR013_SpeciesPoly_LargeEaredPiedBat
Print date: 17 Jul 2025 - 14:38

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

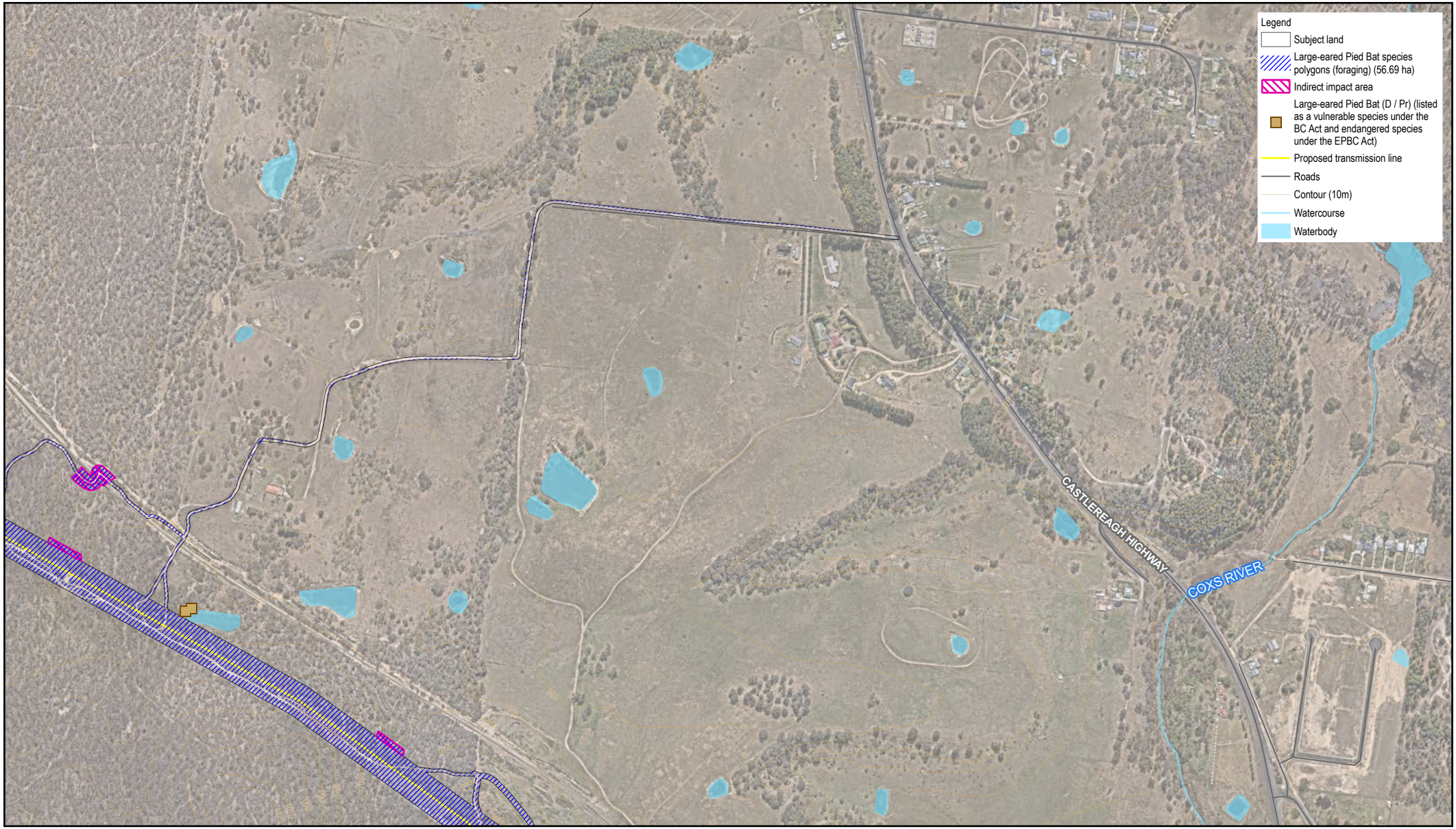
Large-eared Pied Bat species polygons

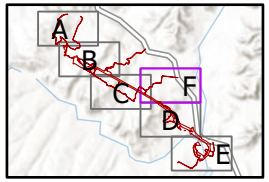
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.9E

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR013_SpeciesPoly_LargeEaredPiedBat
Print date: 17 Jul 2025 - 14:39

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Paper Size ISO A4

0 100 200 300

Metres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

GHD

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

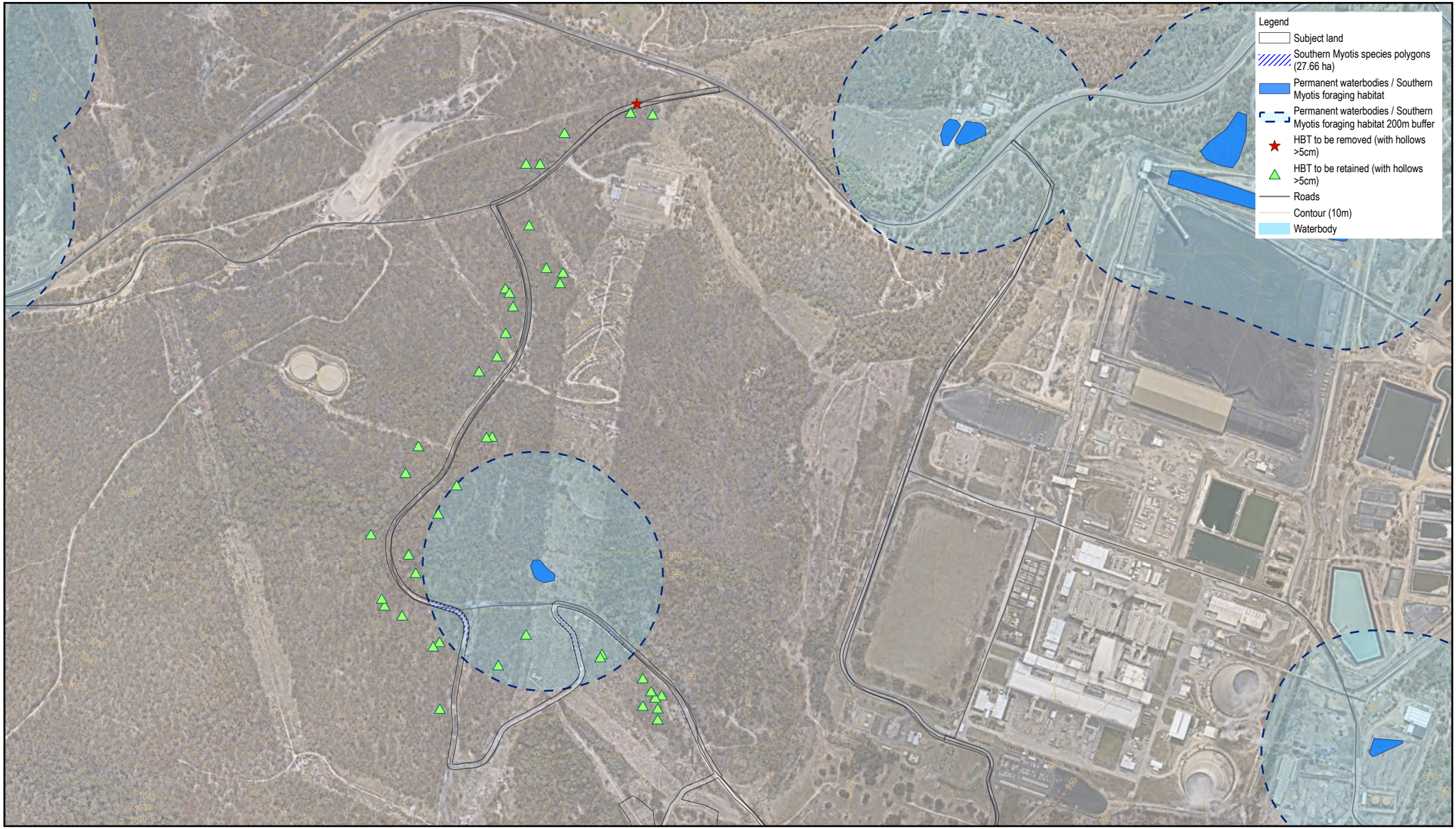
Large-eared Pied Bat species polygons

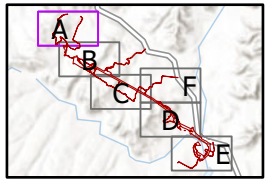
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.9F

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR013_SpeciesPoly_LargeEaredPiedBat
Print date: 17 Jul 2025 - 14:40

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

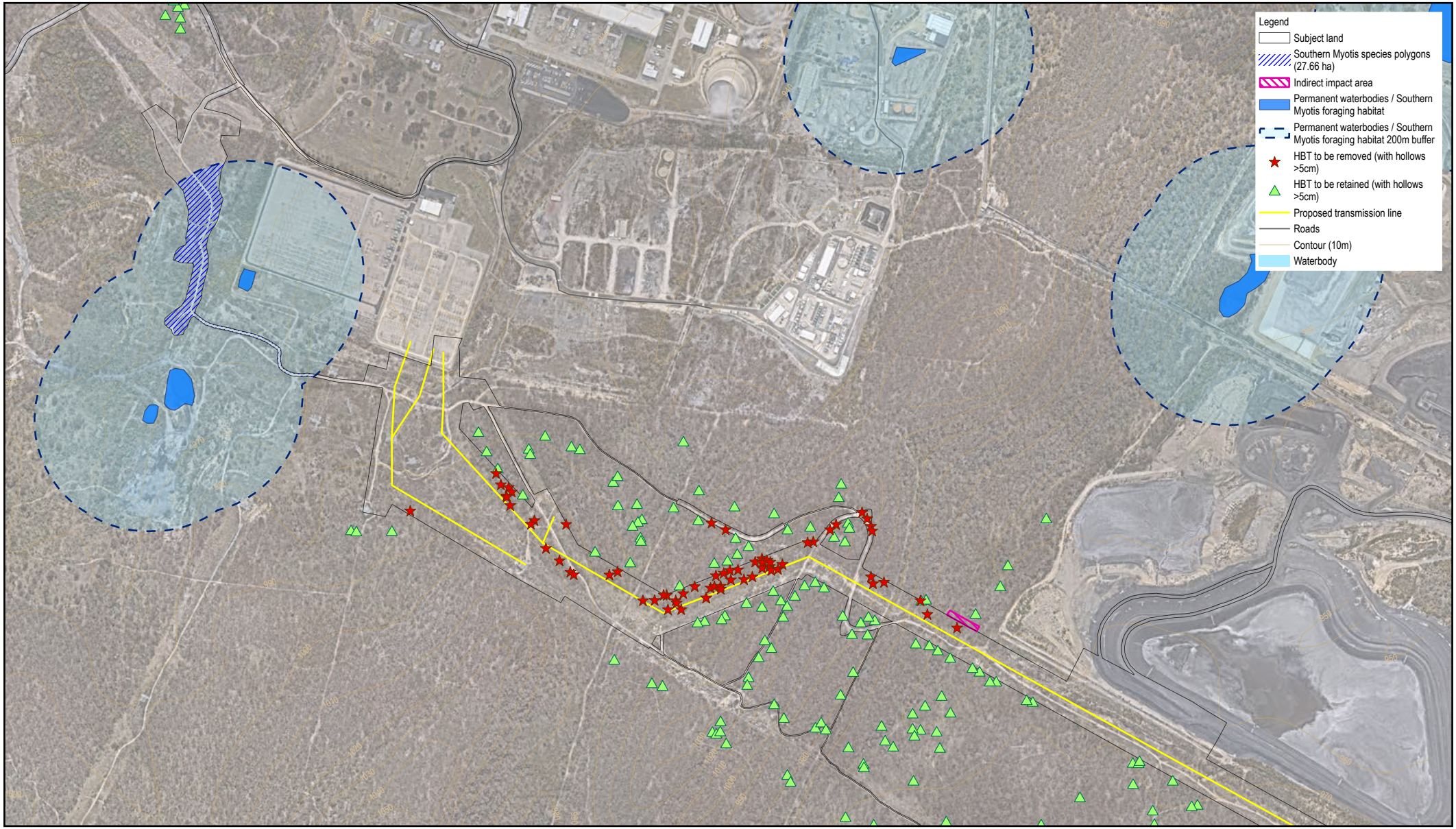
Southern Myotis species polygons

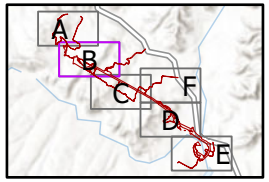
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.10A

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR011_SpeciesPoly_SouthernMyotis
Print date: 17 Jul 2025 - 13:13

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

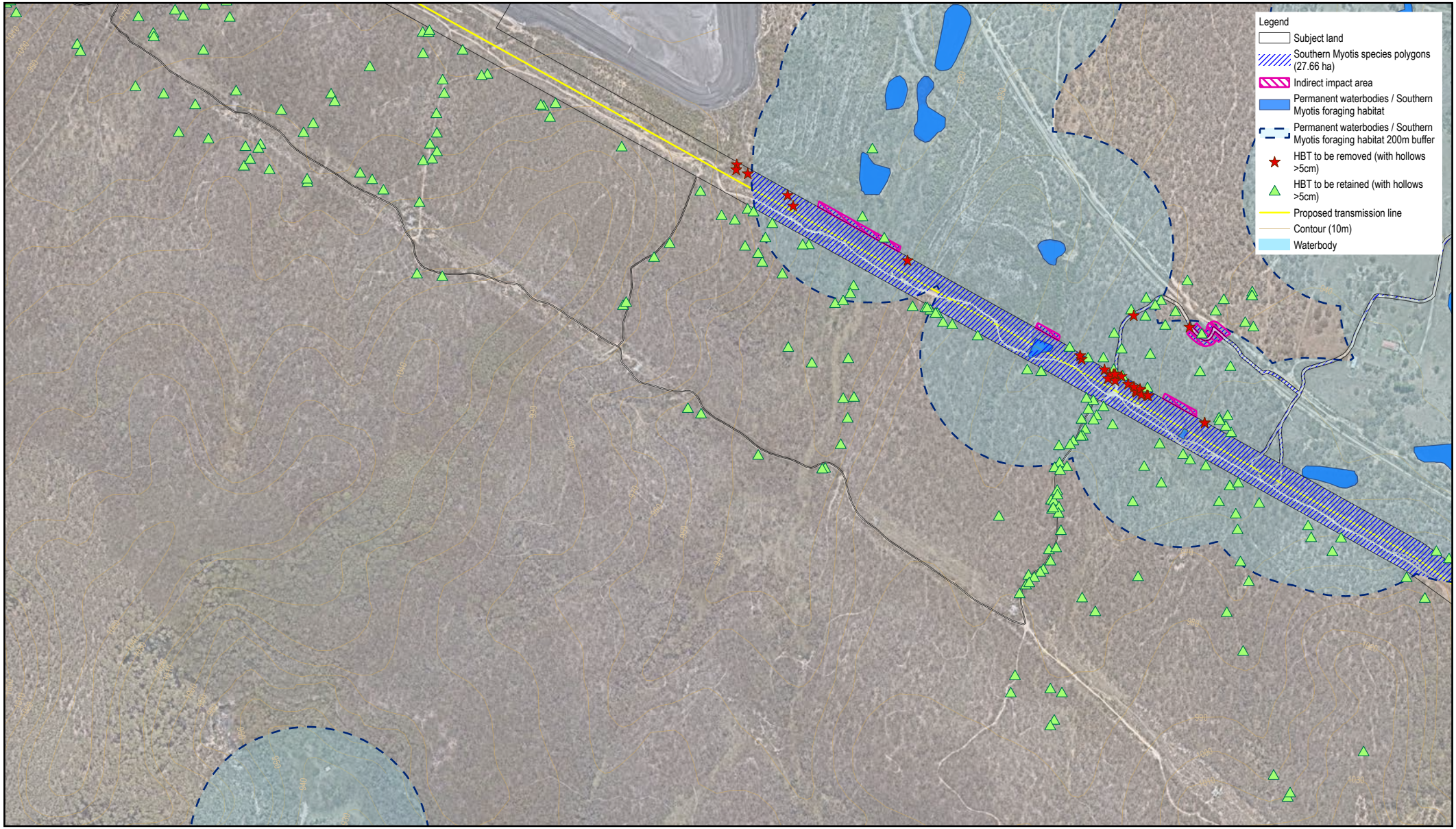
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

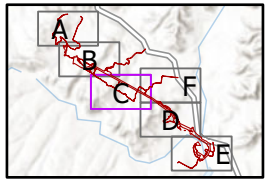
Southern Myotis species polygons

FIGURE 5.10B

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR011_SpeciesPoly_SouthernMyotis
Print date: 17 Jul 2025 - 13:13

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

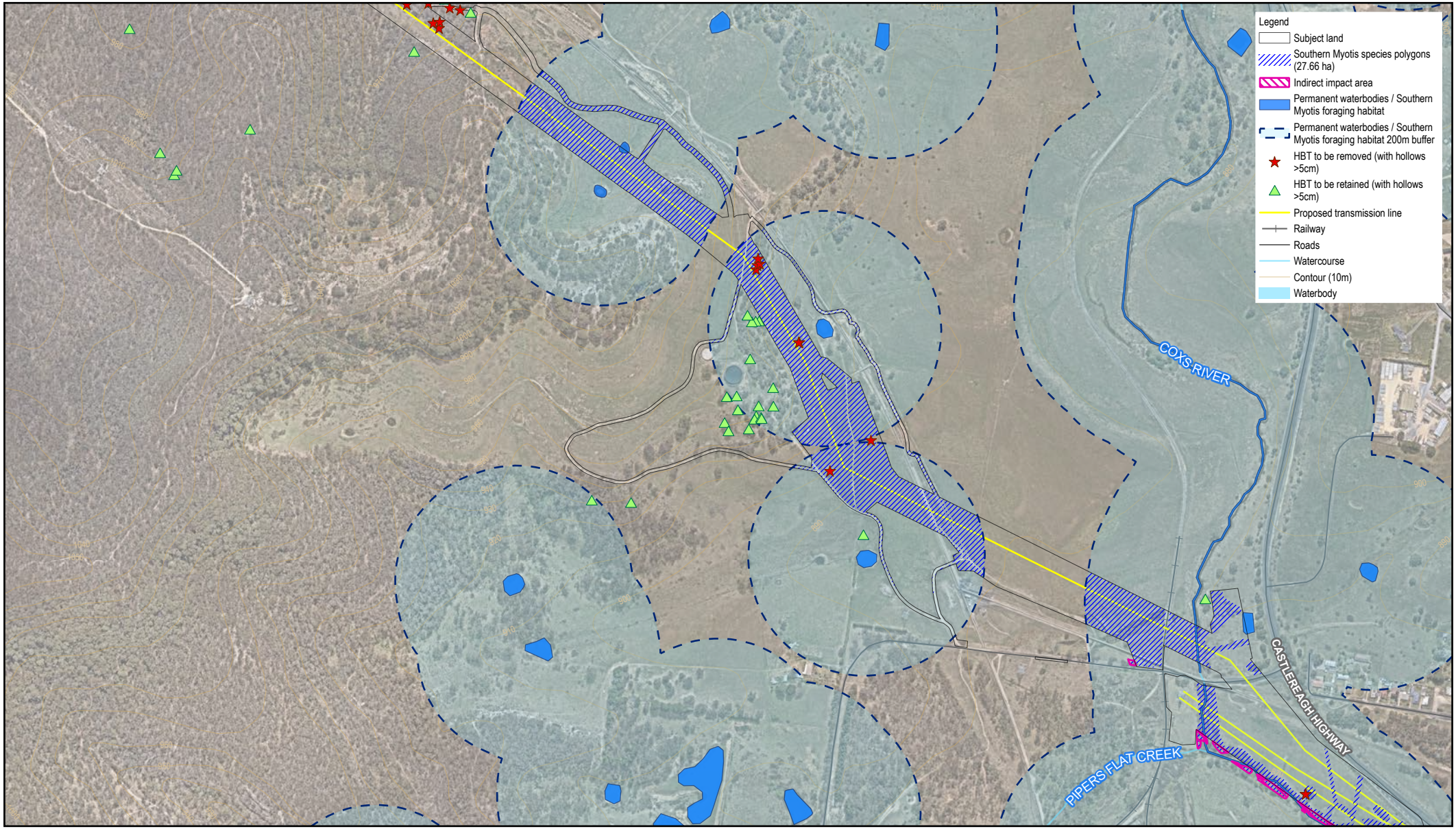
Southern Myotis species polygons

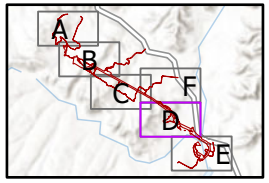
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.10C

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR011_SpeciesPoly_SouthernMyotis
Print date: 17 Jul 2025 - 13:14

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Paper Size ISO A4

0 100 200 300

Metres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

GHD

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

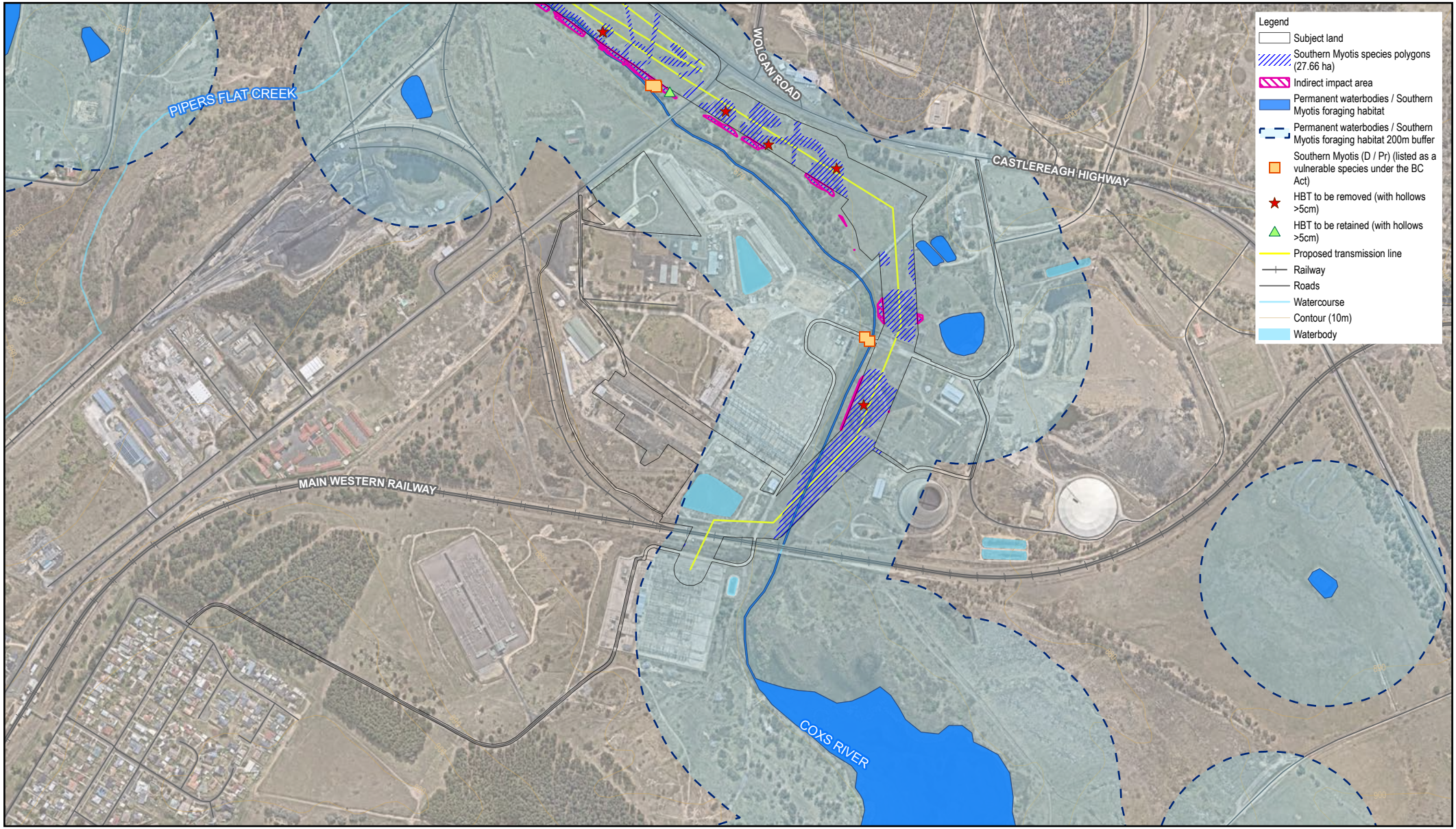
Southern Myotis species polygons

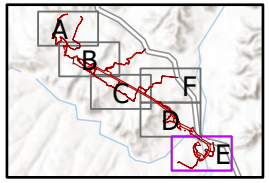
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.10D

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR011_SpeciesPoly_SouthernMyotis
Print date: 17 Jul 2025 - 13:15

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Paper Size ISO A4

0 100 200 300

Metres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

GHD

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

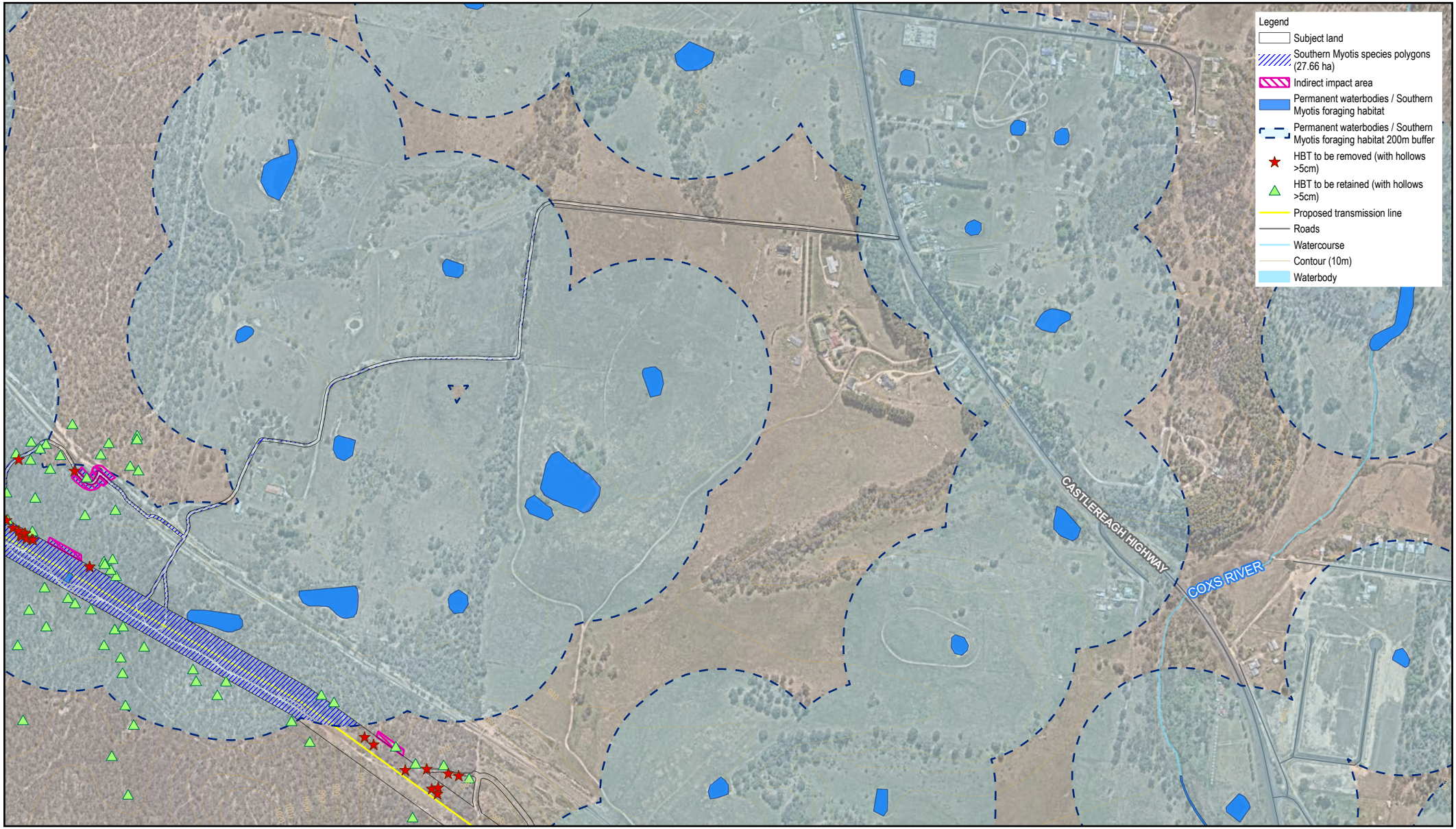
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

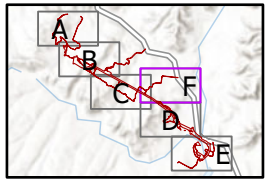
Southern Myotis species polygons

FIGURE 5.10E

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR011_SpeciesPoly_SouthernMyotis
Print date: 17 Jul 2025 - 13:15

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

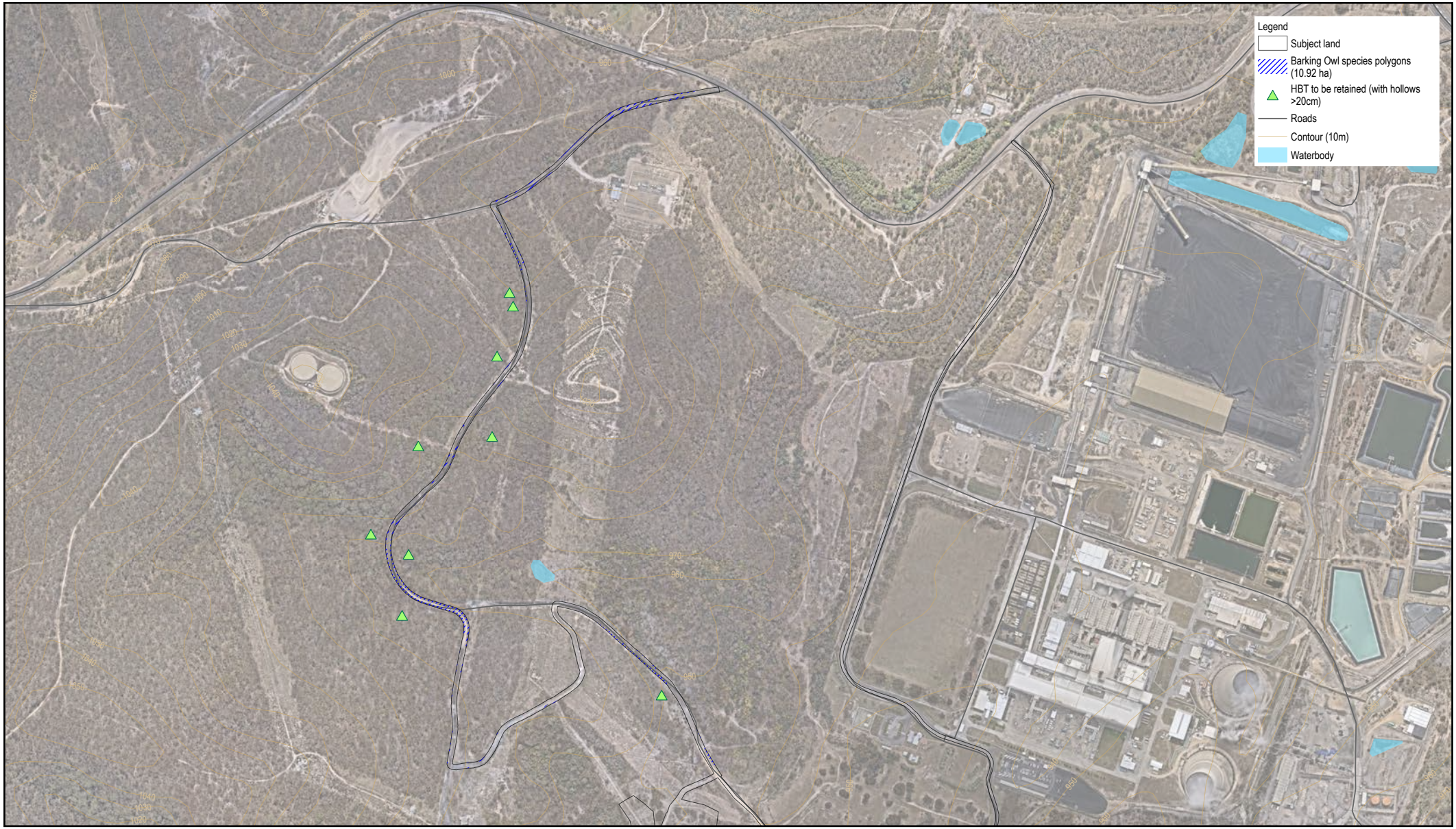
Southern Myotis species polygons

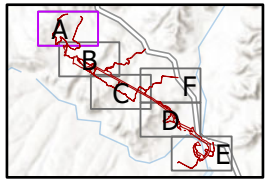
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.10F

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR011_SpeciesPoly_SouthernMyotis
Print date: 17 Jul 2025 - 13:16

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Paper Size ISO A4

0 100 200 300

Metres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

GHD

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

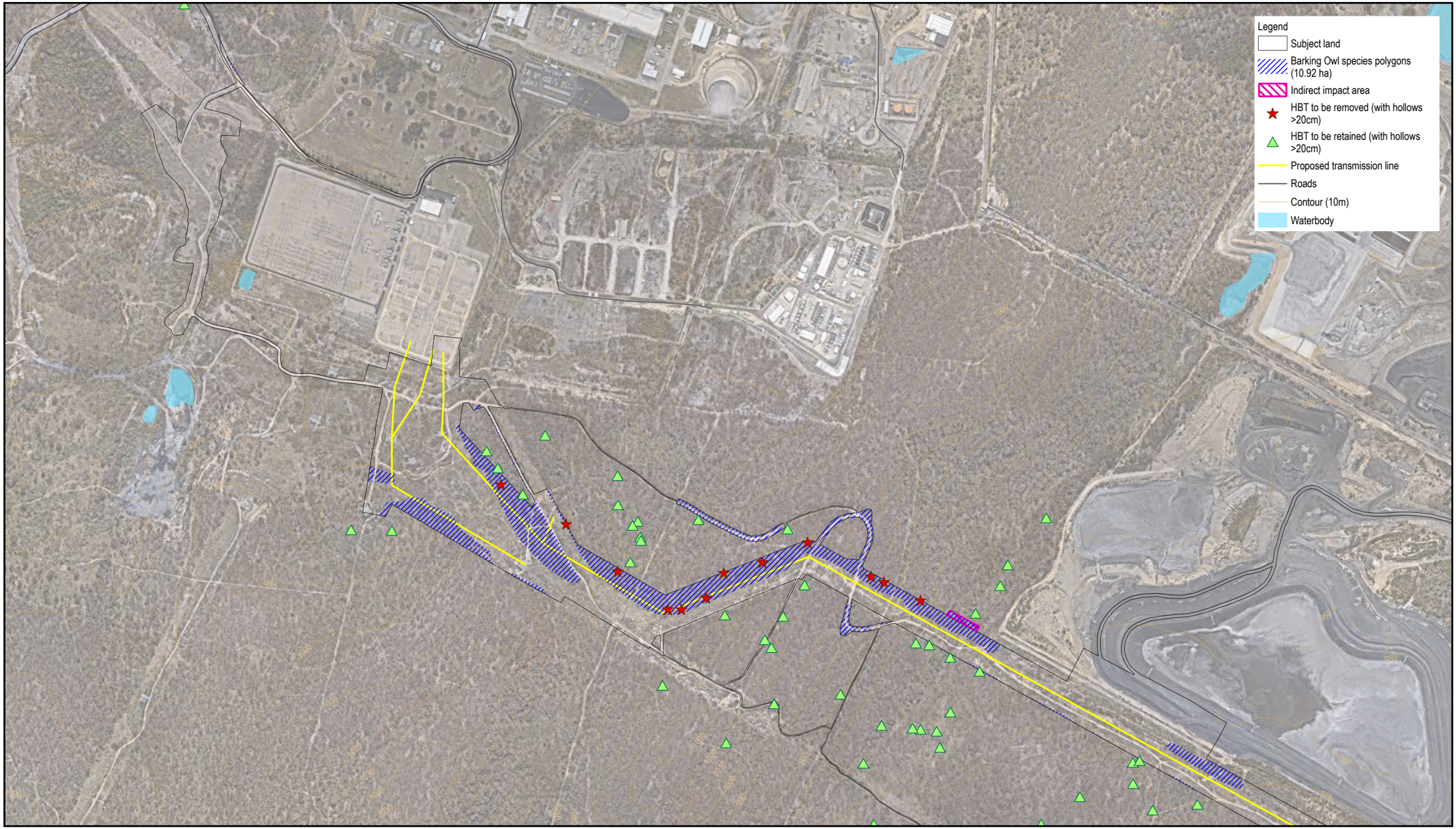
Barking Owl species polygons

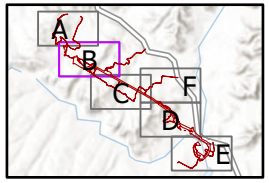
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.11A

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR010_SpeciesPoly_BarkingOwl
Print date: 17 Jul 2025 - 12:41

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Paper Size ISO A4

0 100 200 300

Metres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

GHD

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

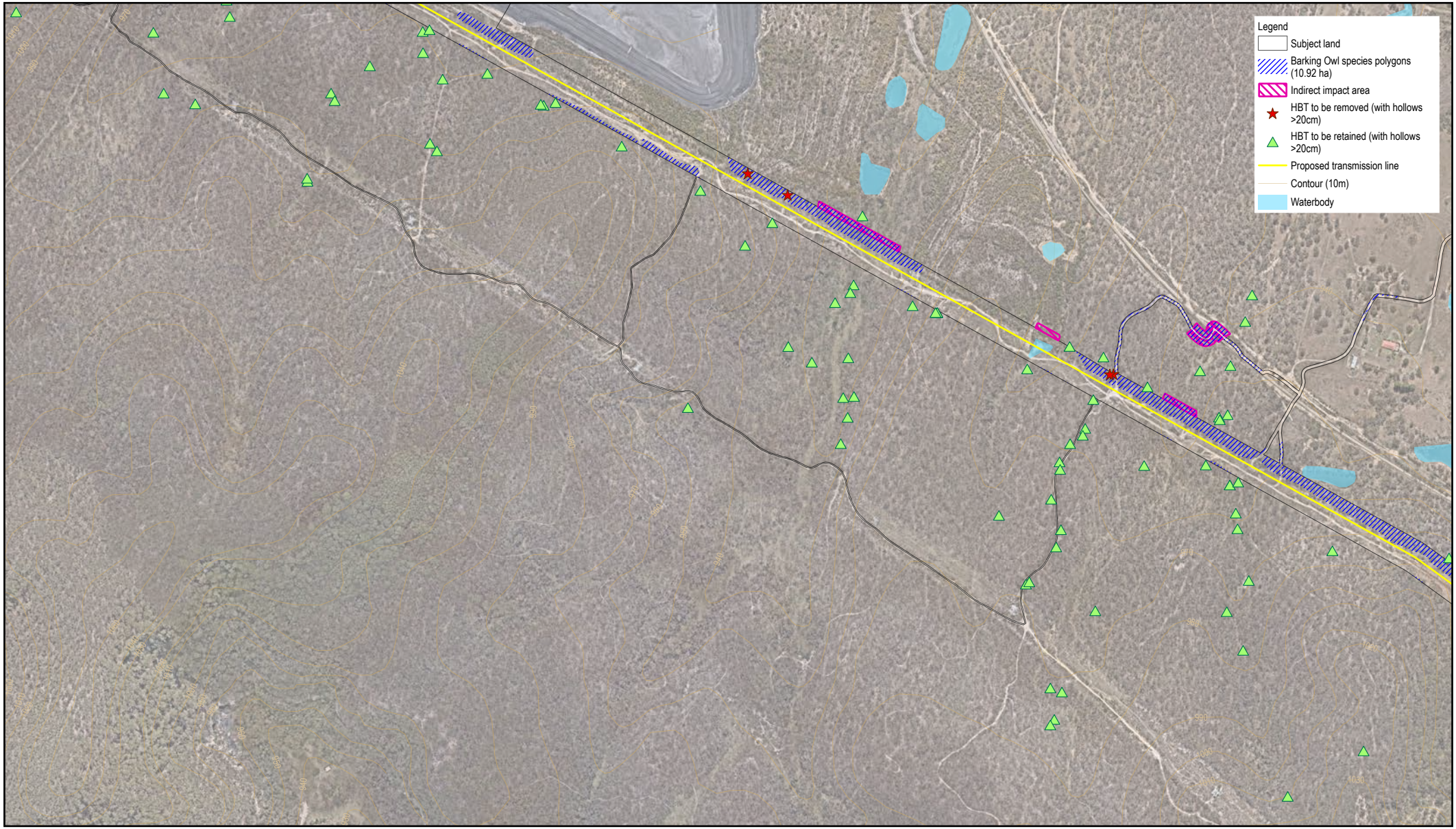
Barking Owl species polygons

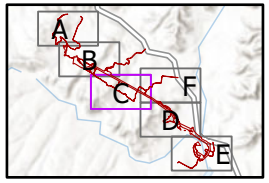
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.11B

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR010_SpeciesPoly_BarkingOwl
Print date: 17 Jul 2025 - 12:41

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Paper Size ISO A4

0 100 200 300

Metres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

GHD

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

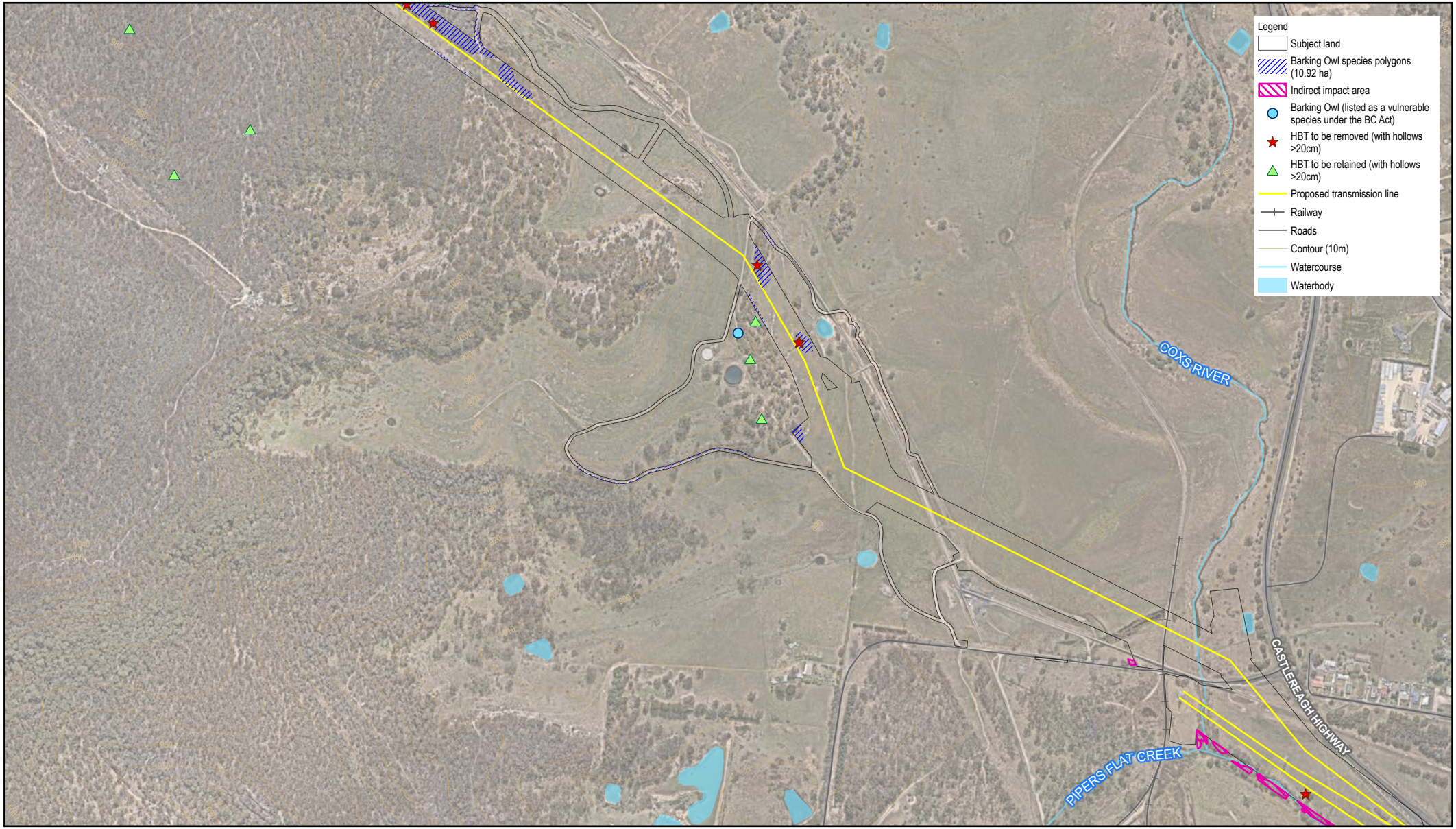
Barking Owl species polygons

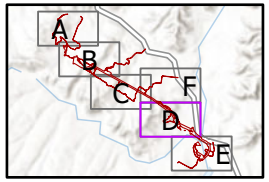
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.11C

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR010_SpeciesPoly_BarkingOwl
Print date: 17 Jul 2025 - 12:41

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Paper Size ISO A4

0 100 200 300

Metres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

GHD

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

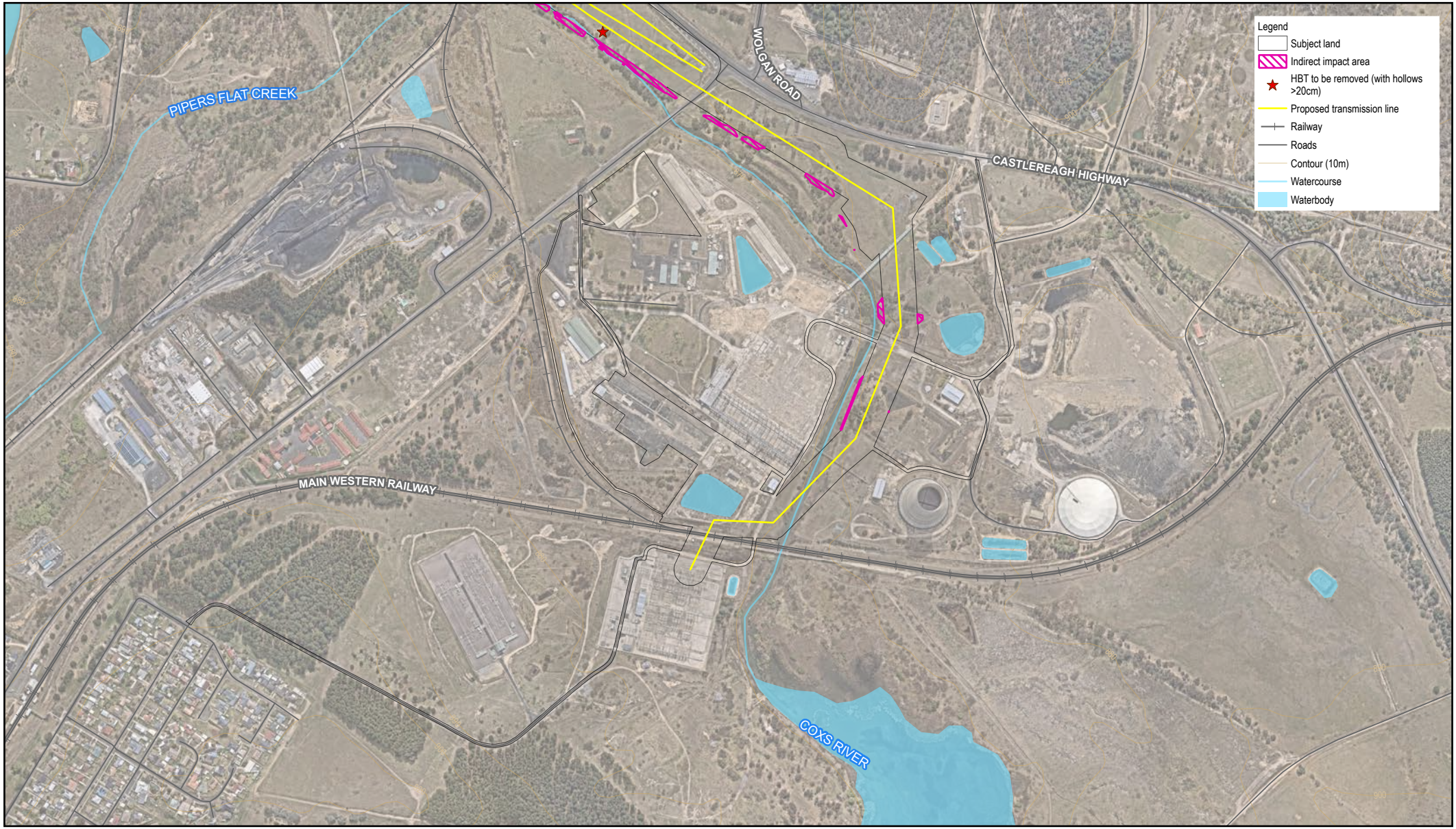
Barking Owl species polygons

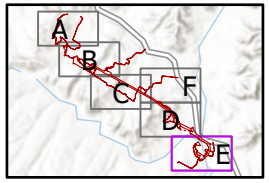
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.11D

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR010_SpeciesPoly_BarkingOwl
Print date: 17 Jul 2025 - 12:42

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Paper Size ISO A4

0 100 200 300

Metres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

GHD

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

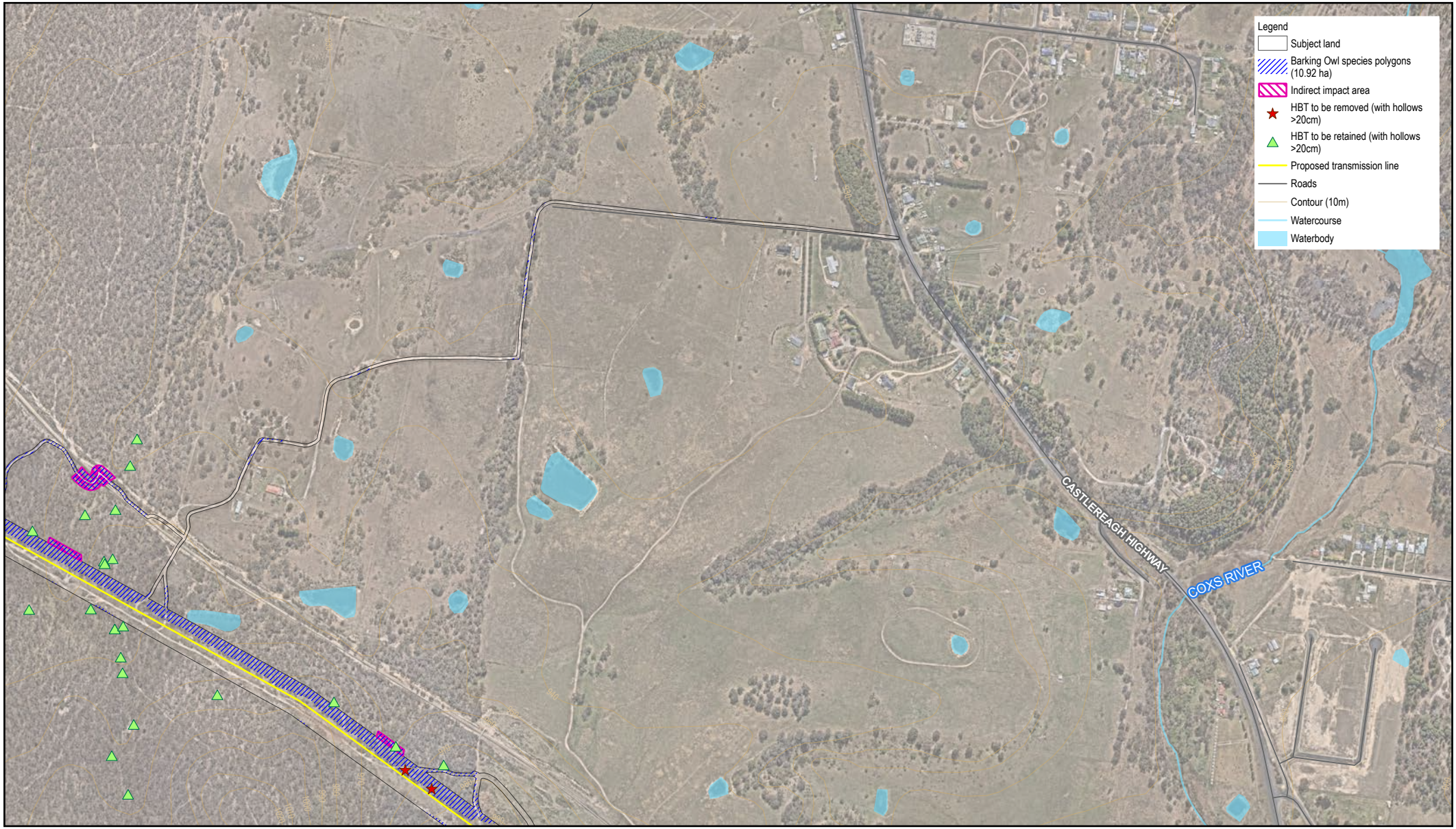
Barking Owl species polygons

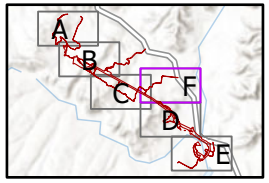
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.11E

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR010_SpeciesPoly_BarkingOwl
Print date: 17 Jul 2025 - 12:43

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Paper Size ISO A4

0 100 200 300

Metres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

GHD

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

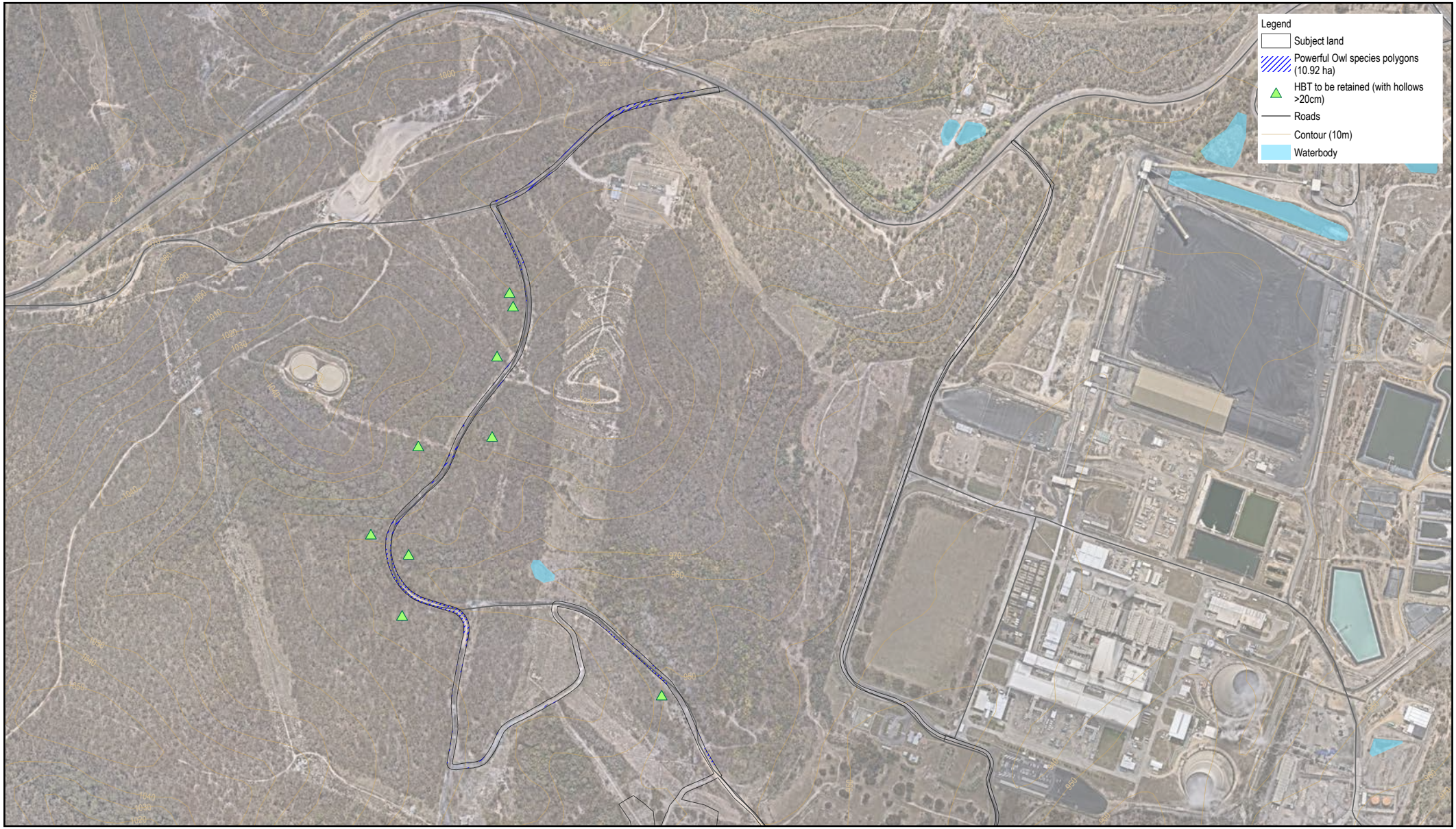
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

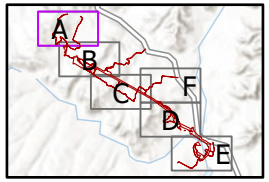
Barking Owl species polygons

FIGURE 5.11F

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR010_SpeciesPoly_BarkingOwl
Print date: 17 Jul 2025 - 12:43

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

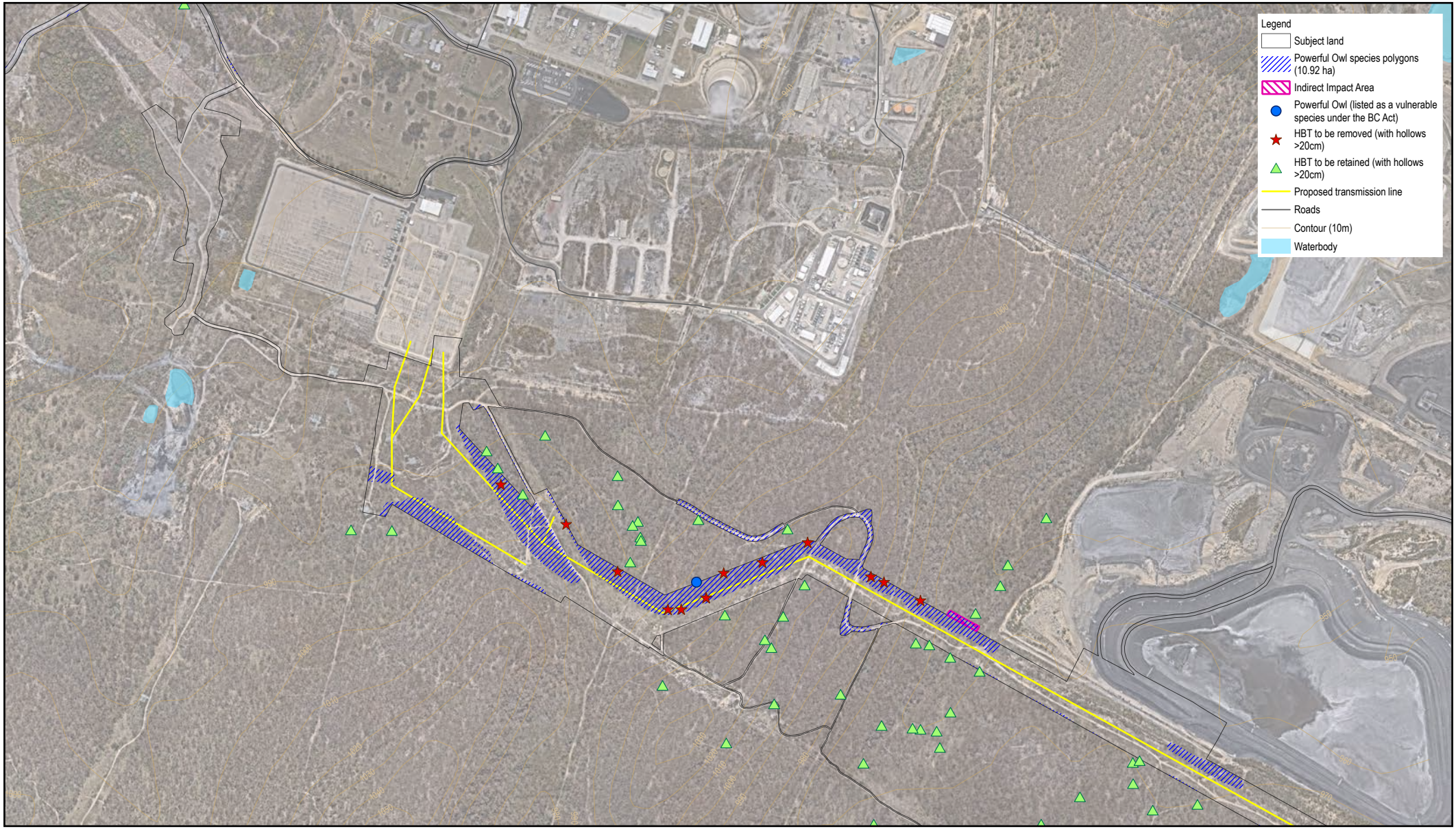
Powerful Owl species polygons

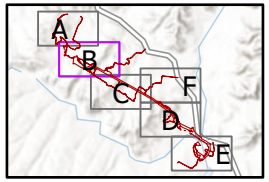
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.12A

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR012_SpeciesPoly_PowerfulOwl
Print date: 17 Jul 2025 - 13:18

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Paper Size ISO A4

0 100 200 300

Metres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

GHD

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

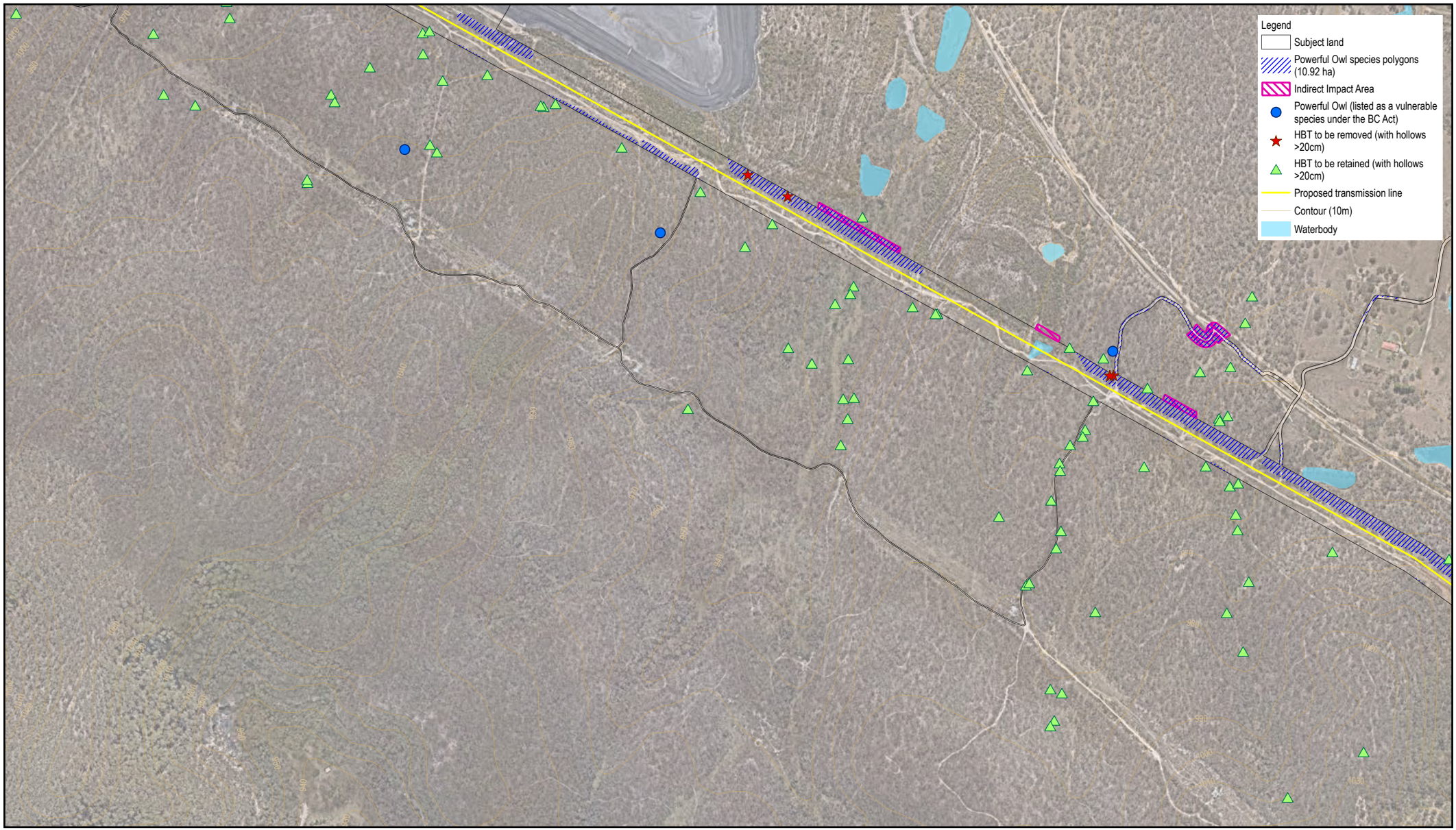
Powerful Owl species polygons

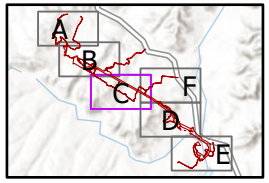
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.12B

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR012_SpeciesPoly_PowerfulOwl
Print date: 17 Jul 2025 - 13:18

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Paper Size ISO A4

0 100 200 300

Metres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

GHD

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

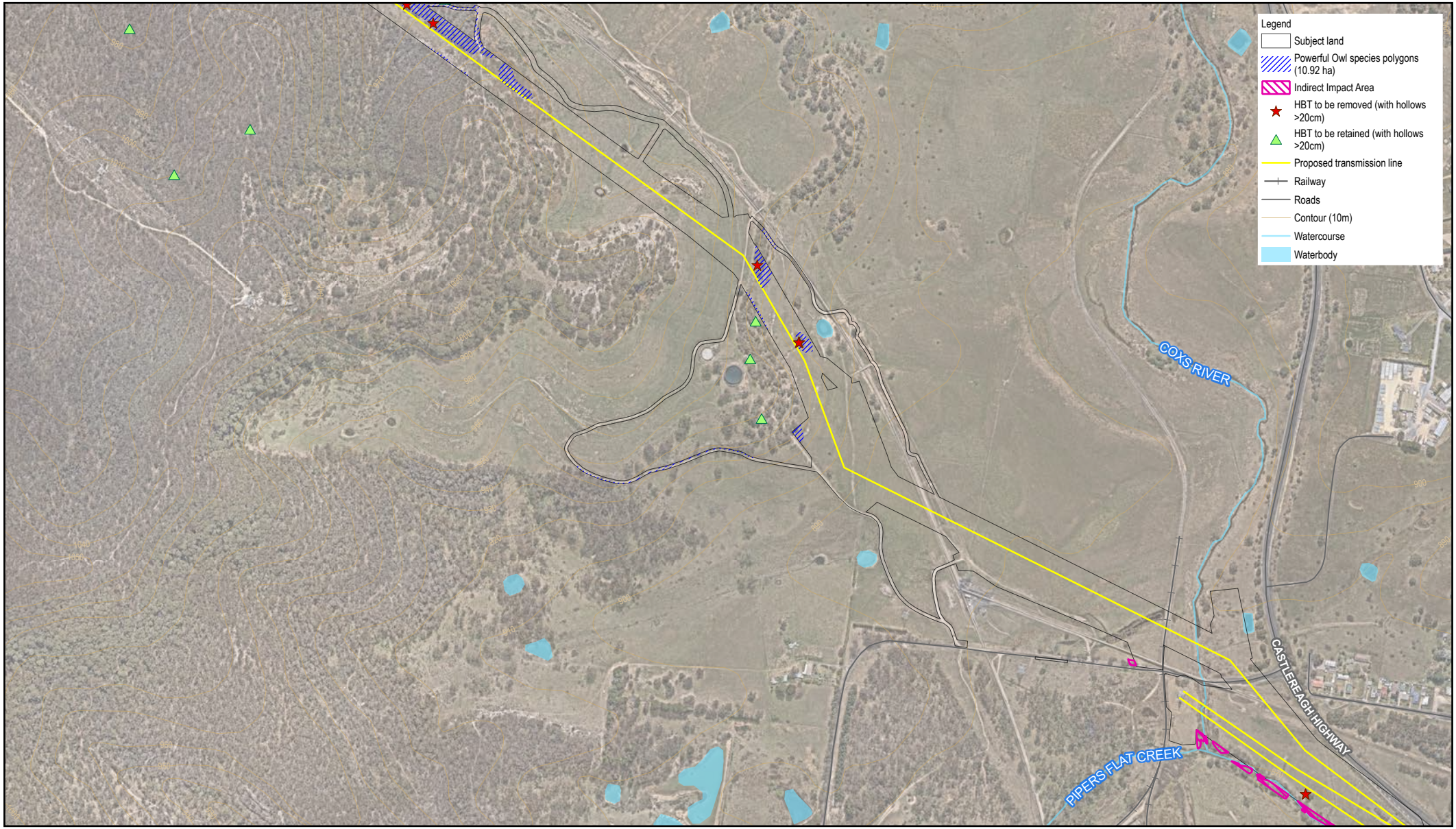
Powerful Owl species polygons

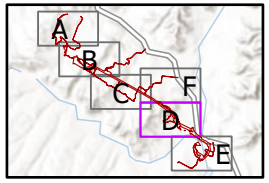
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.12C

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR012_SpeciesPoly_PowerfulOwl
Print date: 17 Jul 2025 - 13:19

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

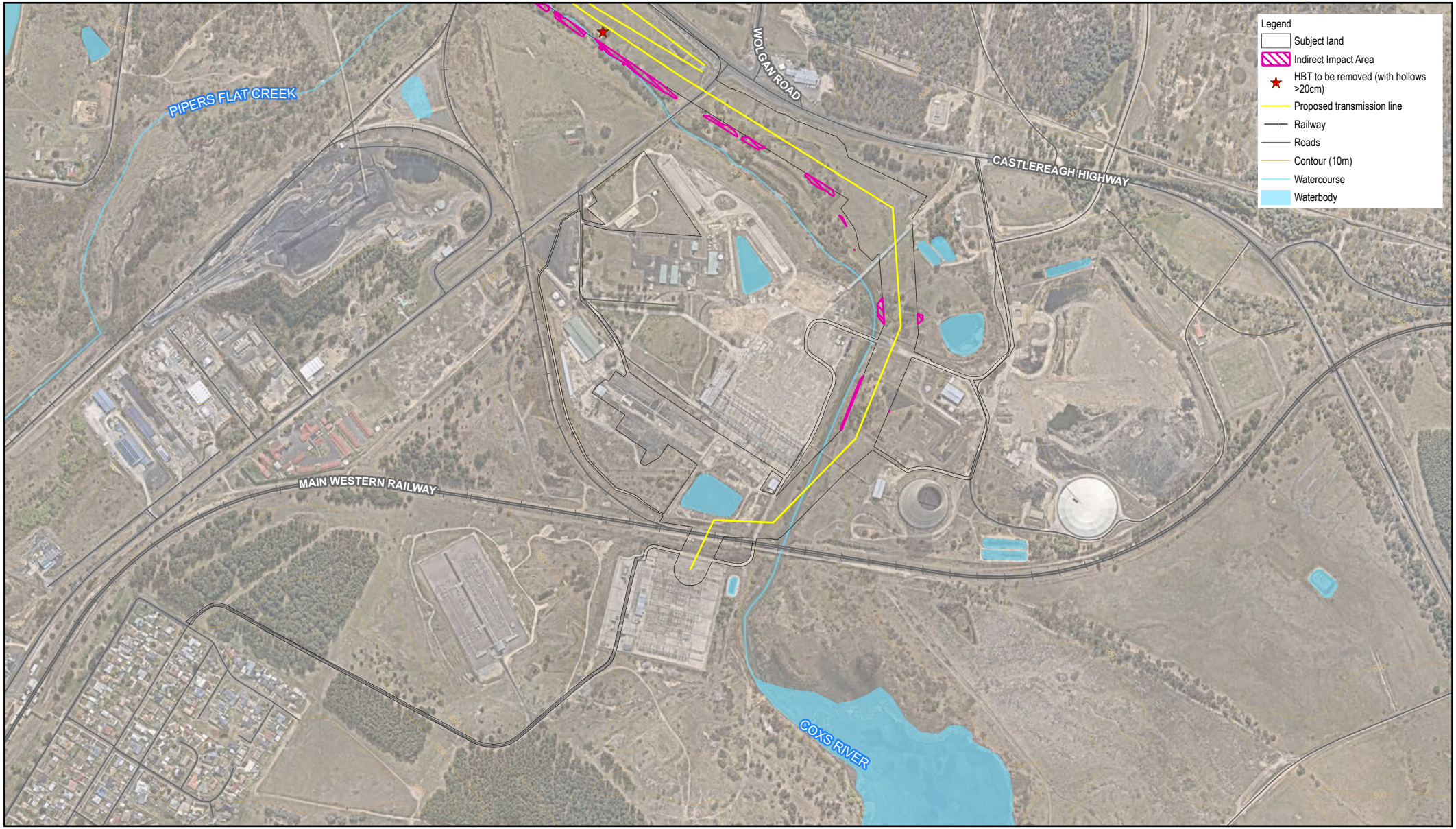
Powerful Owl species polygons

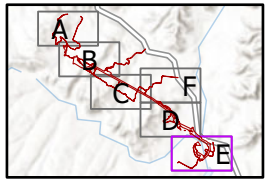
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.12D

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR012_SpeciesPoly_PowerfulOwl
Print date: 17 Jul 2025 - 13:19

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

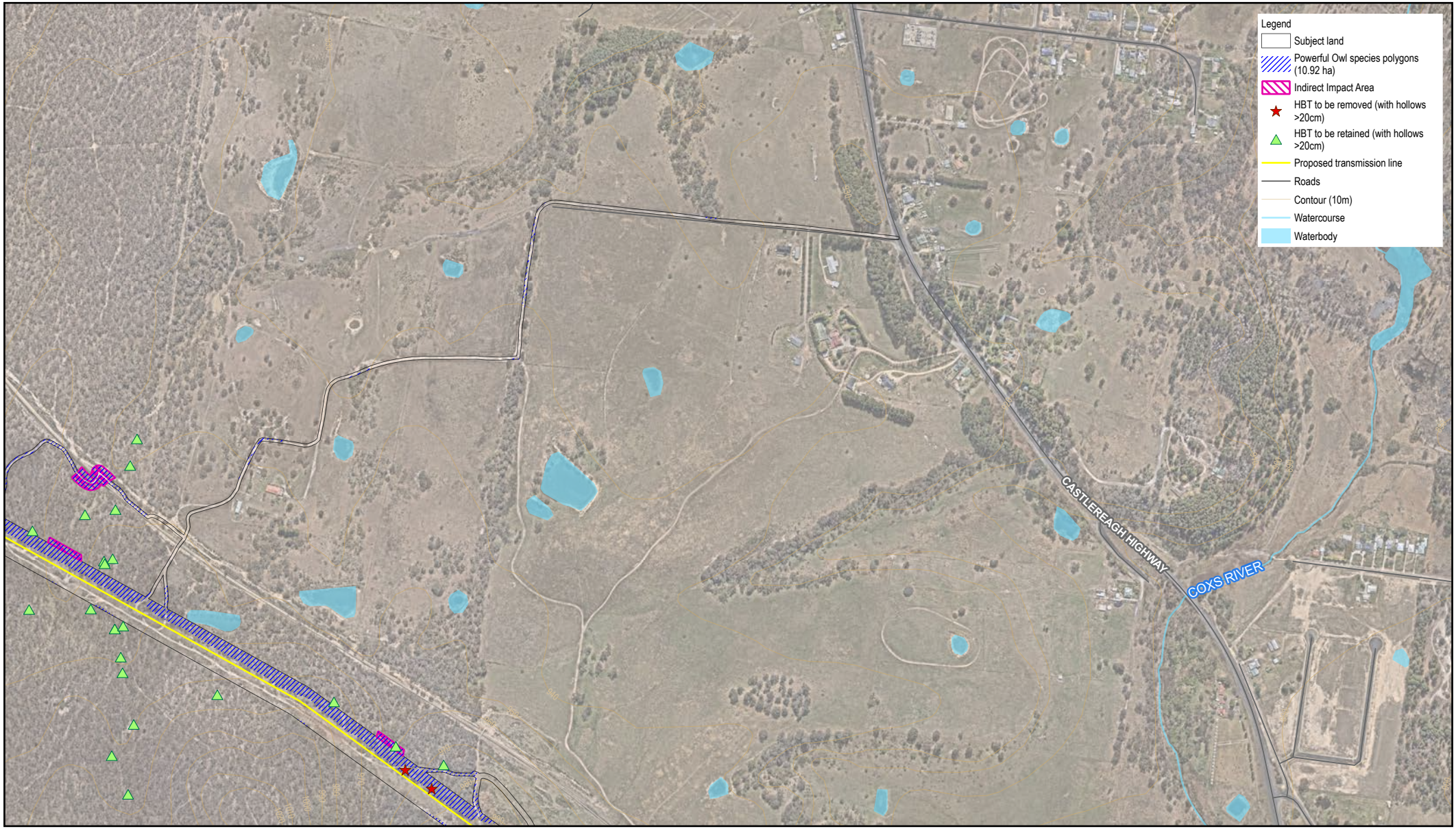
Powerful Owl species polygons

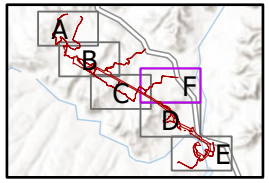
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.12E

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR012_SpeciesPoly_PowerfulOwl
Print date: 17 Jul 2025 - 13:20

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Paper Size ISO A4

0 100 200 300

Metres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

GHD

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

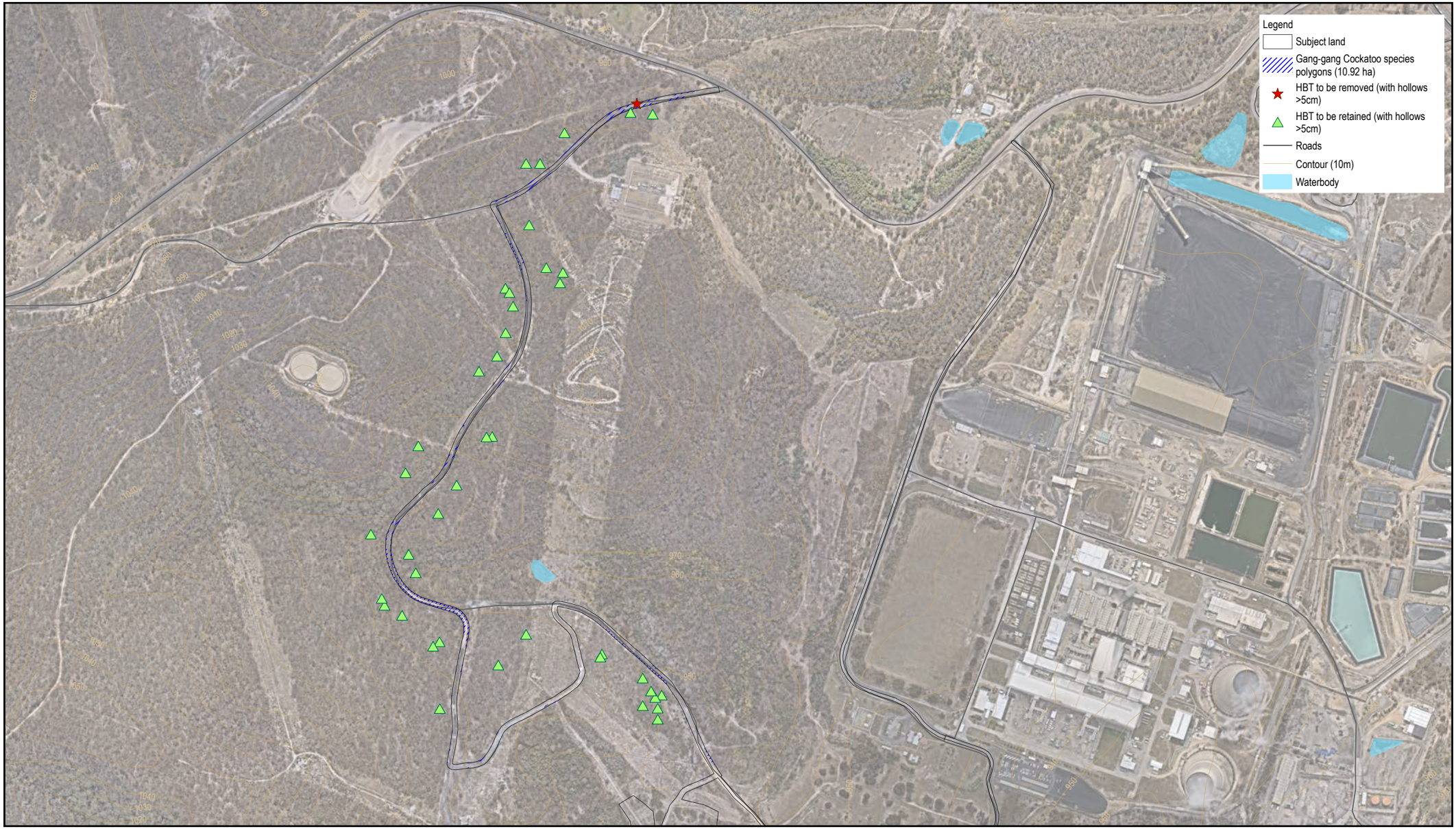
Powerful Owl species polygons

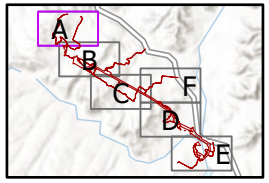
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.12F

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR012_SpeciesPoly_PowerfulOwl
Print date: 17 Jul 2025 - 13:21

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

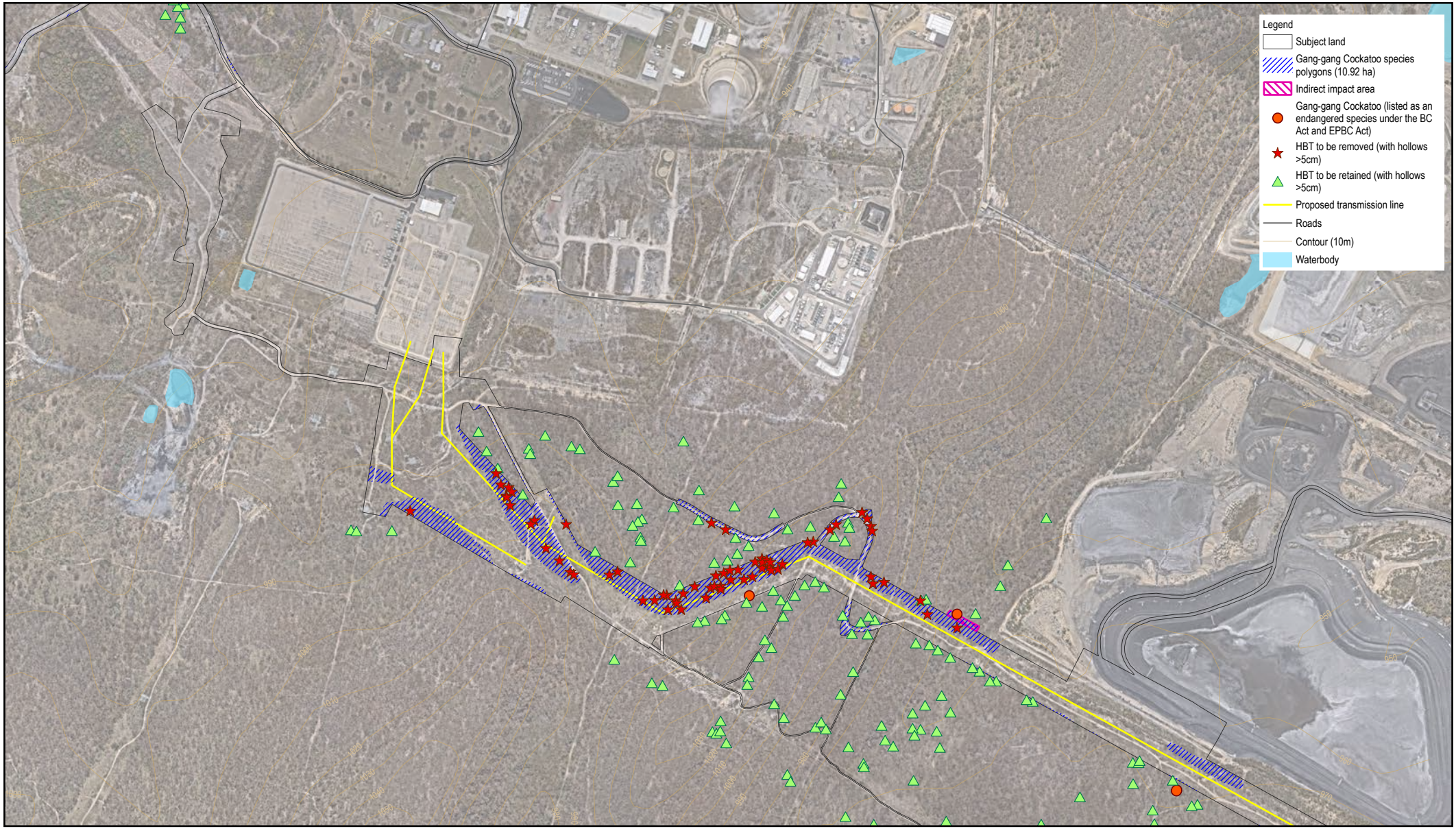
Gang-gang Cockatoo species polygons

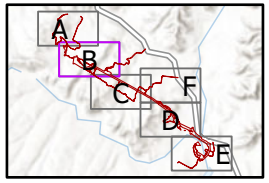
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.13A

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR019_SpeciesPoly_GangCockatoo
Print date: 17 Jul 2025 - 13:32

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

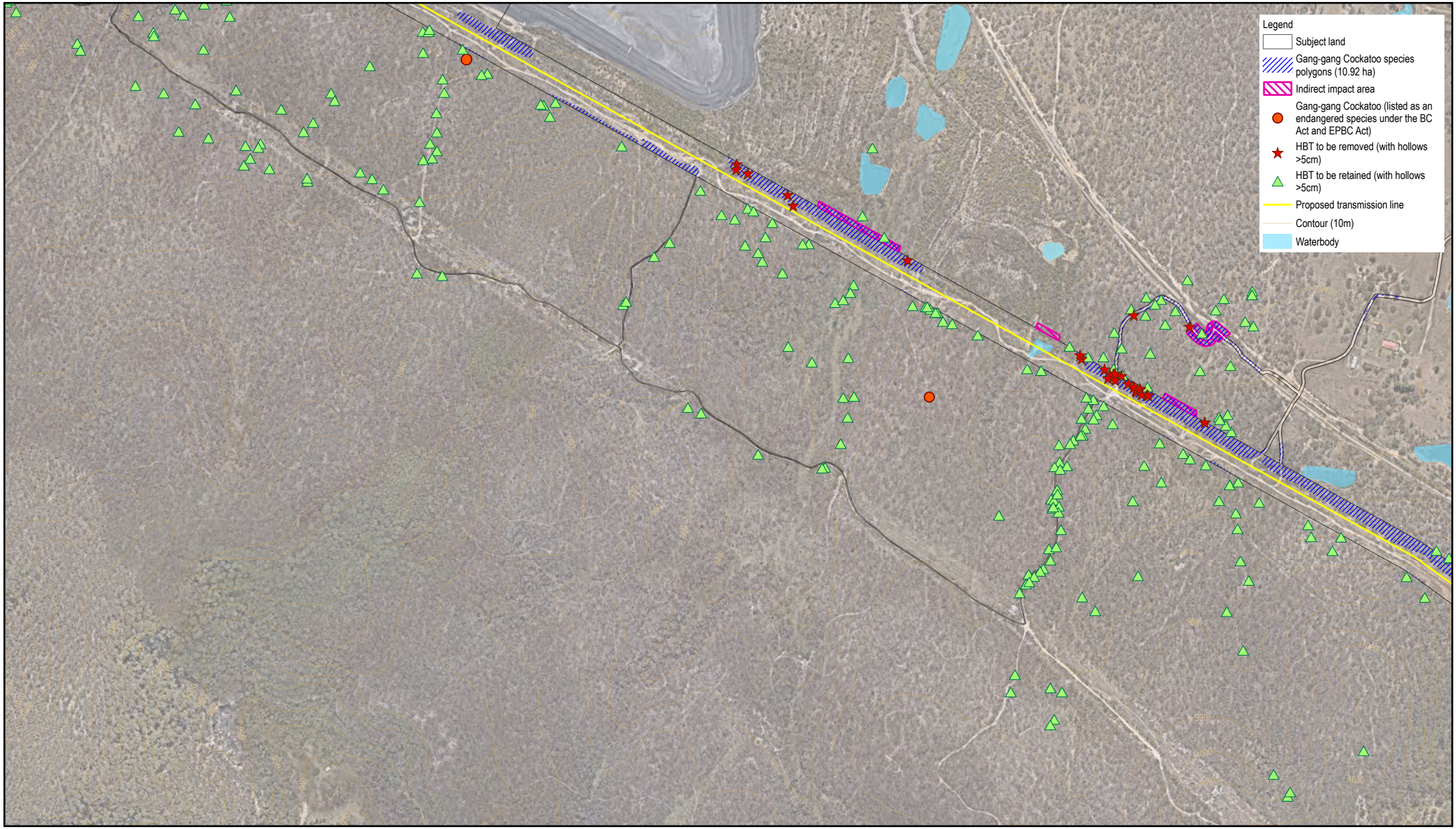
Gang-gang Cockatoo species polygons

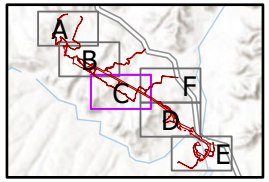
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.13B

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR019_SpeciesPoly_GangCockatoo
Print date: 17 Jul 2025 - 13:32

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Paper Size ISO A4

0 100 200 300

Metres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

GHD

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

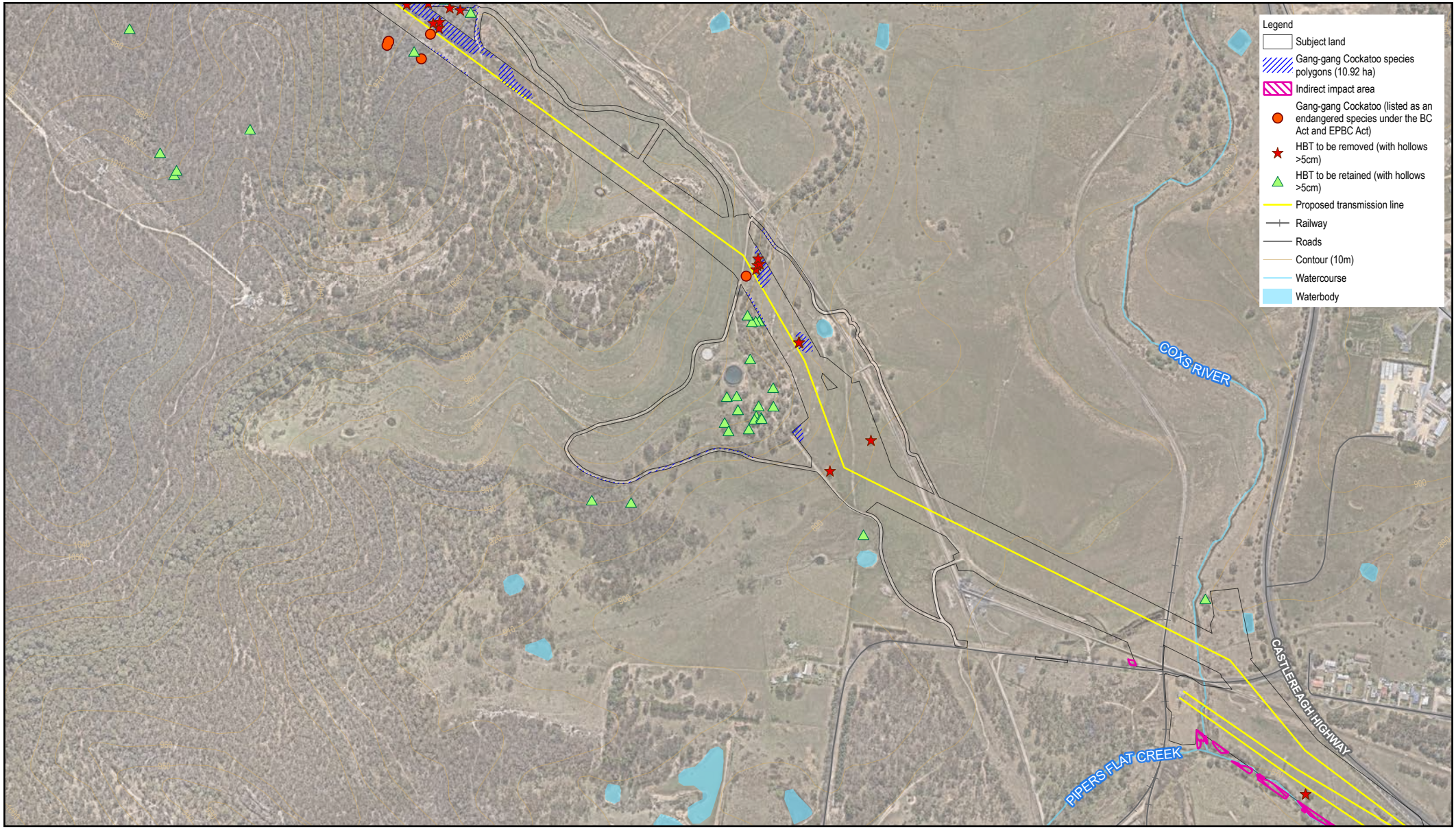
Gang-gang Cockatoo species polygons

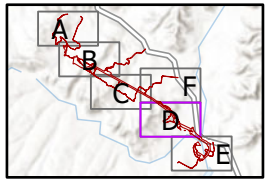
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.13C

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR019_SpeciesPoly_GangCockatoo
Print date: 17 Jul 2025 - 13:33

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Paper Size ISO A4

0 100 200 300

Metres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

GHD

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

Gang-gang Cockatoo species polygons

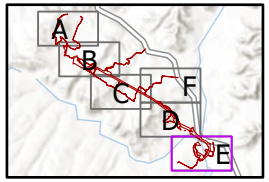
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.13D

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR019_SpeciesPoly_GangCockatoo
Print date: 17 Jul 2025 - 13:34

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

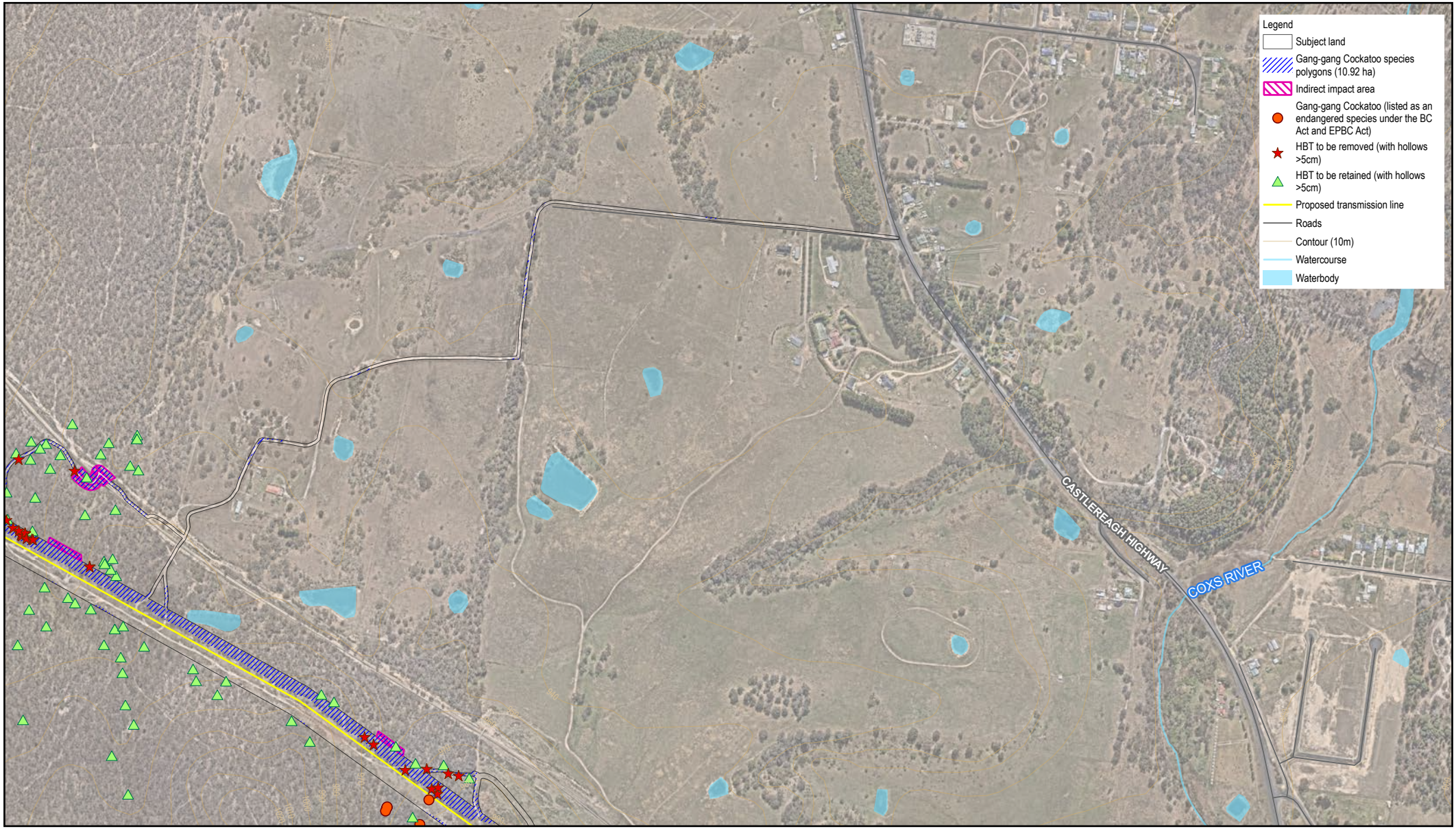
Gang-gang Cockatoo species polygons

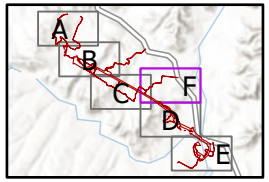
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.13E

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR019_SpeciesPoly_GangCockatoo
Print date: 17 Jul 2025 - 13:35

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Paper Size ISO A4

0 100 200 300

Metres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

GHD

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

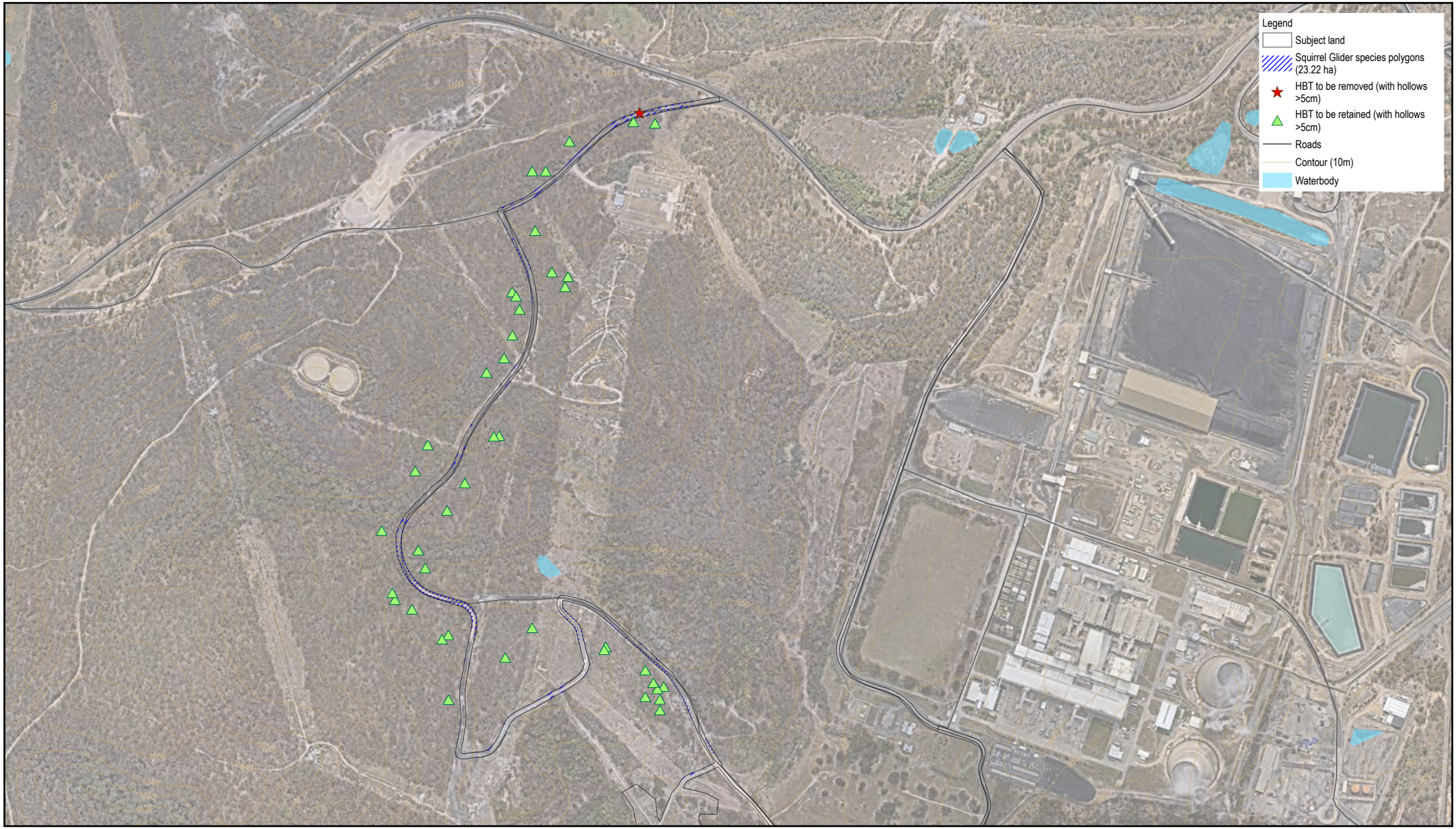
Gang-gang Cockatoo species polygons

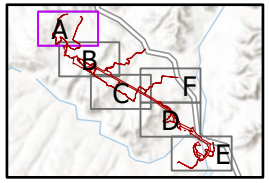
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.13F

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR019_SpeciesPoly_GangCockatoo
Print date: 17 Jul 2025 - 13:35

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

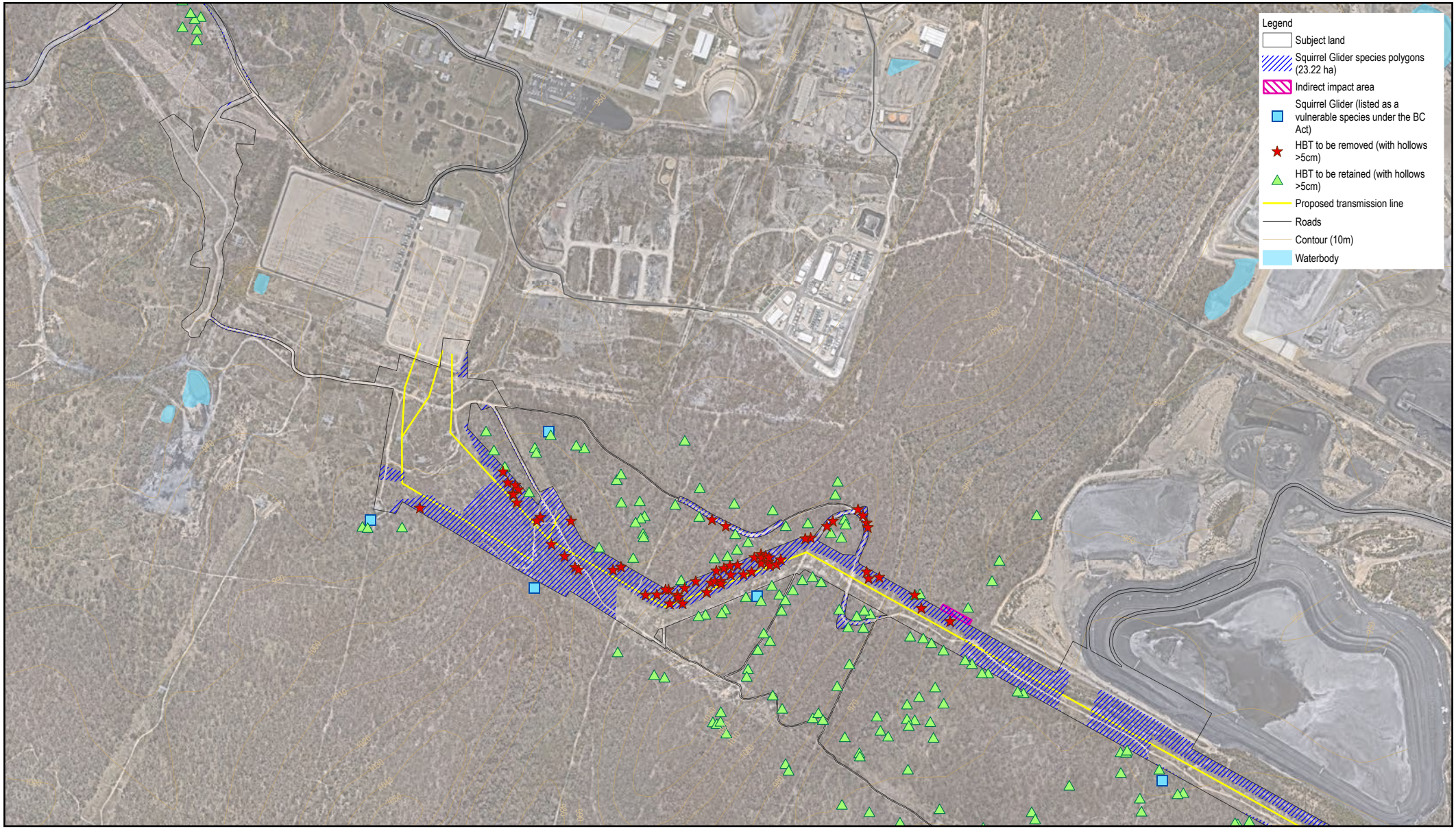
Squirrel Glider species polygons

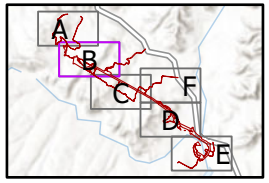
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.14A

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR018_SpeciesPoly_SquirrelGlider
Print date: 17 Jul 2025 - 13:22

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

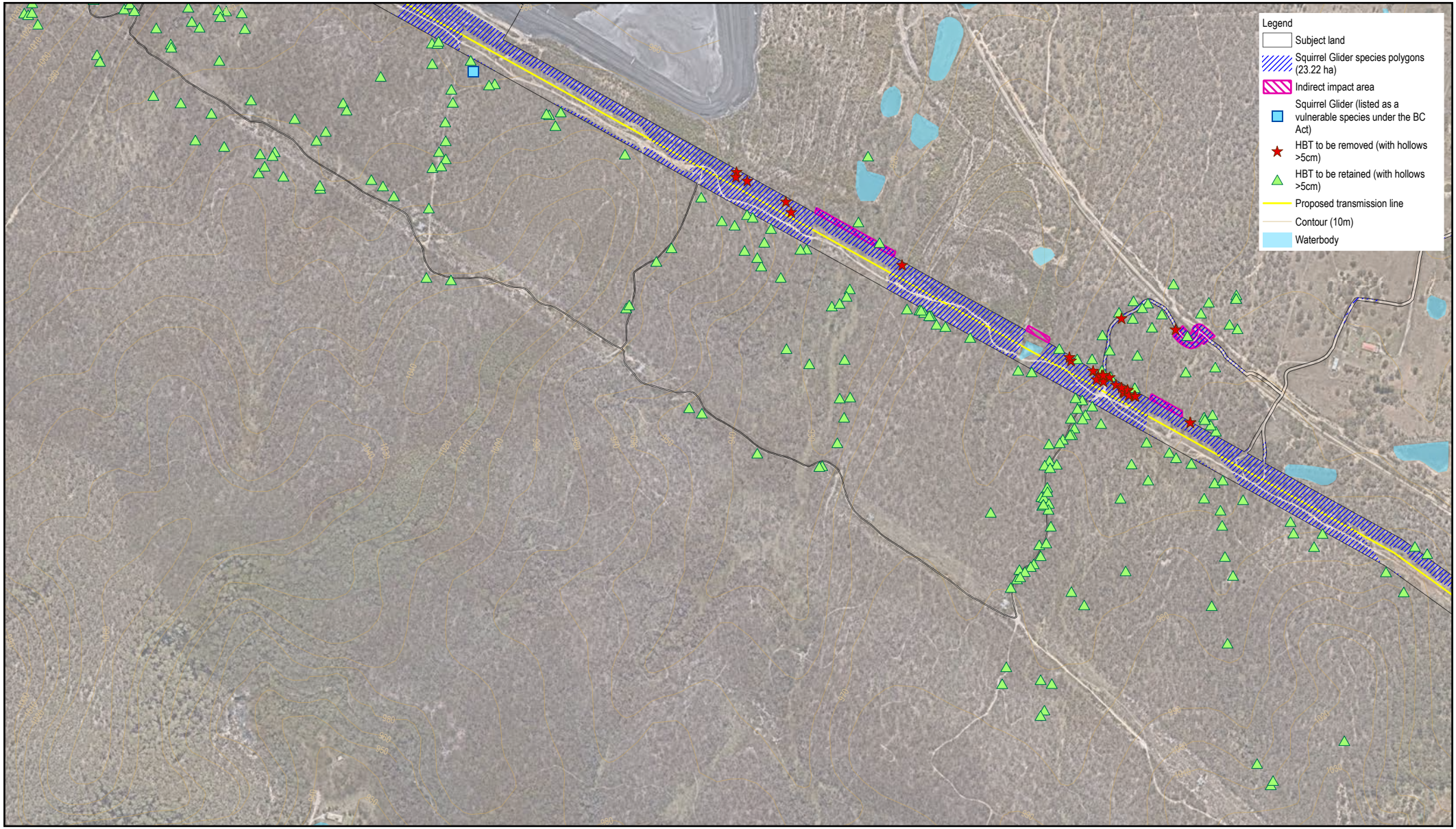
Squirrel Glider species polygons

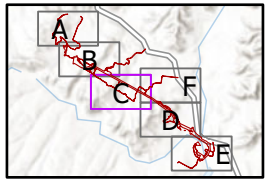
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.14B

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR018_SpeciesPoly_SquirrelGlider
Print date: 17 Jul 2025 - 13:23

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

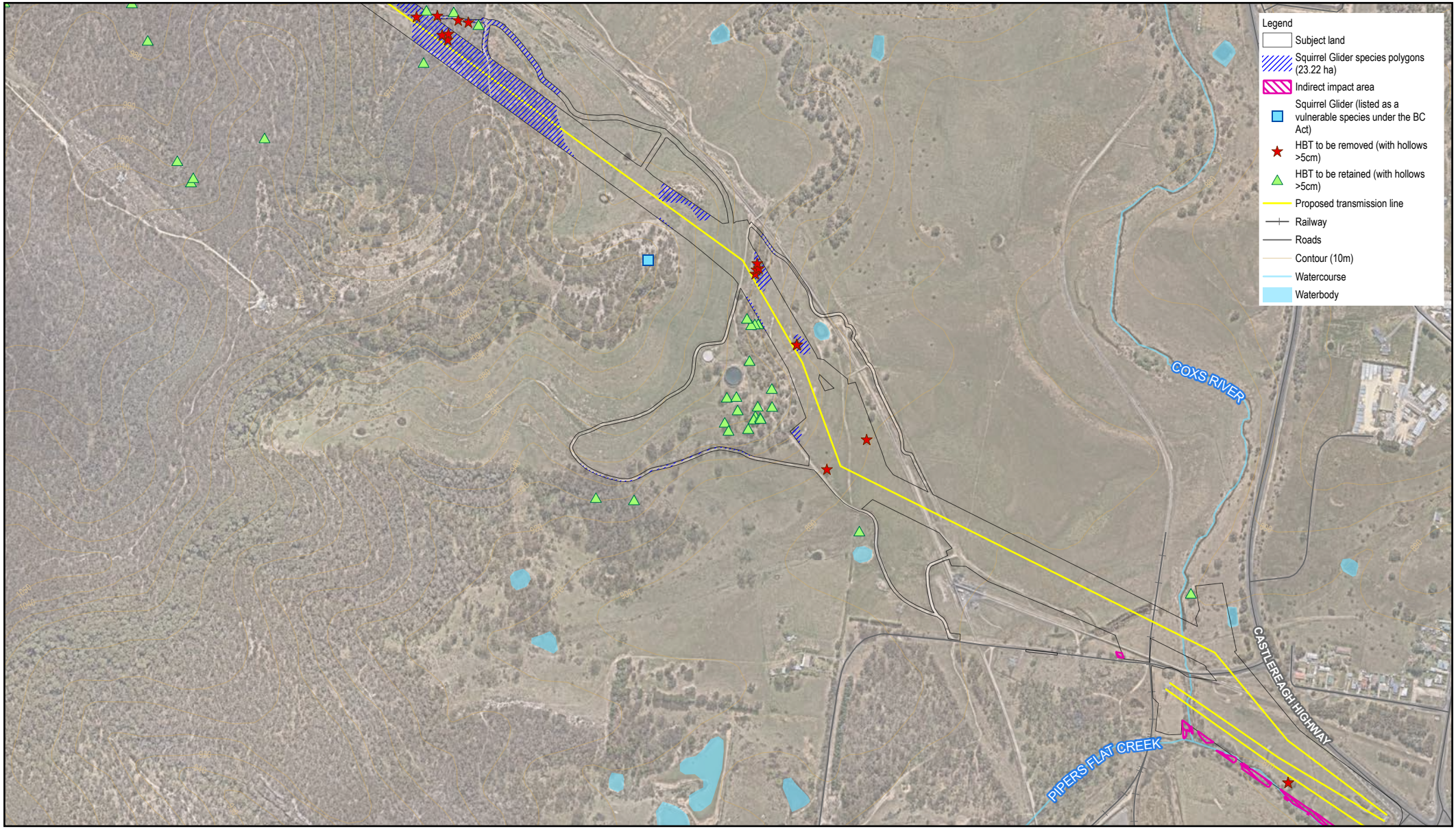
Squirrel Glider species polygons

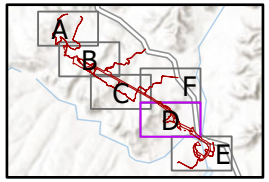
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.14C

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR018_SpeciesPoly_SquirrelGlider
Print date: 17 Jul 2025 - 13:24

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

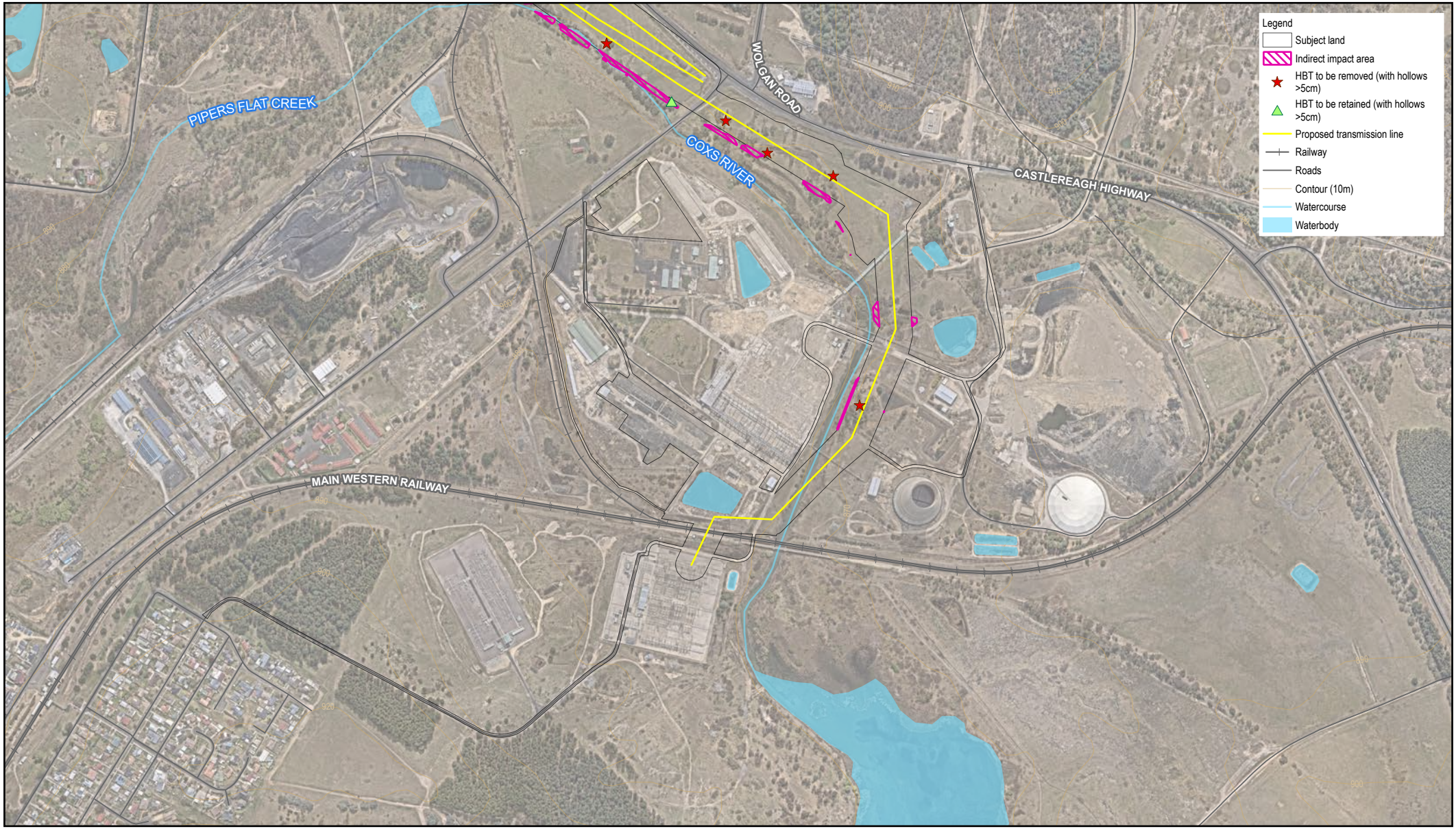
Squirrel Glider species polygons

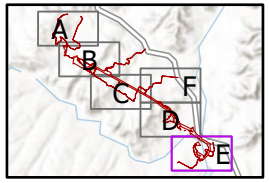
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.14D

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR018_SpeciesPoly_SquirrelGlider
Print date: 17 Jul 2025 - 13:24

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

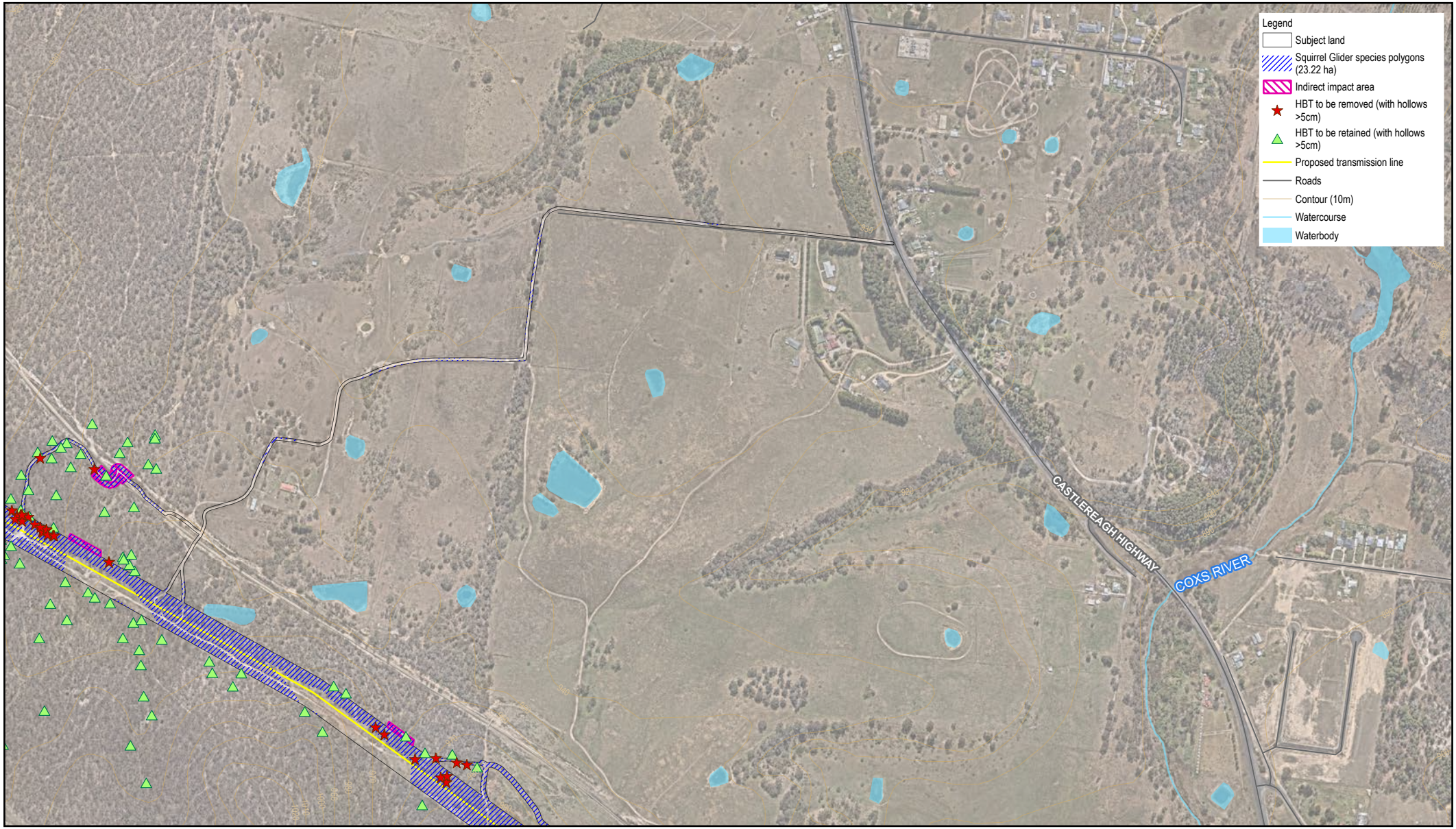
Squirrel Glider species polygons

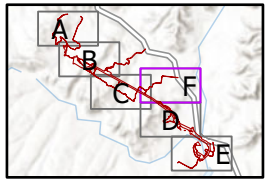
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.14E

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR018_SpeciesPoly_SquirrelGlider
Print date: 17 Jul 2025 - 13:25

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

Squirrel Glider species polygons

Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 5.14F

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR018_SpeciesPoly_SquirrelGlider
Print date: 17 Jul 2025 - 13:26

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan

5.3 Matters of National Environmental Significance

5.3.1 Threatened ecological communities

Two TECs listed under the EPBC Act have the potential to occur in the subject land based on PCT associations:

– Temperate Highland Peat Swamps on Sandstone, listed as an EEC
– White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland, listed as an CEEC.

PCT 3932 Central and Southern Tableland Swamp Meadow Complex has been recorded within the subject land and can be commensurate with *Temperate Highland Peat Swamps on Sandstone* EEC where it occurs on deep, peaty soils (TSSC, 2005). An assessment of the vegetation zone (14_3932_Moderate) that is floristically similar to this community against the diagnostic and condition criteria specified in the listing advice for the EPBC Act listed EEC (TSSC, 2005) is provided in Table 4.30. The assessment concluded that the EPBC Act listed EEC is not present in the study area or subject land.

PCT 3376 Southern Tableland Grassy Box Woodland has been recorded in the study area. PCT 3376 can be commensurate with *White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland* CEEC (Box Gum Woodland) where it has an overstory dominated or co-dominated by *Eucalyptus albens* (White Box) and/or *E. melliodora* (Yellow Box) and/or *E. blakelyi* (Blakely's Red Gum) and has a predominantly native ground layer (DCCEEW, 2023). An assessment of PCT 3376 in the study area that is floristically similar to this community against the diagnostic and condition criteria specified in the approved conservation advice for the EPBC Act listed CEEC (Commonwealth DCCEEW, 2023) is provided in Table 4.29. The assessment concluded that the EPBC Act listed CEEC is not present in the subject land. Development of the project has ensured that any impacts on this CEEC have been avoided. The CEEC has been listed in the Supplementary SEARs as requiring further assessment and is discussed further in Appendix E.

5.3.2 Threatened species

Threatened flora and fauna species listed under the EPBC Act that were positively identified during surveys of the subject land are mapped on Figure 5.1 and Figure 5.2. Several additional threatened fauna species have the potential to occur in the subject land. Table 5.10 summarises the species recorded as well as those with potential to occur in the subject land. Various other species have been assessed to have a low potential to occur given lack of suitable habitat and few local records (Appendix B). Threatened species with the potential for a significant impact and/or requiring further assessment as per the Supplementary SEARS are discussed further in Appendix E.

Table 5.10 Threatened species listed under the EPBC Act that have been recorded or are likely to occur at the subject land

Common name	Scientific name	EPBC Act status	Likelihood of occurrence	Requires further assessment with consideration of supplementary SEARS
Flora				
Black Gum	*Eucalyptus aggregata*	V	Known. Species recorded throughout the subject land, with most records south of Brays Lane.	Yes
Fauna				
Australasian Bittern	*Botaurus poliocephalus*	E	Moderate. Extensive patches of tall dense vegetation such as Typha and Phragmites spp. occur along the Coxs River at the former Wallerawang Power Station site. Small dams in private land to the north of Brays Lane may also provide potential foraging and breeding habitat for the species.	No

Common name	Scientific name	EPBC Act status	Likelihood of occurrence	Requires further assessment with consideration of supplementary SEARS
Australian Painted Snipe	*Rostratula australis*	E	Moderate. May occur on occasion in wetlands associated with the Coxs River.	No
Brown Treecreeper	*Climacteris picumnus victoriae*	V	Present. Species recorded during opportunistic observation whilst completing field surveys for the Ecological Constraints and risk assessment report (Umwelt, 2022). The species was not recorded during targeted surveys between 2023-2025.	Yes
Diamond Firetail	*Stagnopleura guttata*	V	Moderate. Suitable foraging and breeding habitat occurs in Scribbly Gum woodlands and grassy woodlands throughout the easement and also within lightly wooded farmland off Brays Lane.	No
Gang-gang Cockatoo	*Callocephalon fimbriatum*	E	Present. Species recorded on several occasions during field surveys. Potentially suitable nest trees present, however no evidence of nesting observed during surveys.	Yes
Greater Glider	*Petauroides volans*	E	Low. Moist sclerophyll forests and woodland preferred by the species are absent in the study area. No evidence of the species during targeted surveys.	Yes
Hooded Robin	*Melanodryas cucullata cucullata*	E	Moderate. Potential foraging and breeding habitat in agricultural land north of Brays Lane and adjacent to the Mount Piper 330 kV substation where regeneration has been observed as well as in dense forest and woodland along the central portion of the study area.	No
Latham's Snipe	*Gallinago hardwickii*	V, J, K	Moderate. Extensive patches of tall dense vegetation such as *Typha* and *Phragmites* spp. occur along the Coxs River around the former Wallerawang Power Station. Small dams in private land to the north of Brays Lane may also provide potential foraging and breeding habitat for the species. Subject land unlikely to support important habitat for this species.	No
Painted Honeyeater	*Grantiella picta*	V	Moderate. Broadly suitable habitat where mistletoe is present. Likely a vagrant to the study area when mistle is flowering. The species has previously been recorded adjacent to the study area in NPWS land. In the broader locality, clustered records occur to the north at Glen Davis.	No
Purple Copper Butterfly	*Paralucia spinifera*	V	Low Potentially suitable habitat occurs in the study area where *Bursaria spinosa* is present, however habitat is restricted in area and no evidence of the species was observed during targeted surveys.	Yes

Common name	Scientific name	EPBC Act status	Likelihood of occurrence	Requires further assessment with consideration of supplementary SEARS
Regent Honeyeater	*Anthochaera phrygia*	CE	Moderate. Study area is outside important habitat mapped for the species (NSW DCCEEW, 2025a). Key eucalypt species are absent from the study area. Important foraging resources such as Mistletoe is present in the study area, primarily within woodland and forest between the Mount Piper 330 kV substation and private land to the east. No records in locality however the nearest key breeding area (Capertee Valley) occurs ~20 km north of the study area. Closest records occur in the Wolgan Valley ~15 km to the north (NSW DCCEEW, 2025a)."	Yes
South-eastern Glossy Black-cockatoo	*Calyptorhynchus lathami lathami*	V	Possibly recorded (chewed cones). Suitable foraging habitat is scarce in the study area, with a small planted *Allocasuarina* stand present south of the Springvale coal face along the easement. Suitable hollows present for breeding throughout the study area between the Mount Piper 330 kV substation and private land north of Brays Lane, however lack of good quality foraging habitat makes breeding less likely.	No
Superb Parrot	*Polytelis swainsonii*	V	Low. The study area occurs outside key breeding areas and at the edge of the distribution range of the species. No evidence of the species was observed during targeted surveys.	Yes
White-throated Needletail	*Hirundapus caudacutus*	V, C, J, K	Moderate. May forage above the study area on occasion. May roost on rare occasions within the study area."	No
Grey-headed Flying-fox	*Pteropus poliocephalus*	V	Possible. Suitable foraging habitat occurs in the study area and species has previously been recorded within a 10 km buffer. No roost camps present.	No
Large-eared Pied Bat	*Chalinolobus dwyeri*	V	Known. Suitable foraging habitat occurs in the study area. Potential breeding habitat occurs within 2 km of the study area, on the south-western escarpment of the range.	Yes
Spotted-tail Quoll	*Dasyurus maculatus*	E	Possible. Suitable habitat occurs in the study area.	No

5.3.3 Migratory shorebird species

A critical consideration in assessing the significance of potential impacts on listed migratory shorebird species is whether or not a proposed action is likely to affect 'important habitat' (DotE, 2015). Important habitat mapping by DPE (2022c), maps areas that support bird numbers exceeding the international and national significance thresholds as defined above and in the Wildlife Conservation Plan for Migratory Shorebirds (DotE, 2015). The subject land does not intersect any important habitat for shorebird species.

The Latham's Snipe has been identified as the only migratory shorebird species with the potential to occur within the subject land. Important habitat for the Latham's Snipe is described as:

– Areas that have previously been identified as internationally important for the species, or
– Sites that support at least 18 individuals of the species.

Eight recent (<10 years) records of Latham's Snipe have been identified around Lake Wallace and Coxs River. The PCTs associated with these records are PCT 3367: Central Tableland Granites Grassy Box Woodland, PCT 3385: Southern Tableland Creekflat Swamp Woodland, and PCT 3747: Southern Tableland Western Hills Scribbly Gum. This location has not been identified as internationally important for this species, though the number of individuals recorded and amount of potentially suitable habitat present in the area suggests the site is unlikely to support at least 18 individuals of Latham's Snipe.

5.3.4 Migratory terrestrial species

Referral guidelines have been published for 14 migratory terrestrial species (DotE, 2015). Important habitat for these species generally relates to breeding habitat. While these species may occur on occasion in the area, the subject land does not provide important breeding habitat for these species. Vegetation within the subject land is generally highly modified, fragmented and would have only limited value for migratory species listed under the EPBC Act. Habitat in the study area is not likely to support an ecologically significant proportion of the population of any of these species, be of critical importance to the species at particular life-cycle stages, is not located at the limit of any of the species' range, and/or located within an area where the species is declining. As such, potential habitat in the study area is not 'important habitat' for any of these species, as defined in the guidelines (DotE, 2015). Migratory species identified with a possible likelihood of occurrence at the subject land are detailed in Table 5.11.

Table 5.11 Migratory terrestrial species listed under the EPBC Act that may occur at the subject land

Common name	Scientific name	Important habitat (DotE, 2015)	Likelihood of occurrence
Fork-tailed Swift	*Apus pacificus*	Non-breeding visitor only: Found across a range of habitats, from inland open plains to wooded areas, where it is exclusively aerial. This species is believed to roost on the wing.	Possible. Wide range of habitat use. May occur in the study area on occasion during migration. May forage high above the subject land.
White-throated Needletail	*Hirundapus caudacutus*	Non-breeding visitor only: Found across a range of habitats, more often over wooded areas, where it is almost exclusively aerial, though does roost in tree hollows and the foliage canopy. Large tracts of native vegetation, particularly forest, may be a key habitat requirement for species.	Possible. Suitable habitat occurs in the study area and it was previously recorded within a 10 km buffer. May forage high above the subject land.
Black-faced Monarch	*Monarcha melanopsis*	The Black-faced Monarch is a wet forest specialist, occurring mainly in rainforests and riparian vegetation. In wet sclerophyll forest, the species mostly frequents sheltered gullies and slopes with a dense understorey of ferns and/or shrubs. The species has an extensive breeding range in south-eastern Australia from Cooktown to eastern Victoria.	Possible. The species may prefer wetter habitats in the subject land which align within riparian corridors of ephemeral drainage lines within Gardens of Stone SCA. Important habitat is not present in the subject land, and the species is likely to pass through only on occasion.

Common name	Scientific name	Important habitat (DotE, 2015)	Likelihood of occurrence
Satin Flycatcher	*Myiagra cyanoleuca*	Eucalypt forest and woodlands, at high elevations when breeding. They are particularly common in tall wet sclerophyll forest, often in gullies or along waterways. In woodlands they prefer open, grassy woodland types. During migration, habitat preferences expand, with the species recorded in most wooded habitats.	Possible. The species is a generalist which may use both woodland and forest components of the subject land. The study area does not contain habitat resources critical to the survival of the species and is unlikely to be important to individuals passing through on migration.
Rufous Fantail	*Rhipidura rufifrons*	Moist, dense habitats, including mangroves, rainforest, riparian forests and thickets, and wet eucalypt forests with a dense understorey. When on passage a wider range of habitats are used including dry eucalypt forests and woodlands and Brigalow shrublands.	Possible. Wide range of habitat use, and it may occur in the study area on occasion during migration.

6. Identifying prescribed impacts

6.1 Introduction

Section 6.1 of the Biodiversity Conservation Regulation 2017 (BC Regulation) identifies additional biodiversity impacts to which the BOS applies. These 'prescribed impacts' are the impacts on biodiversity values which are not related to, or are in addition to, native vegetation clearing and habitat loss. These types of impacts are used by the decision-maker to inform the determination and conditions of consent for developments. These include impacts:

- on the habitat of threatened entities including:
  - karst, caves, crevices, cliffs, rocks and other geological features of significance
  - human-made structures
  - non-native vegetation
- on areas connecting threatened species habitat, such as movement corridors
- that affect water quality, water bodies and hydrological processes that sustain threatened entities
- on threatened and protected animals from turbine strikes from a wind farm (not relevant to this project)
- on threatened species or fauna that are part of a TEC from vehicle strikes.

The BDAR must identify the relevant prescribed impacts and the suite of threatened species that use or rely on the habitat values or would be affected by the impact, as specified in Section 6 of the BAM. The likelihood, extent and magnitude of prescribed impacts must then be assessed using the approach specified in the BAM Section 8.3.

6.2 Threatened biota that may be subject to prescribed impacts

Threatened species of relevance to this project that may be subject to prescribed impacts are described in Table 6.1. Potentially affected threatened species were identified based on the desktop assessment, site inspections and habitat assessments described above and have been grouped according to shared life histories and habitat associations. Candidate species that have been surveyed and are not present are not considered to be subject to prescribed impacts.

Table 6.1 Threatened species potentially subject to prescribed impacts

Group	Species
Woodland birds	– Black-chinned Honeyeater (*Melithreptus gularis gularis*) – Brown Treecreeper (*Climacteris picumnus victoriae*) – Diamond Firetail (*Stagnopleura guttata*) – Dusky Woodswallow (*Artamus cyanopterus*) – Flame Robin (*Petroica phoenicea*) – Little Lorikeet (*Glossopsitta pusilla*) – Painted Honeyeater (*Grantiella picta*) – Regent Honeyeater (*Anthochaera phrygia*) – Scarlet Robin (*Petroica boodang*) – South-eastern Hooded Robin (*Melanodryas cucullata cucullata)* – Speckled Warbler (*Chthonicola sagittata*) – Swift Parrot (*Lathamus discolor*) – Varied Sittella (*Daphoenositta chrysoptera*) – White-throated Needletail (*Hirundapus caudacutus*)
Raptors	– Black Falcon (*Falco subniger*) – Spotted Harrier (*Circus assimilis*) – White-bellied Sea-eagle (*Haliaeetus leucogaster*)

Group	Species
Owls and cockatoos	– Barking Owl (*Ninox connivens*) – Gang-gang Cockatoo (*Callocephalon fimbriatum*) – Powerful Owl (*Ninox strenua*)
Wetland birds	– Australasian Bittern (*Botaurus poiciloptilus*) – Australian Painted Snipe (*Rostratula australis*) – Black-necked Stork (*Ephippiorhynchus asiaticus*) – Blue-billed Duck (*Oxyura australis*) – Freckled Duck (*Stictonetta naevosa*)
Arboreal mammals	– Spotted-tailed Quoll (*Dasyurus maculatus*) – Squirrel Glider (*Petaurus norfolcensis*)
Fruit bats	– Grey-headed Flying-fox (*Pteropus poliocephalus*)
Microbats	– Eastern False Pipistrelle (*Falsistrellus tasmaniensis*) – Large Bent-winged Bat (*Miniopterus oriane oceanensis*) – Large-eared Pied Bat (*Chalinolobus dwyeri*) – Southern Myotis *(Myotis macropus*) – Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*)
Flora	– Black Gum (*Eucalyptus aggregata*) – Capertee Stringybark (*Eucalyptus canonnii*)

6.3 Prescribed impact features of relevance to the project

Table 6.2 summarises the prescribed impact features listed in the BC Regulation and BAM along with an assessment of their presence or otherwise in the study area, their characteristics and location, and the threatened entities that are associated with the feature in the study area. Further discussion is provided in the sections below.

Table 6.2 Prescribed impacts

Feature	Present	Description of feature characteristics and location	Threatened entities that are likely to use the habitat feature and/or be affected by the prescribed impact feature
Karst, caves, crevices, cliffs, rocks or other geological features of significance	☒Yes / ☐No	A small rocky outcrop occurs in private agricultural land to the east of the existing coal conveyer belt and north of Brays Lane and adjacent to the subject land. The rocky outcrop is comprised of lithic sandstone and continues for ~400 m in a south-west orientation. A number of small caves and a small overhang is present under the outcrop that may be used by reptiles. Larger expanses of escarpments with caves occur to the south at least 1 km away. 	The rock outcrop is considered poor quality potential breeding or roosting habitat for the cave-roosting microbats given the overhang microhabitat is located near the ground surface, would be subject to predation by foxes and cats, lacks depth and would not provide adequate flying space. The structure of Large-eared Pied Bat maternity roosts appears to be very specific. Caves need to have indentations in the roof and be high and deep enough to allow juvenile bats to learn to fly inside. Roosting bats cluster in the indentations, which most likely allow the capture of heat (Pennay, 2008). These features are not present in this overhand. Cave-roosting microbats may roost and breed in escarpments located over 1 km from the subject land.

Feature	Present	Description of feature characteristics and location	Threatened entities that are likely to use the habitat feature and/or be affected by the prescribed impact feature
Human-made structures	☒Yes / ☐No	An arched rail bridge comprising of brick and sandstone is present in the subject land at the former Wallerawang Power Station site in the south. It has limited roost habitat given the lack of overhangs or crevices with suitable shelter. This bridge would be retained as part of the project as it supports the main train line. An existing access track under the bridge would be used for the project.  The former Wallerawang Power Station site contains several disused buildings/structures outside the subject land including the cooling tower (over 100 m from the subject land), gantries, sheds and other buildings. No buildings intersect the subject land, however some gantry structures do cross under the existing power line.	The arched rail bridge at the former Wallerawang Power Station in the south may contain potential temporary shelter or roost sites for threatened microbats: – Large Bent-winged Bat – Large-eared Pied Bat – Southern Myotis.
Non-native vegetation	☒Yes / ☐No	Non-native vegetation is present within Centennial Springvale Coal Services Facility, off Brays Lane on the lower foothills of agricultural land, within the former Wallerawang Power Station site and the existing Mount Piper 330 kV substation. Non-native vegetation includes stands of planted *Pinus* sp. and exotic grassland vegetation.	None identified. Stands of *Pinus* sp. may comprise roosting habitat for the Powerful Owl, however the species was not recorded despite targeted surveys.
Habitat connectivity	☒Yes / ☐No	Removal of native vegetation including trees on the edge of an existing easement in the upper reaches of the site (refer to Figure 4.1 and Figure 8.2) would increase gaps between vegetation. Further detailed discussion of existing and future connectivity for the Squirrel Glider is provided in Section 8.5.	Threatened microbats, woodland birds, owls and cockatoos, raptors and mammals may travel within or through the subject land to other areas of habitat.
Waterbodies, water quality and hydrological processes	☒Yes / ☐No	Natural ephemeral creeks in the upper reaches of the subject land. Most of these creeks have a natural geomorphology and intersect the subject land. Some creeks form small wetlands at low points that intersect existing easements which contain fringing emergent vegetation.	Threatened wetland birds may forage in the creeks and small wetlands in the subject land.
Wind turbine strikes (wind farm development only)	☐Yes / ☒No	The project does not involve construction of wind turbines.	N/A

Feature	Present	Description of feature characteristics and location	Threatened entities that are likely to use the habitat feature and/or be affected by the prescribed impact feature
Vehicle strikes	☒Yes / ☐No	The subject land would be accessed via a number of existing sealed and unsealed roads. Vegetation cover across the landscape varies from heavily vegetated near the Gardens of Stone SCA, to sparsely vegetated towards the former Wallerawang Power Station site. There is a risk of vehicle strikes to native fauna. The project would increase the volume of vehicle traffic to and through the subject land during construction and then periodically during maintenance of the transmission line.	Threatened woodland birds, raptors, cockatoos, wetland birds and mammals may be at risk of vehicle strike while traveling within or through the subject land to other areas of habitat. Minimal risk for nocturnal species. Vehicles travelling to and from the subject land would increase the risk of collisions with the same suite of fauna in the surrounding region.
Injury or mortality from transmission line collision, entanglement, or electrocution[1]	☒Yes / ☐No	Duplication or paralleling of the transmission line is likely to increase the risk of powerline strike for species that are capable at flying at the elevations of the proposed work. This risk is increased in the forested corridor where there is capability for arboreal movements for gliding mammals, birds and bat species foraging in close proximity to powerlines and towers. The risk of powerline strike would not increase where the project replaces one transmission line with another (i.e. within the Gardens of Stone SCA.	Threatened microbats, woodland birds, raptors, owls and cockatoos, and flying/gliding mammals may be at risk of powerline strike while traveling within or through the subject land to other areas of habitat.

Note: 1. Not an impact prescribed by the Biodiversity Conservation Regulation but considered here as a similar impact as wind turbine strikes.

Stage 2: Impact assessment (biodiversity values and prescribed impacts)

7. Avoid and minimise impacts

7.1 Introduction

The BAM identifies two key areas of project planning to avoid and minimise direct, indirect and prescribed impacts:

– Project location – locating the development away from the highest biodiversity values.
– Project design – retaining biodiversity values through design features that limit vegetation clearing or reduce the amount of development within the footprint.

Specific mitigation measures are recommended to minimise likely impacts on biodiversity values. These measures are presented according to the hierarchy of avoidance and minimise of impacts, mitigation of the effect of unavoidable impacts, and finally the provision of offsets to compensate for residual impacts of the project.

7.2 Avoid and minimise direct and indirect impacts

7.2.1 Project location and design

A transmission line upgrade is required between the Mount Piper and Wallerawang 330 kV substations. A Preferred Route Report was developed in 2023 (Transgrid, 2023) to identify proposed options for the transmission line. The preferred option for the project uses the existing 45 m wide easement for Line 94E, a 132 kV transmission line. While the easement would need to be widened by approximately 15 m, the use of the existing easement would reduce the impact on intact woodland vegetation. The use of this easement resulted in only an additional 15 m being required within a specific section of the new transmission line to provide the required easement. It is noted that in some locations a full 60 m easement is required to be established as the new transmission line diverges from the existing easement.

The existing easement to the south (Line 70/71), would be used primarily for access via existing tracks.

Discussion of opportunities to avoid impacts are provided in Table 7.1.

Table 7.1 Avoidance

Action	Outcome
Details of constraints that have influenced the selection of the project's location	Consideration of biodiversity was one factor relevant to the multi-criteria analysis in developing options for the preferred route for the transmission line. A number of stakeholders with environmental interests were contacted for input and included the NPWS, Wilderness Australia, Lithgow Environmental Group and WaterNSW. Other factors strongly influencing route selection included social and community views, Aboriginal heritage, cost constraints and alignments and presence of existing infrastructure (in particular electricity infrastructure). Particular attention for the preferred route has taken into account biodiversity impacts associated with and partial avoidance of Gardens of Stone SCA. Biodiversity impacts within Gardens of Stone SCA for each initial option and justification why this encroachment/occupation must occur as part of the project is outlined in Table 7.2 and described further for the preferred route in section 8.3. Decisions with regard to the location of access tracks were informed by reusing existing tracks where available, with new track locations based on the assessment of onsite terrain and also targeting disturbed areas where possible. Brake and winch site locations were selected through assessment of safe locations for delivery of the works, in conjunction with site conditions for access and amount of work (ie clearing and earthworks) required to make areas suitable for use.

Action	Outcome
Alternatives for the location and design of the project have been evaluated with evidence of analysis of social, economic and environmental considerations	There are currently two key network connections needed to support the renewable generator growth in the CWO REZ; one from the Wollar substation to Newcastle via Bayswater Power Station, and one from the Mount Piper Power Station to Sydney via Wallerawang. This project is proposed to address the second of these two key connections by providing an additional 330 kV transmission line between Mount Piper and Wallerawang. Initial option selection of the transmission easement from the Mount Piper Power Station to Sydney via Wallerawang followed a multi criteria assessment process with broad stakeholder input as described above. Further refinement of the access track was also informed by biodiversity surveys such as the rapid biodiversity assessment that was undertaken in 2024 by GHD to identify terrestrial biodiversity constraints along access tracks and other proposed ancillary infrastructure. The initial findings of these field surveys and the potential for extensive adverse impacts contributed to refining the project during the concept design.
Consideration of alternative technologies to achieve the same outcome with reduced impacts	The key objective of the project is to support the NSW Government's delivery of the CWO REZ and the State's energy policies and strategies, including Australia's greenhouse gas emission targets. The existing transmission line connections between the Mount Piper and Wallerawang 330 kV substation currently have a combined capacity of approximately 1,550 MVA. To provide sufficient capacity and reliability to enable the forecast output from renewable generators in the CWO REZ, additional transmission capacity is required. The project would support the delivery of 3,000 MW of renewable energy generation from the CWO REZ to consumers through the construction of a new transmission line or upgrade of an existing transmission line by increasing the capacity/voltage of the line. Multiple technical solutions were considered to meet the project objective of increasing transmission network capacity requirement of the CWO REZ construction, including different alignments for new infrastructure and underground cables (see Table 7.2). Ultimately, construction of new overhead infrastructure is required to increase network capacity.
Constraints for matters other than biodiversity that might restrict the availability of alternative sites or footprints	Site selection also responded to: – design efficiency and constructability – alignment to existing infrastructure, such as roads and transmission lines – cost constraints – network resilience – community and stakeholder views – land use considerations, including existing and planned use for agriculture, tourism and industry – Aboriginal heritage, including significant cultural heritage sites – hazards such as bushfire and extreme weather – topography, such as gradient and valleys – other environmental features like soils and hydrology.
Consideration of whether the areas of impact are focused away from threatened species habitat	Due to the location of the key works (construction of transmission lines), construction work is generally focused adjacent to or within existing powerline easements and previously disturbed areas of land connecting the existing Mount Piper and Wallerawang 330 kV substations. Where possible, access tracks have been located within existing tracks with widening only required in select areas, to minimise clearing. The locations for compound sites have been positioned to avoid clearance of trees and away from riparian habitats, where possible. These include adjacent to the Mount Piper 330 kV substation and two within previously disturbed land within the former Wallerawang Power Station site.
Whether the proposed development makes the best use of space	Transgrid minimised impacts on previously undisturbed areas of vegetation by maximising the use of existing transmission line easements. This was done by: 1) widening the Line 94E easement by approximately 15 m to replace the single circuit transmission line with a double circuit transmission line 2) paralleling existing transmission lines to the extent possible, which allowed for overlap of the easements. The use of these disturbed areas within existing easements is considered to make the best use of available space.

Action	Outcome
Mechanisms to assure biodiversity values in avoided areas are not degraded or lost	Transgrid has limited control over land use in areas not required for this project. The project is located in a range of land-holdings, including land owned by Centennial Coal, EnergyAustralia, NPWS and private property. Areas avoided by the project through design would continue to be subject to impacts to biodiversity values from existing land uses and some future land uses such as the redevelopment of the former Wallerawang Power Station site. .

7.2.2 Evolution of the project design

7.2.2.1 Evolution of transmission line

Overall, eleven possible routes were assessed and labelled with letters and numbers. These include Options A-1, A-2, B-1 to B-5, C-1, C-2, D and E (as shown in Figure 7.1). In early 2022, seven route options were made public and consulted on that connect the existing Mount Piper 330 kV/500 kV substation and Wallerawang 330 kV substation. Options A-1, A-2, D, and E were discontinued earlier in the assessment phase due to environmental, cost and operational constraints. The remaining feasible options assessed in the latter stages of the route refinement process were Options B-2, B-3, B-4, B-5 and C-2.

After consulting on the route options with stakeholders and community, Transgrid received feedback that Options B-1 and B-2 would result in a degree of vegetation clearing that was unacceptable in the Gardens of Stone SCA. Option B-3 was not considered due to the significant impacts to the Centennial Springvale Coal Services facility operations and Option C-2 was removed due to the impact on private landowners.

A number of sub-options were also assessed within Option A, B and C. Option B-4 was selected as the preferred option as it would impact the smallest number of landowners and generally minimised biodiversity impacts compared to other options. Further details regarding social, economic and other factors are provided in section 2.4 of the EIS (GHD, 2025e). Ancillary areas including potential access tracks, laydown areas and brake and winch locations were not considered during the route option assessment.

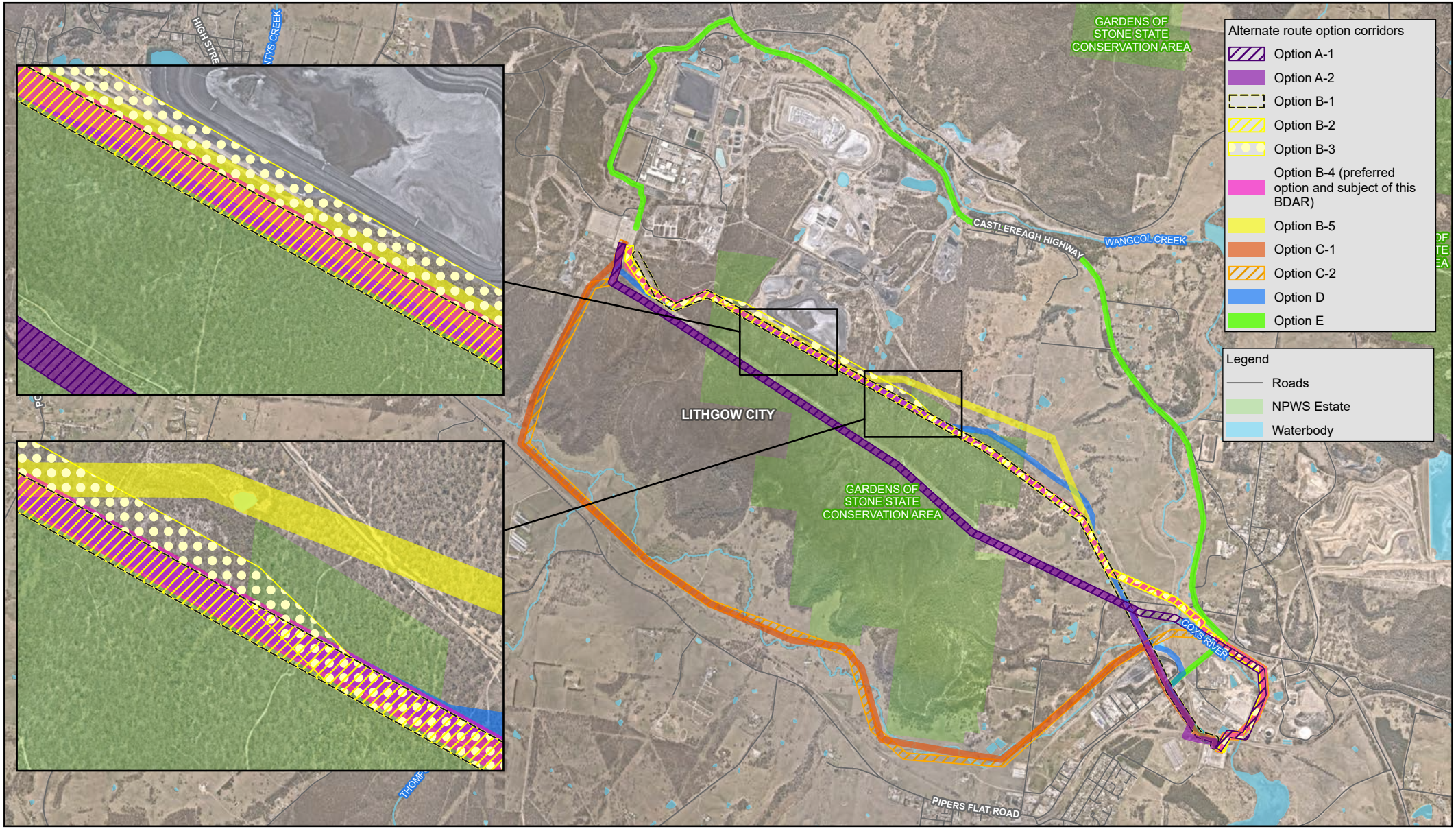
A description of the route options with a high-level assessment of biodiversity impacts is provided in Table 7.2.

Table 7.2 Evaluation of route options

Option/sub-option ID	Option/sub-option description and assessment of biodiversity impacts
A-1 and A-2	Options A-1 and A-2 are located to the south, adjacent to the existing 330 kV Line 70/71 diverging from each other at Brays Lane and taking different routes to the Wallerawang 330 kV substation. North of Brays Lane, these both sub-options require vegetation clearing for a new 60 m easement through vegetated areas within the Gardens of Stone SCA for approximately 3 km (on the south side of the existing 330 kV Line 70/71) and would likely have as higher biodiversity impact of all the other options considered. This new easement would occur adjacent to the existing easement, increasing the gap between canopied habitat to be 120 m, and having a high impact on the degree of habitat connectivity within Gardens of Stone SCA. South of Brays Lane, Option A-1 and A-2 would impact a mixture of non-native vegetation and poor condition Creekflat Swamp Woodland associated with former Wallerawang Power Station. South of Brays Lane, Option A-1 would also primarily impact native vegetation but also potentially the riparian corridor of the Coxs River including paddocks trees and canopied fragments associated with Creekflat Swamp Woodland, as well as emergent vegetation within grassy drainage lines. These two options would have resulted in a greater amount of vegetation clearing in the SCA that increased biodiversity impacts and offsets. This was unacceptable to stakeholders; therefore they were not considered further. These were the lowest cost options considered, with the highest biodiversity impacts.

Option/sub-option ID	Option/sub-option description and assessment of biodiversity impacts
B-1	Option B-1 exits the Wallerawang 330 kV substation following the 132 kV Line 94E to the north-west north of Brays Lane (as opposed to following the existing 330 kV Line in Option A). South of Brays Lane, the option follows a similar route to Option A-2. North of Brays Lane, biodiversity impacts under Option B-1 would result from the widening of the existing 132 kV Line 94E easement by 15 m to the north, slightly increasing the gap between canopied habitat to be 60 m and having a minor impact on the degree of habitat connectivity within Gardens of Stone SCA. Vegetation clearing impacts on the Gardens of Stone SCA on the north side of the existing easement, and between the tailings dam of the Centennial Springvale Coal Services facility, would remove a mix of planted, sub-mature and intact native vegetation which is currently exposed to dust pollution. South of Brays Lane, the option follows a similar route to Option A-2 and would have similar biodiversity impacts. The cost of Option B-1 is approximately 22% greater than the lowest cost option (Option A-1/A-2).
B-2 and B-4	Options B-2 and B-4 generally head north-east from the Wallerawang 330 kV substation and follow the 330 kV Line 70/71, then follow the 132 kV Line 94E with a diversion into the Centennial Springvale Coal Services facility, north of the Gardens of Stone SCA. Options B-2 and B-4 are very similar; both requiring widening of the existing 45 m easement through the Gardens of Stone SCA to achieve a 60 m wide easement. Option B-2 proposes vegetation clearing up to 15 m (7.5m either side of the existing 132 kV Line 94E easement) through Gardens of Stone SCA) with vegetation clearing and biodiversity impacts to vegetation south of Brays Lane like Option A-1). Option B-4 is the preferred option and would result from the widening of the existing 132 kV Line 94E easement by 15 m to the north within Gardens of Stone SCA. Biodiversity impacts are similar to Option A-1/B-2/B-3 south of Brays Lane and Option B-1, B-2 and B-3 north of Brays Lane. The expansion of the easement to the north within Gardens of Stone SCA would avoid higher quality intact vegetation on the south side of the easement and preferentially impact a narrow band of SCA land already between the easement and the mine and thus subject to a higher degree of indirect impacts, and was chosen in consultation with NPWS. Option B-4 therefore results in less vegetation removal within the Gardens of Stone SCA than Option B-2, and the removal of lower condition vegetation due the vegetation already being subject to previous disturbances. This was a key differentiating factor resulting in Option B-2 being considered less acceptable. The costs of these options are approximately 36% and 48% greater than the lowest cost option respectively, however they had less social, environmental and biodiversity impacts.
B-3	Option B-3 heads north-west from the Wallerawang 330 kV substation and generally follows the existing 330 kV line (Line 70/71) for the first 3 km. It then follows the existing 132 kV line (Line 94E) with a diversion into the Centennial Springvale Coal Services facility, north of the Gardens of Stone SCA. Option B-3 would require vegetation clearing for a new 60 m easement through vegetated areas within the Gardens of Stone SCA and also within the Centennial Springvale Coal Services facility (on the north side of the existing 330 kV Line 70/71). The expansion of the easement to the north within Gardens of Stone SCA would avoid higher quality intact vegetation on the south side of the easement and preferentially impact a narrow band of SCA land already trapped between the easement and the mine and thus subject to a higher degree of indirect impacts. Option B-3 would likely have the biggest biodiversity impact of all the other options, excluding A-1 and A-2. This new easement would occur adjacent to the existing easement, increasing the gap between canopied habitat to be 105 m, and having a moderate impact on the degree of habitat connectivity within Gardens of Stone SCA. A Reject Emplacement Area within the Centennial Springvale Coal Services facility, would require to be removed under this option. The removal of the REA would significantly impact existing and future operations of the Centennial Springvale Coal Services Facility. The cost of this option is approximately 50% greater than the lowest cost option.
B-5	Option B-5 was developed following stakeholder feedback received on Option B-4. Option B-5 was developed specifically to avoid the Gardens of Stone SCA. It does this by following the same route as Option B-4 but then follows a route further north to avoid the Gardens of Stone SCA (instead of following the existing 132 kV line (Line 94E), crossing into the Centennial Springvale Coal Services facility and private landowners. This option utilises the southern area of the Centennial Springvale Coal Services facility, including space currently occupied by a Reject Emplacement Area and coal conveyor. Consultation with Centennial Springvale Coal Services Facility indicated that relocating the Reject Emplacement Area and coal conveyor belt would render the facility inoperable. The cost of this option is approximately 67% greater than the lowest cost option.

Option/sub-option ID	Option/sub-option description and assessment of biodiversity impacts
C-1	Option C-1 traverses close to Pipers Flat Road to mostly avoid impacting the Gardens of Stone SCA, before turning north to follow the existing 500 kV transmission line (Line 5A7) to the Mount Piper 330 kV substation. In the north, Option C-1 would require vegetation clearing for a new 60 m wide easement adjacent to the existing 500 kV transmission line easement through vegetated area owned by Ivanhoe Coal. Option C-1 would void vegetation removal within the Gardens of Stone SCA except for a small section in the south near Pipers Flat Road. This new easement would increase the gap between canopied habitat to 120 m and have a high impact on the degree of habitat connectivity within intact native vegetation contiguous with Gardens of Stone SCA. Option C-1 was not chosen as the preferred option due to proximity to the Wallerawang township and the potential for visual and other impacts on sensitive receivers. The costs of this option is approximately 26% greater than the lowest cost option respectively.
C-2	Option C-2 follows a similar route to C1 along Pipers Flat Road north to the Mount Piper 330 kV/500 kV substation. Option C-2 would require vegetation removal for a 60 m wide easement parallel to the existing 500 kV transmission line easement. An approximately 30 m wide strip of vegetation would be retained between the existing easement and new easement. In the south, Option C-2 would cross Pipers Flat Creek several times. This option would also primarily impact native vegetation including the riparian corridor of Pipers Flat Creek and Coxs River. The key factors resulting in Option C-2 being less preferred compared with other options was that it included the potential to remove significant amount of vegetation for a new easement and a greater impact on private landowners. Option C-2 was therefore not considered further. The cost of this option is approximately 57% greater than the lowest cost option respectively.
D and E	Options D and E considered two underground routes with a proposed 25 m corridor. Option D follows a similar route to option B-1, however its route varies between Brays Lane and the eastern portion of Gardens of Stone SCA where it traverses across agricultural land owned by Ivanhoe Coal. Option E follows the road reserve along Main Street and the Castlereagh Highway to the north, entering the Mount Piper 330 kV substation via Boulder Road and the existing access into the Mount Piper Power Station. As these are underground options, the width of the easement required to be cleared and maintained would be reduced to 25 m wide. These options were rejected due to the significant cost to energy consumers, short asset life expectancy, costly and time-consuming maintenance and greater environmental disturbance from construction impacts. The potential cost was approximately four to six times the cost of the lowest cost option (A-1/A-2).



Paper Size ISO A4

0 0.5 1 1.5

Kilometres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

GHD

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

Alternate route option corridors

FIGURE 7.1

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR020_AlternateRouteOptions
Print date: 17 Jul 2025 - 12:30

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Nearmap WMS Server: Imagery Extracted 17/07/2025.
Created by: lmanasan

7.2.2.2 Evolution of access tracks, laydown areas and brake and winch sites

A rapid ecology assessment was undertaken in 2024 to identify terrestrial biodiversity constraints along access tracks and other proposed ancillary infrastructure. The purpose of this assessment was to assist Transgrid with selecting preferred locations of additional impact areas (access tracks, compounds and brake and winch sites) and to avoid and minimise impacts on biodiversity as far as practical. Table 7.3 shows the evolution of the project design in regard to additional impact areas and shows the reduction in native vegetation proposed for clearing.

Notable changes to the location and size of additional impact areas resulting in a reduction of impacts include:

- Reduction in the number of access tracks required for the project, including reduction in the number of required tracks within the Gardens of Stone SCA and some tracks within agricultural land north of Brays Lane
- Complete avoidance of direct and indirect impacts on Box-Gum Woodland located in agricultural lands owned by Centennial Springvale Coal Services Facility north of Brays Lane
- No additional clearing required for access tracks within Gardens of Stone SCA within the existing Line 70/71 easement with these tracks identified as only being used by light vehicle and therefore not requiring any widening or vegetation clearing
- Positioning of construction laydown areas in non-native or poor condition vegetation
- Refinement of the number and size of brake and winch sites, particularly where they are located outside the easement.

Table 7.3 Comparison of native vegetation impact reduction within ancillary areas

Additional impact areas[1]	Removal of native vegetation previous design (August 2024) (ha)	Removal of native vegetation (current design) (ha)	Reduction in native vegetation clearing (ha)
Access track[2]	7.33	6.24	1.09
Laydown area	17.01	2.47	14.54
Brake and winch site	19.25	6.51	12.74

Note: 1. Additional impact areas can occur within the core subject land: (proposed footprint for the Line 94E and associated easement). There may be overlap within additional impact areas where access tracks occur within laydown areas and brake and winch sites
2. Access track areas (GHD, 2024) include three flexibility areas where access track design was in preliminary stages of design and where a slightly larger footprint has been accounted for.

7.2.3 Summary of measures to avoid and minimise impacts

A summary of measures undertaken to avoid and minimise impacts is provided in Table 7.4.

The selected route minimises visual impact for community and the local township and balances landowner preferences and various constraints including engineering, constructability, environmental impacts and cost, to ensure that the outcome is prudent and efficient. Transgrid requested feedback from impacted landowners, the NPWS, Centennial Coal, Greenspot, EnergyAustralia and private residential landowners. All landowners understood the many constraints involved when identifying a suitable route option. NPWS and local First Nations community groups indicated a strong preference for minimising impacts to the Gardens of Stone SCA and to use Centennial Coal property as much as possible.

Transgrid took this feedback into account by identifying a proposed route which is located adjacent to an existing, operational coal mine with existing disturbed vegetation. Due to the proximity of the shared property boundary, this extension of the existing easement to the north was chosen as it represents the lowest impact overall because it uses an existing transmission line easement, which would impact the smallest number of landowners and minimises impact on the environment.

Transgrid is continuing to consult with all landowners including Centennial Springvale Coal Services Facility and NPWS on any refinements as the project proceeds through the detailed design phase. Transgrid is also during detailed design considering ways to minimise impacts to biodiversity, for example looking at sections of the easement which would not require any vegetation removal based on existing conditions. This includes further consideration of more detailed construction methods which may reduce areas required for construction purposes only.

Table 7.4 Avoidance and minimisation measures for direct, indirect and prescribed impacts

Action	Outcome	Timing	Responsibility
Identification of a site with minimal biodiversity value	The subject land is determined by the need to link the Mount Piper and Wallerawang 330 kV substations with a new transmission line. It is not possible to fully avoid impacts, however impacts have been confined where possible within an existing transmission line easement that has already been subject to clearing of native vegetation and is subject to ongoing management of native vegetation. The preferred route was selected to minimise disturbance to the Gardens of Stone SCA as vegetation clearing would be only on one side of the existing easement, where poorer quality habitat is present due to its position between the existing easement and the Centennial Coal's Reject Emplacement Area.	Route selection	Proponent
Avoidance of impacts to vegetation through locating the subject land in previously disturbed areas.	The existing 45 m wide easement that runs through the SCA has been utilised to accommodate the new 60 m easement. This was selected to avoid the creation of new easements and the associated additional vegetation removal. Brake and winch sites have been located within the existing easement as far as possible. Existing access tracks have been utilised with widening reduced to a few select areas only. Vegetation along the existing easements is managed by Transgrid's existing operational management procedures.	Route selection	Proponent
Minimisation of impacts to biodiversity values by avoiding higher value habitat features and resources.	See above re-aligning of project within Gardens of Stone SCA (section 7.2.2.2). Avoidance of impacts on Box Gum Woodland through removal of an access track from the project as a result of the constraints assessment. Avoidance of impacts to the rock outcrop containing a small overhanging cave.	Preliminary design	Proponent
Reducing the subject land and concentrating development in non-native or poor condition vegetation.	Avoiding and minimising the amount of native vegetation clearing required through positioning of compound areas within primarily poor condition or non-native vegetation.	Design	Proponent
Preparation and implementation of a Construction Environmental Management Plan (CEMP).	Minimising and managing direct and indirect impacts during construction.	Construction	Construction contractor

8. Impact assessment

8.1 Direct impacts

8.1.1 Summary

The project would result in direct impacts on native vegetation and associated threatened species habitat through the removal or modification of up to 55.43 ha of native vegetation for the construction of the project (refer to Figure 9.1). Residual direct impacts are summarised in Table 8.1.

A breakdown of the subject land into various proposed activities and the associated intensity and duration of impacts is provided in Table 8.2. The BAM, in general, provides for assessment of partial vegetation removal associated with activities such as maintaining asset protection zones surrounding infrastructure or minimum safety clearances in transmission line easements. This approach requires splitting of vegetation zones into management zones based on detailed design of infrastructure and associated construction footprints. This detail is not available for all elements of the project and so for the purposes of this BDAR it is assumed that project would result in the clearing of the entire subject land. All future composition, structure and function scores have therefore, been entered as 0 for all vegetation zones as summarised in Table 8.3.

Table 8.1 Summary of residual direct impacts

Vegetation zone	BC Act status	EPBC Act status	SAII entity	Project phase/timing of impact (e.g. construction, operation, rehabilitation)	Area in subject land (ha)[1]
3369_Good_Central Tableland Ranges Peppermint-Gum Grassy Forest	Not listed	Not listed	No	Construction, operation	1.47
3369_Shrubland_Central Tableland Ranges Peppermint-Gum Grassy Forest	Not listed	Not listed	No	Construction, operation	5.48
3385_Good_Southern Tableland Creekflat Swamp Woodland	Not listed	Not listed	No	Construction, operation	2.59
3385_Moderate_Southern Tableland Creekflat Swamp Woodland	Not listed	Not listed	No	Construction, operation	0.83
3385_Paddock trees_Southern Tableland Creekflat Swamp Woodland	Not listed	Not listed	No	Construction, operation	0.61
3385_Poor_Southern Tableland Creekflat Swamp Woodland	Not listed	Not listed	No	Construction, operation	6.94
3735_Good_Central Tableland Peppermint Shrub-Grass Forest	Not listed	Not listed	No	Construction, operation	1.69
3735_Shrubland_Central Tableland Peppermint Shrub-Grass Forest	Not listed	Not listed	No	Construction, operation	7.53
3747_Good_Southern Tableland Western Hills Scribbly Gum Forest	Not listed	Not listed	No	Construction, operation	4.65
3747_Poor_Southern Tableland Western Hills Scribbly Gum Forest	Not listed	Not listed	No	Construction, operation	5.96
3747_Shrubland_Southern Tableland Western Hills Scribbly Gum Forest	Not listed	Not listed	No	Construction, operation	12.30
3749_Good_Western Blue Mountains Scribbly Gum Forest	Not listed	Not listed	No	Construction, operation	1.64
3749_Shrubland_Western Blue Mountains Scribbly Gum Forest	Not listed	Not listed	No	Construction, operation	1.35

Vegetation zone	BC Act status	EPBC Act status	SAII entity	Project phase/timing of impact (e.g. construction, operation, rehabilitation)	Area in subject land (ha)[1]
3932_Moderate_Central and Southern Tableland Swamp Meadow Complex	Not listed	Not listed	No	Construction, operation	2.38
Total clearing of native vegetation[1]					**55.43**
Non-native	Not listed	Not listed	No	Construction, operation	29.96
Planted native vegetation	Not listed	Not listed	No	Construction, operation	0.27
Waterbody	Not listed	Not listed	No	Construction, operation	0.78
Total vegetation clearing[1]					**86.45**

Note: 1. The overall total vegetation clearing value is rounded up to be consistent with the total derived from spatial data calculations; and is 0.01 ha greater than the sum of individual vegetation zone areas. The value of 86.45 ha is adopted throughout the BDAR as the conservative total vegetation clearing area.

Table 8.2 Direct impacts associated with proposed activities

Proposed activity	Intensity of impacts	Duration of impacts
Establishment of construction compound	To be used for construction purposes only (eg the storage of materials, site office and parking). Construction compounds have been selected to minimise the amount of tree removal required. Two of the three construction compounds (compounds 2 and 3) are in non-native vegetation while the third is in poor condition grassland and shrubland (compound 1). For compound 1, grubbing and clearing of small native shrubs / grasses may be required as well as topsoil removal and some areas to be re-graded. Trimming of native trees may also be required. Construction compounds, would be left in a stable, weed free condition upon completion of construction.	Temporary medium term
Vegetation removal within the easement including the existing easement and the widened section of the easement	Full vegetation removal has been assumed across the easement. However, about 75 per cent of the proposed easement is already cleared of any canopy vegetation with only some native groundcover and shrubs present. Minimal clearing would be required on agricultural land. The impact of clearing would be greatest in areas where the removal of trees and associated understorey vegetation is required to widen the easement from 45 m to 60 m. Following construction, these areas would be left in a stable, weed free condition. Vegetation regrowth which would not infringe on the VCR at , at maturity, would be allowed to regrow.	Permanent – where tall growing vegetation infringes on the VCR Temporary medium term - where vegetation does not infringe on the VCR
Upgrade and construction of access tracks	Vegetation removal would be required for new and upgraded access tracks. Some existing access tracks do not require any vegetation removal. Access tracks are shown in Figure 1.3. Approximately 25.3 km of existing tracks would be upgraded and widened up to 6 m with vegetation removal required outside of the existing track extent. In some locations, tracks would be widened up to 10 m in due to local topography. Approximately 1.7 km of new access tracks would be required with vegetation removal required for the full 6 m width of these new tracks. A permanent box culvert would also be installed across an unnamed existing waterway north of Brays Lane to the west of the rail line as part of the access track providing access to transmission structures 10D and 11D. A second new culvert is required north of the Coxs River near transmission structure 6D. Widening of existing waterway crossings may be required. The need for such works would be confirmed during detailed design. Within the new and upgraded access tracks, removal of all vegetation (where present) will be required.	Permanent – where tracks retained for operation

Proposed activity	Intensity of impacts	Duration of impacts
	In addition to the above tracks, a further 4.3 km of existing access track would be subject to repairs to the surface repairs only, and not widened. These tracks would not require any vegetation removal. Most tracks used for the project are existing tracks and would remain in use post-construction. A number of access tracks within agricultural land would not be required beyond construction and would be restored to existing condition in consultation with landowners.	
Removal of transmission structures and conductors	Vegetation clearing would be required for the removal of the gantry, transmission structures, and conductors. Full vegetation clearing has been assumed in these areas. Following construction, these areas would be left in a stable, weed free condition. Vegetation that would not infringe on the VCR at maturity would be allowed to regrow.	Temporary medium term
Construction of transmission structures including establishment of construction benches	Full vegetation removal is required at construction benches measuring 70 m by 50 m. Topsoil would be removed and stock-piled during construction. Following construction, topsoil would be respread across the area. A 20 m radius of each transmission structure footing would be kept free of shrubs and trees. The remainder of the construction bench would be left in a stable, weed free condition. Vegetation that would not infringe on the VCR at maturity would be allowed to regrow.	Permanent – 20 m radius around the base of each structure Temporary - medium term - remainder of construction bench
Transmission line stringing including establishment of brake and winch sites	Brake and winch sites are required to string transmission lines. Full vegetation removal is required at brake and winch sites. They vary in size with some contained within the easement and others extending beyond the easement. Following construction, brake and winch sites on agricultural land would be restored to previous condition. The others would be left in a stable, weed free condition and vegetation allowed to regrow. On easement, vegetation that could infringe on the VCR at maturity would be removed.	Temporary medium term – where outside the easement Permanent – on easement where vegetation infringing on the VCR would need to be removed

Table 8.3 Impacts on vegetation integrity

Vegetation zone	Area (ha)	Before development				After development				Change in VI score
		Composition	Structure	Function	VI score	Composition	Structure	Function	VI Score	
3369_Good_Central Tableland Ranges Peppermint-Gum Grassy Forest	1.47	53.4	89.7	88.9	75.3	0	0	0	0	-75.3
3369_Shrubland_Central Tableland Ranges Peppermint-Gum Grassy Forest	5.48	41.9	52.8	12.2	30	0	0	0	0	-30
3385_Good_Southern Tableland Creekflat Swamp Woodland	2.59	74.4	97.1	76	81.9	0	0	0	0	-81.9
3385_Poor_Southern Tableland Creekflat Swamp Woodland	6.94	29.7	41.9	2.6	14.8	0	0	0	0	-14.8
3385_Moderate_Southern Tableland Creekflat Swamp Woodland	0.83	79.9	70.7	18.1	46.8	0	0	0	0	-46.8
3385_Paddock_Trees_Southern Tableland Creekflat Swamp Woodland	0.61	27.3	31.5	49.0	34.8	0	0	0	0	-34.8
3735_Good_Central Tableland Peppermint Shrub-Grass Forest	1.69	91.4	95.5	87.6	91.5	0	0	0	0	-91.5
3735_Shrubland_Central Tableland Peppermint Shrub-Grass Forest	7.53	70.1	54.3	14.7	38.3	0	0	0	0	-38.3
3747_Good_Southern Tableland Western Hills Scribbly Gum Forest	4.65	73.8	90.8	76.1	79.9	0	0	0	0	-79.9
3747_Shrubland_Southern Tableland Western Hills Scribbly Gum Forest	12.30	71.8	52.3	22.1	43.6	0	0	0	0	-43.6
3747_Poor_Southern Tableland Western Hills Scribbly Gum Forest	5.96	25.1	32.8	7.6	18.4	0	0	0	0	-18.4
3749_Good_Western Blue Mountains Scribbly Gum Forest	1.64	95.3	84.5	52.6	75.1	0	0	0	0	-75.1
3749_Shrubland_Western Blue Mountains Scribbly Gum Forest	1.35	81.2	53.1	13.6	38.8	0	0	0	0	-38.8
3932_Moderate_Central and Southern Tableland Swamp Meadow Complex	2.38	39.8	60.1	-	48.9	0	0	0	0	-48.9

8.1.2 Removal of vegetation and habitat resources

The project would remove or modify a maximum of 55.43 ha of native vegetation as detailed in section 8.1.1. Impacts would be mainly concentrated in areas that have previously been disturbed and modified as a result of the construction of existing transmission lines and other infrastructure. The project would utilise the existing 45 m easement for Line 94E for 4.8 km. This easement would need to be widened by 15 m and trees removed from this area. Much of the area southeast of the Gardens of Stone SCA has already been cleared and contains low condition grassland and shrubland. Less vegetation clearing would therefore be required for the project in this area than in the SCA.

For the purposes of this BDAR, it is assumed that project would result in the clearing of the entire subject land as shown on Figure 4.1. All future composition, structure and function scores would therefore be reduced to 0 for all vegetation zones across the entire subject land as summarised in Table 8.3.

Surveys confirmed the presence of two threatened flora species Black Gum (*Eucalyptus aggregata*) and Capertee Stringybark (*Eucalyptus cannonii*) listed under the under the NSW BC Act and Commonwealth EPBC Act. The project would remove 274 individuals of Black Gum (including up to 60 seedlings and resprouting saplings within an existing maintained electricity easement) and 142 individuals of Capertee Stringybark.

Surveys conducted between 2023 and 2025 confirmed the presence of a number of threatened fauna listed under the NSW BC Act and Commonwealth EPBC Act within or near the study area:

– Dusky Woodswallow (*Artamus cyanopterus cyanopterus*)
– Gang-gang Cockatoo (*Callocephalon fimbriatum*)
– South-eastern Glossy Black-cockatoo (*Calyptorynchus lathami lathami*)
– Scarlet Robin (*Petroica boodang*)
– Speckled Warbler (*Chthonicola sagittata*)
– Varied Sittella (*Daphoenositta chrysoptera*)
– White-bellied Sea-eagle (*Haliaeetus leucogaster*)
– Little Lorikeet (*Glossopsitta pusilla*)
– Southern Myotis (*Myotis macropus*)
– Large-eared Pied Bat (*Chalinolobus dwyeri*)
– Large Bent-winged Bat (*Miniopterus orianae oceanensis*)
– Eastern False Pipistrelle (*Falsistrellus tasmaniensis*)
– Yellow-bellied Sheathtail Bat (*Saccolaimus flaviventris*).

A nest tree census was conducted to identify hollow-bearing trees, stick nests or other signs of breeding activity of threatened fauna that could require calculation of species credits according to the BAM. The nest tree census revealed numerous hollow-bearing trees in the subject land and surrounding study area as shown on Figure 5.2. No candidate nest trees suitable for use by threatened eagles or kites were recorded. No direct evidence of habitat resources was observed to suggest that the subject land is of particular importance to local populations of other threatened species. A rocky outcrop with a small cave providing low quality potential breeding habitat for the Large-eared Pied Bat in agricultural land adjacent to the subject land would be retained and not directly impacted by project.

The subject land does not contain mapped important habitat for any threatened or migratory species listed under the EPBC Act.

The subject land contains habitat for the threatened fauna species listed above and other fauna of riparian and woodland environments. A summary of impacts by habitat types as mapped on Figure 5.2 is provided in Table 8.4. Habitat associated with large mature trees, understorey vegetation and shelter substrate such as fallen timber, leaf litter and grasses would be removed or modified over up to 55.43 ha of native vegetation within the subject land. The project would remove a small proportion of the resources available in the local area, given clearing would occur predominantly within an existing transmission line easement.

The loss of forest and woodland habitats would result in the loss of 180 hollow-bearing trees that may provide nesting and denning for several threatened species known or likely to occur in the subject land, including cockatoos, owls, microbats and Squirrel Gliders. While many hollow-bearing trees are mapped in or adjacent to the subject land, it is noted that no additional clearing is occurring along some of the access tracks (e.g. those within the parallel easement in the Gardens of Stone SCA) or along the southern boundary of the easement through the SCA as this is an existing easement. Figure 5.2 identifies hollow-bearing trees that would be removed, as well as hollow-bearing trees recorded in adjacent areas, noting that surveys outside the subject land were not exhaustive.

The loss of woodland, forest and shrubland habitat would remove breeding, foraging and shelter habitat for a range of species, including small woodland birds. Eucalyptus and other native canopy species provide nectar resources as well as foraging substrate for a diverse range of arboreal species, such as birds and arboreal mammals, as well as microbats. The surrounding locality, in particular the Gardens of Stone SCA, provides many thousands of hectares of similar vegetation and habitat resources which would continue to support these threatened species.

Construction is likely to result in the injury or mortality of individuals of less mobile fauna species and other small terrestrial fauna that may be sheltering in vegetation within the subject land during clearing activities and unable to move out of the area. This could include nesting birds, small terrestrial mammals, lizards and frogs, and nocturnal fauna sheltering in hollows. More mobile native fauna such as adult birds, and larger terrestrial mammals and reptiles that may be sheltering in vegetation in the subject land are more likely to evade injury during construction activities.

The project will widen the gap between intact vegetation either side of the easement, exacerbating the existing impacts on connectivity created by the 132 kV transmission line. Habitat loss and fragmentation strongly influence animal movement patterns, which are intrinsically related to population dynamics. Species of animals most at risk of population fragmentation due to linear infrastructure include species that are unwilling or unable to travel across cleared areas or have poor dispersal ability. Further discussion of impacts on connectivity are provided in section 8.5.

Table 8.4 Summary of residual direct impacts on fauna habitat types

Habitat type	Extent in subject land (ha)
Dry shrubby sclerophyll forest and woodland	9.46
Paddock trees	0.61
Riparian woodland	3.42
Poor condition shrubland and grassland	39.56
Wetland	2.38

8.2 Indirect impacts

Table 8.5 documents the potential residual indirect impacts that could arise from the construction and operation of the project. Edge effects as a result of the project have been assessed to have a low to moderate level of impact on vegetation zones 3385_Good and 3385_Moderate and species credit species associated with these vegetation zones. Ecosystem and species credits have been calculated and assessed in BAM-C for these impacted entities (refer to section 9.1.4). The management zones subject to indirect impacts on these entities are shown on Figure 8.1.

Table 8.5 Summary of residual indirect impacts

Indirect impact	Impacted entities	Frequency	Duration	Timing	Likelihood and potential consequences	Residual indirect impact
Edge effects	Woodland vegetation susceptible to increased growth or exotic plants: – 3385_Good – 3385_Moderate – Barking Owl – Gang-gang Cockatoo – Large-eared Pied Bat – Powerful Owl – Southern Myotis – Squirrel Glider.	Ongoing	Long-term	Construction and operation	'Edge effects' can include increased noise and light or erosion and sedimentation at the interface of intact vegetation and cleared areas. Edge effects may result in impacts such as changes to vegetation type and structure, increased growth of exotic plants, increased predation of native fauna or avoidance of habitat by native fauna. Altered environmental conditions along new edges can allow invasion by pest animals specialising in edge habitats and/or change the behaviour of resident animals. Edge zones can be subject to higher levels of predation by introduced mammalian predators and native avian predators. Edge effects may result from the clearing of native vegetation and other construction activities and then continue to affect vegetation and habitats retained outside the subject land. Given the location of the project along an existing electricity easement, much of the adjacent vegetation is already subject to edge effects. The expansion of the easement to the north will move the edge and thus extend the edge effects in some locations into areas not currently affected. No new edge effects are expected along the southern boundary of the existing easement through the Gardens of Stone SCA and similar vegetation further to the west as there is no change to the location of the southern edge of this easement with the existing southern easement boundary for the 132 kV to be reused. Particular woodland vegetation types can be more susceptible to edge effects compared to others. A study by Hansen et al. (2008) found that edge effects are most likely to negatively influence woodlands with a high biomass ecosystem and finer microclimates such as tropical and temperate rainforests but may have little influence on woodlands with low biomass ecosystems. Six PCTs occur in the subject land, four of these PCTs (PCT 3369, 3735, 3747 and 3749) typically occur on the drier quartz-rich sedimentary soils on ridges and upper slopes and are assessed as low biomass ecosystems with a more open woodland structure and a lower cover of mid-story and understory species. These four PCTs in the subject land occur adjacent to the existing cleared easement and showed minimal influence of edge effects, with relatively low cover and abundance of exotic plants. PCT 3385 and 3932 in the subject land typically occur on more loamy fertile soils in low-lying areas and are assessed as high biomass ecosystems with a much denser mid-story and understory. These PCTs in the subject land were observed to be affected by edge effects as a result of the existing cleared easement and contained a much higher cover and	Moderate to low – offsets required (refer to section 9.1.4)

Indirect impact	Impacted entities	Frequency	Duration	Timing	Likelihood and potential consequences	Residual indirect impact
					abundance of exotic plants, in particular Blackberry (*Rubus fruticosus*). Additional offset credit obligations have been calculated for vegetation zones in the subject land which are more susceptible to edge effects. These vegetation zones are PCT 3385_Good and PCT 3385_Moderate. The buffer distance and adjustment to VI attributes to assess predicted impacts of edge effect to these vegetation zones is included in section 9.1.3. PCT 3932_Moderate is also considered a high biomass ecosystem, however, has not been included in edge effect calculations as this PCT in the subject land occurs in narrow bands adjacent to degraded areas mapped as non-native vegetation (Figure 4-1). As such the project is not considered to increase edge effects to this vegetation zone.	
Introduction and spread of weeds, pests and pathogens	All vegetation	Ongoing	Long-term	Construction and operation	Disturbance associated with vegetation clearing and vehicle traffic during construction may, in general, increase the potential for the spread, introduction and establishment of weed and pest species, and diseases and pathogens. There are moderate numbers of priority weeds and high threat exotics present across the subject land. The project has the potential to result in further spread of these weed species into native vegetation where they are not yet established or where they occur at low densities. Construction environmental management plans will specify measures to prevent access to native vegetation outside the subject land and minimise the risk of transmitting weed propagules. The subject land adjoins sensitive areas of native vegetation in the Gardens of Stone SCA. Environmental inductions, visual barriers and/or exclusion fencing will be used to exclude personnel and vehicles from native vegetation outside the construction footprint. To further mitigate the risk of pathogens being brought onto and/or spread through the site all vehicles, plant and equipment will be cleaned down (wash/blow down) and certified weed free prior to all entry to site All vehicles, plant and equipment will strictly adhere to the approved roads, tracks, easements and work areas to minimise contact with vegetation. In addition to the above mitigation measures, any residual indirect impacts from the spread of weeds pests and pathogens has been captured in the method to offset edge effects. Refer to section 9.1.4 and Figure 8.1.	Low

Indirect impact	Impacted entities	Frequency	Duration	Timing	Likelihood and potential consequences	Residual indirect impact
Noise and vibration; and light impacts on fauna	Barking Owl Powerful Owl Gang-gang Cockatoo Southern Myotis Squirrel Glider	Ongoing	Short-term	Construction	Noise levels during the construction period would result in an increase above existing background levels for the duration of construction. Noise levels would vary during the construction period, with some activities being louder and producing higher levels of vibration than others such as piling for the construction of transmission structures foundations . The linear nature of the project also means noise sources would move along the easement as the works are progressively undertaken. Noise, vibration, and light have been shown to have a variety of impacts on fauna, including changing foraging behaviour, impacting breeding success and changing species occurrences. Construction activities in the subject land would increase noise and vibration levels in the vicinity of fauna roosting and nesting habitat in the Gardens of Stone SCA and other areas of native vegetation. Parts of the study area are already subject to noise as a result of operation of the Mount Piper Power Station, various Centennial Springvale Coal Services Facility operations (including the coal conveyor), rail lines and public roads. Fauna most at risk would be those residing near the works area, and in particular any species that may be nesting, roosting or denning in the area. Some fauna may vacate areas in proximity to the subject land during construction. There are extensive, connected areas of alternative habitat which any displaced animals could access with minimal risk or energy cost. Lighting for night construction works has the potential to result in light spill into adjoining areas of native vegetation which may disturb resident fauna. Light generated during construction will be managed in general accordance with the requirements in Australian Standard AS 4282-1997 Control of the Obtrusive Effects of Outdoor Lighting. Directional lighting will be used to minimise the effects of light spill outside the works area as far as possible. As construction works would generally be finished by 7pm, impacts of light spill would mainly occur at dusk and shortly thereafter during winter months. Impacts of light spill during construction can be mitigated. There is not expected to be any residual impacts of light spill post construction.	Low

Indirect impact	Impacted entities	Frequency	Duration	Timing	Likelihood and potential consequences	Residual indirect impact
Erosion and sedimentation	PCT 3385 Southern Tableland Creekflat Swamp Woodland PCT 3932 Central and Southern Tableland Swamp Meadow Complex *Eucalyptus aggregata* *Eucalyptus cannoni*	Ongoing	Long-term	Construction and operation	Removal of vegetation, soil disturbance and excavation, and construction of ancillary infrastructure would expose subsoil and generate spoil material and could, in general, result in erosion and sedimentation. Given the location of the works in an existing easement for much of the project and the proposed environmental management measures, the project is highly unlikely to result in a tangible increase in the degree of erosion or sedimentation. The project would be undertaken in accordance with a CEMP and would include industry best practice methods for excavating, handling and storing soils. Impacts of erosion and sedimentation will be mitigated appropriately. There are no expected residual impacts from erosion and sedimentation.	Low
Dust	All vegetation	Ongoing	Long-term	Predominantly construction	Construction of the project may result in generation of dust. High dust levels could reduce habitat quality for flora and fauna species by reducing plant and animal health in adjacent areas of vegetation. Dust may affect photosynthesis, respiration and transpiration in plants and allow the penetration of gaseous pollutants. This then leads to decreased productivity, and in the long-term can alter community structure. Dust could also impact health of fauna, such as through respiratory disease, and the reduction in health of animals would be exacerbated by changes to plant health and community structure. Suppression of dust would be undertaken during construction and detailed in a CEMP. Impacts of dust will be mitigated appropriately. There are no expected residual impacts from dust.	Low
Fire	All vegetation and species	Uncertain	Long-term	Construction and operation	Construction of the project presents a potential risk of fire, for example from storage of combustible fuels or ignition from works areas. In drought conditions, this risk would be increased due to the dry nature of the vegetation. Much of Australia's biodiversity is adapted to and relies upon bushfire as a natural ecosystem process. However, fires can lead to mortality of fauna, and destruction of habitat resources, especially if too regular or intense. Small fires can spread very quickly in unfavourable conditions to become large wildfires, such as the State Mine Fire in 2013 and the Gosper's Mountain Fire in 2019-2020. Bushfires of high to extreme intensity can result in significant modification of vegetation structure and composition such that the original vegetation type and condition is no longer identifiable.	Low

Indirect impact	Impacted entities	Frequency	Duration	Timing	Likelihood and potential consequences	Residual indirect impact
					The risk of fires spreading to adjacent areas would be minimised through the implementation of a Bushfire Management Plan and a Bushfire Emergency Management and Evacuation Plan as part of the CEMP and other measures to contain and control the outbreak of fire.	

As stated in the BAM (DPIE, 2020a) the 'retirement of biodiversity credits may be used with other conservation measures to mitigate prescribed impacts or the indirect impacts of a proposal on areas of native vegetation, TECs and/or threatened species, or their habitat adjacent to the subject land. Where part or all of the indirect or prescribed impacts cannot be avoided, minimised or mitigated, the assessor can propose offsets or other measures that benefit threatened entities and their habitat. The approach to calculating any proposed offsets should be documented and justified.'

Following application of the measures to avoid, minimise and mitigate as summarised in Table 9.4, additional biodiversity offset credits have been applied for indirect impacts associated on habitat and threatened species adjacent to the subject land. Vegetation zones and threatened species determined to be impacted by edge effects are as follows:

– PCT 3385_Good
– PCT 3385_Moderate
– Barking Owl
– Gang-gang Cockatoo
– Large-eared Pied Bat
– Powerful Owl
– Southern Myotis
– Squirrel Glider.

The area of residual indirect impact on the above listed entities was calculated by applying a 10 m buffer to the subject land. A 20 per cent reduction in the vegetation composition and structure was applied to mid-story and groundcover species only to account for the loss of vegetation integrity as a result of edge effects. The indirect impacts on PCTs are summarised in Table 8.6, and the indirect impacts on species credit entities are summarised in in Table 8.7.

Table 8.6 Indirect impacts – vegetation zones

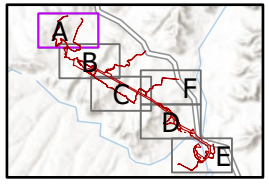
Vegetation zone	PCT ID	TEC	Impact area (ha)	Current VI score	Future VI score	Change in VI score
3385_Good_Southern Tableland Creekflat Swamp Woodland	3385	No	1.03	81.9	74.8	-7.1
3385_Moderate_Southern Tableland Creekflat Swamp Woodland	3385	No	0.05	46.8	42.1	-4.7

Table 8.7 Indirect impacts areas – species

Common name	Scientific name	BC Act status	EPBC Act status	Indirect impact area (ha)
Barking Owl	*Ninox connivens*	V	Not listed	0.52
Gang-gang Cockatoo	*Callocephalon fimbriatum*	E	E	0.52
Large-eared Pied Bat	*Chalinolobus dwyeri*	E	E	1.08
Powerful Owl	*Ninox strenua*	V	Not listed	0.52
Southern Myotis	*Myotis macropus*	V	Not listed	0.95
Squirrel Glider	*Petaurus norfolcensis*	V	Not listed	0.52

Notes: E – listed as an endangered species.
V – listed as a vulnerable species.





Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

Management zones

Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 8.1A

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR022_ManagementZones
Print date: 17 Jul 2025 - 12:51

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan



Legend

Management Zones

- MZ1 Full removal of 3369_Good_Central Tableland Ranges Peppermint-Gum Grassy Forest
- MZ2 Full removal of 3369_Shrubland_Central Tableland Ranges Peppermint-Gum Grassy Forest
- MZ3 Full removal of 3385_Good_Southern Tableland Creekflat Swamp Woodland
- MZ3I Indirect impacts to 3385_Good_Southern Tableland Creekflat Swamp Woodland
- MZ6 Full removal of 3385_Poor_Southern Tableland Creekflat Swamp Woodland
- MZ7 Full removal of 3735_Good_Central Tableland Peppermint Shrub-Grass Forest
- MZ8 Full removal of 3735_Shrubland_Central Tableland Peppermint Shrub-Grass Forest
- MZ9 Full removal of 3747_Good_Southern Tableland Western Hills Scribbly Gum Forest
- MZ10 Full removal of 3747_Poor_Southern Tableland Western Hills Scribbly Gum Forest
- MZ11 Full removal of 3747_Shrubland_Southern Tableland Western Hills Scribbly Gum Forest
- MZ12 Full removal of 3749_Good_Western Blue Mountains Scribbly Gum Forest
- MZ13 Full removal of 3749_Shrubland_Western Blue Mountains Scribbly Gum Forest

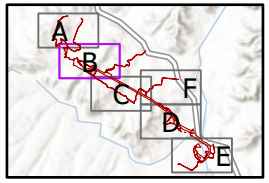
Subject land

Indirect impact area

Proposed transmission line

Roads

Contour (10m)



Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

Management zones

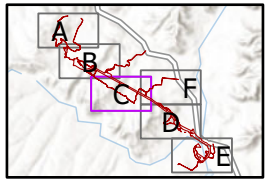
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 8.1B

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR022_ManagementZones
Print date: 17 Jul 2025 - 12:52

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

Management zones

Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 8.1C

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR022_ManagementZones
Print date: 17 Jul 2025 - 12:53

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan

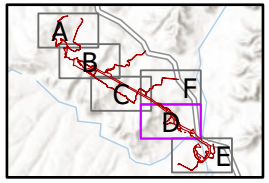


Legend

Management Zones

- MZ1 Full removal of 3369_Good_Central Tableland Ranges Peppermint-Gum Grassy Forest
- MZ2 Full removal of 3369_Shrubland_Central Tableland Ranges Peppermint-Gum Grassy Forest
- MZ3 Full removal of 3385_Good_Southern Tableland Creekflat Swamp Woodland
- MZ3I Indirect impacts to 3385_Good_Southern Tableland Creekflat Swamp Woodland
- MZ5 Full removal of 3385_Paddock trees_Southern Tableland Creekflat Swamp Woodland
- MZ6 Full removal of 3385_Poor_Southern Tableland Creekflat Swamp Woodland
- MZ8 Full removal of 3735_Shrubland_Central Tableland Peppermint Shrub-Grass Forest
- MZ9 Full removal of 3747_Good_Southern Tableland Western Hills Scribbly Gum Forest
- MZ10 Full removal of 3747_Poor_Southern Tableland Western Hills Scribbly Gum Forest
- MZ11 Full removal of 3747_Shrubland_Southern Tableland Western Hills Scribbly Gum Forest
- MZ14 Full removal of 3932_Moderate_Central and Southern Tableland Swamp Meadow Complex

- Subject land
- Indirect impact area
- Proposed transmission line
- Railway
- Roads
- Contour (10m)
- Watercourse



Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

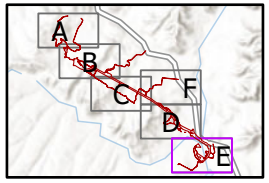
Management zones

FIGURE 8.1D

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR022_ManagementZones
Print date: 17 Jul 2025 - 12:53

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

Management zones

Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 8.1E

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR022_ManagementZones
Print date: 17 Jul 2025 - 12:54

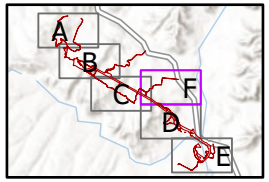
Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan



Legend

Management Zones

- MZ1 Full removal of 3369_Good_Central Tableland Ranges Peppermint-Gum Grassy Forest
- MZ2 Full removal of 3369_Shrubland_Central Tableland Ranges Peppermint-Gum Grassy Forest
- MZ3 Full removal of 3385_Good_Southern Tableland Creekflat Swamp Woodland
- MZ3I Indirect impacts to 3385_Good_Southern Tableland Creekflat Swamp Woodland
- MZ4 Full removal of 3385_Moderate_Southern Tableland Creekflat Swamp Woodland
- MZ6 Full removal of 3385_Poor_Southern Tableland Creekflat Swamp Woodland
- MZ7 Full removal of 3735_Good_Central Tableland Peppermint Shrub-Grass Forest
- MZ8 Full removal of 3735_Shrubland_Central Tableland Peppermint Shrub-Grass Forest
- MZ9 Full removal of 3747_Good_Southern Tableland Western Hills Scribbly Gum Forest
- MZ10 Full removal of 3747_Poor_Southern Tableland Western Hills Scribbly Gum Forest
- MZ11 Full removal of 3747_Shrubland_Southern Tableland Western Hills Scribbly Gum Forest
- Subject land
- Indirect impact area
- Proposed transmission line
- Roads
- Contour (10m)
- Watercourse



Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

Management zones

Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 8.1F

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR022_ManagementZones
Print date: 17 Jul 2025 - 12:54

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan

8.3 Impacts on Gardens of Stone State Conservation Area

The Gardens of Stone SCA was reserved in 2022 and comprises the former Newnes, Ben Bullen and Wolgan state forests. The SCA covers an area of 28,322 ha with the majority of the SCA occurring to the east of the Castlereagh Highway. The Angus Place, Clarence and Springvale mining operations occur below parts of the SCA (including other portions of the SCA) and supply coal to the Mount Piper Power Station. The SCA is divided over three areas (NSW NPWS, 2023); the project would traverse through the smaller portion of the SCA located on the western side of the Castlereagh Highway and is not directly connected to any other portions of SCA, National Parks or State Forest. This portion of the SCA has two existing parallel transmission line easements (supporting 330 kV and 132 kV lines) as well as associated access tracks.

The project would predominantly remove a strip of vegetation up to 15 m wide on the northern side of the existing 132 kV line easement near the Centennial Springvale Coal Services facility for approximately 3 km (see Figure 8.2). Up to 17.54 ha of native vegetation associated with the project would be removed from within the SCA (see Table 8.8). Impacts on threatened species within the SCA are provided in Table 8.9. Vegetation clearing would also occur to provide suitable access tracks and potential brake and winch locations within the subject land. Vegetation clearing is not anticipated for the upgrade of access tracks within the parallel 330kV line easement with no widening of these tracks proposed.

The vegetation proposed for removal within the Gardens of Stone SCA comprises a mix of regenerating shrubland and mature eucalypt forest. This vegetation is currently subject to edge effects as it occurs adjacent to the Reject Emplacement Area.

The portion of the SCA in which the subject land lies does not contain key biodiversity features that the rest of the SCA is renowned for, such as three TECs (White Box – Yellow Box – Blakely's Red Gum Woodland EEC, Newnes Plateau Shrub Swamps EEC and Montane Peatlands and Swamps of the New England Tableland, Sydney Basin, South East Corner, South Eastern Highlands and Australian Alps bioregions EEC) and complex rocky landforms and pagodas representing the upland plateau (DPE, 2022a., DPE, 2022b).

Table 8.8 Direct native vegetation impacts in the Gardens of Stone SCA

Vegetation zone	Direct impact in subject land (ha)
3369_Good	0.74
3369_Shrubland	1.29
3385_Good	0.72
3385_Moderate	0.80
3385_Poor	0.43
3735_Good	1.14
3735_Shrubland	2.74
3747_Good	1.77
3747_Shrubland	7.77
3749_Good	0.12
Total native vegetation	**17.54**

Table 8.9 Impacts on species credit species and removal of habitat resources in the Gardens of Stone SCA

Species credit entity / habitat resource	No. of individuals impacted within subject land in the SCA	Extent of species polygon within subject land in the SCA (ha)	Extent of species polygons in indirect impact areas in the SCA (ha)
Black Gum	4	N/A	N/A
Capertee Stringybark	30	N/A	N/A
Large-eared Pied Bat	N/A	17.54	0.20
Southern Myotis	N/A	7.71	0.08
Powerful Owl	N/A	4.50	0.19
Barking Owl	N/A	4.50	0.19
Gang-gang Cockatoo	N/A	4.50	0.19
Squirrel Glider	N/A	12.27	0.19
Hollow-bearing trees	80	N/A	N/A

Impacts on threatened flora include the removal of Black Gum and Capertee Stringybark individuals. Removal of four Black Gums would occur for the construction of the proposed transmission line where the project crosses two creek lines in the SCA. Individuals extend either side of the project along the creeks, and the majority of these populations would be retained in the SCA and includes at least 22 individuals. The majority of the impact on the Capertee Stringybark will occur outside the SCA portion of the subject land at the western end of the subject land on land surrounding the Mount Piper Power Station. Thirty individuals in the SCA would be impacted but many are likely to remain in unaffected areas of this portion of the SCA given the species is known to occur in other separate portions of the SCA to the north and east.

Direct impacts on threatened fauna include the removal of occupied habitat and up to 80 hollow-bearing trees within the SCA. Indirect impacts to threatened fauna would likely occur in up to 0.20 ha of native vegetation associated with recorded species credit species within indirect impact areas of the SCA.

While efforts have been made to minimise impacts to native vegetation in the Gardens of Stone SCA, clearing would still be required and would result in loss of habitat for threatened fauna, including removal of hollow-bearing trees and foraging resources. The clearing would increase the width of the easement, and result in impacts on connectivity for the Squirrel Glider for the portion of the SCA that extends north of the existing easement. There would be limited impacts on connectivity for birds and microbats. The project includes the implementation of mitigation measures to mitigate the impacts on habitat connectivity for the Squirrel Glider within the SCA portion of the subject land (refer to Table 8.16).

The *Developments adjacent to National Parks and Wildlife Service lands: guidelines for consent and planning authorities* (NSW NPWS, 2020) outlines issues that need to be addressed when developing land adjacent to national park estate. An assessment of the nature, extent and duration of any potential indirect impacts on the SCA, addressing matters relevant to biodiversity, is provided in Table 8.10.

Table 8.10 Indirect and other impacts on National Park estate

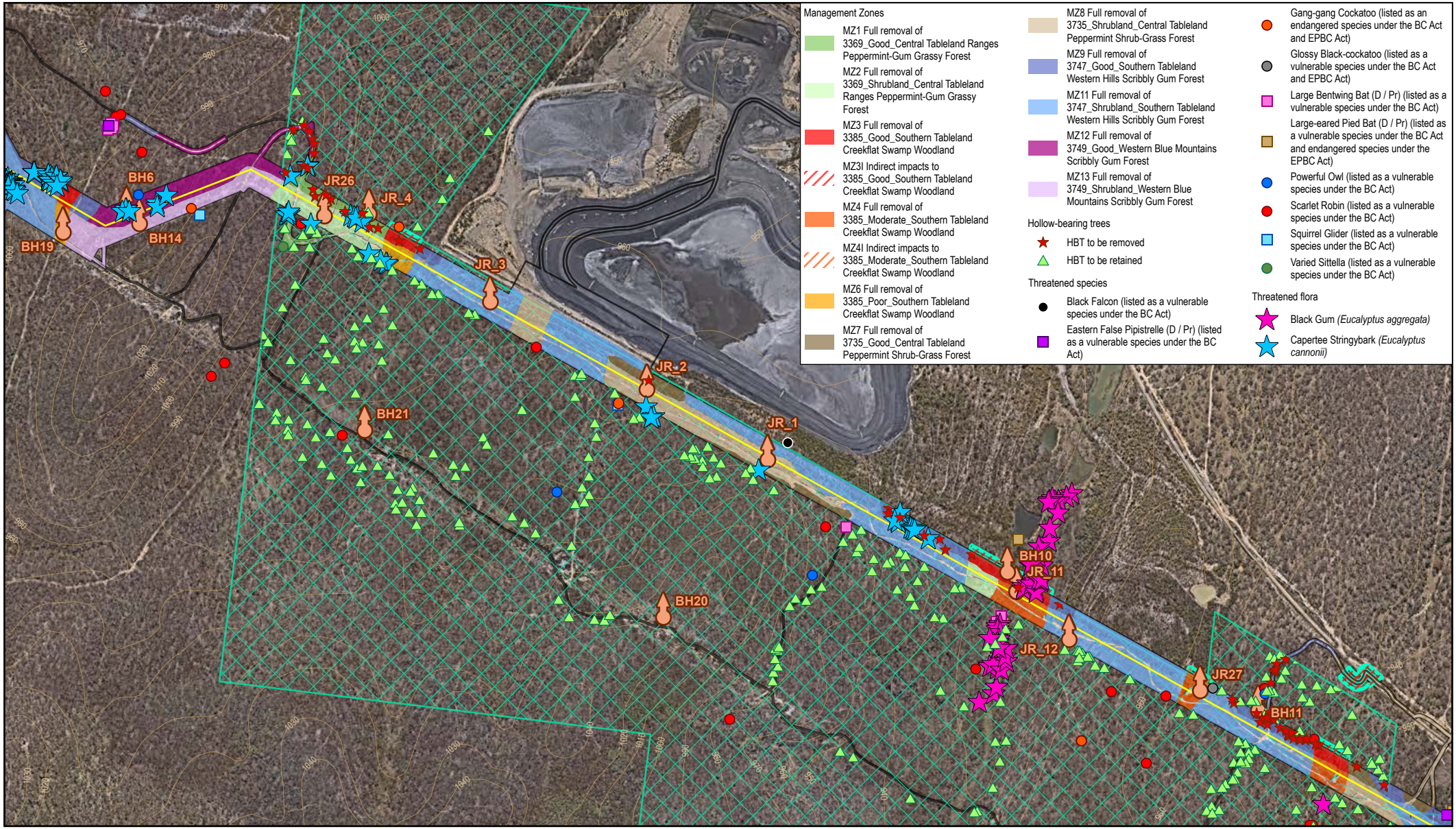
Issue	Aim	Discussion
Erosion and sediment control	To prevent erosion and the movement of sediment onto NPWS land	The guidance document highlights intense and frequent stream flows resulting from vegetation clearing within or adjoining lands managed by NPWS as a potential risk of a project. This may lead to scouring of the bed and banks of waterways and altering water quality downstream aquatic habitats. **Nature and extent** There are no major waterways adjacent to or within Gardens of Stone SCA which would be indirectly impacted by erosion and sedimentation during construction. The Coxs River is the nearest waterway to Gardens of Stone SCA within the subject land and occurs over approximately 1 km to the east and with a drop in elevation of over 100 m. A number of drainage lines intersect the Gardens of Stone SCA and may be susceptible to erosion and sedimentation, particularly where vegetation clearing is required outside the existing easement if mitigation measures are not implemented. These drainage lines are ephemeral and only periodically contain water. They are currently exposed to existing sedimentation and erosion impacts resulting from the construction, operation and continual degradation of the existing access track along the existing 132KV easement. General consideration of indirect erosion and sediment impacts is provided in Table 8.5. Measures to minimise sedimentation impacts within and adjacent to the Gardens of Stone SCA is provided in Table 8.16. **Duration** Erosion and sediment impacts would occur during construction for a period of up to 24 months. The subject land within Gardens of Stone SCA represents approximately 3 km of the 8 km long new transmission line easement required for the project. Construction of the project will involve specific sections at a time. Accordingly, construction within Gardens of Stone SCA is likely to occur across several shorter periods during the two-year constructure timeframe. Operation of the project is approximately 50 years. The duration of erosion and sediment control during operation would extend for the life of the project, with regular maintenance required to restore tracks and crossings over ephemeral drainage lines.
Wastewater and stormwater	Nutrient levels are minimised, and stormwater flow regimes and patterns mimic natural levels before reaching NPWS land, to ensure no detrimental change to hydrological regimes	The guidance document highlights discharging of stormwater or wastewater causing a dispersal of litter and pest species, altering nutrient composition and pollutant levels and causing potential erosion and sedimentation in waterways and impacting on Aboriginal sites as a risk to NPWS land. **Nature and extent** Disconnected tributaries of Wangcol Creek are likely to be impacted within Gardens of Stone SCA. All eight new transmission structures within Gardens of Stone SCA would be constructed between 40 m and 235 m from these tributaries and would be outside the vegetated riparian zone (VRZ) (see Water Assessment - GHD 2025a). The operation of the project will not involve any ongoing works that would otherwise divert, intercept or impact flows directly or indirectly as existing structures would be replaced with like-for-like. No new or existing waterway crossings or infrastructure associated with stormwater treatment are proposed within Gardens of Stone SCA. One concrete sediment basin is already present within the easement in the SCA to manage runoff from track erosion. No wastewater disposal systems are proposed within Gardens of Stone SCA. **Duration** Timing as above for erosion and sediment control.

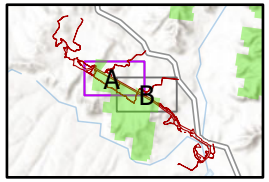
Issue	Aim	Discussion
Management implications relating to pests, weeds and edge effects	Adjoining or nearby development does not: lead to increased impacts from invasive species (weeds and pests), domestic pets and stock – Facilitate unmanaged visitation, including informal tracks, resulting in negative impacts on cultural or natural heritage values – Lead to impacts associated with changes to the nature of the vegetation surrounding the Gardens of Stone SCA – Impede NPWS access for management purposes, including inappropriate fencing (refer also to access).	The guidance document highlights increased drying of soils and consequent changes to vegetation, a decline in fauna species that are sensitive to changes in vegetation along newly created edges, and increased predation associated with aggressive species in open situations as risks posed by vegetation clearing along or near the boundary of the Gardens of Stone SCA. **Nature and extent** As detailed in Table 7.2, the project has aimed to minimise impacts to Gardens of Stone SCA by clearing a strip of vegetation on the northern boundary of the existing 132 kV easement only. This side of the easement is located adjacent to a coal Reject Emplacement Areas forming part of the Centennial Springvale Coal Services facility with existing disturbed vegetation. The positioning of the project avoids impacts to larger areas of intact native vegetation on its southern boundary. As such, the existing edge effects from the above risks are already present. Siting of the project has been developed in consultation with NPWS. The use of an appropriate buffer or setback from NPWS land as recommended in the guidance is not practical for this project considering it is already using an existing easement to reduce edge effects in the Gardens of Stone SCA. Many informal bike tracks are present within the SCA. The widening of the easement is unlikely to result in the creation of additional informal tracks. A summary of mitigation to avoid additional impacts to pests, weeds and edge effects is provided in Table 8.5. **Duration** Ongoing pest and weed management will be ongoing for the operation of the project utilising Transgrid's existing procedures which are implemented across the transmission network. The Gardens of Stone SCA Plan of Management (DPE, 2022a) notes that feral animal and weed control strategies are currently in development.
Fire and the location of asset protection zones	All asset protection measures are within the development area, and there is no expectation for NPWS to change its fire management regime for the land it manages	The guidance document acknowledges the risk of fire which can degrade park values including biodiversity, cultural heritage and tourism. **Nature and extent** There is the risk of ignition from hot works, vehicle and machinery use and vegetation removal which may impact Gardens of Stone SCA. However, given the project is primarily using an existing easement in Gardens of Stone SCA, these sources of ignition are not novel and may slightly increase the risk of fire in the SCA. The Traffic and Transport Assessment (GHD, 2025c) noted that the upgrade of access tracks along the 132 kV easement would improve trafficability of the project, providing access through the entirety of the alignment and the opportunity for Category 1 response vehicles to traverse the easement in the SCA. This is likely to improve the management and control of a fire (if present). Asset Protection Zones (APZ) for the project have been provided for the location of the three construction compounds, where hazardous (combustible) materials may be stored. No construction compounds occur within the Gardens of Stone SCA, and therefore no additional clearing would be required for an APZ within or adjacent to the SCA. Risk to the project from large scale fires within the landscape would be high (considering the continuity of fuels from Gardens of Stone SCA), however the transmission lines would be constructed within easements which would be maintained in line with Transgrid's operational maintenance guidelines and non-conforming vegetation would be removed.

Issue	Aim	Discussion
		Transgrid have an established vegetation management program within easements to ensure vegetation is maintained with minimum clearances to maximum conductor sag points of the transmission lines. Vegetation Clearance Requirements (VCRs) are implemented within easements applicable to the project as described in Transgrid's *Maintenance Plan – Easements and Access Tracks.* General mitigation measures for fire risk are detailed in the Bushfire Assessment (GHD, 2025b). **Duration** Timing as above for erosion and sediment control.
Boundary encroachments and access through NPWS lands	No pre-construction, construction or post-construction activity occurs on land managed by NPWS. Any access that does occur must be legally authorised and comply with park management objectives.	The guidance document highlights unauthorised access resulting in vegetation, erosion and soil disturbance as a risk to NPWS lands. **Nature and extent** Unauthorised access to the subject land within Gardens of Stone SCA has been recorded with observations of illegal firewood collection and recreational use by dirt bike riders. While access to the existing 132 kV easement is currently padlocked, there is likely to be informal access trails used by trespassers to gain access, or access from the existing 500 kV easement. The widening of the easement is unlikely to result in the creation of additional informal tracks. Existing access tracks in the subject land within Gardens of Stone SCA may be used to access other areas of the project, to store materials, equipment, personnel vehicles or machinery or for maintenance access during operation of the transmission line. Measures, such as temporary fencing of 'no-go' areas during construction or installation of permanent, wildlife-compatible fencing would be used, to avoid unnecessary vegetation removal within the Gardens of Stone SCA. **Duration** Timing as above for erosion and sediment control.
Visual, odour, noise, vibration, air quality and amenity impacts	There is no reduction of amenity on NPWS land due to adjacent development.	The guidance document lists visual, odour, noise, vibration and lighting impacts as well as a degradation of air quality, as a potential risk to NPWS lands. **Nature and extent** Working hours for the project are proposed to be across a 6-day work week, between 7am to 6pm Monday to Friday and 8am to 1pm on Saturday. Out-of-hours construction would likely be required between 6 pm to 7pm Monday to Friday, 7am to 8am and 1pm to 7pm on Saturday and 7am to 7pm on Sunday. Some 24-hour work periods will also be required, including on Sundays and public holidays, this is for essential work required to be completed in electricity outages stipulated by the energy regulator. Any out-of-hours construction will occur in accordance with a project specific out-of-hours works protocol. The project is likely to create visual, noise, vibration and air quality impacts during construction within Gardens of Stone SCA from the construction of transmission structures and use of access tracks. Further detail of these impacts in general is provided in Table 8.5 with relevant mitigation to reduce noise, vibration and air quality provided in Table 8.16. **Duration** During construction and then intermittently during the operation of the project where maintenance is required.

Issue	Aim	Discussion
Threats to ecological connectivity and groundwater-dependent ecosystems	Native vegetation and other flora and fauna habitats that provide a linkage, buffer, home range or refuge role on land that is adjacent to parks are maintained and enhanced, where possible. Groundwater-dependent ecosystems in NPWS land are protected.	Fragmentation of habitat corridors and isolation from other areas of habitat in the locality is a risk to NPWS land as per the guidance document. **Nature and extent** The project would remove 17.54 ha of native vegetation and 1.74ha of non-native vegetation within Gardens of Stone SCA. The vegetation to be cleared would occur between an existing easement and the adjacent Centennial Springvale Coal Services Facility. As described above, this approach was the preferred option as it reduced biodiversity impacts by retaining the larger tract of the SCA in the south. The clearing would increase the width of the easement, and result in impacts on connectivity for some fauna species for the one portion of the SCA that extends north of the existing easement. A discussion of impacts to habitat connectivity in general is provided in Table 8.12. The project would not involve the extraction of groundwater and so the impacts to groundwater-dependent ecosystems has not been considered. **Duration** Impacts on connectivity (gaps between tree canopy) would be permanent. Connectivity would be retained in the ground and shrub layers following construction.
Cultural heritage	Areas and sites of heritage value on NPWS land, including Aboriginal cultural heritage, are protected.	The guidance document has considered impacts to the most significant and intact areas of Aboriginal and historic cultural heritage values as a risk within NPWS land. **Nature and extent** One artefact scatter with Potential Archaeological Deposit (PAD) (AHIMS ID 45-1-0215) has been recorded on an access track within Gardens of Stone SCA along the easement for Line 70/71. The upgrade of the access track in this location would result in an impact to the Aboriginal heritage site with the artefact scatter to be collected. Impacts on the PAD would be avoided through avoidance of any further disturbance beyond the extent of the existing track. Further detail is provided in the *Aboriginal Cultural Heritage Assessment Report* (Ozark, 2025). Gardens of Stone SCA is not on the World Heritage listed, on the National Heritage list or the State Heritage register. **Duration** Impacts on the artefact scatter would be permanent. The artefact scatter would be collected prior to construction and relocated. Further detail is provided in the *Aboriginal Cultural Heritage Assessment Report* (Ozark, 2025).
Road network design and its implications for continued access to the Gardens of Stone SCA	Adjacent developments do not compromise public and NPWS access to parks.	Changing or limiting access to the Gardens of Stone SCA is a risk identified in the guidance document. **Nature and extent** There are five existing access points (Access Points 1, 1a, 2, 3 and 4) that connect to existing tracks and lead to the Gardens of Stone SCA. These access tracks are not currently publicly accessible. While access is possible to the subject land, the area is currently infrequently utilised by the public due to no formal access or recreation facilities.

Issue	Aim	Discussion
		The workforce required for construction is expected to peak at 150 personnel, with an average workforce of about 60 personnel (depending on the stage of construction). Personnel would primarily stay locally and travel to the compounds and laydown areas, from which they would travel together to work sites. Construction vehicle movements would be limited to areas of the widened easement and for works within the SCA. There would be not vehicle movements within the SCA associated with construction compounds, as these are located outside the SCA. Access tracks to be used for heavy vehicles and plant would be those within the proposed transmission line easement. The project would also utilise tracks within the parallel 330 kV transmission line (TL70/71) easement to the south. These tracks would be for light vehicles only with no proposed upgrade works beyond the extent of the existing track proposed. The project would not block access to lookouts, picnic areas, campgrounds and tourist drives in NPWS land as these are not present in this portion of the SCA. A Fire Access and Fire Trail (FAFT) plan and the NPWS reserve fire management strategy is yet to be implemented for the Gardens of Stone SCA (DPE, 2022). However, the project intends to use a number of existing access trails currently used for the current easements. The draft masterplan for the SCA (DPE, 2022b) does not propose scenic lookouts, walking trails or mountain biking trails in this portion of the SCA so additional foot traffic associated with the potential use of the broader SCA is unlikely to be impacted by the project and its proposed traffic generation. **Duration** The life of the project. The project would likely improve the condition of existing access tracks into the SCA.





Legend
- Indirect Impact Area
- Subject land
- NPWS Estate
- Proposed transmission line
- Vegetation intergrity plot
- Contour (10m)

Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

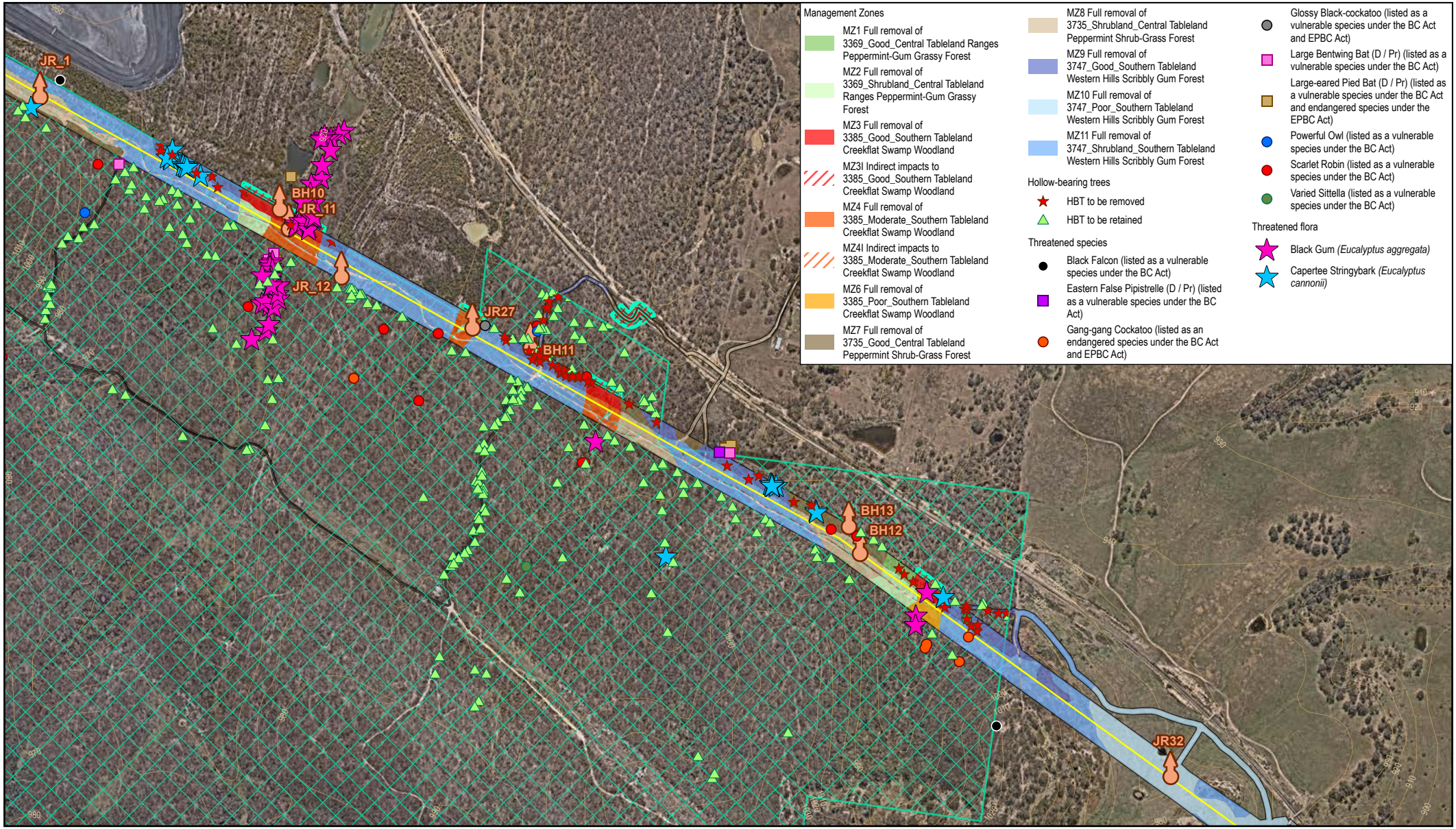
Impacts within Gardens of Stone SCA

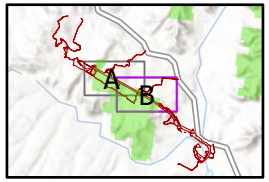
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 8.2A

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR021_GOSImpacts
Print date: 17 Jul 2025 - 12:49

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;World Hillshade: Esri, Geoscience Australia, NASA, NGA, USGS;Nearmap WMS Server: . Created by: lmanasan





Legend
- Indirect Impact Area
- Subject land
- NPWS Estate
- Proposed transmission line
- Vegetation intergrity plot
- Roads
- Contour (10m)

Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

Impacts within Gardens of Stone SCA

Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 8.2B

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR021_GOSImpacts
Print date: 17 Jul 2025 - 12:50

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;World Hillshade: Esri, Geoscience Australia, NASA, NGA, USGS;Nearmap WMS Server: . Created by: lmanasan

8.4 Cumulative impacts

Section 21.2 of the EIS outlines the assessment methodology for cumulative impacts including the methods for identifying what projects have been considered as part of the issue-specific cumulative impact assessments for the project. The assessment has been undertaken in accordance with the Cumulative Impact Assessment Guidelines for State Significant Projects (DPIE, 2022).

A total of 10 projects within 20 km of the project footprint were identified for consideration as part of the cumulative impact assessment and are shown in Figure 8.3. The following projects have been considered:

– Wallerawang Battery Energy Storage System
– Mount Piper Battery Energy Storage System
– Great Western Battery Energy Storage System
– Pinecrest Battery Energy Storage System
– Lake Lyell Pumped Hydro Energy Storage
– Ben Bullen Wind Farm
– Sunny Corner Wind Farm
– Wallerawang Power Station Ash Dam
– Wallerawang residential subdivision (DA226/22)
– Wallerawang Station upgrades.

Four of these projects have adequate data to assess known impacts. The total cumulative impact on native vegetation for these four projects is 21.68 ha (see Table 8.11). The combined cumulative impact of the project and these four other projects on native vegetation is 71.11 ha. The project would make a major contribution to the cumulative loss of native vegetation.

Several threatened species relevant to this project overlap with the four determined projects. The total cumulative direct impact on species credit entities are as follows:

– Black Gum: 69 individuals, increased to 343 individuals as a result of this project
– Large-eared Pied Bat: 17.98 ha, increased to 73.41 ha as a result of this project
– Southern Myotis: 6.00 ha, increased to 33.72 ha as a result of this project
– Squirrel Glider: 0.78 ha, increased to 23.47 ha as a result of this project
– Gang-gang Cockatoo: 1.15 ha, increased to 10.39 ha as a result of this project
– Six hollow bearing trees, increased to 186 as a result of this project.

The negative combined cumulative impacts would likely be associated with increased loss of native vegetation and threatened species habitat for the project, increased direct impact on threatened species (species credit entities) and hollow bearing trees, representing substantial contributions to cumulative impacts when considered with these other projects. The project would contribute about 60 to 95 per cent of the total cumulative impacts across various species credit entities listed above.

Within the locality surrounding the project, the loss of native vegetation and threatened species habitat would only represent a small percentage of vegetation to be impacted. Within the Gardens of Stone SCA alone, about 28,322 ha, the impacted vegetation represents about a 0.06 per cent loss of suitable habitat vegetation. This percentage would only decrease for the wider locality due to the presence of additional areas of native vegetation which is suitable habitat for the impacted threatened species. For example, the Lithgow LGA includes 194,933 ha of vegetation under nature conservation (including National Parks) (see Technical Report 4 – Land use and Agriculture Assessment) which would be expected to provide suitable nearby and alternative habitat. Additionally, available survey data indicates there are 6,300 to 8,100 mature Black Gum trees in NSW (NSW Scientific Committee, 2010). The loss of 274 individuals as a result of the project would represent a decrease between 3.4% and 4.3% per cent. The combined cumulative loss of 343 individuals from all nearby projects would represent a decrease between 5.44 per cent and 4.23 per cent.

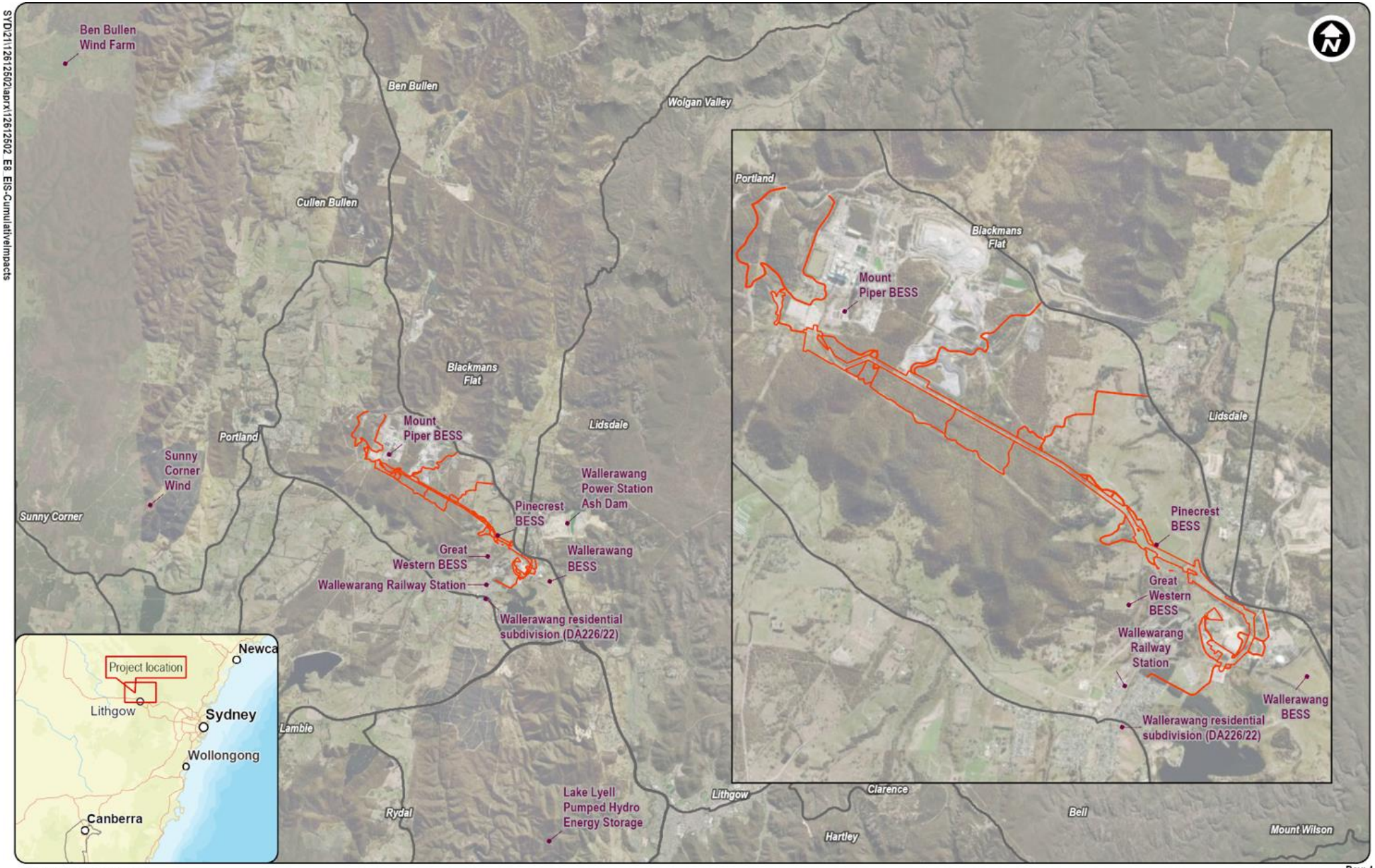


Figure 8.3 Projects considered in cumulative assessment

Table 8.11 Potential cumulative impacts of relevant future projects

Relevant future project	Scope	Approximate location	Status/timeframe/ operational period	Impacts on native vegetation	Impacts on relevant threatened ecological communities	Impacts on relevant threatened species
Wallerawang BESS	Design changes to optimise the layout of the approved Wallerawang BESS (500 MW and 1,000 MWh of battery storage capacity)	500 m east of the project footprint	Approved 4/8/2022 Modification at response to submissions Construction period of 1 to 2 years, expected to commence from 2025 if approved Operational period unchanged	Direct impacts to 1.16 ha of native vegetation	N/A	Black Gum: 0.76 ha of potential habitat and 47 individuals. Dusky Woodswallow: 1.16 ha of potential habitat. Eastern False Pipistrelle: 1.16 ha of potential habitat and six hollow bearing trees. Gang-gang Cockatoo: 1.16 ha of potential habitat. Large Bent-winged Bat: 1.16 ha of potential habitat. Large-eared Pied Bat: 1.16 ha of potential habitat. Yellow-bellied Sheathtail-bat: six hollow bearing trees.
Mount Piper BESS	Development of a grid-scale BESS with a capacity of up to 500 MW	Immediately north of the project footprint	Approved 15/11/2024 Construction period of 2 years expected to commence from 2026 if approved. Operational for 20-25 years	Direct impacts to 9.76 ha of native vegetation.	N/A	Black Gum: 0.95 ha of potential habitat, 20 individuals Large-eared Pied Bat: 16.83 ha Southern Myotis: 6.00 ha
Great Western BESS	Development of a 500 MW / 1,000 MWh BESS and associated infrastructure	300 m west of the project footprint	Approved 2/11/2023 The construction period of 12–14 months until 2028. Project has not yet commenced construction and construction start date is not known The BESS is intended to have an operational life of up to 20 years	Direct impacts to 1.05 ha of native vegetation	N/A	Black Gum: 0.27 ha of potential habitat and 2 individuals. Squirrel Glider: 0.78 ha of potential habitat.

Relevant future project	Scope	Approximate location	Status/timeframe/ operational period	Impacts on native vegetation	Impacts on relevant threatened ecological communities	Impacts on relevant threatened species
Pinecrest BESS	Development of 500 MW battery storage capacity and 1,000 MWh of storage with (2-hour duration) connecting to the grid via underground cabling	Next to the project footprint potentially overlapping the easement near Brays Lane.	EIS in preparation. EIS is expected to be submitted in late 2025 Construction period of 18 months commencing in late 2026 if approved. Operations proposed to start in 2028	Impacts not yet quantified.	Impacts not yet quantified.	Impacts not yet quantified.
Lake Lyell Pumped Hydro Energy Storage	Development of the Lake Lyell Pumped Hydro Energy Storage Scheme (that will provide between 300 to 350 MW of electricity generating capacity for up to 8 hours during peak demand	10 km south of the project footprint	EIS in preparation Technical design expected to conclude in 2025. Construction expected to take four years with operation commencing in 2029	Impacts not yet quantified. Potential impacts to Central Tableland Ranges Peppermint-Gum Grassy Forest (PCT 3369), Southern Tableland Creekflat Swamp Woodland (PCT 3385) and Southern Tableland Western Hills Scribbly Gum Forest (PCT 3747) based on preliminary desktop mapping.	Impacts not yet quantified. No TEC association with desktop mapped PCTs.	Impacts not yet quantified. Species recorded with moderate/high likelihood of occurrence within the Lake Lyell footprint (EMM, 2022) and which have also been recorded in the Mount Piper study area include Gang-gang Cockatoo, Glossy Black-cockatoo, Powerful Owl, Barking Owl, Brown Treecreeper, Scarlet Robin, White-bellied Sea-eagle, Black Falcon, Squirrel Glider, Large-eared Pied Bat, Large Bent-winged Bat, Eastern False Pipistrelle, Yellow-bellied Sheath-tail Bat, Black Gum and Capertee Stringybark.

Relevant future project	Scope	Approximate location	Status/timeframe/ operational period	Impacts on native vegetation	Impacts on relevant threatened ecological communities	Impacts on relevant threatened species
Ben Bullen Wind Farm	Construction of approximately 64 wind turbine generators, a BESS and ancillary infrastructure	20 km north-west of the project footprint	EIS in preparation Construction in 2028 for 18-24 months Operational life of 35 years+	Impacts not yet quantified. Potential impacts to Central Tableland Ranges Peppermint-Gum Grassy Forest (PCT 3369), Central Tableland Peppermint Shrub-Grass Forest (3735), Southern Tableland Western Hills Scribbly Gum Forest (PCT 3747), and Western Blue Mountains Scribbly Gum Forest (PCT 3749) based on preliminary desktop mapping (EMM, 2025).	N/A	Impacts not yet quantified. Species recorded with moderate/high likelihood of occurrence within the Ben Bullen Wind Farm study area (EMM, 2025) and which have also been recorded in the Mount Piper study area include White-bellied Sea-eagle, Black Falcon, Gang-gang Cockatoo, Glossy Black-cockatoo, Barking Owl, Powerful Owl, Speckled Warbler, Dusky Woodswallow, Brown Treecreeper, Varied Sittella, Scarlet Robin, Squirrel Glider, Yellow-bellied Sheathtail-bat, Eastern False Pipistrelle, Large Bent-winged Bat, Large-eared Pied Bat, Southern Myotis, Black Gum and Capertee Stringybark.
Sunny Corner Wind Farm	Construction of approximately 80 wind turbine generators, a BESS and ancillary infrastructure	15km north-west of the project footprint	EIS in preparation Construction in 2030. Operational life of 30 years.	Impacts to up to 38.6 ha of native vegetation and 460.4 ha of non-native vegetation (RPS 2025). Potential impacts to 8 potential PCTs including Central Tablelands Ranges Peppermint-Gum Grassy Forest (PCT 3369), Central Tableland Peppermint Shrub-Grass Forest (PCT 3735), Southern Tableland Western Hills Scribbly Gum Forest (PCT 3747) and Central and Southern Tableland Swamp Meadow Complex (PCT 3932) which also occur within the Mount Piper subject land. No areas of impact have been quantified with aforementioned PCTs.	N/A	Impacts not yet quantified. Species recorded within the Sunny Corner Wind Farm study area (RPS, 2025) and which have also been recorded in the Mount Piper study area include Gang-gang Cockatoo and Large Bent-winged Bat. Impacts to threatened raptors and flocking birds (i.e. Superb Parrot) also likely from turbine collision.

Relevant future project	Scope	Approximate location	Status/timeframe/ operational period	Impacts on native vegetation	Impacts on relevant threatened ecological communities	Impacts on relevant threatened species
Wallerawang Power Station Ash Dam	Use of part of the lands lying north of the Castlereagh Highway that were once used by the former Wallerawang Power Station as coal ash dam repositories	Immediately north of the project footprint	Approved 13/10/2023 The modification proposes an additional ten years for the importation of capping material	The modification increases the timeframe where capping can occur. No changes to the quantity of native vegetation removal proposed for removal in the original application.	Not applicable	Not applicable
Wallerawang residential subdivision (DA226/22)	Torrens Subdivision - 1 Lot into 54 Residential Allotments, 4 New Roads, 2 Lots for Drainage and Public Reserve	19 Barton Avenue Wallerawang 2 km south-west of the project footprint	Development Application has been lodged with Council for approval	Direct impacts to 17.22 ha of native vegetation, mostly comprising poor condition grassland. Impacted PCTs do not match PCTs being impacted for this project (AREA Environmental & Heritage Consultants, 2022).	N/A	N/A.
Wallerawang Railway Station upgrade	Works to upgrade the existing station, closed in 1989, so that passenger services can be restated.	850 m southwest of project footprint	Project has been announced on Transport for NSW website Early enabling works will be carried out from March to August 2025. Once the design is finalised, construction will commence later in 2025, with re-opening of the station planned for late 2025	Impacts not yet quantified. Impacts unlikely to occur based on SVTM	Impacts unlikely to occur based on SVTM	Impacts not yet quantified.

8.5 Prescribed impacts

Prescribed impacts are the impacts on biodiversity values which are not related to, or are in addition to, native vegetation clearing and habitat loss (Section 6.7 of the BAM). These types of impacts are used by the decision-maker to inform the determination and conditions of consent for developments. In general, these types of impacts affect habitat or features of the environment that are irreplaceable or otherwise important to the maintenance of biodiversity values.

The BC Regulation (Section 6.1) identifies actions that are prescribed as impacts to be assessed under the biodiversity offsets scheme. The likelihood, extent and magnitude of prescribed impacts must be assessed using the approach specified in the Section 8.3 of the BAM. The likely effect of prescribed impacts that are relevant to the project is presented in Table 8.12. The number of threatened species that may be affected by these prescribed impacts are presented in section 6. Measures to minimise the effect of prescribed impacts on threatened species and other biodiversity values are presented in Table 8.12.

Table 8.12 Residual prescribed impacts on the subject land

Prescribed impact	Description of impact
Karst, caves, crevices, cliffs, rocks or other geological features of significance	**Nature of impact** The study area contains a small rocky outcrop in agricultural land owned by Centennial Coal north of Brays Lane. This rocky outcrop occurs ~100 m to the west of a transmission structure 14D and adjacent to an existing access track that would be used for the project (Figure 5.2). This rocky outcrop would not be directly impacted by construction of the project. A number of cliff lines within the Gardens of Stone SCA detected by review of NSW basemaps and aerial imagery ~1 km to the south of the subject land, between the Mount Piper Power Station and the existing 500 kV transmission easement, would not be impacted. **Extent of impact** No direct impacts on this habitat resource are anticipated. Indirect impacts from noise and vibration may occur during construction of the transmission structure, and upgrade and use of the existing access track. **Duration of impact** Construction would occur up to a 24 month period, with site establishment planned from November 2025 to April 2026. Construction would start from May 2026 up until June 2027. Construction activities in the vicinity of transmission structure 14D are not likely to occur for the entire 24 month period, as such, noise and vibration impacts are not likely to be permanent. For example piling works, which could result in noise and vibration, are likely to be programmed for non-summer months, which would minimise impacts on breeding/roosting bats if present. Upgrades to the access track would be short term, while the use of the access track would be intermittent, as there are two access tracks in this area. **Consequence of impact** Threatened microbat species may use the small overhangs within the rocky outcrop on an occasional basis for roosting. The Large-eared Pied Bat are known to use sandstone caves for roosting and breeding in the locality. A large number of records are present in the broader locality to the east at the former Newnes State Forest, where occupied roosting and breeding habitat is likely to occur. The Large-eared Pied Bat was not recorded at the rocky outcrop despite ultrasonic detection surveys and active searches, and no evidence of guano was recorded. The rocky outcrop is considered marginal temporary roosting and breeding habitat only for the species as it lacks the size (height and depth) to allow juvenile bats to learn to fly inside. The species may use the caves under the rocky outcrop as temporary roosting habitat on occasion but is unlikely to comprise breeding habitat for the species. The Large Bent-wing Bat is also known to use caves for breeding and roosting. The species has previously been recorded in the subject land. The caves under the sandstone rocky outcrop are unlikely to comprise breeding habitat for the species as they are known to use caves in limestone karst systems, and the habitat resource is open to predation in open agricultural land. This overhang would not support more than 500 individuals. There is no evidence to suggest that rocky outcrop habitat within the subject land would have particular value to local populations of threatened microbats as opposed to better quality habitat comprising extensive caves within escarpments with specific thermal properties suitable for roosting. There are alternative habitat resources in the surrounding area including extensive areas of riparian vegetation containing hollow-bearing trees and large cliff lines and caves associated with Garden of Stone SCA and Newnes State Forest in the locality. The project would install box concrete culvert at the Coxs River near Brays Lane (near transmission structures 10D and 11D),

Prescribed impact	Description of impact
	which may comprise alternative habitat for these species once constructed, noting that the size of the culvert is unknown and to be determined at the discretion of the construction contractor. Noise and vibration impacts from construction machinery is likely to have a minor effect on native microbat individuals (if present within rock overhangs at the time of construction). Piling works would likely not occur in the summer months (during the breeding season) (see section 8.6.2).
Human-made structures	**Nature** The project includes the removal of human-made structures with some limited fauna habitat including steel gantry structures at the former Wallerawang Power Station. The threatened Dusky Woodswallow was observed resting on structures at the former Wallerawang Power Station in between foraging bouts. The heritage-listed brick arch rail bridge in the south of the study area would be retained. **Extent** The project would include removal or modification of redundant wood pole structures supporting the existing 132 kV transmission infrastructure and a few select transmission structures supporting the existing 330 kV transmission line that may be used as roosts by birds on occasion. There is minimal risk of direct harm birds' other native fauna roosting during construction as species such as the Dusky Woodswallow would easily move away from disturbance. The historic brick arch rail bridge and currently operating railway bridge would be retained as part of the project. This bridge has limited roost habitat given the lack of overhangs or crevices with suitable shelter. An access track that runs under the rail bridge would be used for the project. The brick arch railway bridge is no longer in operation; however the adjacent railway bridge currently carries rail traffic, and additional noise and vibration from vehicles is unlikely to substantially affect any fauna that may temporarily use the bridge for roosting. There are no human-made structures which provide potential habitat for threatened species within the subject site in the Gardens of Stone SCA. **Duration** Construction would occur over up to a 24-month period, with site establishment occurring from November 2025 to April 2026. Construction would start from May 2026 up until June 2027. **Consequences** Threatened microbat species may use human made structures such as the brick arch rail bridge as temporary roost sites. Southern Myotis and Large Bent-winged Bat are known to use man-made structures. The Southern Myotis and Large Bent-winged Bat has been recorded along the Coxs River and the upper reaches of the subject land during surveys. Both species may roost within the arched rail bridge, however this habitat is considered marginal given the existing noise and vibration effects from passing trains above and lack of suitable crevices. Fauna management measures such as pre-clearing surveys would be specified in a CEMP and would help mitigate the risk of harm to any resident fauna.
Non-native vegetation	**Nature** Of a total of about 87 ha, the subject land contains around 30 ha of non-native vegetation including patches of bare earth associated with open agricultural space, access tracks and brown-field areas within the former Wallerawang Power Station site (Figure 4.1). These areas may be travelled over or through or used occasionally as foraging habitat by threatened fauna species occupying adjoining forested wetland, woodland and riparian habitats. A portion of non-native vegetation such as exotic grasslands are regularly maintained. Non-native vegetation within the Gardens of Stone SCA is restricted to existing access tracks only. **Extent** The project may remove up to 30 ha of non-native vegetation. This includes up to 1.74 ha of non-native vegetation associated with access tracks within Gardens of Stone SCA. There is a risk of direct harm to any native fauna occupying non-native vegetation during construction and a reduction in the extent of habitat resources. No threatened fauna are likely to be resident in the areas. While existing infrastructure, areas of bare ground, mown grassland and grazing land has been assessed as being cleared totally for the purposes of the BDAR, impacts are likely to be substantially less than 30 ha. **Duration** Removal of non-native vegetation would be a permanent impact, however areas of impact are presented as a worst case scenario. All disturbed areas are to be remediated to their previous condition, unless designated as a permanent access track.

Prescribed impact	Description of impact
	Consequences The subject land would be travelled over or through or used occasionally as foraging habitat by native fauna, including a number of threatened species. Areas of non-native vegetation and cleared areas support limited shelter, roosting or breeding habitat for the species that could potentially occur and have minimal value for these species. These species or their prey may use habitat resources at the site on occasion as an extension of their use of habitat in adjoining areas of native vegetation but would not be limited to, or reliant on, the habitats present within the subject land for any stage of their life cycle. Fauna management measures would be specified in a CEMP and would help mitigate the risk of harm to any resident fauna during clearing of exotic vegetation. Given the limited value of habitat resources in non-native vegetation at the subject land and extensive areas of similar habitat in the surrounding agricultural landscape and more valuable resources in native vegetation, the consequences of removal or modification of non-native vegetation would be minor.
Habitat connectivity	**Nature of impact** The assessment of landscape context according to the BAM is provided in section 3. Table 3.1 and Figure 3.1 show the extent of the patches of native vegetation that the project falls within, with extensive areas of connected vegetation surrounding the subject land including the Gardens of Stone SCA. All vegetation zones at the subject land have a patch size of greater than 101 ha. Agricultural grazing land between the Gardens of Stone SCA and the former Wallerawang Power Station in the south-eastern portion of the study area may comprise a gap in habitat that may limit movement of some fauna through the subject land and the locality in these areas. The existing easements intersecting Gardens of Stone SCA and EnergyAustralia land (which are partially cleared) would also comprise a gap for less mobile species within large expanses of intact and semi-intact native vegetation The Coxs River riparian corridor provides stepping stones for some fauna to reach the more vegetated parts of the subject land to the west. The Coxs River riparian corridor adjacent to the subject land would not comprise a regionally significant habitat corridor for terrestrial species given large sections of the corridor are planted but not over-mature with hollow-bearing trees being scarce. The presence of standing water, higher overall in-stream vegetation cover and other habitat resources may make it a useful corridor for frogs. There are thousands of hectares of native woodland and forest that are similar to that in the subject land in the locality. In this context the subject land is unlikely to comprise a key link in a resource corridor, or to be critical to the ongoing connectivity of habitat in the local area. The project would result in increased gaps in native vegetation cover due to the widening of the existing easement from 45 m to 60 m. Vegetation would be removed for the new widened easement and the associated new transmission structures and conductor Ancillary works, required during construction including establishment of temporary construction compounds, would have negligible impact on habitat connectivity due to being located in previously disturbed areas containing no connecting canopy. Given the majority of the subject land has been subject to previous disturbance by the construction and operation of an existing powerline easement, leased in part as agricultural land and also the former Wallerawang Power Station site, operational impacts are unlikely to significantly reduce habitat connectivity in the locality for most species. Species most at risk of impact include the Squirrel Glider, which is limited by its maximum glide distance, and small woodland birds such as the Brown Treecreeper that are not able to cross large gaps in habitat. Overall, the project is predicted to marginally reduce the habitat connectivity of the locality and slightly increase the gap in vegetation cover within the existing easement and adjacent vegetation. Impacts would be greatest for the Squirrel Glider. Habitat connectivity would be retained between sections of the Gardens of Stone SCA via vegetation alongside the new easement between the Mount Piper 330 kV substation and the Centennial Springvale Coal Services Facility and also between Gardens of Stone SCA and Ben Bullen State Forest to the east of the Centennial Springvale Coal Services Facility (Figure 1.1). No access tracks are proposed to be widened within the Garden of Stone SCA. All new access tracks would be restricted to areas that are currently highly fragmented. The widening of existing tracks outside of the Garden of Stone SCA is not expected to reduce the function of these areas in providing habitat connectivity. **Extent of impact** The proposed action would result in an impact on habitat connectivity due to: – Creation or maintenance of permanent gaps in understorey vegetation between 6 m to 10 m wide along access tracks. – Creation or maintenance of permanent gaps in canopy vegetation in the transmission line alignment is proposed up to 60 m wide. This would include widening of the existing 132 kV easement from 45 m to 60 m for 4.8 km to accommodate double circuit transmission structures for the existing 132 kV transmission line and a new 330 kV transmission line.

Prescribed impact	Description of impact
	– Creation of partial gaps in vegetation cover up to 100 m wide and/or displacement of fauna at compound areas and brake and winch sites. Human activity may deter certain native fauna species from moving through the local area during construction. Impacts associated with human activity would occur along the entire transmission line alignment, with impacts most notable in the south of the subject land where it is used for agricultural use and in close proximity to coal conveyers, and also in the north-west of the subject land at the Mount Piper Power Station. Impacts associated with human activity within the existing transmission line easement within Gardens of Stone SCA may also be common, with personnel required for general maintenance of the existing transmission corridor, recreational use by local motorbike enthusiasts and illegal firewood collection. Native fauna at or near the subject land in the north-west and south-east would be habituated to vehicle traffic and other human activity as well as the presence of domestic livestock. Species that are more sensitive to such disturbance are unlikely to be present in the local area. <u>Squirrel Glider</u> The Squirrel Glider is a key species that may be impacted by a reduction in habitat connectivity of the subject land within the Gardens of Stone SCA and adjacent forested Centennial Coal and EnergyAustralia lands. Squirrel Gliders were recorded on several occasions via spotlighting and camera trap analysis in these areas, with none recorded in vegetation south of Brays Lane. The existing 45 m wide easement is currently slashed and maintained as shrubland and grassland as required for safety clearances to electricity transmission infrastructure. The new easement will be 60 m wide. Key information regarding the gliding ability of the Squirrel Glider is as follows: – Trees are critical for movement and typically need to be closely connected (i.e. no more than 50 m apart) (Threatened Biodiversity Data Collection TBDC). – They have been observed to glide up to 100 m with the assistance of a downhill slope and up to 50 m over flatter terrain (Australian Museum, 2024). – The mean glide angle down from the launch point to the landing point has been found to be 28.5 ± 0.8° (Goldingay & Taylor, 2009). – Tree/launch height will affect the distance of a glide. Animals glided a mean of 21.5 ± 0.9 m (range 9–47 m) in a horizontal plane (Goldingay & Taylor 2009). – Animals launched from a horizontal position ~1.7 m below the top of a tree and 2.3 m out from the main trunk (Goldingay & Taylor, 2009). The potential for Squirrel Gliders to cross the widened easement depends on the height of adjacent trees, width of the easement and slope of the easement. Where trees are taller, the glide distance would be greater. Conversely, if maximum tree height is lower, there is very limited opportunity for crossing the easement. Tree height is the key variable for connectivity for the species at Mount Piper. The vegetation has a maximum height of around 20-25 m on sheltered slopes and valley floors and 10-15 m on exposed slopes and ridges, meaning the existing 45 m wide easement can only be crossed if flat and trees are of a suitable height, or where a downhill slope allows further glide distance. In some locations the existing easement is flat across the easement, potentially allowing movement to and from either side of the easement. In many areas the easement is steeply sloped, meaning Squirrel Gliders could glide one way but not return. This is demonstrated in a portion of the easement adjacent to the Centennial Coal land where vegetation height is low resulting in the species likely being able to glide one direction but not the other. Increasing the width of the easement along the extent of the subject land would further hamper the ability of the Squirrel Glider, however there would not be a net impact on connectivity in parts of the landscape where the current 45 m gap already exceeds maximum glide distances. Many of the trees in the subject land are between 15-20 m tall, making crossing the existing easement difficult. Currently a perpendicular glide across the existing easement is within the gliding ability of the Squirrel Glider if the trees are over 25 m tall and the ground is flat. With a small downhill slope (e.g. 10 m change in elevation or less across a 45 m easement), gliders may be able to cross the 45 m easement both at a perpendicular angle from a smaller tree or at an angle across the easement of up to 45°. A 60 m wide easement would need a tree height of more than 32 m for a Squirrel Glider to be able to cross flat sections, which exceeds the maximum height of any trees in the study area. With a downhill slope however, Squirrel Gliders may be able to cross at a perpendicular angle but would be unlikely to cross at a 45° angle. An assessment of where Squirrel Gliders would be able to cross the existing easement and new easement has been undertaken to enable an assessment of residual impacts on the species. Mapping was undertaken for both the existing easement and the new easement. The following method was employed in GIS to map the potential crossing locations: – High resolution LiDAR data for the area was gathered and classified vegetation was extracted from the data. A 50 m buffer was used around the existing and proposed easements to select trees above 10 m tall to analyse, with trees thinned out to a manageable number of points that still maintained coverage.

Prescribed impact	Description of impact
	– The maximum theoretical distance that a glider could glide from any tree height was calculated based on the glide angle of 28.5° using a formula of 1.84 x height. – The distance multiplier of 1.84 was rounded up to 2 to produce areas where gliders could potentially glide (in order not to constrain results too heavily). – Within this search created, ground levels were assessed to the top of tree to calculate glide angle, and a straight line path was created to each ground point within the search area. – Connections ~25-30° were extracted out and filtered against the easements to isolate those that were making it across most of the easement (to give an appropriate +/- on the glide angle). – Glider paths were chosen and mapped if they looked to clear enough of the easement. – Vegetated riparian corridors present within the existing 330 kV easement to the south of the subject land were also mapped to show existing connectivity within that easement. The existing potential connectivity for the Squirrel Glider is mapped on Figure 8.4 based on the method above. Crossing locations are mapped as one way (eg due to slope) or both ways. Potential future crossing locations are mapped on Figure 8.5. Crossing locations do not take into account any shrub vegetation within the existing easement that may also assist Squirrel Gliders to move across the easement. These are described below from west to east, with the existing and future potential assessed for each general location: – Moderate (existing) and poor (proposed) near transmission structure 33A: In the west there is currently some two-way connectivity between an isolated patch of vegetation between the existing 330 kV and 132 kV transmission line easements and vegetation to the north-east. This does not provide connectivity to the southern side of the easement. This isolated patch would be reduced in size as a result of the project with connectivity retained in the north. – Good (existing) and moderate (proposed) east of transmission structure 27D: two-way connectivity is present where the two easements diverge, before the slope becomes too steep. Following construction, both two-way and one way connectivity would be reduced. However some crossing points would remain with fewer suitable trees present due to the increased easement width. – Good (existing) and good (proposed) east of transmission structure 26D: in the existing easement one-way connectivity occurs on the slope and a small area of two-way connectivity is associated with a drainage line located to the west of the coal reject emplacement area. This is within the area where the Gardens of Stone SCA extends to the north of the existing easement alongside Mount Piper power station. Two-way connectivity would remain in the riparian area following construction, and the amount of one-way connectivity would reduce. – Poor (existing) and none (proposed) east of transmission structure 24D: a small two-way link is present adjacent to the coal reject emplacement area. This link would not be present following construction due to easement width and vegetation height. Given the disturbance to connectivity from the adjacent emplacement this impact is minimal. – Good (existing) and good (proposed) east of transmission structure 22D: two-way connectivity is associated with a drainage line to the east of the coal reject emplacement area, linking the Gardens of Stone SCA in the south to a more extensive area of regrowth vegetation in Centennial Coal lands and better quality vegetation more broadly. This link would remain following construction due to taller vegetation being present along the drainage line. – Good (existing) and moderate (proposed) east of transmission structure 20D: two-way connectivity is associated with a drainage line further to the east of the coal reject emplacement area, linking the Gardens of Stone SCA in the south to a more extensive area of regrowth vegetation in Centennial Coal lands and better quality vegetation more broadly. One potential link occurs directly west of 20D. This link would remain following construction due to taller vegetation being present along the drainage line, however fewer trees at this location are likely to be suitable as linkages. – Moderate (existing) and poor (proposed) at and between transmission structures 19D and 18D: Occasional trees appear to provide one way and two-way connectivity over a distance of around 600 m between two drainage lines. The number of linkages would reduce in this section as a result of construction. Existing and proposed connectivity is likely to be further impacted by the existing and proposed towers in this area. – Good (existing) and good (proposed) east of transmission structure 18D: two-way connectivity is associated with a drainage line near the eastern boundary of the Gardens of Stone SCA. This link would remain following construction. – Poor (existing) and none (proposed) near transmission structure 14D: A two-way link is mapped near the WaterNSW water tank, with this linking to an isolated patch of trees only. Suitability is likely to be further limited by the presence of the transmission tower. The small patch of trees would be removed as a result of the project. Two-way connectivity is also mapped under the existing 330 kV easement to the south, particularly where vegetation occurs in deep gullies and does not require management.

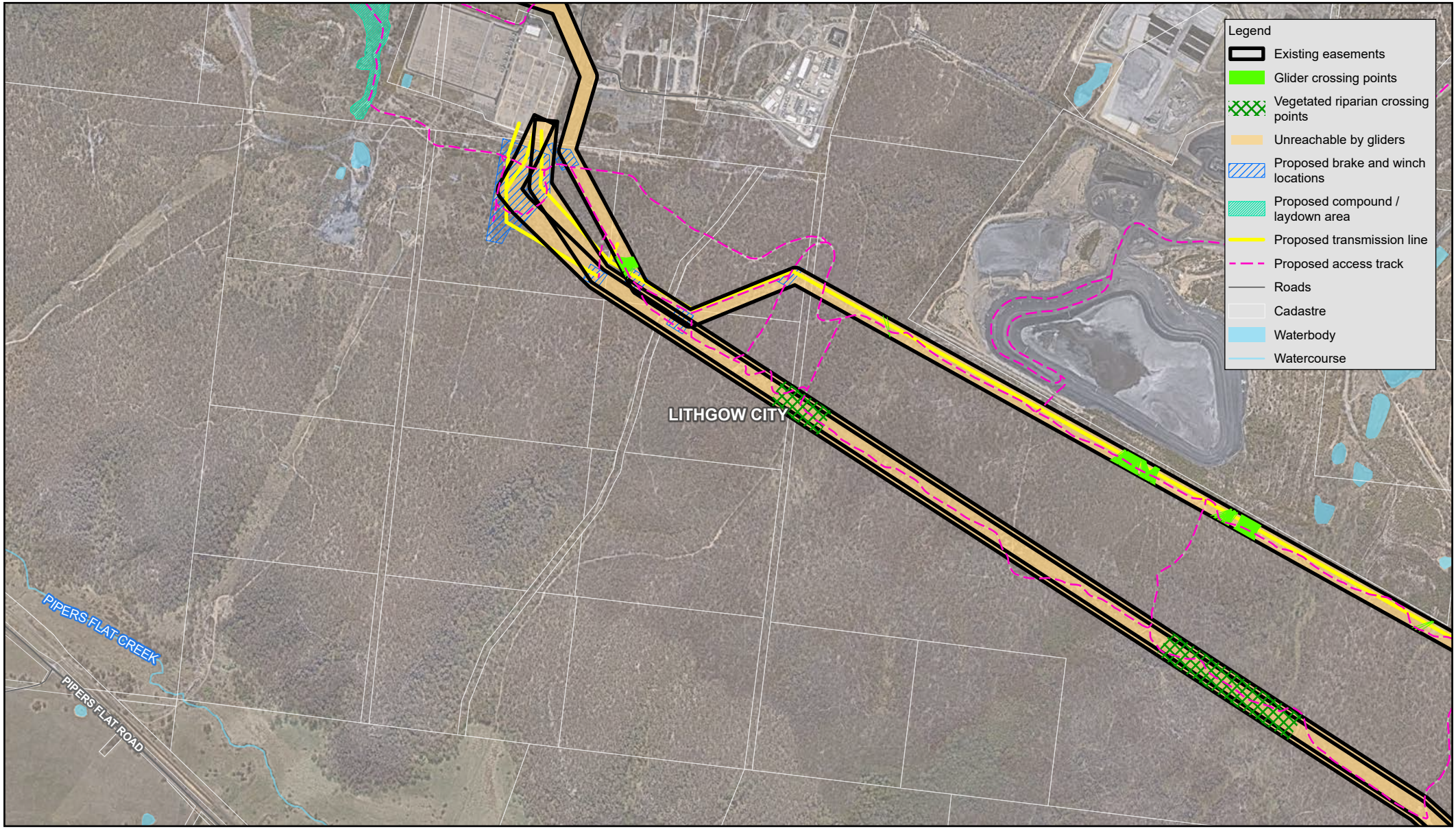
Prescribed impact	Description of impact
	Based on this mapping, there is currently opportunity for Squirrel Gliders to glide both ways across the existing 132 kV easement at various locations, including at four drainage lines where trees tend to be taller. Other crossing areas also occur including both two-way and one-way connectivity. Following construction, connectivity would be somewhat reduced from vegetation clearing for the proposed easement but would be retained at each of the four drainage lines and at a location further to the west. Given the retention/regrowth of groundcover and shrub layers, the current and new easement are not considered 'hard' barriers to movement, as Squirrel Gliders are known to sometimes land on the ground if necessary, before scampering to nearby trees (D. Sharpe, pers. comm.). As such, dispersal may occur currently in areas where the width is mapped as outside the glide distance and may continue to occur in some of these areas in the future. Given the retention of two-way connectivity at each of the drainage lines and other locations, the project is unlikely to result in significant residual impacts on connectivity for this species. Potential for further avoiding and mitigating impacts on connectivity are also being investigated. Avoidance areas where taller vegetation would be able to grow under the transmission lines would be a key strategy (for example in deeper gullies). Other mitigation measures such as glider poles may also be suitable in some areas if they do not interfere with the swag and sway of the transmission lines. <u>Small woodland birds</u> The risk of a disruption to population connectivity is considerable for smaller, less mobile species, or those which avoid crossing larger open areas. Species which can suffer population fragmentation as a result of linear infrastructure are likely to include the Brown Treecreeper, Diamond Firetail, Flame Robin, Speckled Warbler, and Varied Sittella. These species are considered less mobile due to one or more factors, including their small home ranges, weaker flight, or an aversion to large clearings or openings in the forest. Brown Treecreepers use scattered trees to move outside their natal remnants more than they used corridors, but only rarely crossed gaps of more than about 100 m between trees (Doerr and Doerr, 2007). Robertson and Radford (2009) found that treecreepers appeared reluctant to cross gaps of more than ~60 m between patches of vegetation. There is limited information on specific gap impacts on other woodland bird species, and it is assumed that gaps of more than 60 m would likely impact their movement across the landscape. While the new easement will be 60 m wide, the presence of shrubland within the easement will encourage movement of these species, particularly where it is taller (such as patches dominated by species of *Cassinia*). **Duration of impact** Construction impacts to habitat connectivity would occur up to 24-month period. After rehabilitation, the project would contain native vegetation representative of the locality, unless designated as a permanent access track, or is required to be managed as part of the designated transmission line easement. The implications of the increased easement width will depend on the ability of species to cross gaps between patches of trees. Shrubland and grassland vegetation would continue to grow within the easement, providing connectivity for those species that would use those habitats. Highly mobile species such as microbats and larger birds would not be impacted. **Consequence of impact** The construction of transmission structures up to 60 m tall may increase the risk or energy cost of movement of threatened or migratory birds. The removal of vegetation for laydown areas, brake and winch sites and the transmission line alignment would result in a generally minor increase in the degree of fragmentation between retained areas of habitat for these species and would not result in the isolation of any habitat. The threatened species listed in section 5 and other native fauna species would travel over or occupy the subject land, with groundcover and midstory vegetation, large trees and water bodies used as shelter by smaller species. These species would travel through the subject land as an extension of their use of habitat in adjoining areas of native vegetation but would not be limited to, or reliant on, the connectivity provided by the subject land to support their continued use of the local area. Habitat connectivity would be retained around the subject land through extensive areas of forest and woodland associated with the Gardens of Stone SCA. Scattered patches of native and planted vegetation in the Coxs River floodplain would provide stepping stone connectivity throughout this area.

Prescribed impact	Description of impact
	A large amount of research has been conducted into impacts of roads on fauna. Studies on various species have found only limited impacts of roads on gene flow (e.g. Grilo et al., 2016), with strong genetic effects usually associated with large, fenced roads or species with very limited mobility. It appears that in many cases, habitat connectivity throughout the surrounding landscape can alleviate the effect of linear infrastructure on wildlife (Soanes et al., 2013). Stepping stone vegetation is thought to reduce the genetic impacts of habitat fragmentation and infrastructure on wildlife in agricultural and urban landscapes. Arboreal mammals are known to take circuitous detours to avoid inhospitable terrain (Soanes et al., 2013). Impacts of a transmission line would be substantially less than a road, given the limited risk of vehicle strike and presence of shrubland and groundcover vegetation within the easement. Impacts would be highest during and immediately following construction when vegetation has not yet recovered and noise impacts discourage individuals from the area. During operation, low vegetation would regrow, restoring connectivity. Overall, the negative consequences of the project's impact on habitat connectivity would be minor and some of the impact temporary. The project would increase existing fragmentation which would not be sufficient to completely interrupt any ecological process such as migration or pollination. Most species would continue to be able to move across the easement. Small woodland birds are likely to utilise shrubland vegetation to cross wider gaps and would be able to move longitudinally along the adjacent vegetation to find appropriate crossing locations. Squirrel Gliders are likely most at risk of impact, with the increased width of the easement further impacting the ability of the species to cross. Modelling presented in Figures 8.4 and 8.5 shows that while there will be some reduction in opportunities for Squirrel Gliders to glide across the easement from the project, these linkages will be retained, primarily within 3 riparian areas along the easement.
Waterbodies, water quality and hydrological processes	**Nature of impact** The south-east portion of the subject land around Wallerawang is located on the floodplain of the Coxs River. All native vegetation and threatened species habitat in close vicinity of the Coxs River is subject to, and to varying degrees dependent upon, flooding from the Coxs River and adjacent Lake Wallace. The Coxs River and Lake Wallace occur within the Warragamba Dam catchment area as well as the Hawkesbury-Nepean catchment in the Central Tablelands and Blue Mountain regions of south-eastern New South Wales (Aurecon, 2018). The upper reaches of the Coxs River occur at Gardiners Gap, with surface water flowing south through the former Ben Bullen State Forest and into Lake Wallace and Lake Lyell. After reaching its confluence with the Warragamba River, surface flows feed into Lake Burragorang. The Coxs River used to provide a water source at the former Wallerawang Power Station and currently provides water to the Mount Piper Power Station in the north-west of the study area. The current water health of the Coxs River adjacent to the subject land is likely to be degraded, due to the agricultural and coal mining land-uses in the locality (Aurecon, 2018.; Young et al., 2000). Heightened salinity and heavy metal deposits within the Coxs River are likely to attributable to these land-uses (Judge, 2013). The project would modify the catchment and would result in local changes to waterbodies, water quality and hydrological processes through clearing of vegetation and earthworks and installation of a concrete box culvert at the Coxs River near Brays Lane (near transmission structures 10D and 11D). It is unlikely that the project would result in changes to the operation of the system. Construction related impacts to in-stream habitats and floodplain wetlands may include: – mobilisation of poorer water quality to the downstream receiving environment at Lake Wallace – loss of connectivity and temporary barriers to fauna movement if riparian vegetation is removed within construction and laydown areas at the former Wallerawang Power Station – direct loss or degradation of habitat features and riparian vegetation – reduced water quality and proliferation of weeds, pests and pathogens. **Extent of impact** The project would include clearing of native and exotic vegetation and short-term exposure of soils, levelling and compaction of soil, and construction of infrastructure within an 86.89 ha subject land. A portion of construction activities would occur within and adjacent to the Coxs River, at the former Wallerawang Power Station and would likely risk impacts to water quality. The extent of impacts to waterbodies and water quality would include: – A potential reduction in water quality downstream of the Coxs River at Lake Wallace resulting from the clearing of floodplain vegetation at the Coxs River in the south-east of the study area. – A potential reduction in water quality within sediment dams and ephemeral drainage lines within the Gardens of Stone SCA resulting from the clearing of vegetation for access track upgrades and fringing vegetation along the edge of an existing easement in the central portion of the study area.

Prescribed impact	Description of impact
	– A potential reduction in water quality within ephemeral drainage lines associated with EnergyAustralia land in the north-west of the study area. This would include ephemeral drainage lines that have been highly modified and include roadside drains. Impacts on waterbodies, water quality and hydrological processes within Gardens of Stone SCA is detailed in section 8.3. Given the limited extent and duration of vegetation clearing and exposure of soils, standard measures for managing soil and surface water are likely to mitigate against any tangible impacts on the broader Coxs River floodplain, ephemeral drainage lines and any waterbodies with particular habitat value. No groundwater would be intercepted or extracted for the project. **Duration of impact** Potential impacts on water quality would occur during construction (~24 months) and for the time taken for understorey vegetation to regenerate outside of permanent infrastructure footprints. After rehabilitation, the project would contain native vegetation representative of the locality, unless designated as a permanent access track, or is required to be kept clear as part of the designated transmission line easement. **Consequence of impact** Each of the threatened species that could occur at the subject land would rely on waterways and the riparian and floodplain vegetation in the vicinity of the subject land as a water source, foraging habitat and shelter habitat. Potential adverse changes to water quality or hydrology would have a greater risk of impacts to wetland-breeding species such as the threatened or migratory waterbirds. However no threatened or migratory wetland bird species were recorded during surveys, and it is unlikely that these species regularly occur within the study area. Noting the minor and localised extent of such changes relative to the many thousands of hectares of catchment feeding waterways in the locality, changes to surface water flows in the subject land would have a negligible effect on the hydrology of the system.
Vehicle strike	**Likelihood of vehicle strike** Construction of the project would generate heavy vehicle movements associated with vegetation and spoil removal, and delivery of construction material and equipment. Light vehicle movements for construction personnel, including contractors, site labour force and specialist supervisory personnel would also be required. There would be five key access points which may lead to vehicle strike within the subject land. These comprise: – Access point 1a, from 350 Boulder Road, Blackmans Flat NSW (main access) – Access point 12, from Heel Street, Wallerawang NSW – Access point 4, from Brays Lane, Wallerawang NSW – Access points 10, from Castlereagh Highway, Wallerawang NSW – Access points 8 & 11, from Main Street, Wallerawang NSW. The project would generate additional traffic via the state road network Castlereagh Highway (route B55) when access from Boulder Road and Brays Lane is used. The travel route to Heel Street would be via Castlereagh Highway and local roads Main Street, Barton Avenue and Cripps Lane. Vehicles travelling to and from the subject land would use several hundred kilometres of sealed road along both fenced and unfenced carriageway widths of up to 10 m within a heavily vegetated landscape, particularly to the east where the Blue Mountains occur. These roads and tracks are already subject to vehicle movements and vehicle strike; however construction would temporarily increase this risk in the study area and surrounds due to an increase in vehicle movements. The likelihood of vehicle strike within the subject land and in particular where it occurs within Gardens of Stone SCA is low, as construction speed limits would apply and the terrain in higher elevations of the study area also limits speed vehicles can travel. Species most at risk would be diurnal ground-dwelling species. Working hours for the project are proposed to be across a 7-day work week, between 7am to 7pm Monday to Sunday. Extended hours and out-of-hours construction would likely be required between 7 pm to 7am Monday to Sunday. Some 24-hour work periods will also be required, including on Sundays and public holidays, when making adjustments and connections to other transmission infrastructure during essential outages. As construction works would generally be finished by 7 pm, vehicle strike risk for nocturnal fauna would mainly occur at dusk and shortly thereafter during winter months. **Estimated rate of vehicle strike** The project is likely to require approximately 100 light vehicles, and 70 heavy vehicles access the site during a typical day during construction. This may increase up to 40 light vehicles and 20 heavy vehicles additionally accessing site during peak construction.

Prescribed impact	Description of impact
	Traffic generation during operations is expected to be minimal, with infrequent visits to the project footprint by one to two vehicles. Numbers may increase when works are required however these numbers are to remain relatively low and would be very infrequent. The impacts of the project on the road network were quantified using a mid-block assessment at key points along the Castlereagh Highway using the traffic volumes gathered from the traffic surveys (GHD, 2025c). The Traffic Impact Assessment concluded that peak construction traffic and operation of the project would have a minimal impact on the roads and transport network within the study area (GHD, 2025c). The traffic assessment focussed mainly on the capacity of the road network to accommodate additional traffic volumes and did not include any estimation of rates of vehicle strike on native fauna. The assessment indicates that the project is expected to have minimal impact on peak hour traffic volumes along the roads within the vicinity of the project and so it is likely that the project would result in a similarly minor increase in the rate of vehicle strike in these areas. Few terrestrial and diurnal threatened fauna species are likely to occur in the subject land. Given the low speed of travel possible during construction, fauna such as small woodland birds that may be foraging in the easement are expected to be able to move away. As noted above, there would be limited movement of vehicles at night, and thus vehicle strike rate for nocturnal fauna is also likely to very low. **Consequence of impact** Access to the subject land would be along a sealed divided carriageway and then unsealed access tracks. Access roads may be traversed by native fauna including threatened species. Threatened species such as threatened microbats and forest owls are unlikely to experience a significant risk of vehicle strike as vehicle movements will occur predominantly during daylight hours when these species are inactive. Threatened raptors and woodland birds and other diurnal species may be at risk of vehicle strike during the day but are likely to be able move away from vehicles. The project would result in a minor, but tangible increase in vehicle movements and associated risk of vehicle strike for these species.
Injury or mortality from transmission line collision, entanglement, or electrocution.	**Nature of the impact** The construction, operation and maintenance of around 8 km of a new 330 kV electricity transmission line, replacement of transmission structures and partial adjustment of existing transmission lines may increase the risk of powerline strike for species that are capable at flying at the elevations of the proposed work. This risk is increased in the forested corridor where there is capability for arboreal movements for gliding mammals, birds and bat species foraging in close proximity to powerlines and towers. It must be noted that powerline strike is an existing impact in the study area with several other powerlines already present and constructed at similar heights to those proposed in this project, with a 132 kV already present within the forested portions of the subject land. There is limited information on impacts associated with transmission line projects for microbats, but parallels can be drawn from impacts associated with windfarm developments (Bennett et al., 2022). It is assumed that despite the lack of research in the topic there is a risk of collision for both micro and megabats from transmission line projects. The level of impact is species-specific and dependant on the morphology and foraging habits of the species. The Large-eared Pied Bat, Southern Myotis and Eastern False Pipistrelle which have been recorded on site tend to be low to mid-canopy flyers, and therefore, are less likely to be susceptible to transmission line strike. The Large Bent-winged Bat has a large foraging and migration range and tends to fly above the canopy level, but flies low over cleared land (Churchill, 2009). Similarly, the Yellow-bellied Sheath-tail Bat flies high over the forest canopy, but lower in more open country. This places these species at a higher risk of transmission line strike in forested portions of the subject land, such as within the Gardens of Stone SCA. Birds with the highest risk of powerline strike are those that are likely to fly at a level where powerlines are located and are not familiar with local habitat. This includes raptors, owls, cockatoos and waterbirds. Multiple recorded species on site fall into this category including the White-bellied Sea-eagle, Barking Owl, Powerful Owl and Gang-Gang cockatoo. Due to the existing transmission lines in the area the Barking Owl, Powerful Owl and Gang-gang cockatoo are likely to be acclimatised to the risk of powerlines in their foraging habitats and minimal disturbance would be expected. However, the White-bellied Sea Eagle is at a higher risk due to the large range of the species. Arboreal mammals such as the Squirrel Glider are at risk of electrocution when using structures to glide between habitat areas. Given the project is replacing wooden poles with steel transmission structures, Squirrel Gliders are unlikely to use transmission structures as a bridging point between existing patches of forested woodland. This species also has the potential to glide into transmission lines, particularly where the lines are at their lowest point, if this is within the glide height of the Squirrel Glider. This would potentially only occur if individuals were gliding at an angle across the easement, and otherwise they would normally glide under the transmission lines.

Prescribed impact	Description of impact
	Extent of the impact There is likely to be an increase in the risk of collision as a result of the project. This is expected to be higher in the areas adjacent to intact forest vegetation. As the project is duplicating an existing transmission line in the largely the same easement, most species present in the area are acclimatised to the presence of a transmission line and associated infrastructure. Most at risk would be migrant species, raptors etc foraging in an extended area that they are not familiar with. These species have been well documented at being at risk of transmission line strike (D'amico et al., 2019). The White-bellied Sea-eagle is at the highest risk of recorded species given the large home range they occupy and likelihood of hunting in an area they are unfamiliar with, with this risk highest in areas near the Coxs River. The majority of microbats recorded on site prefer to forage at low to mid canopy height and would be at minimal risk of strike due to the height of the transmission lines. The Large Bent-winged Bat and Yellow-bellied Sheath-tailed Bat an exception to this as they prefer to forage above canopy height. This places the species at a higher risk of transmission line strike. Arboreal mammals are at minimal risk of impact from transmission line electrocution or entanglement. Existing populations in the area are acclimatised to the existing powerline structures and the majority of new towers are at a height between 30-60 m, which is well above the surrounding canopy for gliders. There is potential for entanglement if gliders glide into the transmission lines. The risk of injury or mortality from transmission line collision, entanglement, or electrocution is likely to be highest within the subject land within the Gardens of Stone SCA. **Duration of the impact** The construction phase of the project would last up to 24 months and would involve additional disturbance to the area where line duplication and associated infrastructure is being constructed. The structures would be permanent. Collision risk would likely reduce overtime at animals acclimatise to the presence of additional transmission lines and towers within the area. **Consequence of impact** Threatened forest owls and forest birds are unlikely to experience a significant risk of transmission line strike as the species present within the local area are acclimatised to the structures present in the area. Threatened raptors and some microbat species are at a higher risk due to flight patterns and foraging in large ranges. The project would result in a minor, but tangible increase in transmission line strike for these species.



Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

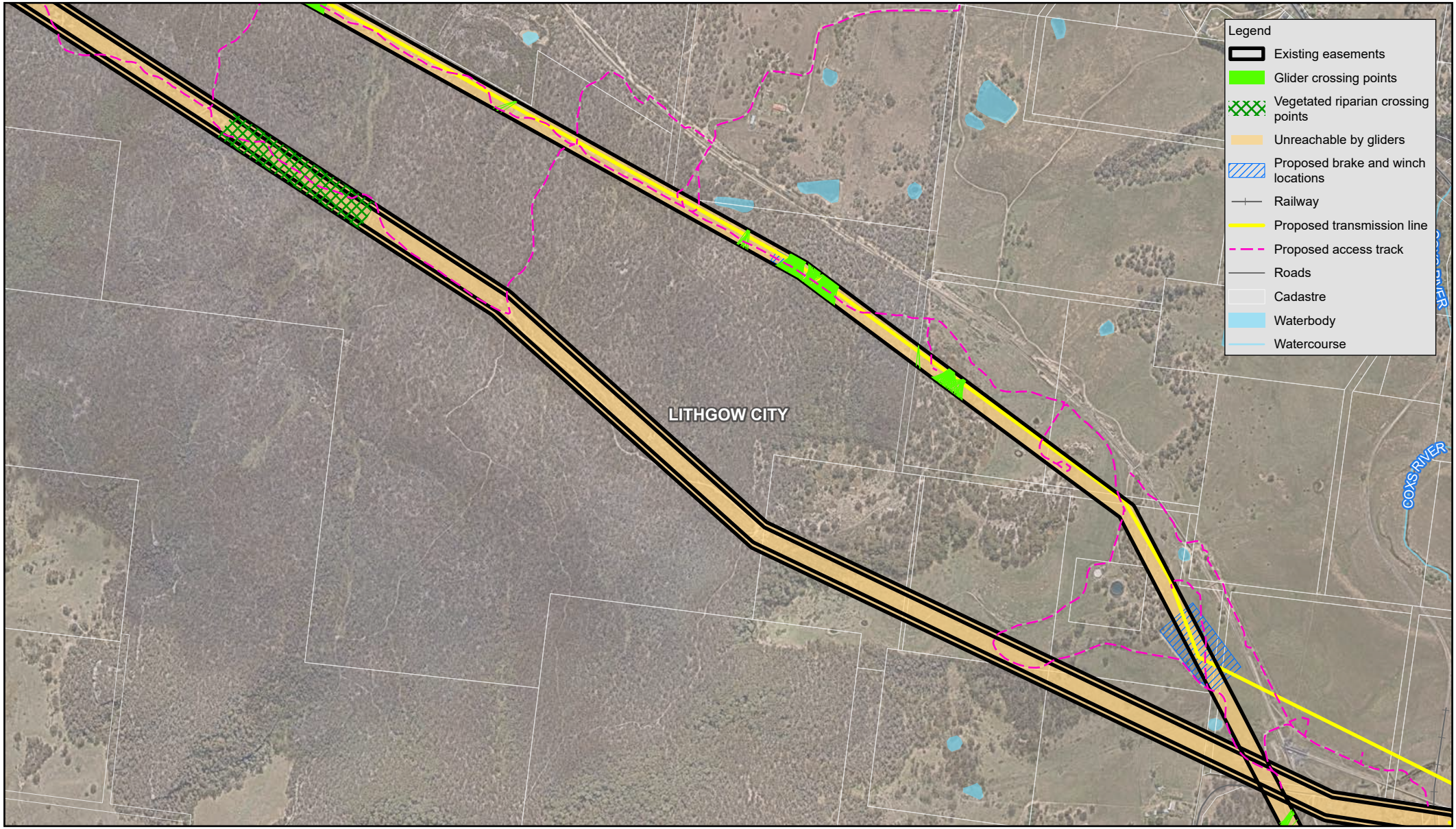
Squirrel Glider – potential existing glide locations

Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 8.4A

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR024_GlidersExisting
Print date: 17 Jul 2025 - 15:07

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;World Hillshade: Esri, Geoscience Australia, NASA, NGA, USGS;Nearmap WMS Server: . Created by: lmanasan



Paper Size ISO A4

0 100 200 300

Metres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

GHD

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

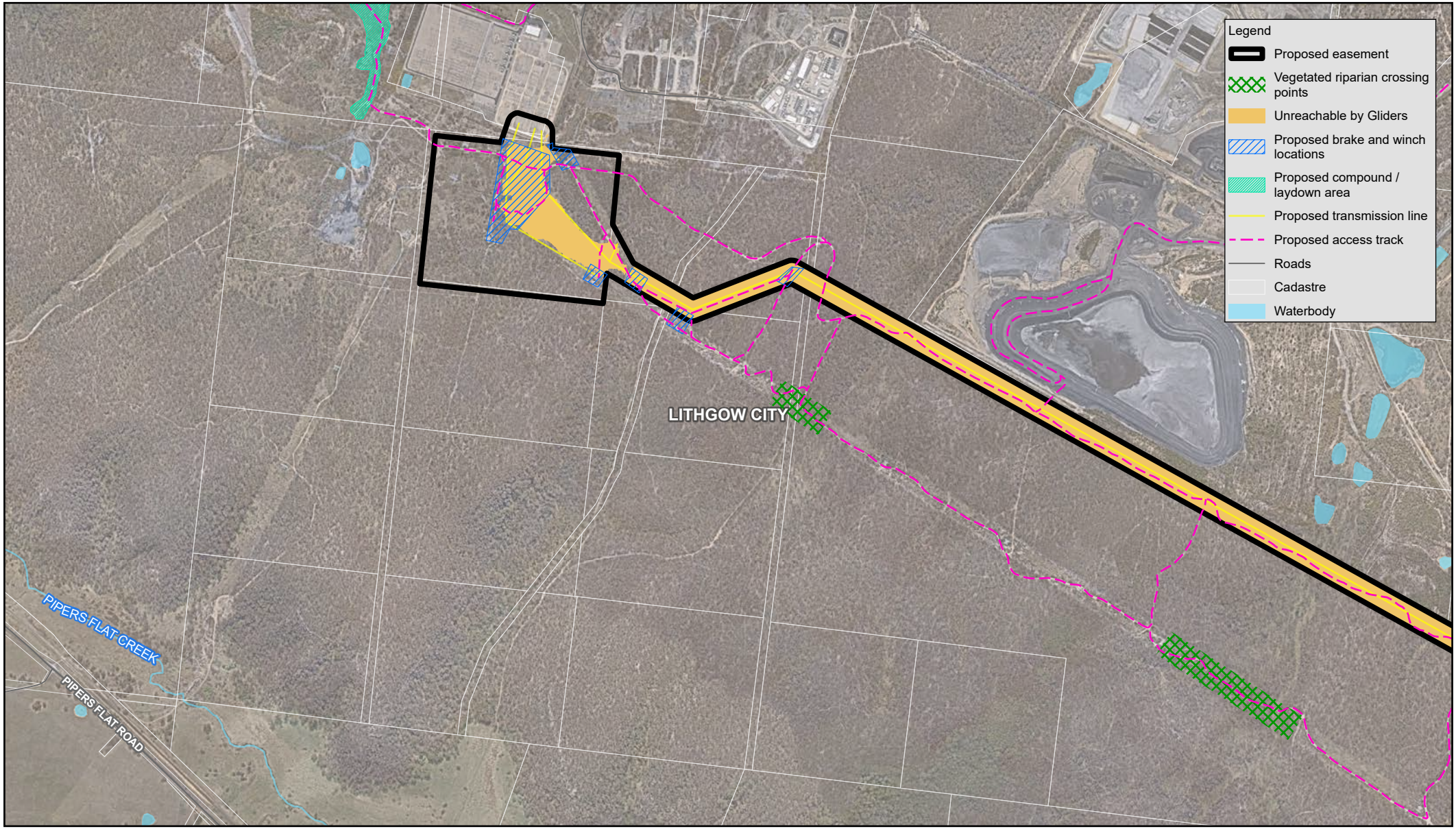
Squirrel Glider – potential existing glide locations

Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 8.4B

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR024_GlidersExisting
Print date: 17 Jul 2025 - 15:08

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;World Hillshade: Esri, Geoscience Australia, NASA, NGA, USGS;Nearmap WMS Server: . Created by: lmanasan



Paper Size ISO A4

0 100 200 300

Metres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

GHD

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

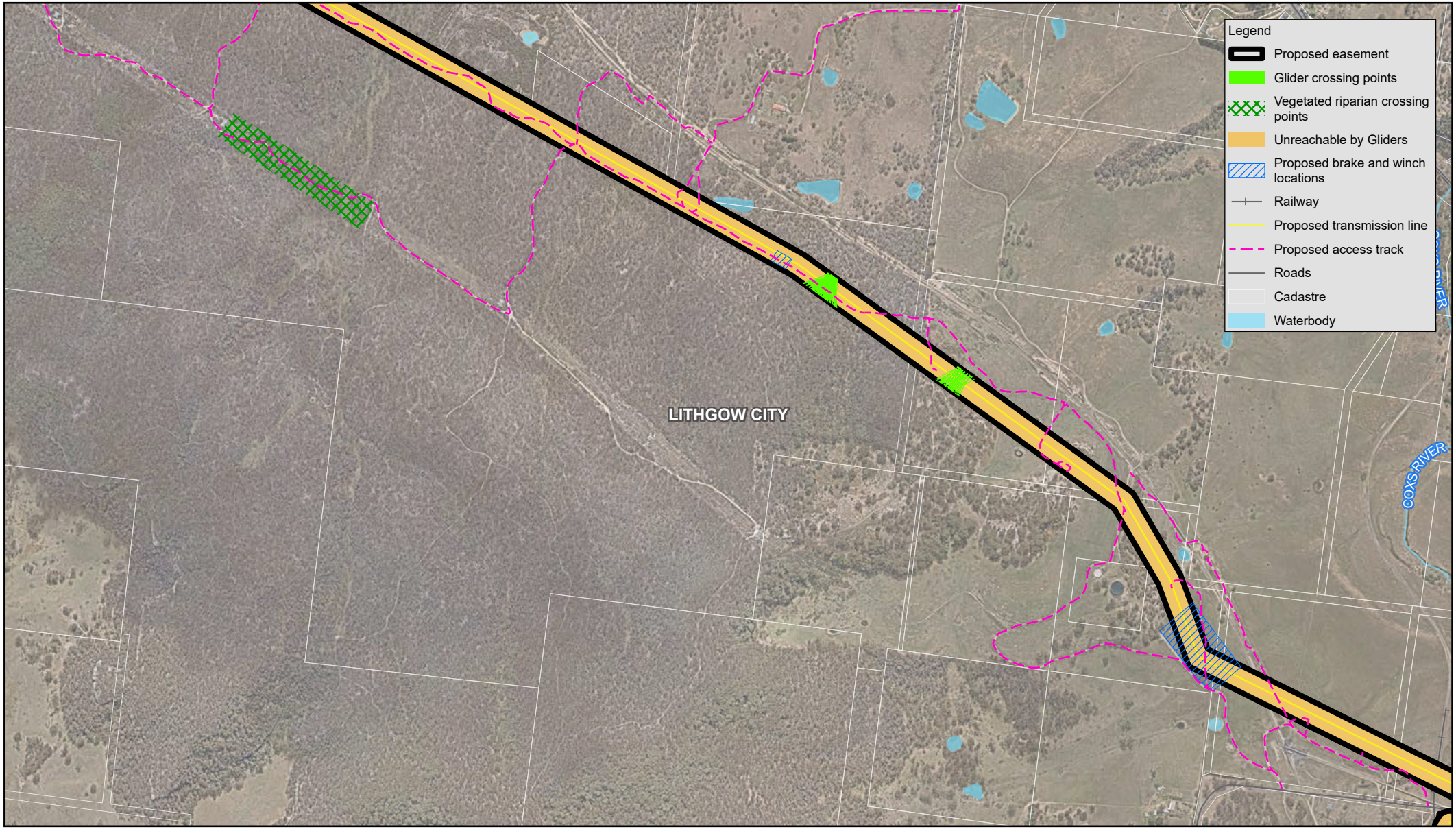
Squirrel Glider – potential future glide locations

Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 8.5A

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR023_GlidersProposed
Print date: 17 Jul 2025 - 15:06

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;World Hillshade: Esri, Geoscience Australia, NASA, NGA, USGS;Nearmap WMS Server: . Created by: lmanasan



Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang Transmission Line Upgrade Project
Biodiversity Development Assessment Report

Squirrel Glider – potential future glide locations

Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 8.5B

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR023_GlidersProposed
Print date: 17 Jul 2025 - 15:06

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;World Hillshade: Esri, Geoscience Australia, NASA, NGA, USGS;Nearmap WMS Server: . Created by: lmanasan

8.5.1 Potential for significant residual prescribed impacts

Prescribed impacts are difficult to quantify compared to direct, or even indirect, impacts (DPIE, 2019). The relevant authority has the discretion to increase the number of biodiversity credits to be retired (or other conservation measures to be undertaken), if the justification is due to environmental, social and economic impacts of the proposed development (see Section 7.14(3) BC Act and Section 6.1.2(b) BC Regulation). Given there is no set method for determining a suitable quantum of credits to offset a prescribed impact, the assessor should clearly document the decision pathway and justification for suggested credit numbers or other compensatory actions in the BDAR. Any biodiversity credits proposed are then additional to the baseline number of biodiversity credits determined by the BAM (DPIE, 2019).

A summary of residual impacts resulting from prescribed impacts is provided in Table 8.13. The potential for significant residual impacts is unlikely.

Table 8.13 Summary of prescribed impacts

Prescribed impact	Comment	Residual impacts
Karst, caves, crevices, cliffs, rocks or other geological features of significance	The project may indirectly impact marginal roosting habitat for cave-dependant microbats through noise and vibration impacts from the construction of a transmission tower ~100 m away and use of existing access tracks.	No significant residual impacts are likely.
Human-made structures	The project would remove some human-made structures that may provide temporary roosting for certain threatened fauna.	No significant residual impacts are likely.
Non-native vegetation	The project would remove areas of non-native vegetation that may provide some foraging and breeding habitat for some threatened fauna.	No significant residual impacts are likely.
Habitat connectivity	The project would remove vegetation within and adjacent to an existing easement, expanding the gap between native vegetation. The project would not isolate any areas of habitat or sever any connecting links. Threatened biota including small woodland birds are expected to continue to be able to move across the easement. The connectivity assessment for the Squirrel Glider found that key links would be retained. Further mitigation would be investigated during detailed design.	No significant residual impacts are likely.
Water bodies, water and hydrological processes	Potential impacts on water quality would occur during construction. These impacts would likely comprise increases in sediment load and turbidity over this period within the Coxs River and ephemeral drainage lines intersecting existing easements. Given the small scale and duration of proposed works there is a minor risk of impacts to water quality that is likely to be substantially mitigated through standard environmental management measures on floodplain work areas.	No significant residual impacts are likely.
Vehicle strike	The project would temporarily increase the risk of vehicle strike to a small degree. The project would not result in vehicle strike on threatened fauna, or animals that are part of a TEC.	No significant residual impacts are likely.
Injury or mortality from transmission line collision, entanglement, or electrocution.	The project may increase the risk of powerline strike. Fauna in the study area are already habituated to structures to powerlines at flying and gliding height and may briefly encounter increased risk of strike immediately after construction and the locations of these structures are identified within their home range.	No significant residual impacts are likely.

8.6 Serious and irreversible impacts

8.6.1 Overview

Under the BC Act, Section 6.7 of the BC regulation sets out principles for determining whether an impact on a specific threatened species or ecological community is serious and irreversible. If an impact is likely to contribute significantly to the risk of a threatened species or ecological community becoming extinct, this is deemed serious and irreversible. This likelihood is assessed based on the following four principles:

1. The impact will cause a further decline of a species or ecological community that is currently observed, estimated, inferred or reasonably suspected to be in a rapid rate of decline.
2. The impact will further reduce the population size of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very small population size.
3. The impact is made on the habitat of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very limited geographic distribution.
4. The impacted species or ecological community is unlikely to respond to measures to improve its habitat and vegetation integrity, and therefore its members are not replaceable.

A set of criteria have been developed and are included in the DPE Guidelines to assist a decision-maker to determine a SAII (DPIE, 2019). Threatened biota that meet the criteria under one or more of the above principles have been identified as SAII entities. Each potential SAII entity has an impact threshold identified which can be used to help determine if a development will result in SAII.

Entities at potential for risk of an SAII that are unlikely to be affected by the project are outlined in Table 8.14. The Large-eared Pied Bat is at potential for risk of an SAII and to be affected by the project due to the presence of potential breeding habitat within 100 m of the subject land. This species is assessed in detail in section 8.6.2.

Table 8.14 Entities at potential for risk of an SAII

Common name	Scientific name	Reason for exclusion in assessment
Box Gum Woodland	*White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South-eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions*	Outside subject land and unlikely to be impacted by indirect impacts
Eastern Bentwing Bat	*Miniopterus orianae oceanensis*	No breeding habitat present within 100 m of subject land
Regent Honeyeater	*Anthochaera phrygia*	No mapped important habitat within the subject land
Swift Parrot	*Lathamus discolor*	No mapped important habitat within the subject land

8.6.2 Large-eared Pied Bat

The Large-eared Pied Bat is listed as an SAII entity under principle 4 (i.e. the impacted species or ecological community is unlikely to respond to measures to improve its habitat and vegetation integrity, and therefore its members are not replaceable). It is not listed as an SAII entity under principle 1, 2 or 3.

The project would not have a direct impact on karst, caves, cliffs, crevices, and other formations that may comprise roosting or maternity habitat for the species. No confirmed breeding habitat for this species has been recorded within the subject land (there are no caves in the subject land), although a small rock outcrop occurs adjacent to an existing access track near the WaterNSW water tank in agricultural land (see Figure 5.2D). The project would directly impact 55.43 ha of foraging habitat within the subject land. Indirect impacts are outlined in Section 8.2 and may occur if bats are roosting in poor quality habitat in the rocky outcrop. Figure 5.9 shows areas of potential breeding and foraging habitat for the species, including respective species polygons for each activity. The project would impact 0.68 ha of predominantly grassland habitat within 100 m of the small cave in the subject land. Table 8.15 provides further information on impacts relating to the Large-eared Pied Bat (Section 9.1.2 of the BAM).

It is a matter for the consent authority to determine whether any impact is serious or irreversible having regard to the principles in the Biodiversity Conservation Regulation and the Guidance. It is my opinion as the accredited assessor who has certified this BDAR that the consent authority would be able to determine that there was no impact that was serious or irreversible based on the following regard that I have had to the principles in the Regulation and Guidance (DPIE, 2020a) as applied to the Large-eared Pied Bat in Table 8.15 below.

Table 8.15 Additional impact provisions for threatened species at risk of SAII

Additional impact provisions for species at risk of SAII (Section 9.1.2 of the BAM)	Large-eared Pied Bat
1. The assessor is required to provide further information in the BDAR or BCAR for any species at risk of an SAII, including the action and measures taken to avoid the direct and indirect impact on the species at risk of an SAII. Where these have been addressed elsewhere the assessor can refer to the relevant sections of the BDAR or BCAR	The Large-eared Pied Bat mostly roosts in caves and overhangs in sandstone cliffs and forages on fertile valley floors near waterways (Pennay, 2002., DECC, 2007., Pennay, 2008). They also roost in disused mine shafts and Fairy Martin nests (Schulz, 1998). Maternity roosts occur in arch caves with dome roofs (DERM, 2011), and more recent research suggests the species has a broader range of breeding habitat. A rock outcrop is located adjacent to the subject land that contains a small cave as described in section 6.3. There would be no direct impacts on the small cave. The project will cause an increase in vehicles using the adjacent access track. Piling for nearby transmission structure foundations may create noise and vibration that is likely to impact the potential habitat for Large-eared Pied Bat provided by the rock outcrop. The potential habitat provided by the rock outcrop is sub optimal and as such is not considered an important habitat feature for the local population of Large-eared Pied Bat. Large expanses of more suitable breeding habitat occur in escarpments within the Gardens of Stone SCA around 1 km from the subject land. Specific measures to address impacts to the rock outcrop providing potential breeding habitat for the Large-eared Pied Bat include: – Refinement of new easement and access track upgrades to avoid the rocky outcrop in agricultural land. An existing access track that occurs between sections of the rocky outcrop would not be used during construction and operation of the project. – Piling for structure foundations within 80 m of the rock outcrop will be conducted outside the breeding period (November to January) wherever possible within the required work program. Note this work is likely to be outside of the breeding period under the current program however there needs to be flexibility in the program to allow works in this period if unavoidable. – Establishment of biodiversity exclusion zones including a minimum 10m buffer around the rock outcrop. The boundary of this is to be delineated using a method that does not restrict access for microbats to potential habitat. – Pre-clearing targeted surveys by the Project Ecologist of the rocky outcrop to confirm the presence / absence of active roosts prior to construction. – Weekly inspections by an Environment Officer of potential breeding habitat within the rocky outcrop during construction where this includes the breeding period (November-January). – Diversion of light vehicles to avoid the adjacent access track during the breeding season if any microbats are recorded in pre-clearance or weekly inspections. Heavy vehicles are unable to be divert due to existing constraints including narrow bridges along alternate access tracks. Alternative lower impact piling methods and foundation designs will be explored during detailed design, however are subject to geotechnical findings. This includes the use of smaller drill rigs and methods of piling with lower noise and vibration impact. Measures to mitigate impacts to the rock outcrop will be included within the CEMP for the project. Further details on avoidance and mitigation are provided in Chapter 7 and section 8.8 of the BDAR. Mitigation measures B19 - B24 in Table 8.16, although are general, will mitigate impacts of the project to Large-eared Pied Bat. Mitigation measure B24 relates to impacts of collision with new lines and electrocution to fauna including the Large-eared Pied Bat. Mitigation measures specific to potential Large-eared Pied Bat roosting/breeding habitat are listed in B25 in Table 8.16.

Additional impact provisions for species at risk of SAII (Section 9.1.2 of the BAM)	Large-eared Pied Bat
2. The assessor must consult the TBDC and/or other sources to report on the current population of the species including:	
a) evidence of rapid decline (Principle 1, clause 6.7(2)(a) BC Regulation) presented by an estimate of the: i. decline in population of the species in NSW in the past 10 years or three generations (whichever is longer), or ii. decline in population of the species in NSW in the past 10 years or three generations (whichever is longer) as indicated by: an index of abundance appropriate to the species; decline in geographic distribution and/or habitat quality; exploitation; effect of introduced species, hybridisation, pathogens, pollutants, competitors or parasites	According to the TBDC (NSW DCCEEW, 2025b), the species is not at risk of SAII under Principle 1 – rapid decline. The generation time for the species ranges between 4-5.6 years with this assessment based on works by Woirnaski et. al (2014) and Pennay (2020). This range in generation time is also noted in the Conservation Advice for the species (Commonwealth DCCEEW, 2023). The number of mature individuals is presumed to be declining due to historical and ongoing habitat loss and degradation from known threats. The Conservation Advice notes likely impacts of the 2019/2020 bushfire to 27% of its range and also likely impacts from the 2018 central QLD bushfires, although the extent of overlap between the two incidents is unknown.
b) evidence of small population size (Principle 2, clause 6.7(2)(b) BC Regulation) presented by: i. an estimate of the species' current population size in NSW, and ii. an estimate of the decline in the species' population size in NSW in three years or one generation (whichever is longer), and iii. where such data is available, an estimate of the number of mature individuals in each subpopulation, or the percentage of mature individuals in each subpopulation, or whether the species is likely to undergo extreme fluctuations	According to the TBDC (NSW DCCEEW, 2025b), the Large-eared Pied Bat is not at risk of SAII under Principle 2 – small population size. The population size of the species ranges from 10,000 (Pennay & Thomson, 2008) to 20,000 individuals (Woinarski et al., 2014) (including immature individuals) and includes individuals across both NSW and Queensland where the species resides. The current population size in NSW is unknown and would be lower than ranged estimates suggested above. BioNet records (NSW DCCEEW, 2025a) over the last 4-5.6 years (one generation) are unlikely to contain enough records to confidently estimate its current population size in NSW, or its numbers within sub-populations. There is no peer-reviewed information from the last generation to confidently estimate population size or decline. There are at least ten subpopulations across its range. While the maximum plausible number of subpopulations is unknown, Woinarski et al., (2014) states there are ten or more (Commonwealth DCCEEW, 2023). The species is not known to undergo extreme fluctuations in its distribution or number of mature individuals (Commonwealth DCCEEW, 2023).
c) evidence of limited geographic range for the threatened species (Principle 3, clause 6.7(2)(c) BC Regulation) presented by: i. extent of occurrence ii. area of occupancy iii. number of threat-defined locations (geographically or ecologically distinct areas in which a single threatening event may rapidly affect all species occurrences), and iv. whether the species' population is likely to undergo extreme fluctuations	According to the TBDC (NSW DCCEEW, 2025b), the species is not at risk of SAII under Principle 3 – limited geographic range. The decline of the EOO and AOO of the species has been inferred due to loss of known roosting sites, habitat destruction and impacts from drought and bushfire. The extent of occurrence (EOO) for the species is estimated to be 276,333 km^2 (range 276,333-279,734 km^2). The area of occupancy (AOO) is estimated to be <500 km^2 (range 12-3,092 km^2) based on the number of known maternity sites (NSW TSSC, 2024). The number of known maternity sites are few, with the actual number of actual maternity sites likely to be much greater. Known maternity sites (according to the Conservation Advice) include habitat located in: – Ukerbarley State Conservation Area near Coonabarabran, NSW (noting it was not active in 2021 when the Conservation Advice for the species was published and is unknown whether it has been active since) – Woodsreef Asbestos mine (near Barrabra, NSW) – Pilliga Nature Reserve (Dandry, NSW) Ophir Nature Reserve (Orange, NSW). Lachlan McRae of Macquarie University has recently recorded new maternity colonies in NSW, including in long rocky outcrops in forested land at McCullys Gap near the Hunter Valley (McRae, 2024).

Additional impact provisions for species at risk of SAII (Section 9.1.2 of the BAM)	Large-eared Pied Bat
	The Large-eared Pied Bat is at risk across its range. According to the Conservation Advice and NSW Final Determination for the species, the number of threat-defined locations could vary between 1-2, and also >10 based on the threat of drought to maternity roosts. As such a best estimate of 5 locations has been used. This is based on locations subject to ongoing habitat disturbance or destruction and drought. Within NSW, the sandstone escarpments of the Sydney Basin and north-west slopes of NSW appear to be a stronghold for the species. Any threats to caves/cliffs representing maternity or roosting habitat in this region is likely to affect large proportions of the population over a short period. The species is not known to undergo extreme fluctuations in its distribution or number of mature individuals (Commonwealth DCCEEW, 2023).
d) evidence that the species is unlikely to respond to management (Principle 4, clause 6.7(2)(d) BC Regulation) because: i. known reproductive characteristics severely limit the ability to increase the existing population on, or occupy new habitat (e.g. species is clonal) on, a biodiversity stewardship site ii. the species is reliant on abiotic habitats which cannot be restored or replaced (e.g. karst systems) on a biodiversity stewardship site, or iii. life history traits and/or ecology is known but the ability to control key threatening processes at a biodiversity stewardship site is currently negligible (e.g. frogs severely impacted by chytrid fungus).	According to the TBDC (NSW DCCEEW, 2025b), the species is at risk of SAII under Principle 4 – unlikely to respond to management. The Large eared Pied Bat has a generation length of 4-5.6 years, with females able to breed within one year (DERM, 2011), often with two young and likely over successive years (Dwyer, 1966., Pennay, 2008). There is no peer-reviewed literature available suggesting the age at which the female stops being reproductive. The species is highly reliant on abiotic habitats such as sandstone caves in which it is known to roost and also produce young. The structure of known maternity roosts is highly specific, with caves requiring indentations and be high and deep to promote flying in juvenile bats and with the required thermoregulative properties (Commonwealth DCCEEW, 2023). Pennay (2008) notes the scarcity of these physical characteristics in the landscape with maternity roosts often occurring in accessible areas. A suitable cave (presenting appropriate structural and themoregulatory characteristics for breeding) would need to be already present within a biodiversity stewardship site for any management actions to have a net positive effect on the species. The species may also day roost in smaller cracks and crevices in rock faces (without the requirement for deep caves/caverns). Similar occupied roosting habitat has been recorded nearby ~30 km north at Mugii Murum-ban State Conservation Area in the western Blue Mountains in vertical walls of south-west to north-west facing cliff faces 10-15m high with only small fissures (maximum ~30 cm high. The direction of occupied roosts in clifflines is interesting, given the cliff faces in the study area where present in all directions, and suggest thermoregulatory benefits to roosting in those directions (Williams and Thomson, 2018). The life history traits and ecology of the species is relatively unknown, given the scarcity of known maternity sites and the likely inaccessibility of reaching them and/or studying sub-populations using them. Threats listed in response to additional impact provision item 2 are for the most part controlled within a biodiversity offset site, with the exception of impacts due to drought. The only KTP relevant to the species is the *Alteration of habitat following subsidence due to longwall mining*.
3. Where the TBDC indicates data is 'unknown' or 'data deficient' for a species for a criterion listed in Subsection 9.1.2(2.), the assessor must record this in the BDAR or BCAR.	The TBDC does not indicate data is 'unknown' or 'data deficient' for this species for any of the listed criteria. However some of the additional impact criteria cannot be assessed due to an absence of relevant information in the TBDC, BioNet, and other peer-reviewed literature. The SAII assessment for the Large-eared Pied Bat has been completed with publicly available information. Data to support SAII assessment for threatened entities was provided by the Department through the BOS Help Desk mailbox (in line with Section 5.1 of the BAM Operational Manual-Stage 1). The following references provided by the BOS Help Desk have supported the SAII assessment for the species: – NSW TSSC Final Determination (NSW TSSC, 2024) – Saving our Species Annual Reporting cards (noting cards from 2022 are currently not available) (DPIE, 2018., DPIE, 2019b., DPIE, 2020g) – Commonwealth Conservation Advice (Commonwealth DCCEEW, 2024a).

Additional impact provisions for species at risk of SAII (Section 9.1.2 of the BAM)	Large-eared Pied Bat
4. In relation to the impacts from the project on the species at risk of an SAII, the assessor must include data and information on:	
a) the impact on the species' population (Principles 1 and 2) presented by: i. an estimate of the number of individuals (mature and immature) present in the subpopulation on the subject land (the site may intersect or encompass the subpopulation) and as a percentage of the total NSW population, and ii. an estimate of the number of individuals (mature and immature) to be impacted by the project and as a percentage of the total NSW population, or iii. if the species' unit of measure is area, provide data on the number of individuals on the site, and the estimated number that will be impacted, along with the area of habitat to be impacted by the project	It is not possible to determine the number of individuals present in the subpopulation on the subject land or be impacted by the project as mark/recapture techniques including using harp trapping has not been implemented. In addition, the total number of individuals within NSW is unknown (see additional impact impact provision criteria 2), so a percentage of the total NSW population occupying the subject land cannot be calculated. The species was recorded via anabat analysis in multiple locations within or adjacent to the subject land, including at a farm dam ~100m to the east of the rock outcrop. 102 BioNet records of the species occur within 10km of the subject land from the last 20 years, suggesting a self-sustaining local population. Records in the wider locality are clustered around Newnes Plateau to the east which comprises steep escarpments and clifflines, pagodas and a diverse array of other sandstone structures more suitable for breeding than the small rock outcrop located adjacent to the subject land. Habitat constraints for the species as listed in the TBDC suggest the species only occurs within 2 km of rocky areas containing caves, overhangs, escarpments, outcrops, or crevices, or within 2 km of old mines or tunnels. The project intersects 56.51 ha of native vegetation that would comprise known foraging habitat for the species. A rock outcrop in agricultural land with a small cave would comprise potential roosting habitat for the species. Following discussions with NSW DCCEEW and in-line with the TBDC, the cave has also been assumed as potential breeding habitat requiring a SAII assessment and a breeding species polygon has been prepared (Figure 5.9D). An overhang around 20 m long including a small cave is present as part of a larger rocky outcrop that extends around 400 m. This overhang was inspected and no evidence of use found (no guano). No other crevices or caves occur in the remainder of the rocky outcrop. Good quality potential breeding habitat is present in escarpments located around 1 km from the subject land. Further information and photos are provided in section 6.3. The rocky outcrop occurs outside the subject land and would not be directly impacted by the project. Piling for the transmission tower 14D, would occur ~150m to the north-east and is unlikely to disrupt a colony (if present). Piling is also likely to occur during a non-summer period (as an outage is required), so indirect noise and vibration impacts during the breeding season are unlikely. The rocky outcrop is unlikely to comprise breeding habitat for the species. Previously only four maternity roosts have been identified in NSW in caves with large overhangs (Commonwealth DCCEEW, 2023), however recent research has found maternity roosts in larger rock formations near the McCullys Gap (McRae, 2024). Maternity caves need to have indentations in the roof and be high and deep enough to allow juvenile bats to learn to fly inside (Pennay, 2008); structural characteristics that the small cave does not contain. McRae (2024) recommends conserving large rock formations, such as the large cliffline habtiat around 1 km from the subject land, as these can support several maternity roosts. Given the small size of the rock outcrop near the subject land, position within a partially cleared agricultural lot, location of the overhang near the ground surface, exposure to feral predators, lack of depth and lack of flying space, breeding is unlikely to occur at this location. As discussed earlier, large expanses of good quality breeding habitat are present in escarpment and pagoda habitat associated with the Newnes Plateau and Gardens of Stone SCA, and the species is more likely to utilise that habitat than the poor quality habitat in the subject land.

Additional impact provisions for species at risk of SAII (Section 9.1.2 of the BAM)	Large-eared Pied Bat
b) impact on geographic range (Principles 1 and 3) presented by: i. the area of the species' geographic range to be impacted by the project in hectares, and a percentage of the total AOO, or EOO within NSW ii. the impact on the subpopulation as either: all individuals will be impacted (subpopulation eliminated); OR impact will affect some individuals and habitat; OR impact will affect some habitat, but no individuals of the species will be directly impacted iii. to determine if the persisting subpopulation that is fragmented will remain viable, estimate (based on published and unpublished sources such as scientific publications, technical reports, databases or documented field observations) the habitat area required to support the remaining population, and habitat available within dispersal distance, and distance over which genetic exchange can occur (e.g. seed dispersal) and pollination distance for the species iv. to determine changes in threats affecting remaining subpopulations and habitat if the proposed impact proceeds, estimate changes in environmental factors including changes to fire regimes (frequency, severity); hydrology, pollutants; species interactions (increased competition and effects on pollinators or dispersal); fragmentation, increased edge effects, likelihood of disturbance; and disease, pathogens and parasites. Where these factors have been considered elsewhere in relation to the target species, the assessor may refer to the relevant sections of the BDAR or BCAR.	The project would remove 56.51 ha of occupied foraging habitat for the species. This area overlaps with a breeding species polygon for the species of 0.68 ha in a 100 m buffer from the small cave in agricultural land adjacent to the subject land. The project would remove up to 0.11% of the estimated AOO and 0.0002% of the estimated EOO of the species. The numbers of individuals to be impacted is unknown given mark/recapture trapping was not conducted. No rocky outcropping would be directly impacted by the project, and the rocky outcrop with a small cave in the study area would be retained. A desktop assessment of potential breeding habitat using aerial imagery and NSW basemaps, identified several cliff lines ~1 km to the south of the subject land, between Mount Piper and the existing 500 kV transmission easement. The cliff lines occur from Mount Piper and extend in a south-west direction to the Wallerawang Sewage Treatment Plant. These clifflines are likely to present suitable breeding habitat for the species, given they occur within intact vegetation along steep contours. Additional good quality breeding habitat is present in the Newnes Plateau and Gardens of Stone SCA to the east. Habitat connectivity is expected to be largely un-affected for the species, considering the construction and operation of transmission structures within an existing transmission easement would create permeable gaps in vegetation. The flight paths of Large-eared Pied Bats may temporarily be altered within the subject land as new obstructions including transmission structures are navigated (Threlfall et al., 2011). It is likely that the species uses woodland habitat near the small cave to access nearby water sources such as the farm dam where there are several records of the species. McCrae (2024) also noted that the species likely used narrow linear forested habitat to access water sources. The species has been recorded in the western Blue Mountains having a foraging range and core use area of 14.5 and 71 ha for males and 28 and 114 ha for non-reproductive females (Williams and Thomson, 2018). As such, while the 56.51 ha of occupied foraging habitat that is proposed for removal may represent a significant area for individuals in the study area, the linear nature of the project is likely to minimise the impacts on individuals present in the locality. As such, impacts to habitat connectivity for the species are likely to be minor. If the proposed impact proceeds, threats affecting remaining subpopulations include potential changes to fire regimes, hydrology and increased edge effects. Offsets for indirect impacts to the Large-eared Pied Bat due to edge effects have been calculated (see section 8.2 and section 9.4). The project would not have a significant impact on the hydrology (GHD, 2025a) and would reduce, to an acceptable level, both the risk of bushfire ignition by construction and/or operation of the project and the risk that bushfires in the landscape pose to the project across the construction and operation phases of the project (GHD, 2025b). A discussion of prescribed impacts to caves and clifflines is provided in section 8.5.
5. The assessor may also provide new information that can be used to demonstrate that the principle identifying the species as at risk of an SAII, is inaccurate.	Not applicable

8.7 Impacts on MNES

Impacts on MNES are detailed in Appendix E as per the *Guidance for accredited assessors on the assessment of MNES (*DPHI, undated). The project is likely to have a significant impact on:

– Gang-gang Cockatoo: Removal of 10.39 ha of suitable foraging and breeding habitat for the species within the subject land
– Black Gum: Removal of up to 5.89 ha of habitat and 274 individual species within the subject land.

With reference to the Supplementary SEARS, the following threatened entities are unlikely to be significantly impacted by the project:

– Brown Treecreeper; Glossy Black-cockatoo: Removal of up to 40.15 ha of potential foraging habitat, minimal impacts on connectivity
– Large-eared Pied Bat: Removal of up to 55.43 ha of occupied foraging habitat, no direct impacts on breeding habitat
– White Box- Yellow Box- Blakely's Red Gum Grassy Woodland and Derived Native Grassland: No habitat to be impacted
– Regent Honeyeater; Superb Parrot; Purple Copper Butterfly; Greater Glider; Hoary Sunray: No habitat to be impacted.

The project is unlikely to have a significant impact on EPBC Act listed migratory species.

8.8 Mitigating residual impacts – management measures and implementation

Mitigation measures are recommended and will be adapted to each phase of the project. The project will include implementation of measures to mitigate residual impacts, specified in a CEMP. The CEMP will provide detailed environmental controls to manage key environmental issues. The CEMP will be reviewed and updated as necessary throughout the relevant phases of the modification. A Flora and Fauna Management (FFMP) will also be prepared as a subplan to the CEMP.

The CEMP will include, as a minimum, industry-standard measures for the management of soil, surface water, weeds and pollutants, as well as site-specific measures for the management of flora and fauna. The mitigation and harm minimisation measures for direct, indirect and prescribed impacts are detailed in Table 8.3 including timing, responsibility and outcomes.

Table 8.16 Summary of proposed mitigation and management measures for residual impacts (direct, indirect and prescribed)

Impact	Mitigation measures	Timing/ responsibility	Likely effectiveness of proposed measures	Reliability of proposed measures
Avoid and minimise impacts	Opportunities to avoid and minimise impacts on biodiversity will be investigated during detailed design with consideration to retaining vegetation and trees, where possible, to improve connectivity values and/or minimise impacts on threatened species and their habitats, such as Eucalyptus species and hollow bearing trees.	Detailed design – pre-Approval / Proponent Project ecologist	High	Reliable – standard best practise for construction projects.
General biodiversity impacts	A Biodiversity Management Plan (BMP) will be prepared by a qualified ecologist in consultation with NSW DCCEEW. The BMP will: – include biodiversity values on the site, measures for indirect, prescribed and uncertain impacts, processes and procedures, and responsibilities to minimise the potential for biodiversity impacts during construction – outline induction requirements prior to starting work on site, which will inform the workforce on the biodiversity values of the site, protection measures to be implemented to protect native biota and penalties for breaches – be based on SMART principals (Specific, Measurable, Achievable, Realistic, Timebound) – include a plan for implementing, evaluating and reporting on the effectiveness of all mitigation measures outlined in the BDAR – include an adaptative management approach based on performance triggers for remedial action – include a monitoring and/or auditing process to conform that clearing during construction remains within the predicted clearing of native vegetation and threatened species identified in the BDAR – include a map with co-ordinates showing areas to be cleared and areas to be protected, including exclusion zones and protected habitat features in the vicinity of work areas.	Pre-construction and construction / Construction contractor and Project ecologist	High	Reliable – standard best practise for construction projects.

Impact	Mitigation measures	Timing/ responsibility	Likely effectiveness of proposed measures	Reliability of proposed measures
Removal of vegetation and habitat resources	Prior to the commencement of any work in or adjoining areas of native vegetation, a survey will be carried out to identify threatened plants and threatened species habitat within and adjacent to the subject land that are to be avoided or impacts to be minimised. The survey will focus on identifying occurrences of *Eucalyptus cannonii* and *Eucalyptus aggregata* as well as hollow bearing trees directly adjacent to the works area. The BMP will include a Vegetation Clearance Procedure, which will require the limit of clearing and construction boundary to be surveyed and clearly demarcated using high visibility tape. All vegetation outside the boundary will be clearly sign posted and marked on plans as an exclusion zone. Signage will be maintained for the duration of the construction period. Clearing of shrub and groundcover will be minimised as far as possible.	Pre-construction and construction / Project ecologist	High	Reliable – standard best practise for construction projects.
Impacts on riparian vegetation	The BMP will identify opportunities to minimise impacts on shrub or ground stratum native vegetation within riparian zones when reviewing final construction methods and staging. Riparian vegetation clearing methods will retain root balls and trunk bases in situ and undertaken in a manner that minimises ground disturbance. Riparian buffers will be clearly marked onsite in accordance with recommended vegetated riparian zones (VRZs) from the Guidelines for riparian corridors on waterfront land (DPE, 2022).	Pre-construction and construction / Project ecologist	High	Reliable – standard best practise for construction projects.
Unexpected direct impacts to threatened flora and fauna	An Unexpected Species Finds Protocol will be prepared to detail measures to be undertaken if threatened flora and fauna not previously recorded on site are detected during clearing or construction activities.	Construction / Project ecologist	High	Reliable – standard best practise for construction projects.

Impact	Mitigation measures	Timing/ responsibility	Likely effectiveness of proposed measures	Reliability of proposed measures
Impacts on threatened flora	A pre-clearing survey will confirm all Black Gum and Capertee Stringybark trees that will be removed. Visual markings will be employed prior to any clearing to identify Black Gum and Capertee Stringybark trees that will be removed and retained. Tree protection measures are to be installed and maintained and may include establishment of no-go zones and other practicable measures from AS 4970-2009 – Protection of Trees in Development Sites throughout construction. Any additional removal of native vegetation, including threatened Eucalypts, above the number of individuals identified in the project's BDAR will be avoided wherever possible. In the instance, where additional impact on trees or vegetation cannot be avoided, this will require survey to determine the number of trees, realign tree protection areas and demarcation, and identify the additional credits to be purchased and retired. The BMP will consider measures to work with local Landcare for seed collection from Black Gum and Capertee Stringybark trees to be grown for local restoration projects.	Construction / Construction contractor and Project ecologist	High	Reliable – standard best practise for construction projects.
Fauna management	A Fauna Handling and Rescue Procedure for the management of fauna and habitats will be included in the BMP. These will include: – a procedure for the felling of hollow-bearing trees to prevent or minimise mortality of fauna, and the salvage of hollows and logs where practicable – supervision of hollow-bearing tree removal and salvage by a qualified ecologist – management of any trenches or drill sites to prevent fauna from becoming trapped or injured.	Construction / Construction contractor and Project ecologist	High	Unreliable – standard best practise protocol for construction projects however there is a risk of failure for some individuals.
Pre-clearing surveys	Pre-clearing surveys will be undertaken prior to construction by a suitably qualified ecologist. The surveys and inspections, and any subsequent relocation of species, will be undertaken in accordance with the BMP. Specific surveys include: – surveys for roosting microbats or occupied nests for any man-made structures to be removed – searches for nests in vegetation to be removed – identification of fauna refuge sites potentially requiring fauna management during removal, including woody debris as well as human made material such as metal sheets.	Construction / Construction contractor and Project ecologist	High	Reliable – standard best practise for construction projects.

Impact	Mitigation measures	Timing/ responsibility	Likely effectiveness of proposed measures	Reliability of proposed measures
Post-clearing report	A post-clearing report will be prepared documenting all animals that are handled or managed within the site during vegetation clearing. Data to be recorded includes: – date and time of the fauna interaction or sighting and details of the observer – species (if known) or a photograph – number of individuals recorded – adult/juvenile – condition of the animal (living/dead/injured/sick) – management action undertaken (e.g. captured, handled, taken to vet) – results of any management actions (e.g. released, placed in a nest box, euthanised, placed with carer). The post-clearing report is also to include and maintain an inventory of hollows and fallen timber that have been salvaged and relocated.	Construction / Construction contractor and Project ecologist	High	Reliable – standard best practise for construction projects.
Fauna habitat strategy	The BMP will include a Nest Box Strategy for tree hollows impacted during the clearing of vegetation, developed in consultation with NPWS. The strategy would include (at a minimum): – reuse of hollows – identification of target species that best benefit from installation of nest boxes – identification of alternative methods of replacing or creating hollows, cavity sizes – the number required when assessed against retained hollows – monitoring – the use of nest boxes as an immediate measure (ie for rescue and relocation of fauna during clearing).	Preconstruction / Project ecologist	High	Unreliable – while nest boxes may assist fauna immediately after relocation, there is a risk of mortality due to competition with other individuals. Given the linear nature of the project, fauna would be relocated as close as possible to their capture location to ensure they are in or near their home range.
Rehabilitation of vegetation subject to temporary disturbance	A Rehabilitation Management Plan (RMP) will be prepared to guide rehabilitation planning, implementation, monitoring and maintenance of the following disturbed areas within the construction footprint: – Construction compounds and laydown areas – Brake and winch sites – Areas of the easement where vegetation is allowed to regrow.	Construction / Construction contractor and Project ecologist	High	Reliable – standard best practise for construction projects.

Impact	Mitigation measures	Timing/ responsibility	Likely effectiveness of proposed measures	Reliability of proposed measures
Pathogen spread and establishment	All machinery entering the site will be appropriately washed down to be vegetation-and-soil free prior to work on site, to prevent the potential spread of disease in accordance with the Protocols to protect priority biodiversity areas in NSW (DPIE, 2020d). Protocols to prevent introduction or spread of chytrid fungus will be included in the BMP and implemented following the Hygiene guidelines for wildlife (DPIE, 2020d).	Construction and operation / Contractor	High	Unreliable – while standard best practise protocols for construction projects will be implemented there is a potential for pathogen spread.
Spread of weeds	Declared priority weeds will be managed according to requirements of the NSW Biosecurity Act 2015. Soil material and stripped groundcover vegetation with the potential to contain priority weeds will not be removed from the project footprint. Soil disturbance would be avoided as much as possible to minimise the potential for spreading weeds. Declared priority weeds will be managed according to requirements of the Biosecurity Act 2015. The BMP will include a Biosecurity Management Plan to outline measures for managing declared priority weeds during construction. Weed control strategy during the operational stage of the project will be guided by existing Transgrid operational weed management procedures. During maintenance activities, general biosecurity duty obligations will be implemented as per existing Transgrid procedures. Biosecurity risks within the works footprint, such as weeds, will also be assessed and control measures implemented, as required, to manage existing or emerging issues.	Construction and operation / Contractor	High	Unreliable – while standard best practise protocols for construction projects will be implemented there is a potential for weed spread.
Soil loss hazard – erosion of soils and sediment due to clearing during construction	Erosion and sediment control measures will be established prior to construction in accordance with the principles and guidelines included in Managing Urban Stormwater: Soils and Construction - Volume 1 (Landcom, 2004). Additional controls will also be provided within Gardens of Stone SCA in accordance with: – Erosion and sediment control on unsealed roads (OEH, 2012) – Managing Urban Stormwater – Soils and Construction, Volume II (DECC, 2008) – A Resource Guide for Local Councils: Erosion and Sediment Control (DEC, 2006).	Pre-construction, construction and operation / Contractor	High	Reliable – standard best practise for construction projects.
Reduction in surface water quality due to sedimentation	Erosion and sediment controls throughout the site will be inspected and maintained to ensure they are operating effectively.	Construction / Contractor	High	Reliable – standard best practise for construction projects.

Impact	Mitigation measures	Timing/ responsibility	Likely effectiveness of proposed measures	Reliability of proposed measures
Vehicle strike	Appropriate speeds for all construction and contractor vehicles will be applied to limit dust generation and minimise chances of fauna mortality through vehicle strike throughout construction.	Construction and operation / Contractor	Moderate	Reliable – standard best practise for construction projects.
Light spill – displacement of fauna from habitat adjoining the subject land	Light generated during construction will be managed in general accordance with the requirements in Australian Standard AS 4282-1997 Control of the Obtrusive Effects of Outdoor Lighting. Directional lighting will be used to minimise the effects of light spill outside the easement as far as possible.	Construction and operation / Contractor	Moderate	Reliable – standard best practise for construction projects.
Noise and vibration generation – displacement of fauna from habitat adjoining the subject land	All activities on site are to be undertaken as per the approved CEMP, with works confined between the following hours: daytime hours of 7am to 7pm Monday to Sunday, with the exception of out-of-hours works as approved through the out-of-hours works protocol. Additional, specific controls will be included within the Noise and Vibration Management Plan.	Construction and operation / Contractor	Moderate	Reliable – standard best practise for construction projects.
Water quality, chemical and fuel impacts on flora and fauna	Specific measures will be incorporated into the CEMP to minimise the potential for chemical spills and associated impacts on natural environments adjacent to and downstream of the areas of impact. Spill kits will be made available to construction vehicles. A management protocol for accidental spills will be put in place. Chemicals will be stored in bunded areas.	Construction and operation / Construction contractor	High	Reliable – standard best practise for construction projects.
Fire impacts on vegetation and fauna species	A Bushfire Management Plan and a Bushfire Emergency Management and Evacuation Plan will be prepared and included in the CEMP as outlined in the Bushfire Assessment (GHD, 2025b). The plan will detail measures to contain and control the outbreak of fire.	Construction and operation / Construction contractor	High	Reliable – standard best practise for construction projects.
Habitat connectivity	A Connectivity Strategy will be prepared for all affected threatened fauna species. The strategy will: – identify measures to provide equal to or improved connectivity than is provided by the current maintained easement – include designated exclusion areas and tree retention as a first priority before other measures, including opportunities for revegetating creek lines with vegetation of an appropriate height within the Gardens of Stone SCA and/or considering the feasibility of installing crossing structures. The Connectivity Strategy will be implemented together with Vegetation Clearance Requirements for the maintenance and operation of the transmission line.	Detailed design and construction / Project ecologist	High	Reliable – revegetation (and rehabilitation) of creek lines with trees would improve connectivity for the Squirrel Glider.

Impact	Mitigation measures	Timing/ responsibility	Likely effectiveness of proposed measures	Reliability of proposed measures
Injury or mortality from transmission line collision, entanglement, or electrocution	Use of fauna deterrent devices, most likely consisting of the "flapper" variety, will be considered to minimise impacts on the threatened fauna species, such as raptors which includes the White-bellied Sea Eagle. If required, the positioning and the deterrent model to be used will be developed as part of the habitat connectivity strategy and in consultation with the design team.	Detailed design / Construction contractor and Project ecologist	High	Reliable – standard best practise for transmission line projects.
Large-eared Pied Bat potential breeding habitat impacts	Piling for structure foundations within 80 m of the rock outcrop will be conducted outside the breeding period (November to January) wherever possible within the required work program. Biodiversity exclusion zones including a minimum 10m buffer around the rock outcrop will be established. The boundary of this is to be delineated using a method that does not restrict access for microbats to potential habitat. Pre-clearing targeted surveys by the Project Ecologist of the rocky outcrop will be conducted to confirm the presence / absence of active roosts prior to construction. Weekly inspections by an Environment Officer of potential breeding habitat within the rocky outcrop will be conducted during construction where this includes the breeding period (November-January). Diversion of light vehicles to avoid the adjacent access track during the breeding season if any microbats are recorded in pre-clearance or weekly inspections. Heavy vehicles are unable to be divert due to existing constraints including narrow bridges along alternate access tracks. Alternative lower impact piling methods and foundation designs will be explored during detailed design, however, are subject to geotechnical findings. This includes the use of smaller drill rigs and methods of piling with lower noise and vibration impact.	Detailed design / Construction contractor and Project ecologist / Environment Officer	High	Unreliable – Risk of indirect noise and vibration impacts to microbats if a roost is present. Piling for structure foundations is likely to be outside of the breeding period under the current program however there needs to be flexibility in the program to allow works in this period if unavoidable.

9. Impact and offset summary

9.1 Offset requirement for impacts under the BC Act

9.1.1 Introduction

Impacts associated with the project that require offsetting comprise the removal or modification of up to 55.43 ha of native vegetation and associated threatened species habitat within the subject land as shown on Figure 9.1. A further 1.08 ha would be subject to indirect impacts as a result of edge effects (see section 9.1.4).

9.1.2 Direct impacts on native vegetation (ecosystem credits)

Ecosystem credit requirements for direct impacts are summarised in Table 9.1 and offset trading groups (OTGs) to ensure 'like for like' provision of biodiversity offsets are summarised in Table 9.9. credits relating to indirect impacts are outlined in section 9.1.4.

Table 9.1 Direct impacts that require an offset – ecosystem credits

Vegetation zone	PCT ID	TEC	Impact area (ha)	Current VI score	Future VI score	Change in VI score	Biodiversity risk weighting	Number of ecosystem credits required
3369_Good_Central Tableland Ranges Peppermint-Gum Grassy Forest	3369	No	1.47	75.3	0	-75.3	1.75	48
3369_Shrubland_Central Tableland Ranges Peppermint-Gum Grassy Forest	3369	No	5.48	30	0	-30	1.75	72
3385_Good_Southern Tableland Creekflat Swamp Woodland	3385	No	2.59	81.9	0	-81.9	2.00	106
3385_Moderate_Southern Tableland Creekflat Swamp Woodland	3385	No	0.83	46.8	0	-46.8	2.00	19
3385_Paddock trees_Southern Tableland Creekflat Swamp Woodland	3385	No	0.61	34.8	0	-34.8	2.00	11
3385_Poor_Southern Tableland Creekflat Swamp Woodland	3385	No	6.94	14.8	0	-14.8	2.00	0
3385_Non-native_Southern Tableland Creekflat Swamp Woodland	3385	No	29.96	1.6	0	-1.6	2	0
3735_Good_Central Tableland Peppermint Shrub-Grass Forest	3735	No	1.69	91.5	0	-91.5	1.75	68
3735_Shrubland_Central Tableland Peppermint Shrub-Grass Forest	3735	No	7.53	38.3	0	-38.3	1.75	126
3747_Good_Southern Tableland Western Hills Scribbly Gum Forest	3747	No	4.65	79.9	0	-79.9	1.75	163

Vegetation zone	PCT ID	TEC	Impact area (ha)	Current VI score	Future VI score	Change in VI score	Biodiversity risk weighting	Number of ecosystem credits required
3747_Poor_Southern Tableland Western Hills Scribbly Gum Forest	3747	No	5.96	18.4	0	-18.4	1.75	48
3747_Shrubland_Southern Tableland Western Hills Scribbly Gum Forest	3747	No	12.30	43.6	0	-43.6	1.75	235
3749_Good_Western Blue Mountains Scribbly Gum Forest	3749	No	1.64	75.1	0	-75.1	1.50	46
3749_Shrubland_Western Blue Mountains Scribbly Gum Forest	3749	No	1.35	38.8	0	-38.8	1.50	20
3932_Moderate_Central and Southern Tableland Swamp Meadow Complex	3932	No	2.38	48.9	0	-48.9	1.75	51
							Total ecosystem credits	**1,013**

9.1.3 Direct impacts on threatened species and their habitat (species credits)

Confirmed candidate species credit species requiring assessment in accordance with BAM are detailed in Table 5.8. The method used to confirm their presence, the outcome of targeted surveys and the mapping of species polygons is detailed in section 5.2. Species credits required for direct impacts as a result of the project are identified in Table 9.2. Species credits relating to indirect impacts are outlined in section 9.1.4.

Each of the other candidate species and species credit matters such as nest trees have been excluded through targeted seasonal survey with reference to the TBDC (NSW DCCEEW, 2025b) and relevant guidelines as described in sections 2 and 5.2. No other species credit matters were recorded or are assumed present within the subject land.

Table 9.2 Direct impacts that require an offset – species credits

Common name	Scientific name	BC Act status	EPBC Act status	Loss of habitat (ha) or individuals	Biodiversity risk weighting	Number of species credits required
Gang-gang Cockatoo	*Callocephalon fimbriatum*	E	E	10.39	2	418
Large-eared Pied Bat	*Chalinolobus dwyeri*	E	E	55.43	3	1,800
Black Gum	*Eucalyptus aggregata*	V	V	274 individuals	2	548
Capertee Stringybark	*Eucalyptus cannoni*	V	Not listed	142 individuals	1.5	214
Southern Myotis	*Myotis macropus*	V	Not listed	26.72	2	537
Barking Owl	*Ninox connivens*	V	Not listed	10.39	2	418
Powerful Owl	*Ninox strenua*	V	Not listed	10.39	2	418
Squirrel Glider	*Petaurus norfolcensis*	V	Not listed	22.69	2	686
					Total species credits (direct impacts)	**5,039**

Notes: E – listed as an endangered species.
V – listed as a vulnerable species.

9.1.4 Indirect and prescribed impacts

Indirect and prescribed impacts that remain after measures to avoid, minimise and mitigate have been applied, have been offset using additional biodiversity credits. Table 9.3 summarises proposed conservation measures for residual, indirect and prescribed impacts.

Table 9.3 Summary of proposed conservation measures for residual indirect and prescribed impacts

Residual indirect or prescribed impact	Conservation measure description
Edge effects	Vegetation within and adjoining the subject land varies in condition. Particular woodland vegetation types can be more susceptible to edge effects compared to others. Weeds are prevalent around disturbed edges and tracks, and in cleared areas. There are high threat exotic species present throughout the subject land, including Blackberry. There is a moderate to high risk of construction activities spreading new weeds into adjoining vegetation. Management measures including the development of a weed management sub-plan as part of the project CEMP would be implemented to mitigate these potential impacts as identified in section 8.5.1. Other relevant mitigation measures to reduce the impacts of edge effects include lighting design to minimise light spill, dust suppression, and erosion and sediment measures during construction. Additional credits have been calculated to account for impacts from edge effects (see below).
Introduction and spread of weeds, pests and pathogens	The potential for significant or new impacts as a result of the spread of weeds, pests and pathogens is relatively low to moderate, given the existing development presence and extent of human visitation across the subject land and surrounding study area. Construction personnel and vehicles would be excluded from native vegetation outside the subject land. To further mitigate the risk of pathogens being brought onto and/or spread through the site all machinery brought to site will be washed down and inspected to be free of soils, seeds and other organic material in accordance with section 8.5.1. Additional credits have been calculated to account for impacts from edge effects including weed growth (see below).
Noise and light impacts on fauna	Noise levels during the construction period would result in an increase above existing background levels for the duration of construction. Fauna most at risk would be those residing near the works area, and in particular any species that may be nesting, roosting or denning in the area. Some fauna may vacate areas in proximity to the subject land during construction. Other more resilient fauna species are likely to become accustomed to the noise. Given the site history, and the availability of alternate habitat in surrounding areas, it is unlikely the temporary increase in noise during construction of the project would significantly impact on fauna that occur adjacent to the subject land.
Erosion and sedimentation	The project has the potential to result in erosion within the subject land through construction activities and exposure of soils and may, in general, result in sedimentation impacts on adjoining native vegetation and aquatic habitats. Construction of the project has the potential to result in the mobilisation of contaminated sediments into waterways, or chemical spills from vehicles or plant. Potential water quality impacts would be managed through the implementation of mitigation measures, including the provision of silt fences and other structures to intercept runoff as determined in section 8.5.1. The residual risk of the impact is likely to be low.
Dust	Construction of the project may result in generation of dust. High dust levels could reduce habitat quality for flora and fauna species potentially leading to changes in community structure. Dust could also impact health of fauna, such as through respiratory disease. Suppression of dust would be undertaken during construction and detailed in a CEMP.
Fire	Construction of the project presents a potential risk of fire, for example from storage of combustible fuels or ignition from works areas. Small fires can spread very quickly in unfavourable conditions to become large wildfires. In drought conditions, this risk would be increased due to the dry nature of the vegetation. The risk of fires spreading to adjacent areas would be minimised through the implementation of a Bushfire Management Plan and a Bushfire Emergency Management and Evacuation Plan as part of the project's CEMP and other measures to contain and control the outbreak of fire as detailed in the Bushfire Assessment (GHD, 2025b).

As stated in the BAM (DPIE, 2020a). The *'retirement of biodiversity credits may be used with other conservation measures to mitigate prescribed impacts or the indirect impacts of a proposal on areas of native vegetation, TECs and/or threatened species, or their habitat adjacent to the Subject Land. Where part or all of the indirect or prescribed impacts cannot be avoided, minimised or mitigated, the assessor can propose offsets or other measures that benefit threatened entities and their habitat. The approach to calculating any proposed offsets should be documented and justified.'*

Following application of the measures to avoid, minimise and mitigate as summarised in Table 9.3, additional biodiversity offset credits have been applied for indirect impacts associated on habitat and threatened species adjacent to the subject land. Vegetation zones and threatened species that would be likely impacted by edge effects are as follows (Table 8.5):

– PCT 3385_Good
– PCT 3385_Moderate
– Barking Owl
– Gang-gang Cockatoo
– Large-eared Pied Bat
– Powerful Owl
– Southern Myotis
– Squirrel Glider.

The following has been taken into account for the calculations of indirect impacts:

– The area of residual indirect impact on the above listed entities was calculated by applying a 10 m buffer to the subject land.
– A 20 per cent reduction in the vegetation composition and structure was applied to mid-story and groundcover species only to account for the loss of vegetation integrity as a result of edge effects for those PCTs susceptible to edge effects.
– Where an existing edge occurs (for example the southern boundary of the existing easement through the Gardens of Stone SCA no edge effects have been calculated.
– No indirect impacts have been calculated for *Eucalyptus aggregata* and *Eucalyptus cannonni* as there has been no change to the over-storey composition and structure and no trees would be removed.
– Indirect impacts for fauna species have been calculated based on areas where indirect impacts occur adjacent to the mapped species polygon.

The ecosystem credit requirements for indirect impacts are summarised in Table 9.4, and the species credit requirements for indirect impacts are summarised in in Table 9.5. For the purpose of calculating credits for indirect impacts separately from the direct impact vegetation zones, the vegetation zone ID entered in the BAM-C for zone ID 16 and 17 has also been assigned a management zone, MZ3I and MZ4I respectively.

Table 9.4 Indirect impacts that require an offset – ecosystem credits

Vegetation zone and ID	PCT ID	TEC	Impact area (ha)	Current VI score	Future VI score	Change in VI score	Biodiversity risk weighting	Number of ecosystem credits required
3385_Good_Southern Tableland Creekflat Swamp Woodland_MZ3I	3385	No	1.03	81.9	74.8	-7.1	2.00	4
3385_Moderate_Southern Tableland Creekflat Swamp Woodland_MZ4I	3385	No	0.05	46.8	42.1	-4.7	2.00	1

Table 9.5 Indirect impacts that require an offset – species credits

Common name	Scientific name	BC Act status	EPBC Act status	Loss of habitat (ha) or individuals	Biodiversity risk weighting	Number of species credits required
Barking Owl	*Ninox connivens*	V	Not listed	0.52 ha	2	2
Gang-gang Cockatoo	*Callocephalon fimbriatum*	E	E	0.52 ha	2	2
Large-eared Pied Bat	*Chalinolobus dwyeri*	E	E	1.05 ha	3	6
Powerful Owl	*Ninox strenua*	V	Not listed	0.52 ha	2	2
Southern Myotis	*Myotis macropus*	V	Not listed	0.95 ha	2	4
Squirrel Glider	*Petaurus norfolcensis*	V	Not listed	0.52 ha	2	2
Total species credits (indirect impacts)						**18**

Notes: E – listed as an endangered species.
V – listed as a vulnerable species.

9.2 Impacts that do not require calculation of offsets

There are areas of poor condition native vegetation at the subject land which have a VI <17 as calculated in accordance with the BAM and as such no ecosystem credits are required for clearing of this vegetation. Impacts that do not require calculation of offsets are listed in Table 9.6 (as per BAM Section 9.2.2) and shown on Figure 9.1.

Table 9.6 Impacts that do not require ecosystem credits

Impact	Location within subject land	Justification why no further assessment is required
Removal of 6.94 ha of 3385_poor_Southern Tableland Creekflat Swamp Woodland	Refer to Figure 4.1.	Extensively cleared and degraded native vegetation mapped as 3385_poor_Southern Tableland Creekflat Swamp Woodland on Figure 4.1. These areas have been historically cleared for agriculture or energy generation and contain minimal native vegetation cover. VI calculations for this vegetation zone are presented in section 4.4.2 and detailed description is provided in section 4.4.3.

9.3 Impacts that do not need further assessment under the BC Act

The subject land includes non-native vegetation and cleared land that does not contain any habitat features or resources for threatened biota or any other biodiversity values and do not need further assessment under the BAM. Impacts that do not need further assessment for biodiversity credits are listed in Table 9.7 (as per BAM Section 9.3(1–2)) and shown on Figure 9.1.

Table 9.7 Impacts that do not need further assessment for ecosystem credits

Impact	Location within subject land	Justification why no further assessment is required
Removal of 29.96 ha of non-native vegetation.	Refer to Figure 4.1.	Access tracks and other infrastructure throughout the subject land as mapped as 'Non-native' on Figure 4.1. These areas have been historically cleared for agriculture, mining, energy generation and other land uses and do not contain any native vegetation cover. Justification for the mapping of these areas as non-native vegetation is provided in section 4.1.



Legend

- Subject land
- Impacts requiring offset (56.51 ha)
- Areas not requiring assessment (31.02 ha)
- Impacts requiring calculation of ecosystem credits (49.57 ha)
- Roads
- Contour (10m)

Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

Thresholds for assessing and offsetting impacts

Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 9.1A

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR017_ImpactThresholds
Print date: 17 Jul 2025 - 12:45

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan



Legend

- Subject land
- Impacts requiring offset (56.51 ha)
- Areas not requiring assessment (31.02 ha)
- Indirect impact area (1.08 ha)
- Impacts requiring calculation of ecosystem credits (49.57 ha)
- Roads
- Contour (10m)

Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

Thresholds for assessing and offsetting impacts

Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 9.1B

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR017_ImpactThresholds
Print date: 17 Jul 2025 - 12:46

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan



Legend

- Subject land
- Impacts requiring offset (56.51 ha)
- Areas not requiring assessment (31.02 ha)
- Indirect impact area (1.08 ha)
- Impacts requiring calculation of ecosystem credits (49.57 ha)
- Contour (10m)

Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

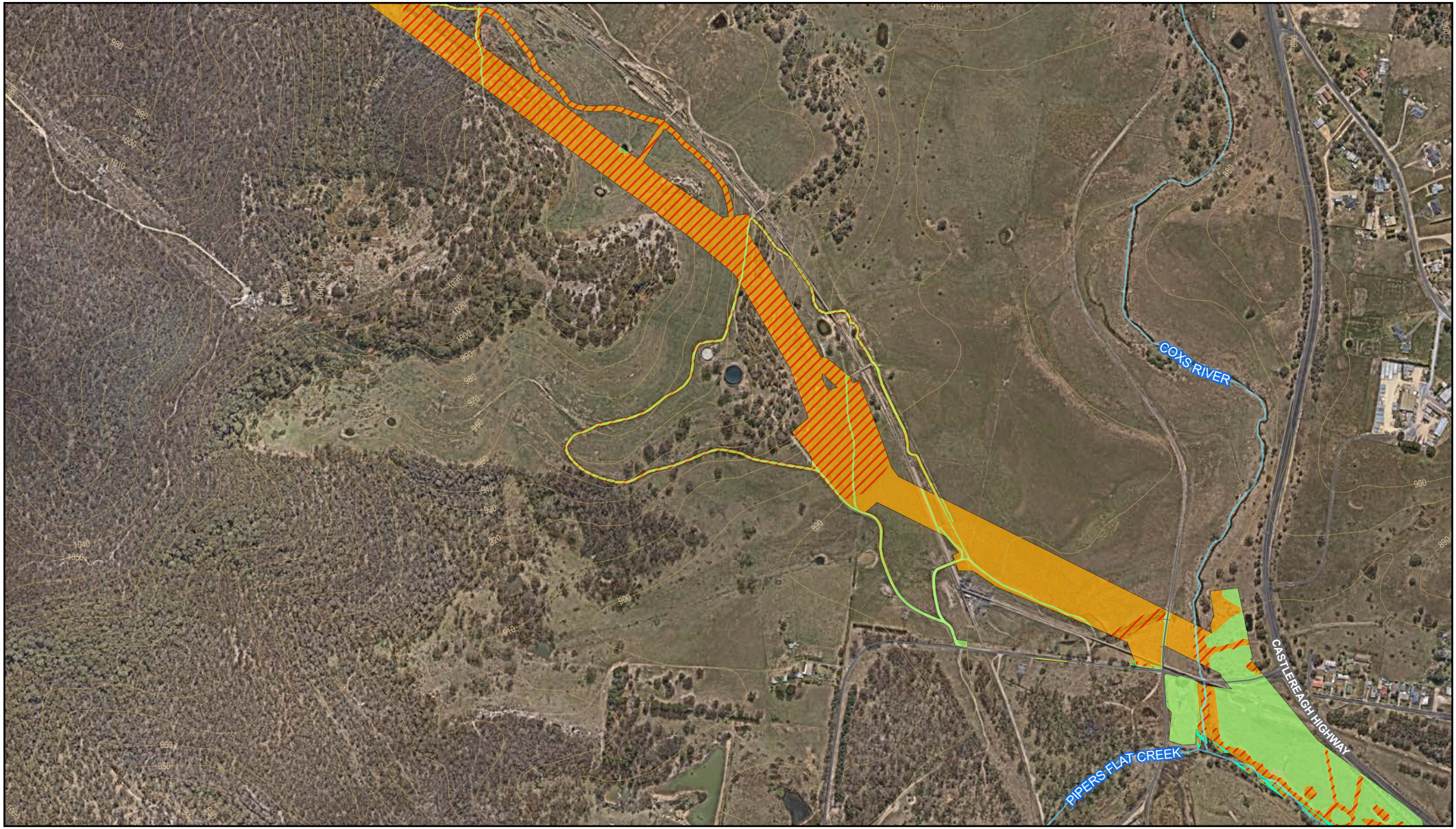
Thresholds for assessing and offsetting impacts

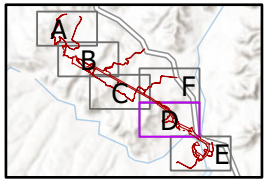
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 9.1C

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR017_ImpactThresholds
Print date: 17 Jul 2025 - 12:46

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Legend

- Subject land
- Impacts requiring offset (56.51 ha)
- Areas not requiring assessment (31.02 ha)
- Indirect impact area (1.08 ha)
- Impacts requiring calculation of ecosystem credits (49.57 ha)
- Railway
- Roads
- Watercourse
- Contour (10m)

Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

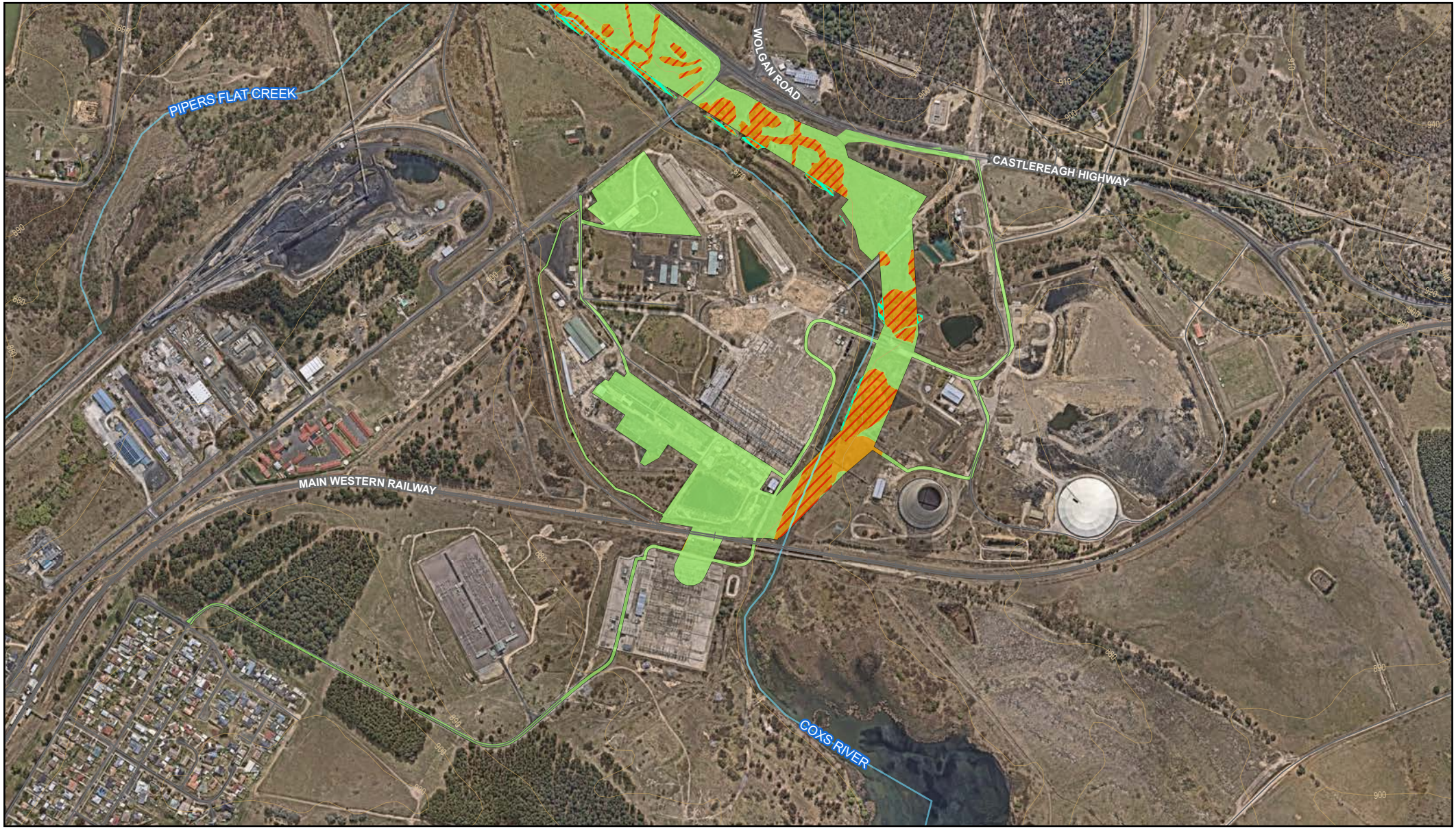
Thresholds for assessing and offsetting impacts

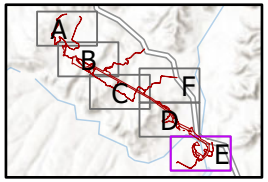
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 9.1D

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR017_ImpactThresholds
Print date: 17 Jul 2025 - 12:47

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Legend

- Subject land
- Impacts requiring offset (56.51 ha)
- Areas not requiring assessment (31.02 ha)
- Indirect impact area (1.08 ha)
- Impacts requiring calculation of ecosystem credits (49.57 ha)
- Railway
- Roads
- Watercourse
- Contour (10m)

Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

Thresholds for assessing and offsetting impacts

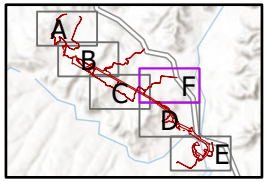
Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 9.1E

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR017_ImpactThresholds
Print date: 17 Jul 2025 - 12:48

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan





Legend

- Subject land
- Impacts requiring offset (56.51 ha)
- Areas not requiring assessment (31.02 ha)
- Indirect impact area (1.08 ha)
- Impacts requiring calculation of ecosystem credits (49.57 ha)
- Roads
- Watercourse
- Contour (10m)

Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transgrid
Mount Piper to Wallerawang
Transmission Line Upgrade Project
Biodiversity Development Assessment Report

Thresholds for assessing and offsetting impacts

Project No. **12612502**
Revision No. **0**
Date **17/07/2025**

FIGURE 9.1F

\\ghdnet\ghd\AU\Sydney\Projects\21\12612502\GIS\Maps\Deliverables\BDAR_A.aprx\12612502_BDAR017_ImpactThresholds
Print date: 17 Jul 2025 - 12:48

Data source: Subject Land - TransGrid, 2023; Railway, Roads, LGAs, Lots, Watercourses, Waterbodies - NSW SS, 2023; State Conservation Areas - NSW DFSI, 2023; Vegetation (Seamless SVTM, Dec 2022) - DPIE, 2023; World Hillshade: Esri, CGIAR;World Terrain Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community;Nearmap WMS Server: .
Created by: lmanasan

9.4 Offsets for MNES

Under the *Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy* (DSEWPaC, 2012) (the EPBC Act Environmental Offsets Policy) biodiversity offsets are required to compensate for significant residual impacts on MNES. This BDAR includes the identification and assessment of potentially affected MNES, consideration of the potential significance of impacts on MNES pursuant to the EPBC Act significant impact guidelines 1.1 (DotE, 2013). The project has been determined a controlled action due to potential significant impacts on threatened species and ecological communities (Sections 18 and 18A of the EPBC Act).

The NSW Government and Commonwealth Government finalised amendments to the Assessment Bilateral Agreement after changes to NSW legislation, and the Amending Agreement no. 1 was signed on 24 March 2020. The Commonwealth Government formally endorsed the NSW Biodiversity Offsets Scheme (BOS) through the *EPBC Act Condition-setting Policy* (DAWE, 2020).

Under the bilateral agreement, only one decision including conditions on approval is made by NSW, accounting for NSW MNES. The EPBC Act condition setting policy (DAWE, 2020) notes that where a project demonstrates compliance with an endorsed state or territory policy, the proponent will not be required to simultaneously comply with the corresponding Commonwealth Government policy. As such, Transgrid is not required to calculate offsets separately using the *EPBC Act offsets policy* (DSEWPAc ,2012) and associated calculator, unless offsets are required for a species not listed under the BC Act.

The BDAR must consider each of the protected matters under the triggered controlling provisions that may be impacted by the action. Where a significant residual adverse impact to a relevant protected matter is considered likely, the BDAR must provide information on the proposed offset strategy.

To meet offsets required for Commonwealth listed entities for controlled actions under the NSW BOS, Transgrid retains the ability to:

– retire biodiversity credits based on the like-for-like provisions in the Biodiversity Conservation Regulation 2017
– fund biodiversity conservation actions that are listed in the Ancillary rules: Biodiversity conservation actions published under Section 6.5 of the Biodiversity Conservation Regulation 2017 and directly benefit the threatened entity impacted
– pay into the Biodiversity Conservation Fund, noting it is Transgrid's responsibility to notify the Biodiversity Conservation Trust (BCT) that their payment is for a controlled action, as the BCT is required to meet the Commonwealth offset requirement component in a like-for-like manner.

This BDAR includes the identification and assessment of potentially affected MNES. Section 5.3 identifies those matters likely to be significantly impacted. Appendix E provides a detailed assessment of those matters identified in section 5.3. Offset requirements have been calculated in accordance with the BAM for significantly impacted MNES and will be delivered in accordance with the BOS and BC Act, pursuant to the agreement bilateral. This would include biodiversity ecosystem credits for removal of habitat for EPBC Act-listed threatened and migratory fauna as summarised in Table 9.8 and Table E.1 in Appendix E. In accordance with the NSW BOS:

– Species credits must be secured to offset significant impacts for Gang-gang Cockatoo and Black Gum as summarised in Table 9.8. 'Like for like offsets' are required for impacts including the Gang-gang Cockatoo and Black Gum as shown in Table 9.10. No significant impacts are expected for the Large-eared Pied Bat and no 'like for like' offsets are required for this MNES according to the EPBC Act Offsets Policy (DSEWPaC, 2012).
– Ecosystem credits matching the associated habitat for fauna will be offset under the BAM and summarised in Table 9.9. No significant impacts are expected for ecosystem credit species and no 'like for like' offsets are required for these MNES according to the EPBC Act Offsets Policy (DSEWPaC, 2012).

Note that Table 9.8 summarise the offsets that would be presented for all potentially affected MNES though offsets would only strictly be required for significantly impacted MNES according to the EPBC Act Offsets Policy (DSEWPaC, 2012). Notwithstanding that most species in Table 9.8 are considered unlikely to be significantly impacted, ecosystem and/or species credits have been calculated, and offsets will be secured in accordance with the BOS. Table 9.8 does not contain species credit entities that have been excluded as occurring in the subject land due to targeted surveys.

Table 9.8 Biodiversity credits required to offset significant impacts to EPBC Act MNES

Common name	Scientific name	EPBC Act status	Likelihood of occurrence	Likelihood of significant impact	Biodiversity credits secured as offsets	Offset trading group
Black Gum	***Eucalyptus aggregata***	**V**	**Known**	**High**	**548**	**Species credit**
Australasian Bittern	*Botaurus poiciloptilus*	E	Moderate	Low	51	As per PCT / ecosystem credit type
Australian Painted Snipe	*Rostratula australis*	E	Moderate	Low	51	As per PCT / ecosystem credit type
Brown Treecreeper	*Climacteris picumnus victoriae*	V	Known	Low	914	As per PCT / ecosystem credit type
Diamond Firetail	*Stagonopleura guttata*	V	Moderate	Low	848	As per PCT / ecosystem credit type
Gang-gang Cockatoo	***Callocephalon fimbriatum***	**E**	**Known**	**High**	**420**	**Species credit**
Hooded Robin (south-eastern form)	*Melanodryas cucullata cucullata*	E	Moderate	Low	914	As per PCT / ecosystem credit type
Latham's Snipe	*Gallinago hardwickii*	V	Moderate	Low	1,013	As per PCT / ecosystem credit type
Painted Honeyeater	*Grantiella picta*	V	Moderate	Low	914	As per PCT / ecosystem credit type
South-eastern Glossy Black-cockatoo	*Calyptorhynchus lathami lathami*	V	Likely	Low	914	As per PCT / ecosystem credit type
White-throated Needletail	*Hirundapus caudacutus*	V	Moderate	Low	1,013	As per PCT / ecosystem credit type
Grey-headed Flying-fox	*Pteropus poliocephalus*	V	Moderate	Low	712	As per PCT / ecosystem credit type
Large-eared Pied Bat	*Chalinolobus dwyeri*	V	Known	Low	1,806	Species credits
Spotted-tail Quoll	*Dasyurus maculatus*	E	Moderate	Low	899	As per PCT / ecosystem credit type

Notes: E= endangered, V= vulnerable species
Bold – species that would be significantly impacted

9.5 Biodiversity offset measures

9.5.1 Offset requirement

The biodiversity credit report for the project is included in Appendix F and identifies the numbers and classes of biodiversity credits required to be retired in accordance with the like-for-like requirements of the offset rules. Credits have been calculated for both direct and indirect impacts. Ecosystem credits are summarised in Table 9.9. Each of the ecosystem credit types can be traded with credits in the same offset trading group (OTG) and located in the Capertee Uplands, Capertee Valley, Hill End, Inland Slopes and Wollemi subregions. There are no additional IBRA subregions within 100 km of the subject land. Species credits are summarised in Table 9.10 and can be traded with matching credits anywhere in NSW.

As described in section 9.4 the Commonwealth Government has formally endorsed the NSW Biodiversity Offsets Scheme (and use of the BAM (DPIE, 2020a) as the methodology for calculating biodiversity credit requirements) through the EPBC Act Condition-setting Policy (DAWE, 2020b), which allows the BOS to be applied to assess and meet Commonwealth biodiversity offset requirements for a project. The biodiversity offset for each entity identified in section 9.4 would be met according to the offset rules of the BOS as set out in section 6.2 of the BC Regulation. Biodiversity offset measures set out in the rules comprise retiring like-for-like credits, funding conservation actions that directly benefit the species or community impacted, or paying into the BCF the value of the credits.

This BDAR has been certified and submitted to the decision-maker within 14 days of the date the BAM-C credit report was finalised.

Table 9.9 'Like-for-like' ecosystem credits required to offset impacts of the project

Vegetation zone	Number of ecosystem credits required	Credit class	Offset trading group	Hollow bearing trees
3369_Good_Central Tableland Ranges Peppermint-Gum Grassy Forest	48	Southern Tableland Grassy Woodlands	Southern Tableland Grassy Woodlands greater than or equal to 50% and less than 70%	Yes
3369_Shrubland_Central Tableland Ranges Peppermint-Gum Grassy Forest	72	Southern Tableland Grassy Woodlands	Southern Tableland Grassy Woodlands greater than or equal to 50% and less than 70%	No
3385_Good_Southern Tableland Creekflat Swamp Woodland	106	Subalpine Woodlands	Subalpine Woodlands greater than or equal to 70% and less than 90%	Yes
3385_Poor_Southern Tableland Creekflat Swamp Woodland	0	Subalpine Woodlands	Subalpine Woodlands greater than or equal to 70% and less than 90%	No
3385_Non-native_Southern Tableland Creekflat Swamp Woodland	0	Subalpine Woodlands	Subalpine Woodlands greater than or equal to 70% and less than 90%	No
3385_Moderate_Southern Tableland Creekflat Swamp Woodland	19	Subalpine Woodlands	Subalpine Woodlands greater than or equal to 70% and less than 90%	No
3385_Paddock trees_Southern Tableland Creekflat Swamp Woodland	11	Subalpine Woodlands	Subalpine Woodlands greater than or equal to 70% and less than 90%	No
3385_Good_Southern Tableland Creekflat Swamp Woodland_MZ3I	4	Subalpine Woodlands	Subalpine Woodlands greater than or equal to 70% and less than 90%	Yes
3385_Moderate_Southern Tableland Creekflat Swamp Woodland_MZ4I	1	Subalpine Woodlands	Subalpine Woodlands greater than or equal to 70% and less than 90%	Yes
3735_Good_Central Tableland Peppermint Shrub-Grass Forest	68	Southern Tableland Dry Sclerophyll Forests	Southern Tableland Dry Sclerophyll Forest greater than or equal to 50% and less than 70%	Yes
3735_Shrubland_Central Tableland Peppermint Shrub-Grass Forest	126	Southern Tableland Dry Sclerophyll Forests	Southern Tableland Dry Sclerophyll Forest greater than or equal to 50% and less than 70%	No
3747_Good_Southern Tableland Western Hills Scribbly Gum Forest	163	Southern Tableland Dry Sclerophyll Forests	Southern Tableland Dry Sclerophyll Forest greater than or equal to 50% and less than 70%	Yes

Vegetation zone	Number of ecosystem credits required	Credit class	Offset trading group	Hollow bearing trees
3747_Shrubland_Southern Tableland Western Hills Scribbly Gum Forest	235	Southern Tableland Dry Sclerophyll Forests	Southern Tableland Dry Sclerophyll Forest greater than or equal to 50% and less than 70%	No
3747_Poor_Southern Tableland Western Hills Scribbly Gum Forest	48	Southern Tableland Dry Sclerophyll Forests	Southern Tableland Dry Sclerophyll Forest greater than or equal to 50% and less than 70%	No
3749_Good_Western Blue Mountains Scribbly Gum Forest	46	Southern Tableland Dry Sclerophyll Forests	Southern Tableland Dry Sclerophyll Forests less than 50%	Yes
3749_Shrubland_Western Blue Mountains Scribbly Gum Forest	20	Southern Tableland Dry Sclerophyll Forests	Southern Tableland Dry Sclerophyll Forests less than 50%	No
3932_Moderate_Central and Southern Tableland Swamp Meadow Complex	51	Montane Bogs and Fens	Montane Bogs and Fens >=50% and <70%	No

Table 9.10 'Like-for-like' species credits required to offset impacts of the project

Common name	Scientific name	BC Act status	EPBC Act status	Kingdom	IBRA Region	Number of species credits required
Gang-gang Cockatoo	*Callocephalon fimbriatum*	E	E	Fauna	South Eastern Highlands	420
Large-eared Pied Bat	*Chalinolobus dwyeri*	E	E	Fauna	South Eastern Highlands	1,806
Black Gum	*Eucalyptus aggregata*	V	V	Flora	South Eastern Highlands	548
Capertee Stringybark	*Eucalyptus cannoni*	V	Not listed	Flora	South Eastern Highlands	214
Southern Myotis	*Myotis macropus*	V	Not listed	Fauna	South Eastern Highlands	541
Barking Owl	*Ninox connivens*	V	Not listed	Fauna	South Eastern Highlands	420
Powerful Owl	*Ninox strenua*	V	Not listed	Fauna	South Eastern Highlands	420
Squirrel Glider	*Petaurus norfolcensis*	V	Not listed	Fauna	South Eastern Highlands	688

9.5.2 Approach to securing offsets

Overview

Transgrid are implementing and considering the following biodiversity offset measures to secure the NSW and Commonwealth offset requirements for the project summarised in section 9.5.1:

– Retire credits from Biodiversity Stewardship Agreements (BSAs) newly established for the project containing the required biodiversity values
– Retire credits from existing Transgrid BSAs or Transgrid held credits
– Purchase suitable 'like-for-like' biodiversity credits from the credit market or the Planning, Offsets, Threatened Species and Ecosystems division (POTSE) Credit Supply Fund, and formally retire the credits

– Entering a Strategic Offset Delivery Agreement (SODA) for a portion of the credit liability
– Funding of approved conservation measures
– Payment to the Biodiversity Conservation Fund (BCF) for a portion of the credit liability.

While Transgrid may discharge their offset obligation through any of these options, including combinations, the preferred approach is to secure credits for the project through BSA establishment, supplemented with market purchase of residual credits not acquitted via project-specific BSAs. Establishment of active, fully funded, in-perpetuity conservation sites under a BSA forms a best-practice approach to biodiversity offsets, whilst also representing a lowest-cost outcome for electricity consumers.

To deliver this outcome and due to the critical timelines of this project, it is anticipated that the conditions of approval for the project would support identification and establishment of BSAs after construction has begun. The terms of this deferral, (including details and equivalent BCF costs of the specific offset measures to be implemented and delivered, deferral security, timing and responsibilities) would be negotiated with the relevant authority prior to project approval and the approval conditions appropriately drafted. It is anticipated that a Biodiversity Offset Package to support the deferral would be prepared for consultation in approximately late-October 2025. This flexibility will enable Transgrid to deliver the dual outcome of best-practice offsets and lowest consumer cost, as has been demonstrated on Transgrid's Project Energy Connect. Project-specific BSA establishment is also likely to have benefits for biodiversity conservation associated with an appropriately located offset that would more directly benefit the species and communities affected by the project.

All biodiversity credits would be secured in accordance with the like-for like trading rules of the BC Regulation, BC Act and bilateral agreement as presented in section 9.5.1 for ecosystem credits / OTGs, species credits and MNES.

Additional detail for each of these options is provided below.

Biodiversity stewardship agreement establishment

Transgrid proposes to establish project-specific BSAs on suitable properties to generate credits to meet the offset needs of the project. As part of the establishment, Transgrid would guarantee fully funded Total Fund Deposits to ensure active management of the BSA/s from approval, which will have best practice benefits for biodiversity conservation. Transgrid would target potential properties close to the alignment as a first priority (including reviewing the potential for co-location of BSAs on properties that would be affected by the project), with the aim to ensure the provision of direct, local and 'like for like' offsets within the region.

Potential properties that support the ecosystem and species credits required to offset impacts of the project are in the process of being identified and investigations are ongoing. Preliminary investigations will be undertaken to map PCTs within the sites and confirm credit type and yield. Further detailed investigations of these sites, including targeted threatened species surveys, would also be required. Subject to agreements with landowners, Transgrid would then finalise the necessary assessments and applications to obtain BSAs over sites deemed suitable for conserving the biodiversity values needed to offset the impacts arising from the project.

Purchase of credits

Transgrid has the opportunity to approach brokers and landowners who have credits for sale. Registered credits are shown on the Credit Supply Register and landowners can also indicate that they potentially have credits available (though not yet created) through an expression of interest within the register. Transgrid may also participate in POTSE Credit Supply Fund reverse auctions to identify any additional sources of credits, particularly species credits, noting that species credits may be traded anywhere in NSW. Comprehensive analysis of market credits will occur as required to align with the program for securing offsets in the project conditions of approval and as a better understanding of credits required is progressed. Purchase of credits from the market would be pursued as a complementary approach in tandem with establishing BSAs to fulfill the offset needs of the project.

Strategic Offset Delivery Agreement (SODA)

Section 6.2(2)(f) of the BC Regulation allows the proponents of a 'major project development' to negotiate acquittal of an agreed portion of an offset liability by entering into a SODA to fund actions that benefit biodiversity values, to be delivered by the Environment Agency Head. The project comprises major project development eligible for the SODA option pursuant to section 6.2(6) (a) of the BC Regulation: a priority transmission infrastructure project or REZ network infrastructure project within the meaning of the *Electricity Infrastructure Investment Act 2020*. The project is identified in the NSW Network Infrastructure Strategy (EnergyCo, 2023) and would provide the additional capacity required to reliably transmit power from the CWO REZ to the Greater Sydney region.

A SODA may be entered into by the proponent following development approval. A SODA must specify the number and class of biodiversity credits to be offset and requires the Environment Agency Head to deliver the offset in a way that is consistent with a regional Conservation Investment Strategy. Subject to final design, offset mechanisms can be determined with NSW DCCEEW and may include a SODA where appropriate. The details and progression of a SODA would be developed in consultation with CPHR and POTSE.

Approved conservation measures

Section 6.2(2)(c) of the BC Regulation allows for 'conservation actions' listed in the *Ancillary Rules: Biodiversity Conservation Actions* to be funded that would benefit threatened species or ecological communities. Conservation actions remain an option to offset impacts of the project, especially for species that may be difficult to offset via establishment of BSA/s or market purchases. Subject to final design, offset mechanisms can be determined in consultation with NSW DCCEEW and may include conservation actions where appropriate. The details and progression of conservation actions to address any credit requirements not able to be acquitted through other means would be developed in consultation with CPHR and POTSE.

Biodiversity conservation fund payment

Section 6.2(2)(e) of the BC Regulation allows proponents with an offset liability to make payments into the BCF, determined in accordance with the offsets payment calculator to satisfy the requirement to retire biodiversity credits. A BCF payment may be used to secure part of the offset obligation even when other sources have been confirmed, for instance, when certain species credits cannot be generated from an otherwise suitable BSA.

This measure is the least likely to be used for the project, with above options preferred prior to any payments into the BCF. If all other options for securing offsets are exhausted and a residual offset liability remains, agreement from the BCT would be sought to pay the remaining liability into the BCF. Any payment into the BCF would be at the price as calculated by the Biodiversity Offsets Payment Calculator at the time of payment.

10. Summary and conclusions

Transgrid proposes the construction, operation and maintenance of approximately 8 km of new 330 kV transmission line between the Mount Piper 330 kV and Wallerawang 330 kV substations, replacement of transmission structures, partial adjustment of existing transmission lines, permanent and temporary access tracks and roads, and ancillary facilities (the project). The project would support the NSW Government's delivery of the Central-West Orana Renewable Energy Zone (CWO REZ) and the State's energy policies and strategies, including Australia's emission targets.

The BDAR describes the existing environment of the study area (section 3), assesses the value and conservation significance of native vegetation and habitats at the subject land (section 4) and the potential for threatened biota including MNES to occur or be affected by the project (section 5). The BDAR also assesses the residual direct, indirect and prescribed impacts of the project (section 8), determines the project's biodiversity offset obligation for residual impacts in accordance with the BAM (section 9) while recommending measures to mitigate and manage the impacts identified (section 7).

The subject land is located approximately 14 km north-west of Lithgow situated on the western fringes of the Blue Mountains. The study area was surveyed and assessed by GHD ecologists according to the BAM. The study area comprises extensive areas of native woodland habitat, particularly where it adjoins Gardens of Stone SCA. Extensive vegetation clearing has occurred for agriculture and various infrastructure in the north-west and south-east portions of the subject land in close proximity to the existing Wallerawang and Mount Piper Power 330 kV substations and the former Wallerawang Power Station.

Surveys identified several threatened flora and fauna species in the subject land; Dusky Woodswallow (*Artamus cyanopterus cyanopterus*), Gang-gang Cockatoo (*Callocephalum fimbriatum*), South-eastern Glossy Black-Cockatoo (*Calyptorhynchus lathami lathami*), Large-eared Pied Bat (*Chalinolobus dwyeri*), Speckled Warbler (*Chthonicola sagittate*), Varied Sittella (*Daphoenositta chrysoptera*), Black Gum (*Eucalyptus aggregata*), Capertee Stringybark (*Eucalyptus cannonii*), Black Falcon (*Falco subniger*), Eastern False Pipistrelle (*Falsistrellus tasmaniensis*), Little Lorikeet (*Glossopsitta pusilla*), White-bellied Sea-eagle (*Haliaeetus leucogaster*), Large Bent-winged Bat (*Miniopterus orianae oceanensis*), Southern Myotis (*Myotis macropus*), Barking Owl (*Ninox connivens*), Powerful Owl (*Ninox strenua*), Scarlet Robin (*Petroica boodang*), Squirrel Glider (*Petaurus norfolcensis*) and Yellow-bellied Sheathtail Bat (*Saccolaimus flaviventris*).

The design of the subject land layout has been developed and revised to avoid impacts to biodiversity values, specifically:

– re-alignment of the project through the Gardens of Stone SCA which would clear vegetation only on one side of the existing easement, where poorer quality habitat is present
– locating a majority of the new transmission line within the current easement
– complete avoidance of the rocky outcrop containing a small cave and Box-Gum Woodland TEC
– reduction in the number of access tracks required for the project, including no additional clearing required for access tracks within Gardens of Stone SCA within the 330 kV easement and existing tracks between the new 330 kV easement and the 132 kV easement
– location construction laydown areas in areas of non-native or poor condition vegetation.

The project would result in direct impacts to native vegetation and associated threatened species habitat through clearing of up to 55.43 ha of native vegetation and 180 hollow-bearing trees. Direct impacts on native vegetation as a result of the project comprise:

– removal of 6.95 ha of Central Tableland Ranges Peppermint-Gum Grassy Forest (PCT 3369)
– removal of 10.98 ha of Southern Tableland Creekflat Swamp Woodland (PCT 3385)
– removal of 9.22 ha of Central Tableland Peppermint Shrub-Grass Forest (PCT 3735)
– removal of 22.90 ha of Southern Tableland Western Hills Scribbly Gum Forest (PCT 3747)
– removal of 2.99 ha of Western Blue Mountains Scribbly Gum Forest (PCT 3749)
– removal of 2.38 ha of Central and Southern Tableland Swamp Meadow Complex (PCT 3932).

Direct impacts on candidate species credit species listed under the BAM comprise:

– removal of 10.39 ha of breeding habitat for the Gang-gang Cockatoo (*Callocephalon fimbriatum*).
– removal of 55.43 ha of occupied habitat for Large-eared Pied Bat (*Chalinolobus dwyeri*)
– removal of 274 individuals of Black Gum (*Eucalyptus aggregata*)
– removal of 142 individuals of Capertee Stringybark (*Eucalyptus cannoni*)
– removal of 26.72 ha of breeding habitat for Southern Myotis (*Myotis macropus*)
– removal of 10.39 ha of breeding habitat for Barking Owl (*Ninox connivens*)
– removal of 10.39 ha of breeding habitat for Powerful Owl (*Ninox strenua*)
– removal of 22.69 ha of breeding habitat for Squirrel Glider (*Petaurus norfolcensis*).

Note that no occupied nest trees for the Gang-gang Cockatoo, Barking Owl or Powerful Owl have been recorded in the subject land, and this area is based on the assumption that breeding may occur in the subject land given the presence of the species in the area. The 274 Black Gum impacted includes up to 60 seedlings and resprouting saplings within an existing maintained electricity easement.

The project would result in residual indirect impacts to 1.08 ha of native vegetation as a result of edge effects and loss of habitat connectivity. Additional offsets have been applied and comprise:

– modification of 1.08 ha of Southern Tableland Creekflat Swamp Woodland (PCT 3385)
– modification of 0.52 ha of occupied habitat for the Gang-gang Cockatoo (*Callocephalon fimbriatum*)
– modification of 1.08 ha of occupied habitat for Large-eared Pied Bat (*Chalinolobus dwyeri*)
– modification of 0.95 ha of occupied habitat for Southern Myotis (*Myotis macropus*)
– modification of 0.52 ha of occupied habitat for Barking Owl (*Ninox connivens*)
– modification of 0.52 ha of occupied habitat for Powerful Owl (*Ninox strenua*)
– modification of 0.52 ha of occupied habitat for Squirrel Glider (*Petaurus norfolcensis*).

Entities at potential risk of a SAII have been assessed and the project is unlikely to result in a SAII. While the Large-eared Pied Bat has been recorded in the subject land, no confirmed breeding habitat would be removed. The project would have indirect impacts on a small cave that is considered poor quality potential breeding habitat.

Impacts prescribed by the Biodiversity Regulation have been assessed. A detailed assessment of impacts on connectivity for the Squirrel Glider was undertaken. Based on this assessment, the Squirrel Glider would be able to continue to glide across the new easement in several locations. The project is unlikely to result in any significant residual prescribed impacts that require additional offsets.

Impacts on the threatened species listed under the EPBC Act have been assessed in accordance with the Matters of National Environmental Significance Significant impact guidelines 1.1 Environment Protection and Biodiversity Conservation Act 1999 (DotE, 2013). Assessments of significance have been prepared for threatened species listed under the EPBC Act that are likely to be impacted by the project. The project is considered likely to have a significant impact on the following species listed under the EPBC Act:

– Gang-gang Cockatoo (*Callocephalon fimbriatum*)
– Black Gum (*Eucalyptus aggregata*).

Specific mitigation measures are recommended to minimise likely impacts on biodiversity values. These measures are presented according to the hierarchy of avoidance and mitigation of impacts, and the identification of residual impacts of the project that cannot be avoided or mitigated. The project will include, as a minimum, industry-standard measures for the management of soil, surface water, weeds and pollutants, as well as site-specific measures for the management of flora and fauna.

A BAM assessment and credit calculations have been performed in accordance with the methodology (DPIE, 2020a) and using credit calculator version 1.5 incorporating version 1.2 ‘wet year’ benchmarks for PCT 3369 only. Offsets are required for residual impacts on native vegetation and threatened species habitat that cannot be avoided or mitigated. The following ecosystem and species credits would need to be retired to offset residual direct and indirect impacts of the project on threatened species habitats:

– 120 ecosystem credits for Central Tableland Ranges Peppermint-Gum Grassy Forest (PCT 3369)
– 141 ecosystem credits for Southern Tableland Creekflat Swamp Woodland (PCT 3385)

- 194 ecosystem credits for Central Tableland Peppermint Shrub-Grass Forest (PCT 3735)
- 446 ecosystem credits for Southern Tableland Western Hills Scribbly Gum Forest (PCT 3747)
- 66 ecosystem credits for Western Blue Mountains Scribbly Gum Forest (PCT 3749)
- 51 ecosystem credits for Central and Southern Tableland Swamp Meadow Complex (PCT 3932)
- 548 species credits for Black Gum (*Eucalyptus aggregata*)
- 214 species credits for Capertee Stringybark (*Eucalyptus cannonii*)
- 420 species credits for the Barking Owl (*Ninox connivens*)
- 420 species credits for the Gang-gang Cockatoo (*Callocephalon fimbriatum*)
- 420 species credits for the Powerful Owl (*Ninox strenua*)
- 1,806 species credits for Large-eared Pied Bat (*Chalinolobus dwyeri*)
- 541 species credits for the Southern Myotis (*Myotis macropus*)
- 688 species credits for the Squirrel Glider (*Petaurus norfolcensis*).

11. References

Abrahams, C. (2018). Bird bioacoustics surveys – developing a standard protocol. *CIEMM Data and Information Management*. 102: 20-23.

Alexander, C. (2021). Passive acoustic monitoring of Australia's largest owl: Using automated species recognition to detect the Powerful Owl (*Ninox strenua*). Submitted in fulfilment of the requirements for the degree of Master of Philosophy (Science). Queensland University of Technology. Accessed at: eprints.qut.edu.au/227461/1/Callan_Alexander_Thesis.pdf

ANZECC (2000). *National Water Quality Management Strategy Paper No 4. Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Volume 1- The Guidelines (Chapter 1–7),* October 2000. Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand.

AREA Environmental & Heritage Consultants (2022). Biodiversity Development Assessment Report, Subdivision Lot 1 DP1253903, Wallerawang, NSW

Aurecon (2018). Wallerawang Power Station Demolition. Statement of Environmental Effects. Prepared for EnergyAustralia NSW Pty Ltd. Accessed at: greenspot.com.au/documents/Wallerawang%20Power%20Station%20-%20Statement%20of%20Environmental%20Effects.pdf

Australian Museum (2024). Squirrel Glider. Accessed at: australian.museum/learn/animals/mammals/squirrel-glider/

Standards Australia (2023). Australian Standard AS 4282-*2003 Control of the Obtrusive Effects of Outdoor Lighting*

Bennett, E.M., Florent, S.N., Venosta, M., Gibson, M., Jackson, A. and Stark, E. (2022). Curtailment as a successful method for reducing bat mortality at a southern Australian wind farm. Austral Ecology, 47: 1329-1339. Accessed at: doi.org/10.1111/aec.13220

Beruldsen G (1980). Field Guide to Nests and Eggs of Australian Birds. Rigby, Adelaide.

Biosis (2023). Great Western Highway Blackheath to Little Hartley Appendix H - Technical report - Biodiversity (Biodiversity Development Assessment Report). Accessed at: majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=SSI-22004371%2120230110T003050.214%20GMT

BOM (2023). *Atlas of Groundwater Dependant Ecosystems*. Accessed at: .bom.gov.au/water/groundwater/gde/#:~:text=The%20Groundwater%20Dependent%20Ecosystems%20Atlas%20%28GDE%20Atlas%29%20was,and%20only%20national%20inventory%20of%20GDEs%20in%20Australia.

BOM (2025). *Climate Data Online.* Accessed at: www.bom.gov.au/climate/data/?ref=ftr

Churchill, S. (2009). Australian Bats, Allen and Unwin.

Clout, MN (1989). Foraging behaviour of Glossy Black-Cockatoos. Australian Wildlife Research 16: 467-473

Cutajar, T, Portway, C; Gillard, G , Rowley, J. (2022). Technical Reports of the Australian Museum (online), The Australian Museum, 36: 1–48.

Commonwealth DCCEEW (2022a). Conservation Advice for *Calyptorhynchus lathami lathami* (South-eastern Glossy Black Cockatoo). Accessed at: environment.gov.au/biodiversity/threatened/species/pubs/67036-conservation-advice-10082022.pdf

Commonwealth DCCEEW (2022b). Conservation Advice for *Petauroides volans* (greater glider (southern and central)). Accessed at: environment.gov.au/biodiversity/threatened/species/pubs/254-conservation-advice-05072022.pdf

Commonwealth DCCEEW (2023). Conservation Advice for the White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland. Accessed at: environment.gov.au/biodiversity/threatened/communities/pubs/43-conservation-advice.pdf

Commonwealth DCCEEW (2024a). Conservation Advice for Chalinolobus dwyeri (Large-eared Pied Bat). Accessed at: environment.gov.au/biodiversity/threatened/species/pubs/183-conservation-advice-15112023.pdf

Commonwealth DCCEEW (2024b). Conservation Advice for Climacteris picummus victoriae (brown treecreeper (south-eastern)). Accessed at: environment.gov.au/biodiversity/threatened/species/pubs/67062-conservation-advice-31032023.pdf

Commonwealth DCCEEW (2025a). *Protected Matters Online Search Tool*. Accessed at: environment.gov.au/epbc/protected-matters-search-tool.

Commonwealth DCCEEW (2025b). *Species profiles and threats database* (SPRAT). Accessed at: environment.gov.au/cgi-bin/sprat/public/sprat.pl.

Daly G. (2019). The distribution and status of the Giant Burrowing Frog *Heleioporus australiacus* in the Shoalhaven regio of south-eastern NSW. Australian Zoologist vol. 40 (2) pp256-271.

D'Amico M, Martins RC, Álvarez-Martínez JM, Porto M, Barrientos R, Moreira F. (2019). Bird collisions with power lines: Prioritizing species and areas by estimating potential population-level impacts. Divers Distrib. 25: 975–982. Accessed at: doi.org/10.1111/ddi.12903

Davey C & Mulvaney M (2020). Report on a survey of breeding activity of the Gang-gang cockatoo within urban Canberra 2019-2020. Canberra Bird Notes, 45, 3

DAWE (2020). *Environment Protection and Biodiversity Conservation Act 1999 Condition-setting Policy.* Accessed at: dcceew.gov.au/sites/default/files/documents/epbc-condition-setting-policy.pdf

DAWE (2021b). Conservation Advice for Leucochrysum albicans subsp. tricolor (Hoary Sunray). Accessed at: environment.gov.au/biodiversity/threatened/species/pubs/89104-conservation-advice-20122021.pdf

DAWE (2022). (Department of Agriculture, Water and the Environment), *Conservation Advice for Callocephalon fimbriatum (Gang-gang Cockatoo)*. Accessed at: environment.gov.au/biodiversity/threatened/species/pubs/768-conservation-advice-02032022.pdf

Dawson S.J, Adams P.J, Moseby K.E, Waddington K.I, Kobryn H.T, Bateman P.W, Fleming P.A (2017). Peak hour in the bush: linear anthropogenic clearings funnel predator and prey species. Austral Ecology. Vol. 43, Issue 2, pp159-171.

DEC (2004). *Use of effluent by irrigation.* NSW Department of Environment and Conservation. Accessed at: epa.nsw.gov.au/publications/water/effguide

DECC (2002). *Descriptions for NSW (Mitchell) Landscapes Version 2.* Based on descriptions compiled by Dr. Peter Mitchell. NSW Department of Environment and Climate Change; Sydney.

DECC (2006). A resource guide for local councils. Erosion and sediment control. Accessed at:environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Water/Water-quality/resource-guide-local-coucils-erosion-sediment-control-0642.pdf

DECC (2007). Terrestrial vertebrate fauna of the Greater Southern Sydney region: Volume 2 Species of conservation concern and priority pest species. A joint project between the Sydney Catchment Authority and the Parks and Wildlife Division of the Department of Environment and Climate Change by the Information and Assessment Section, Metropolitan Branch, Climate Change and Environment Protection Group, Department of Environment and Climate Change (NSW).

DECC (2008). Managing urban stornwater: soils and construction. Vol. 2 A-E.

DEH (2005). Nationally threatened Species and Ecological communities: Temperate Highland Peat Swamps on Sandstone. Department of the Environment and Heritage.

DERM (2011). (Department of Environment and Resource Management), *National Recovery Plan for the Large-eared Pied Bat Chalinolobus dwyeri.* Accessed at: dcceew.gov.au/sites/default/files/documents/large-eared-pied-bat.pdf

DEWHA (2005). Approved Conservation Advice for Temperate Highland Peat Swamps on Sandstone. Accessed at: environment.gov.au/biodiversity/threatened/communities/pubs/32-conservation-advice.pdf

DEWHA (2008). Approved Conservation Advice for *Eleocharis obicis*. Canberra: Department of the Environment, Water, Heritage and the Arts. Accessed at: environment.gov.au/biodiversity/threatened/species/pubs/15320-conservation-advice.pdf

DoEE (2018). *Australia's bioregions* (IBRA). Accessed at: environment.gov.au/land/nrs/science/ibra

Doerr ED & Doerr VAJ (2007). Gene flow in fragmented landscapes: final report. In Better Knowledge Better Bush Project. (Eds PG Ryan, D Freudenberger & S Briggs). CSIRO Sustainable Ecosystems, Canberra.

Doerr, VAJ, Doerr, ED and Davies, MJ (2010). Does structural connectivity facilitate dispersal of native species in Australia's fragmented terrestrial landscapes? *Systematic Review No 44, Collaboration for Environmental Evidence*. Accessed at: environmentalevidence.org/SR44.html

DotE (2013). *Matters of National Environmental Significance Significant impact guidelines 1.1 Environment Protection and Biodiversity Conservation Act 1999*. Australian Government Department of the Environment; Canberra.

DotE (2015). Referral guidelines for 14 birds listed as migratory species under the EPBC Act. Accessed at: awe.gov.au/sites/default/files/documents/migratory-birds-draft-referral-guideline.pdf

DotE (2015b). Regent Honeyeater conservation advice. Accessed at: environment.gov.au/biodiversity/threatened/species/pubs/82338-conservation-advice.pdf

DotE (2016). National Recovery plan for the Regent Honeyeater. Accessed at: agriculture.gov.au/sites/default/files/documents/national-recovery-plan-regent-honeyeater.pdf

DotE (2017). Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species. EPBC Act Policy Statement 3.21. Accessed at: awe.gov.au/sites/default/files/documents/bio4190517-shorebirds-guidelines.pdf

Douglas, S. (2022, July). Ecological Surveys & Planning: Expert Report for *Acacia meiantha*: Accessed at: majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=SSI-22004371%2120230110T003049.155%20GMT

DPE (2012). *SLATS LANDSAT Woody Vegetation Change - NSW 1988 – 2010*. Spatial data set downloaded at: datasets.seed.nsw.gov.au/dataset/nsw-slats-landsat-woody-change-derived-vector-database-1988-2010f5add

DPE (2022a). Gardens of Stone State Conservation Area- Plan of management. Accessed at: environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Parks-reserves-and-protected-areas/Parks-plans-of-management/gardens-of-stone-state-conservation-area-plan-of-management-220570.pdf

DPE (2022b). Gardens of Stone State Conservation Area- Draft Master Plan. Accessed at:environment.nsw.gov.au/sites/default/files/gardens-of-stone-state-conservation-area-draft-master-plan-220244-big.pdf

DPE (2022c). Guidance for the Biodiversity Development Assessment Report Template. Accessed at: environment.nsw.gov.au/publications/guidance-biodiversity-development-assessment-report-template

DPE (2022d). Koala (*Phascolarctos cinereus*) Biodiversity Assessment Method Survey Guide. Accessed at: environment.nsw.gov.au/koala-phascolarctos-cinereus-biodiversity-assessment-method-survey-guide-220249

DPE (2022e). *BioNet Plant Community Types Benchmarks data* Accessed at: environment.nsw.gov.au/publications/bionet-plant-community-types-benchmarks-data

DPE (2022f). State Vegetation Type Mapping (SVTM). Accessed at: environment.nsw.gov.au/topics/animals-and-plants/biodiversity/nsw-bionet/state-vegetation-type-map

DPE (2023a). *Transitional native vegetation regulatory map viewer.* Accessed at: lmbc.nsw.gov.au/Maps/index.html?viewer=NVRMap

DPE (2023b). *Register of biodiversity certification orders.* Accessed at: environment.nsw.gov.au/topics/animals-and-plants/biodiversity-offsets-scheme/about-the-biodiversity-offsets-scheme/biodiversity-certification/biodiversity-certification-orders#:~:text=Register%20of%20biodiversity%20certification%20orders%20The%20Department%20of,126ZU%20of%20the%20repealed%20Threatened%20Species%20Conservation%20Act

DPE (2023c). *BAM Important Areas viewer.* Accessed at: webmap.environment.nsw.gov.au/Html5Viewer291/index.html?viewer=BAM_ImportantAreas

DPE (2023d). eSPADE NSW Soil and Land Information. NSW Department of Planning and Environment, Sydney. Accessed at: environment.nsw.gov.au/eSpade2Webapp#

DPHI (undated). *Guidance for accredited assessors on the assessment of MNES*'. Department of Planning, Housing and Infrastructure.

DPIE (2016). NSW (Mitchell) Landscapes – version 4.1. Accessed at: datasets.seed.nsw.gov.au/dataset/nsw-mitchell-landscapes-version-3-1

DPIE (2018). SoS Annual Report Card_large eared pied bat chalinolobus dwyeri_2018-2019. Accessed at: nswdpe.intersearch.com.au/nswdpejspui/handle/1/21943

DPIE (2019a). Guidance to help a decision maker to determine a serious and irreversible impact. Accessed at: environment.nsw.gov.au/sites/default/files/2024-02/guidance-decision-makers-determine-serious-irreversible-impact-190511.pdf

DPIE (2019b). SoS Annual Report Card_large eared pied bat chalinolobus dwyeri_2019-2020. Accessed at: nswdpe.intersearch.com.au/nswdpejspui/handle/1/22405

DPIE (2020a). *Biodiversity Assessment Method 2020*. Accessed at: environment.nsw.gov.au/research-and-publications/publications-search/biodiversity-assessment-method-2020

DPIE (2020b). *Surveying threatened plants and their habitats. NSW survey guide for the Biodiversity Assessment Method.* Accessed at: environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Biodiversity/surveying-threatened-plants-and-habitats-nsw-survey-guide-biodiversity-assessment-method-200146.pdf

DPIE (2020c). *NSW Survey Guide for Threatened Frogs. Access at:* environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Threatened-species/nsw-survey-guide-for-threatened-frogs-200440.pdf

DPIE (2020d). Protocols to protect priority biodiversity areas in NSW from *Phytophthora cinnamomi*, myrtle rust, amphibian chytrid fungus and invasive plants. Accessed at: environment.nsw.gov.au/research-and-publications/publications-search/hygiene-guidelines

DPIE (2020e). *Guidance for assessors and decision-makers in applying modified benchmarks to assessments of vegetation integrity*. Accessed at: environment.nsw.gov.au/publications/guidance-assessors-and-decision-makers-applying-modified-benchmarks-assessments-vegetation-integrity

DPIE (2020f). NSW Government's Electricity Infrastructure Roadmap. Accessed at: energy.nsw.gov.au/nsw-plans-and-progress/major-state-projects/electricity-infrastructure-roadmap

DPIE (2020g). SoS Annual Report Card_large eared pied bat chalinolobus dwyeri_2020-21. Accessed at: nswdpe.intersearch.com.au/nswdpejspui/handle/1/22848

DPIE (2022). Cumulative Impact Assessment Guidelines for State Significant Projects. Accessed at: planning.nsw.gov.au/sites/default/files/2023-03/cumulative-impact-assessment-guidelines-for-ssp.pdf

DSE (2011a). National Recovery Plan for the Superb Parrot (Polytelis swainsonii). Accessed at: agriculture.gov.au/sites/default/files/documents/polytelis-swainsonii-recovery-plan.pdf

DSE (2011b). National Recovery Plan for the Hoary Sunray *Leucochrysum albicans* var. *tricolor*. Accessed at: dcceew.gov.au/environment/biodiversity/threatened/recovery-plans/national-recovery-plan-hoary-sunray-leucochrysum-albicans-var-tricolor

DSE (2011c). National Recovery Plan White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland. Accessed at: dcceew.gov.au/sites/default/files/documents/white-and-yellow-box.pdf

DSEWPaC (2012). *Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy. October 2012.* Australian Government Department of Sustainability, Environment, Water, Population and Communities; Canberra.

Environment ACT (1999). Brush-tailed Rock-wallaby (*Petrogale penicillata*): An endangered species. Action Plan No. 22.

Ehmann H (1997). (ed) *Threatened Frogs of New South Wales: Habitats, Status and Conservation.* Frog and Tadpole Study Group of NSW, Sydney.

EMM (2022). Lake Lyell Pumped Hydro Energy Storage Project. Preliminary Terrestrial Biodiversity Assessment. Prepared for Energy Australia.

EMM (2025). Ben Bullen Wind Farm Scoping Report. Accessed at: majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=PDA-78726707%2120250115T052614.199%20GMT

EnergyCo (2023). NSW Network Infrastructure Strategy. Accessed at: energyco.nsw.gov.au/industry/network-infrastructure-strategy-nsw

GHD (2024). Mount Piper to Wallerawang Transmission Project. Rapid Ecology Assessment.

GHD (2025a). Mount Piper to Wallerawang transmission line upgrade. Water assessment.

GHD (2025b). Mount Piper to Wallerawang transmission line upgrade. Bushfire assessment.

GHD (2025c). Mount Piper to Wallerawang transmission line upgrade. Traffic and transport assessment.

GHD (2025d). Mount Piper to Wallerawang transmission line upgrade. Noise and vibration impact assessment.

GHD (2025e). Mount Piper to Wallerawang transmission line upgrade. Environmental impact assessment.

Gillespie GR, McNabb E & Gaborov R (2016). The biology and status of the large brown tree frog *Litoria littlejohni* in Victoria. Victorian Naturalist 133, 128-138.

Gillespie GR & Hines HB (1999). The current status of temperate riverine frog species in south eastern Australia. In: A. Campbell (Ed.), Declines and Disappearances of Australian Frogs. Environment Australia, Canberra. pp. 109-130.

Goldingay, R.L. and Taylor, B.D. (2009). Gliding performance and its relevance to gap crossing by the Squirrel glider (*Petaurus norfolcensis*). *Australian Journal of Zoology* 57: 99-104.

Gril, VAJ, Doerr, ED and Davies, MJ (2010). Does structural connectivity facilitate dispersal of native species in Australia's fragmented terrestrial landscapes? *Systematic Review No 44, Collaboration for Environmental Evidence*. Accessed at: environmentalevidence.org/SR44

Grilo, C., del Cerro, I., Centeno-Cuadros, A., Ramiro, V., Román, J., Molina-Vacas, G., Godoy, J. A. (2016). Heterogeneous road networks have no apparent effect on the genetic structure of small mammal populations. *Science of the Total Environment*, 565, 706–713.

Hansen, N. and Crosby, K. (2016). Habitat used of the threatened Booroolong Frog (*Litoria booroolongensis*) in the Central West Catchment Management Area. *Australian Zoologist* 38(2), 161-170

Hansen, Baril, Watts, Kasmer, Ipolyl & Winton (Hansen et al) (2008). Edge effects across ecosystem types. Accessed at: montana.edu/hansenlab/documents/labreadings2011/hansenetal2008.pdf#:~:text=The%20results%20suggest%20that%20forest%20fragmentation%20is,as%20boreal%20or%20subalpine%20forests.%20These%20finding

Hill, F.A.R. (1991). A research recovery plan for the Brush-tailed Rock-wallaby *Petrogale penicillata* (Grey 1825), in south-eastern Australia. Report to Australian National parks and Wildlife Service, Canberra

Higgins PJ (Ed) (1999). Handbook of Australian, New Zealand & Antarctic birds: volume 4 parrots to dollarbird. Oxford University Press, Melbourne.

Judge S.M (2013). Fauna of the Coxs River Catchment: An assessment of common freshwater species in a high-demand landscape. University of Western Sydney. Accessed at: bluemountains.org.au/documents/research/fauna-of-the-upper-coxs-river-catchment-9feb14.pdf

Kavanagh, R.P (1997). Ecology and management of large forest owls in South-eastern Australia. Thesis submitted for the degree of Doctor of Philosophy. University of Sydney.

Landcom (2004). *Managing Urban Stormwater: Soils and Construction – Volume 1* (The 'Blue Book')

Mahony, M., Knowles, R. and Pattinson, L. (1996). Stuttering Barred Frog. In 'Threatened Frogs of New South Wales: Habitats, Status and Conservation'. (Ed. H. Ehmann.) pp. 65-71. (Frog and Tadpole Study Group of NSW Inc: Sydney).

Mahony M, Moses B, Mahony SV, Lemckert FL, & Donnellan S (2020). A new species of frog in the *Litoria ewingii* species group (Anura: Pelodryadidae) from south-eastern Australia. Zootaxa 4858(2), 201-230.

McRae, L. (2024). Large-eared Pied Bat and Eastern Cave Bat ecology - 2024 ECA Conference presentation. youtube.com/watch?v=tVN7Hlvo0FI

Menkhorst P & Hynes E (2010). National recovery plan for the brush-tailed rock-wallaby Petrogale penicillata. Department of Sustainability and Environment (VIC), East Melbourne

Medd, R.W. (2020). *Distribution, ecology and conservation of the endangered shrub, Acacia meiantha (Fabaceae) in Central West New South Wales*. *Cunninghamia* 20: 183 - 192. Accessed at botanicgardens.org.au/sites/default/files/2023-06/BGD0592_Cunninghamia-2020-009-Medd_Acacia-meiantha.pdf

Mulvaney, M.J., Tyrrell, T. & Davey, C. (2022). Gang-Gang nesting: tell-tale behaviours. A guide prepared by Red Hill Regenerators for those undertaking Gang-gang observations. Accessed at: redhillregenerators.org.au/wp-content/uploads/2022/07/Gang-gang-tell-tale-nesting-behaviours-Mulvaney-Tyrell-Davey-2022.pdf

NRMMC (2006). *National Guidelines for Water Recycling: Managing Health and Environmental Risks*. Natural Resource Management Ministerial Council, Environment Protection and Heritage Council and Australian Health Ministers' Conference Accessed at: view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fwww.waterquality.gov.au%2Fsites%2Fdefault%2Ffiles%2Fdocuments%2Fwater-recycling-guidelines-full-21.docx&wdOrigin=BROWSELINK

NSW DCCEEW (2025a). BioNet Atlas, accessed at: atlas.bionet.nsw.gov.au/UI_Modules/ATLAS_/AtlasSearch.aspx

NSW DCCEEW (2025b). *Threatened Biodiversity Data Collection*. Accessed at: environment.nsw.gov.au/AtlasApp/UI_Modules/TSM_/Default.aspx?a=1

NSW DCCEEW (2025c). *NSW State Vegetation Type Map – version C1.1*. Accessed at: datasets.seed.nsw.gov.au/dataset/nsw-state-vegetation-type-map

NSW DCCEEW (2025d). *BioNet Vegetation Classification Database*. environment.nsw.gov.au/NSWVCA20PRapp/LoginPR.aspx?ReturnUrl=%2fNSWVCA20PRapp%2fdefault.aspx

NSW DCCEEW (2025e). *Threatened biodiversity profile search*. Accessed at: environment.nsw.gov.au/threatenedspeciesapp/

NSW Government (2022). *Groundwater and the environment*. Accessed at: water.dpie.nsw.gov.au/science-data-and-modelling/groundwater-management-and-science/groundwater-and-the-environment

NSW Government (2023a). *Strahler Stream Order GIS dataset* Accessed at: spatial.industry.nsw.gov.au/arcgis/rest/services/PUBLIC/StreamOrder/MapServer/0

NSW Government (2023b). *ePlanning Spatial Viewer- Coastal Wetlands and Littoral Rainforests area Map*. Accessed at: planningportal.nsw.gov.au/spatialviewer/#/find-a-property/lot

NSW National Parks and Wildlife Service (NPWS) (2001). Blue Mountains National Park Plan of Management, Department of Environment and Conservation NSW, accessed at: environment.nsw.gov.au/resources/parks/pomfinalbluemountains.pdf

NSW National Parks and Wildlife Service (NPWS) (2020). Developments adjacent to National Parks and Wildlife Service lands. Accessed at: environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Parks-reserves-and-protected-areas/Development-guidelines/developments-adjacent-npws-lands-200362.pdf

NSW National Parks and Wildlife Service (NPWS) (2023). Garden of Stone State Conservation area. Accessed at: nationalparks.nsw.gov.au/-/media/npws/maps/pdfs/parks/gardens-of-stone-state-conservation-area/gardens-of-stone-state-conservation-area-map.pdf

NSW Scientific Committee (2005). Newnes Plateau Shrub Swamp in the Sydney Basin Bioregion - endangered ecological community listing – final determination. Department of Environment and Climate Change (NSW), accessed at: nationalparks.nsw.gov.au/npws.nsf/Content/ Newnes_Plateau_Shrub_Swamp_endangered

NSW Scientific Committee (2020). White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South-eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions Final

Determination. Accessed at: environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Scientific-Committee/Determinations/2020/white-box-yellow-box-final-determination-ceec.pdf

NSW Scientific Committee (2010). Final Determination for *Eucalyptus aggregata* Deane & Maiden (Black Gum) - vulnerable species. Accessed at: environment.nsw.gov.au/topics/animals-and-plants/threatened-species/nsw-threatened-species-scientific-committee/determinations/final-determinations/2008-2010/eucalyptus-aggregata-vulnerable-species-listing

NSW Scientific Committee (2024). Final determination for Large-eared Pied Bat. Accessed at: environment.nsw.gov.au/sites/default/files/large-eared-pied-bat-chalinolobus-dwyeri-final-determination.pdf

OEH (2012). Erosion and sediment control on unsealed roads. A field guide for erosion and sediment control maintenance practices. Office of Environment & Heritage. Accessed at: environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Water/Water-quality/erosion-sediment-control-unsealed-roads-field-guide-120410.pdf

OEH (2018). Species credit' threatened bats and their habitats NSW survey guide for the Biodiversity Assessment Method. Accessed at: environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Threatened-species/species-credit-threatened-bats-survey-guide-180466.pdf

OEH (2024a). *Blue Mountains Water Skink threatened species profile*. Office of Environment & Heritage. Accessed at: threatenedspecies.bionet.nsw.gov.au/profile?id=10322

OEH (2024b). Biodiversity Assessment Method Calculator. Accessed at: https://bamcalc.lmbc.nsw.gov.au/

Ozark (2025). Mount Piper to Wallerawang transmission line upgrade. Aboriginal Cultural Heritage Assessment Report.

Parks and Wildlife Service Tasmania (2003). Wildlife- White-bellied Sea-eagle factsheet. Accessed at: brunyisland.net.au/files/downloads/parks%20pdf/seaeagle.pdf

Parsons Brinckerhoff (2006). Preliminary Ecology Assessment for Stage 2 Kerosene Vale Ash Repository, Delta Electricity, NSW. Accessed at: majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=MP07_0005%2120190731T043213.919%20GMT

Penman T, Lemckert F, Slade C and Mahony M (2005). Non-breeding habitat requirements of the giant burrowing frog, *Heleioporus australiacus* (Anura: Myobatrachidae) in south-eastern Australia, Australian Zoologist, vol.33, pp.251.

Pennay, M. (2008). A maternity roost of the Large-eared Pied Bat *Chalinolobus dwyeri* (Ryan) (Microchiroptera: Vespertilionidae) in central New South Wales Australia. *Australian Zoologist*. 34:564-569.

Pennay, M., B. Law & L. Reinhold (2004). *Bat calls of New South Wales: Region based guide to the echolocation calls of Microchiropteran bats*. Hurstville: NSW Department of Environment and Conservation.

Pennay, M. (2002). Large Pied Bat *Chalinolobus dwyeri*. Brigalow Belt South Stage 2 Vertebrate Fauna Survey, Analysis and Modelling Projects. Appendix 2 pages 38 - 39. Resource and Conservation Division, Planning NSW, Sydney.

Rayner L, Stojanovic D, Heinsohn R, & Manning A (2016). *Breeding ecology of the superb parrot Polytelis swainsonii in northern Canberra: Nest Monitoring Report 2016*.

RBGT (2023). *PlantNet - NSW Flora Online*. The Royal Botanic Gardens and Domain Trust. Accessed at: PlantNET Home Page - National Herbarium of New South Wales (nsw.gov.au)

Reardon, T. B., McKenzie, N. L., Cooper, S. J. B., Appleton., B., Carthew, S. and Adams, M (2014). A molecular and morphological investigation of species boundaries and phylogenetic relationships in Australian free-tailed bats Mormopterus (Chiroptera : Molossidae). *Australian Journal of Zoology* 62: 109-136.

Reside, J. (1998). Monitoring techniques for the Brush-tailed Rock wallaby Petrogale penicillata in the Australian Alps National Parks. Unpublished report prepared by Wildlife Unlimited Consultancy for the Australian Alps Liaison Committee

Robertson, O. J., and Radford, J. Q. (2009). Gap-crossing decisions of forest birds in a fragmented landscape. *Austral Ecology* 34, 435–446.

RPS (2025). Scoping Report- Sunny Corner Wind Farm. Prepared for MRP Someva ProjectCO Pty Ltd

SA DEW (undated). White-bellied Sea-eagle fact sheet. Prepared for the Department of Energy and Water. Accessed at: cdn.environment.sa.gov.au/landscape/docs/hf/white-bellied-sea-eagle-bio-region-fact.pdf

Schulz M., Hannah D., Eyre T. and Hogan L. (1998). Significant results from the Comprehensive Regional Assessment fauna surveys in the south-eastern Queensland bio-geographic region. 8th Australasian Bat Conference Abstracts. Australasian Bat Society, Rockhampton.

SKM (2007). Western Rail Coal Unloader – Flora and Fauna Impact Assessment. Accessed at: majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=MP06_0271%20190813T065023.000%20GMT

State Emergency Services (SES) (2017). *Lachlan Shire Local Flood Plan.* Accessed at: ses.nsw.gov.au/media/2421/lachlan-shire-lfp-sep-2017-endorsed.pdf

Short, J. (1982). Habitat Requirements of the Brush-Tailed Rock-wallaby, Petrogale penicillata, in New South Wales. Wildlife Research 9: 239–246.

Soanes, K., Lobo, M.C., Vesk, P.A., Moore, J., McCarthy, M.A. and van der Ree, R. (2013). Movement re-established but not restored: Inferring the effectiveness of road-crossing mitigation for a gliding mammal by monitoring use. *Biological Conservation* 159: 434-441.

Threlfall, C., Law, B., Penman, T., and Banks, P.B. (2011). Ecological processes in urban landscapes: mechanisms influencing the distribution and activity of insectivorous bats, *Ecography*, 34, pp. 814–826.

Thurstans, S.D (2009a). Modelling the nesting habitat of the White-bellied Sea-eagle Haliaeetus luecogaster in Tasmania. *Corella* 33(3), pp51-65.

Thurstans, S.D (2009b). A survey of White-bellied Sea-eagle *Haliaeetus leucogaster* nests in Tasmania in 2009. *Corella* 33(3): pp 66-70

Traill, B.J. (1998). Identification of Squirrel Gliders and Sugar Gliders in Victoria. Victorian Naturalist 115: 135–41.

Transgrid (2022). Maintenance Plan – Easement and Access Tracks

Transgrid (2024). Mount Piper to Wallerawang transmission line upgrade project. EIS Scoping Report. Accessed at: majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=SSI-70279722%2120240509T050747.566%20GMT

Transport for NSW. (2023). *Great Western Highway Blackheath to Little Hartley Environmental Impact Statement.* Retrieved from Major Projects Planning Portal: majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=SSI-22004371%2120230113T011129.138%20GMT

TSSC (2015). Conservation Advice for *Eucalyptus aggregata* (Black Gum). Threatened Species Scientific Committee. Accessed at: environment.gov.au/biodiversity/threatened/species/pubs/20890-conservation-advice-171115.pdf

TSSC (2016a). Final determination for the White-bellied Sea-eagle. Threatened Species Scientific Committee. Accessed at: environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Scientific-Committee/Determinations/2016/white-bellied-sea-eagle-nsw-scientific-committee-final-determination.pdf

TSSC (2016b) Conservation Advice Paralucia spinifera purple copper butterfly. Threatened Species Scientific Committee. Accessed at: environment.gov.au/biodiversity/threatened/species/pubs/26335-conservation-advice-16122016.pdf

TSSC (2016c) Approved Conservation Advice for the Superb Parrot. Accessed at: https://environment.gov.au/biodiversity/threatened/species/pubs/738-conservation-advice-05052016.pdf

TSSC (2024). Final determination for the Gang-gang Cockatoo. Threatened Species Scientific Committee. Accessed at: environment.nsw.gov.au/sites/default/files/gang-gang-cockatoo-callocephalon-fimbriatum-final-dermination.pdf

Umwelt (2022). Ecological Constraints and Risk Assessment report- Mount Piper Wallerwarang 330 kV connection. Report prepared for Transgrid.

Waldegrave-Knight, L. and Stevens, J. (2003). Brush-tailed Rock-wallaby field management strategy. Department of Sustainability and Environment, Bairnsdale.

Van Dyke. S, Gynther. I, and Baker. A. (2013). Field Companion To The Mammals of Australia. New Holland Publishers.

Wassens, S. (2008). Review of the past distribution and decline of the Southern Bell Frog *Litoria raniformis* in New South Wales. *Australian Zoologist* 34(3): 446–452.

Williams E.R. & Thomson B. (2018). Aspects of the foraging and roosting ecology of the Large-eared Pied Bat (*Chalinolobus dwyeri*) in the western Blue Mountains, with implications for conservation. Australian Mammalogy 41 (2), 212–2019.

Wong, V. (1994). The last of the Brush-tailed Rock-wallabies in the Warrumbungles: Population Management Plan. Unpublished report for the NSW National Parks and Wildlife Service, Nowra District.

Young, W, Brock, M, Chessman, B, Gehrke, P, Maher, W, Marr, A, Olley, J & Warner, R (2000). 'Assessments of river condition under the current flow regime and proposed flow regimes in the lower Coxs River', New South Wales.

Appendix A

Consistency with BAM

Table A.1 below specifies where each component of the BDAR minimum information requirements has been addressed in accordance with BAM Appendix K.

Assessment of compliance with BDAR minimum information requirements:

Table A.1 Assessment of compliance with BDAR minimum information requirements

BAM reference	BAM requirement	Reference(s) in the BDAR
Introduction Chapter 1	**Information**	
	Introduction to the biodiversity assessment including:	
	☒ brief description of the project	Section 1.3 and Table 1.1
	☒ identification of subject land boundary, including: ☒ operational footprint ☒ construction footprint indicating clearing associated with temporary/ancillary construction facilities and infrastructure	Section 1.2
	☒ general description of the subject land	Section 3.2
	☒ sources of information used in the assessment, including reports and spatial data	Section 2.3
	☒ identification and justification for entering the BOS	Section 1.1
	Maps and tables	
	☒ Map of the subject land boundary showing the final subject land, including the construction footprint for any clearing associated with temporary/ancillary construction facilities and infrastructure	Figure 1.3
Site context Chapter 3	**Information**	
	Identification of site context components and landscape features, including:	
	☒ general description of subject land topographic and hydrological setting, geology and soils	Section 3.1 Table 3.1
	☒ per cent native vegetation cover in the assessment area (as described in BAM Section 3.2)	Section 3.3 Table 3.3
	☒ IBRA bioregions and subregions (as described in BAM SubSection 3.1.3(2.))	Section 3.1 Table 3.1
	☒ rivers and streams classified according to stream order (as described in BAM SubSection 3.1.3(3.) and Appendix E)	Section 3.1, Section 3.2.1 Table 3.1
	☒ wetlands within, adjacent to and downstream of the site (as described in BAM SubSection 3.1.3(3.))	Section 3.1, Section 3.2.1 Table 3.1

BAM reference	BAM requirement	Reference(s) in the BDAR
	☒ connectivity of different areas of habitat (as described in BAM SubSection 3.1.3(5–6.))	Section 3.2.1
	☒ karst, caves, crevices, cliffs, rocks and other geological features of significance and for vegetation clearing projects, soil hazard features (as described in BAM SubSections 3.1.3(7.) and 3.1.3(12.))	Section 3.2
	☒ areas of outstanding biodiversity value occurring on the subject land and assessment area (as described in BAM SubSection 3.1.3(8–9.))	Section 3.1 Table 3.1
	☐ any additional landscape features identified in any SEARs for the project	N/A
	☒ NSW (Mitchell) landscape on which the subject land occurs	Section 3.2.2
	☒ details of field reconnaissance undertaken to confirm the extent and condition of landscape features and native vegetation cover (as described in Operational Manual Stage 1 Section 2.4)	Section 2.5
	Maps and tables	
	☒ Site Map ☒ Property boundary ☒ Boundary of subject land ☒ Cadastre of subject land (including labelling of Lot and DP or Section plan if relevant) ☒ Landscape features identified in BAM SubSection 3.1.3	Figure 1.3 Figure 3.1 Figure 3.1
	☒ Location Map ☒ Digital aerial photography at 1:1,000 scale or finer ☒ Boundary of subject land ☒ Assessment area (i.e. the subject land and either 1500 m buffer area or 500 m buffer for linear development) ☒ Landscape features identified in BAM SubSection 3.1.3 ☒ Additional detail (e.g. local government area boundaries) relevant at this scale	Figure 3.1
	Landscape features identified in BAM SubSection 3.1.3 and to be shown on the Site Map and/or Location Map include:	
	☒ IBRA bioregions and subregions ☒ rivers, streams and estuaries ☒ wetlands and important wetlands ☒ connectivity of different areas of habitat ☒ karst, caves, crevices, cliffs, rocks and other geological features of significance and if required, soil hazard features ☒ areas of outstanding biodiversity value occurring on the subject land and assessment area ☒ any additional landscape features identified in any SEARs for the project ☒ NSW (Mitchell) landscape on which the subject land occurs	Figure 3.1

BAM reference	BAM requirement	Reference(s) in the BDAR
	Data	
	☒ All report maps as separate jpeg files	JPEGs provided
	Individual digital shape files of:	
	☒ subject land boundary	Data submitted
	☒ assessment area (i.e. subject land and 1500 m buffer area) boundary	Data submitted
	☒ cadastral boundary of subject land	Data submitted
	☒ areas of native vegetation cover	Data submitted
	☒ landscape features	Data submitted
Native vegetation Chapter 4, Appendix C-1 and Appendix D	**Information**	
	☒ Identify native vegetation extent within the subject land, including cleared areas and evidence to support differences between mapped vegetation extent and aerial imagery (as described in BAM Section 4.1(1–3.) and SubSection 4.1.1)	Section 4.1
	☒ Provide justification for all parts of the subject land that do not contain native vegetation (as described in BAM SubSection 4.1.2)	Section 4.1 Table 4.1
	☒ Review of existing information on native vegetation including references to previous vegetation maps of the subject land and assessment area (described in BAM Section 4.1(3.) and SubSection 4.1.1)	Section 2
	☒ Describe the systematic field-based floristic vegetation survey undertaken in accordance with BAM Section 4.2	Section 2.5.2
	☐ Where relevant, describe the use of more appropriate local data, provide reasons that support the use of more appropriate local data and include the written confirmation from the decision-maker that they support the use of more appropriate local data (as described in BAM SubSection 1.4.2 and Appendix A)	N/A
	For each PCT within the subject land, describe:	
	☒ PCT name and ID	Section 4.4.3 Table 4.12 to Table 4.25
	☒ vegetation class	Section 4.3.2 Table 4.4 to Table 4.9
	☒ extent (ha) within subject land	Section 4.4.3, Table 4.3, Table 4.10
	☒ evidence used to identify a PCT including any analyses undertaken, references/sources, existing vegetation maps (BAM Section 4.2(1–3.))	Section 4.3.2, Table 4.4 to Table 4.9

BAM reference	BAM requirement	Reference(s) in the BDAR
	☒ plant species relied upon for identification of the PCT and relative abundance of each species	Section 4.3.2 Appendix C-1
	☒ if relevant, TEC status including evidence used to determine vegetation is the TEC (BAM SubSection 4.2.2(1–2.))	Section 4.4.3, Section 4.5, Appendix B
	☒ estimate of per cent cleared value of PCT (BAM SubSection 4.2.1(5.))	Table 4.12 to Table 4.25
	Describe the vegetation integrity assessment of the subject land, including:	
	☒ identification and mapping of vegetation zones (as described in BAM SubSection 4.3.1)	Section 2.5.2 Figure 4.1
	☒ description of vegetation zones within the subject land (as described in Operational Manual Stage 1 Table 2 and SubSection 3.3.2)	Section 4.4.3
	☒ area (ha) of each vegetation zone	Table 4.10
	☒ assessment of patch size (as described in BAM SubSection 4.3.2)	Table 4.10
	☒ survey effort (i.e. number of vegetation integrity survey plots) as described in BAM SubSection 4.3.4(1–2.)	Section 4.4 Table 4.10
	☒ use of relevant benchmark data from BioNet Vegetation Classification (as described in BAM SubSection 4.3.3(5.))	Section 4.4.1
	Where use of more appropriate local benchmark data is proposed (as described in BAM SubSection 1.4.2, BAM SubSection 4.3.3(5.) and BAM Appendix A):	
	☐ identify the PCT or vegetation class for which local benchmark data will be applied ☐ identify published sources of local benchmark data (if benchmarks obtained from published sources) ☐ describe methods of local benchmark data collection (if reference plots used to determine local benchmark data)	N/A
	☐ provide justification for use of local data rather than BioNet Vegetation Classification benchmark values	N/A
	☐ provide written confirmation from the decision-maker that they support the use of local benchmark data	N/A
	Maps and tables	
	☒ Map of native vegetation extent within the subject land at scale not greater than 1:10,000 including identification of all areas of native vegetation including areas that are ground cover only, cleared areas (as described in BAM Section 4.1(1–3.)) and all parts of the subject land that do not contain native vegetation (BAM SubSection 4.1.2)	Figure 3.1 Figure 4.1
	☒ Map of PCTs within the subject land (as described in BAM Section 4.2(1.))	Figure 4.1
	☒ Map of vegetation zones within the subject land (as described in BAM SubSection 4.3.1)	Figure 4.1
	☒ Map the location of floristic vegetation survey plots and vegetation integrity survey plots relative to PCT boundaries	Figure 4.1

BAM reference	BAM requirement	Reference(s) in the BDAR
	☐ Map of TEC distribution on the subject land and table of TEC listing, status and area (ha)	N/A
	☒ Map of patch size locations for each native vegetation zone and table of patch size areas (as described in BAM SubSection 4.3.2)	Figure 3.1
	Table of current vegetation integrity scores for each vegetation zone within the site and including:	
	☒ composition condition score ☒ structure condition score ☒ function condition score ☒ presence of hollow bearing trees	Table 4.11
	Data	
	☒ All report maps as separate jpeg files	Data submitted
	☒ Plot field data (MS Excel format)	Data submitted
	☒ Plot field datasheets	Data provided digitally
	Digital shape files of:	
	☒ PCT boundaries within subject land	Data submitted
	☐ TEC boundaries within subject land	N/A
	☒ vegetation zone boundaries within subject land	Data submitted
	☒ floristic vegetation survey and vegetation integrity plot locations	Data submitted
Habitat suitability Chapter 5	**Information**	
	Identify ecosystem credit species likely to occur on the subject land, including:	
	☒ list of ecosystem credit species derived from the BAM-C (as described in BAM SubSection 5.1.1 and Section 5.2(1.))	Section 5.1.1 Table 5.1
	☒ justification and supporting evidence for exclusion of any ecosystem credit species based on geographic limitations, habitat constraints or vagrancy (as described in BAM SubSections 5.2.1 and 5.2.2)	Table 5.1
	☐ justification for addition of any ecosystem credit species to the list	N/A
	Identify species credit species likely to occur on the subject land, including:	
	☒ list of species credit species derived from the BAM-C (as described in BAM SubSection 5.1.1)	Section 5.1.2 Table 5.2

BAM reference	BAM requirement	Reference(s) in the BDAR
	☒ justification and supporting evidence for exclusions based on geographic limitations, habitat constraints or vagrancy (as described in BAM SubSections 5.2.1 and 5.2.2)	Table 5.2 Section 5.1.3
	☒ justification and supporting evidence for exclusions based on degraded habitat constraints and/or microhabitats on which the species depends (as described in BAM SubSection 5.2.2)	Table 5.2 Section 5.1.3
	☒ justification for addition of any species credit species to the list	N/A
	From the list of candidate species credit species, identify:	
	☐ species assumed present within the subject land (if relevant) (as described in BAM SubSection 5.2.4(2.a.)) ☒ species present within the subject land on the basis of being identified on an important habitat map for a species (as described in BAM SubSection 5.2.4(2.d.)) ☒ species for which targeted surveys are to be completed to determine species presence (BAM SubSection 5.2.4(2.b.)) ☐ species for which an expert report is to be used to determine species presence (BAM SubSection 5.2.4(2.c.))	N/A Section 5.1.2 Table 5.2 N/A
	Present the outcomes of species credit species assessments from:	
	☒ threatened species survey (as described in BAM Section 5.2.4)	Section 5.2
	☐ expert reports (if relevant) including justification for presence of the species and information used to make this determination (as described in BAM SubSection 5.2.4, Section 5.3, Box 3)	N/A
	Where survey has been undertaken include detailed information on:	
	☒ survey method and effort (as described in BAM Section 5.3)	Section 2.5 Section 2.6 Section 5.2.1
	☒ justification of survey method and effort (e.g. citation of peer-reviewed literature) if approach differs from the department's taxa-specific survey guides or where no relevant guideline has been published	Section 2.6 Section 5.2.1
	☒ timing of survey in relation to requirements in the TBDC or the department's taxa-specific survey guides. Where survey was undertaken outside these guides include justification for the timing of surveys	Section 2.6 Section 5.2.1 Table 5.8
	☒ survey personnel and relevant experience	Section 2.9.6
	☒ describe any limitations to surveys and how these were addressed/overcome	Section 2.9.4
	Where an expert report has been used in place of survey (as described in BAM Section 5.3, Box 3), include:	

BAM reference	BAM requirement	Reference(s) in the BDAR
	☐ justification of the use of an expert report ☐ identify the expert, provide evidence of their expert credentials and departmental approval of expert status ☐ all requirements of Box 3 have been addressed in the expert report	N/A
	Where use of local data is proposed (BAM SubSection 1.4.2):	
	☐ identify relevant species ☐ identify data to be amended ☐ identify source of information for local data, e.g. published literature, additional survey data, etc. ☐ justify use of local data in preference to VIS Classification or TBDC data	N/A
	☐ provide written confirmation from the decision-maker that they support the use of local data	N/A
	Species polygon completed for species credit species present within the subject land (assumed present or determined on the basis of survey, expert report or important habitat map) ensuring that:	
	☒ the unit of measure for each species is documented	Section 5.2.2 Table 5.9
	for species assessed by area:	
	☒ the polygon includes the extent of suitable habitat for the target species within the subject land (as described in BAM SubSection 5.2.5)	Section 5.2.2
	☒ a description of, and evidence-based justification for, the habitat constraints, features or microhabitats used to map the species polygon including reference to information in the TBDC for that species and any buffers applied	Section 5.2.2
	for species assessed by counts of individuals:	
	☒ the number of individual plants present on the subject land (as described in BAM SubSection 5.2.5(3.))	Section 5.2.2 Table 5.9
	☒ the method used to derive this number (i.e. threatened species survey or expert report) and evidence-based justification for the approach taken	Section 5.2.2 Table 5.9
	☒ the polygon includes all individuals located on the subject land with a buffer of 30 m around the individuals or groups of individuals on the subject land	Section 5.2.2 Table 5.9
	☒ Identify the biodiversity risk weighting for each species credit species identified as present within the subject land (as described in BAM Section 5.4)	Table 5.2

BAM reference	BAM requirement	Reference(s) in the BDAR
	Maps and tables	
	☒ Table showing ecosystem credit species in accordance with BAM SubSection 5.1.1, and identifying:	Table 5.1
	☒ the ecosystem credit species removed from the list	Table 5.1
	☒ the sensitivity to gain class of each species	Table 5.1
	☒ Table detailing species credit species in accordance with BAM Section 5.2 and identifying:	Table 5.2
	☒ the species credit species removed from the list of species because the species is considered vagrant, out of geographic range or the habitat or microhabitat features are not present	Table 5.2
	☒ the candidate species credit species not recorded on the subject land as determined by targeted survey, expert report or important habitat map	Table 5.8
	☒ Table detailing species credit species recorded or assumed as present within the subject land, habitat constraints or microhabitats associated with the species, counts of individuals (flora)/extent of suitable habitat (flora and fauna) (as described in BAM SubSection 5.2.6) and biodiversity risk weighting (BAM Section 5.4)	Table 5.9
	☒ Map indicating the GPS coordinates of all individuals of each species recorded within the subject land and the species polygon for each species (as described in BAM SubSection 5.2.5)	Figure 5.1 Figure 5.2 Figure 5.7 to Figure 5.14
	Data	
	☒ Digital shape files of suitable habitat identified for survey for each candidate species credit species	Data submitted
	☒ Survey locations including GPS coordinates of any plots, transects, grids	Data submitted
	☒ Digital shape files of each species polygon including GPS coordinates of located individuals	Data submitted
	☒ Species polygon map in jpeg format	Data submitted
	☐ Expert reports and any supporting data used to support conclusions of the expert report	N/A
	☒ Field datasheets detailing survey information including prevailing conditions, date, time, equipment used, etc.	Data submitted
Prescribed impact Chapter 6	**Information**	
	Identify potential prescribed biodiversity impacts on threatened entities, including:	
	☒ karst, caves, crevices, cliffs, rocks and other geological features of significance (as described in BAM SubSection 6.1.1) ☒ occurrences of human-made structures and non-native vegetation (as described in BAM SubSection 6.1.2) ☒ corridors or other areas of connectivity linking habitat for threatened entities (as described in BAM SubSection 6.1.3) ☒ waterbodies or any hydrological processes that sustain threatened entities (as described in BAM SubSection 6.1.4)	Section 6.2 Section 6.3

BAM reference	BAM requirement	Reference(s) in the BDAR
	☐ protected animals that may use the proposed wind farm development site as a flyway or migration route (as described in BAM SubSection 6.1.5)	N/A
	☒ where the proposed development may result in vehicle strike on threatened fauna or on animals that are part of a threatened ecological community (as described in BAM SubSection 6.1.6)	Section 6.3
	☒ Identify a list of threatened entities that may be dependent upon or may use habitat features associated with any of the prescribed impacts	Section 6.2
	☒ Describe the importance of habitat features to the species including, where relevant, impacts on life cycle or movement patterns (e.g. SubSection 6.1.3)	Section 6.3
	Where the proposed development is for a wind farm:	
	☐ identify a candidate list of protected animals that may use the development site as a flyway or migration route, including: resident threatened aerial species, resident raptor species and nomadic and migratory species that are likely to fly over the study area (as described in BAM SubSection 6.1.5)	N/A
	☐ provide details of targeted survey for candidate species of wind farm developments undertaken in accordance with BAM SubSection 6.1.5(2–3.)	N/A
	☐ predict the habitual flight paths for nomadic and migratory species likely to fly over the subject land and map the likely habitat for resident threatened aerial and raptor species (BAM SubSection 6.1.5(4.))	N/A
	Where the project may result in vehicle strike:	
	☐ identify a list of threatened fauna or protected fauna species that are part of a TEC and at risk of vehicle strike due to the project	N/A
	Maps and tables	
	☒ Map showing location of any prescribed impact features (i.e. karst, caves, crevices, cliffs, rocks, human-made structures, etc.) where necessary to assess impact	Figure 5.2
	☒ Map showing location of potential vehicle strike locations	Figure 8.1
	☐ Maps of habitual flight paths for nomadic and migratory species likely to fly over the site and maps of likely habitat for threatened aerial species resident on the site (for wind farm developments only)	N/A
	Data	
	☒ Digital shape files of prescribed impact feature locations	Data submitted
	☒ Prescribed impact features map in jpeg format	Data submitted

BAM reference	BAM requirement	Reference(s) in the BDAR
Avoid and minimise impact Chapter 7	**Information**	
	Demonstration of efforts to avoid and minimise impacts on biodiversity values (including prescribed impacts) associated with the project location in accordance with Chapter 7, including an analysis of alternative:	
	☐ modes or technologies that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed mode or technology where necessary to assess impacts	N/A
	☐ routes that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed route	N/A
	☒ alternative locations that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed location	Section 7.2.1, 7.2.2
	☒ alternative sites within a property on which the project is located that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed site	Section 7.2.1, 7.2.2
	☒ Describe efforts to avoid and minimise impacts (including prescribed impacts) to biodiversity values through project design (as described in BAM Sections 7.1 and 7.2)	Section 7.2.3
	☒ Identification of any other site constraints that the proponent has considered in determining the location and design of the project (as described in BAM SubSection 7.2.1(3.))	Section 7.2.2
	Maps and tables	
	☒ Table of measures to be implemented to avoid and minimise the impacts of the project, including action, outcome, timing and responsibility	Table 7.1 - Table 7.4 Table 8.1 - Table 8.5
	☒ Maps demonstrating indirect impact zones where applicable	Figure 8.1
	Data	
	Digital shape files of:	
	☒ alternative and final subject land	Data submitted
	☒ direct and indirect impact zones	Data submitted
	☒ Maps in jpeg format	Data submitted

BAM reference	BAM requirement	Reference(s) in the BDAR
Impact assessment Chapter 8	**Information**	
	☒ Determine the impacts on native vegetation and threatened species habitat, including a description of direct impacts of clearing of native vegetation, threatened ecological communities and threatened species habitat (as described in BAM Section 8.1)	Section 8.1
	Assessment of indirect impacts on vegetation and threatened species and their habitat including (as described in BAM Section 8.2):	
	☒ description of the nature, extent, frequency, duration and timing of indirect impacts of the project	Section 8.2 Table 8.5
	☒ documenting the consequences to vegetation and threatened species and their habitat including evidence-based justifications	Section 8.2 Table 8.5
	☒ reporting any limitations or assumptions, etc. made during the assessment, as necessary	Section 2.9.3 Section 2.9.4 Section 2.9.5
	☒ identification of the threatened entities and their habitat likely to be affected	Section 5
	Assessment of prescribed biodiversity impacts (as described in BAM Section 8.3) including:	
	assessment of the nature, extent frequency, duration and timing of impacts on the habitat of threatened species or ecological communities associated with:	
	☒ karst, caves, crevices, cliffs, rocks and other features of geological significance	Section 8.5
	☒ human-made structures	Section 8.5
	☒ non-native vegetation	Section 8.5
	☒ connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range	Section 8.5
	☒ water quality, waterbodies and hydrological processes that sustain threatened species and threatened ecological communities	Section 8.5
	☐ assessment of the impacts of wind turbine strikes on protected animals	N/A
	☒ assessment of the impacts of vehicle strikes on threatened species of animals or on animals that are part of a TEC	Section 8.5
	☒ evaluate the consequences of prescribed impacts	Table 8.12
	☒ describe impacts that are uncertain	Table 8.12
	☒ document limitations to data, assumptions and predictions	Section 2.9.5 Section 8.5

BAM reference	BAM requirement	Reference(s) in the BDAR
	Maps and tables	
	☒ Table showing change in vegetation integrity score for each vegetation zone as a result of identified impacts	Table 8.3
Impact assessment Chapter 8	**Information**	
	Identification of measures to mitigate or manage impacts in accordance with the recommendations in BAM Sections 8.4 and 8.5 including:	
	☒ techniques, timing, frequency and responsibility ☒ identify measures for which there is risk of failure ☒ evaluate the risk and consequence of any residual impacts	Section 7.2.3 Section 8.8
	☐ document any adaptive management strategy proposed, as required	N/A
	Identification of measures for mitigating impacts related to:	
	☒ displacement of resident fauna (as described in BAM SubSection 8.4.1(2.)) ☒ indirect impacts on native vegetation and habitat (as described in BAM SubSection 8.4.1(3.)) ☒ mitigating prescribed biodiversity impacts (as described in BAM SubSection 8.4.2)	Section 7.2.3 Section 8.8
	☐ Details of the adaptive management strategy proposed to monitor and respond to impacts on biodiversity values that are uncertain (BAM Section 8.5), as required	N/A
	Maps and tables	
	☒ Table of measures to be implemented before, during and after construction to mitigate and manage impacts of the project, including action, outcome, timing and responsibility	Table 8.16
Impact summary Chapter 1	**Information**	
	Identification and assessment of impacts on TECs and threatened species that are at risk of a serious and irreversible impacts (SAII, in accordance with BAM Section 9.1) including:	
	☐ addressing all criteria in SubSection 9.1.1 for each TEC listed as at risk of an SAII present on the subject land	N/A
	☐ for each TEC, report the extent of the TEC in NSW	N/A
	☐ addressing all criteria in SubSection 9.1.2 for each threatened species at risk of an SAII present on the subject land	N/A
	☐ for each threatened species, report the population size in NSW	N/A
	☐ documenting assumptions made and/or limitations to information ☐ documenting all sources of data, information, references used or consulted ☐ clearly justifying why any criteria could not be addressed	N/A
	☒ Identification of impacts requiring offset in accordance with BAM Section 9.2	Section 9.1

BAM reference	BAM requirement	Reference(s) in the BDAR
	☒ Identification of impacts not requiring offset in accordance with BAM SubSection 9.2.1(3.)	Section 9.2
	☒ Identification of areas not requiring assessment in accordance with BAM Section 9.3	Section 9.3
	Maps and tables	
	☐ Map showing the extent of TECs at risk of an SAII within the subject land	N/A
	☐ Map showing location of threatened species at risk of an SAII within the subject land	N/A
	Map showing location of:	
	☒ impacts requiring offset	Figure 9.1
	☒ impacts not requiring offset	Figure 9.1
	☒ areas not requiring assessment	Figure 9.1
	Data	
	Digital shape files of:	
	☐ extent of TECs at risk of an SAII within the subject land	N/A
	☒ location of threatened species at risk of an SAII within the subject land	Data submitted
	☒ boundary of impacts requiring offset	Data submitted
	☒ boundary of impacts not requiring offset	Data submitted
	☒ boundary of areas not requiring assessment	Data submitted
	☒ Maps in jpeg format	Data submitted
Impact summary Chapter 10	**Information**	
	Ecosystem credits and species credits that measure the impact of the development on biodiversity values, including:	
	☒ future vegetation integrity score for each vegetation zone within the subject land (Equation 25 and Equation 26 in BAM Appendix H) ☒ change in vegetation integrity score (BAM SubSection 8.1.1) ☒ number of required ecosystem credits for the direct impacts of the project on each vegetation zone within the subject land (BAM SubSection 10.1.2)	Section 9.1
	☒ biodiversity risk weighting for each	Section 9.1
	☒ number of required species credits for each candidate threatened species that is directly impacted on by the project (BAM SubSection 10.1.3)	Section 9.1.3

BAM reference	BAM requirement	Reference(s) in the BDAR
	Maps and tables	
	☒ Table of PCTs requiring offset and the number of ecosystem credits required	Table 9.1
	☒ Table of threatened species requiring offset and the number of species credits required	Table 9.2
	Data	
	☒ Submitted project in the BAM Calculator	Yes
Biodiversity credit report	**Information**	
	☒ Description of credit classes for ecosystem credits and species credits at the development or clearing site or land to be biodiversity certified (BAM Section 10.2)	Table 9.9
	Maps and tables	
	☒ Table of credit class and matching credit profile	Table 9.9
	Data	
	☒ BAM credit report in pdf format	Appendix F

Table A.2 Likelihood of occurrence criteria for threatened flora species

Likelihood	Criteria
Known	The species was observed in the study area either during the current survey conducted between August 2023 and January 2025, or during another survey less than one year prior to commencement of this study.
High	A species has a high likelihood of occurrence if: – The study area contains or forms part of a large area of high-quality suitable habitat that has not been subject to recent disturbance (e.g. fire). – The species is known to form a persistent soil seedbank. – The species has been recorded recently (within 10 years) in the locality. – The species is a cryptic flowering species that has been recorded recently (within 10 years) in the locality and has a large area of high-quality potential habitat within the study area that was not seasonally targeted by surveys.
Moderate	A species has a moderate likelihood of occurrence if: – The species has a large area of high-quality suitable habitat in the study area that has not been subject to a recent disturbance (e.g. fire). – The species is known to form a persistent soil seedbank. – The species has not been recorded recently (within 10 years) in the locality. – The species has a small area of high-quality suitable habitat or a large area of marginal habitat in the study area that has not been subject to recent disturbance (e.g. fire). – The species is a cryptic flowering species, with a small area of high-quality potential habitat or a large area of marginal habitat within the study area, that was not seasonally targeted by surveys.
Low	A species has a low likelihood of occurrence if: – It is not a cryptic species, nor a species known to have a persistent soil seedbank and was not detected despite targeted searches. – The species is a cryptic flowering species, with a small area of high-quality potential habitat or a large area of marginal habitat within the study area, that was not seasonally targeted by surveys as the species has not been recorded within 50 years in the locality.
None	Suitable habitat is absent from the study area.

Appendix B

Threatened species for assessment

Table B.1 Likelihood of occurrence criteria for threatened fauna species

Likelihood	Criteria
Known	The species was observed in the study area either during the current survey conducted between August 2023 and January 2025, or during another survey less than one year prior to commencement of this study.
High	A species has a high likelihood of occurrence if: – The study area contains or forms part of a large area of high-quality suitable habitat. – Important habitat elements (i.e. for breeding or important life cycle periods such as winter foraging periods) are abundant within the study area. – The species has been recorded recently in similar habitat in the locality. – The study area is likely to support resident populations or to contain habitat that is visited by the species during regular seasonal movements or migration.
Moderate	A species has a moderate likelihood of occurrence if: – The study area contains or forms part of a small area of high-quality suitable habitat. – The study area contains or forms part of a large area of marginal habitat. – Important habitat elements (i.e. for breeding or important life cycle periods such as winter foraging periods) are sparse or absent within the study area. – The study area is unlikely to support resident populations or to contain habitat that is visited by the species during regular seasonal movements or migration but is likely to be used occasionally during seasonal movements and/or dispersal.
Low	A species has a low likelihood of occurrence if: – Potentially suitable habitat exists but the species has not been recorded recently (within 10 years) in the locality despite intensive survey (i.e. the species is considered to be locally extinct). – The species is considered to be a rare vagrant, likely only to visit the study area very rarely, e.g. during juvenile dispersal or exceptional climatic conditions (e.g. extreme drought conditions in typical habitat of inland birds).
None	Suitable habitat is absent from the study area.

Table B.2 Likelihood of occurrence assessment

Scientific Name	Common Name	NSW Status	EPBC Act Status	Records	Distribution and habitat association	Credit type	Likelihood of occurrence	Likelihood of impact
Botaurus poiciloptilus	Australasian Bittern	E	E	Species or species habitat likely to occur within area (Commonwealth DCCEEW, 2025a); Species listed in the BAM-C)	Widespread but uncommon over south-eastern Australia. Found over most of NSW except for the far north-west. Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (*Typha* spp.) and spikerushes (*Eleocharis* spp.). Hides during the day amongst dense reeds or rushes and feed mainly at night on frogs, fish, yabbies, spiders, insects and snails. May construct feeding platforms over deeper water from reeds trampled by the bird; platforms are often littered with prey remains.	Ecosystem	Moderate. Extensive patches of tall dense vegetation such as Typha and Phragmites spp. occur along the Coxs River at the former Wallerawang Power Station site. Small dams in private land to the north of Brays Lane may also provide potential foraging habitat for the species. Species not recorded in the locality.	Possible. Limited clearing of good quality habitat along the Coxs River. Potential for indirect impacts from changes to water quality and from noise disturbance.
Rostratula australis	Australian Painted Snipe	E	E	Species or species habitat likely to occur within area (Commonwealth DCCEEW, 2025a); Species listed in the BAM-C	In NSW many records are from the Murray-Darling Basin including the Paroo wetlands, Lake Cowal, Macquarie Marshes, Fivebough Swamp and more recently, swamps near Balldale and Wanganella. Other important locations with recent records include wetlands on the Hawkesbury River, the Clarence and lower Hunter Valleys. Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber. Forages nocturnally on mudflats and in shallow water.	Ecosystem	Moderate. May occur on occasion in wetlands associated with the Coxs River. Species not recorded in the locality.	Possible. Limited clearing of potential habitat along the Coxs River. Potential for indirect impacts.

Scientific Name	Common Name	NSW Status	EPBC Act Status	Records	Distribution and habitat association	Credit type	Likelihood of occurrence	Likelihood of impact
Ninox connivens	Barking Owl	V	-	8 records within 10 km (NSW DCCEEW, 2025a); Species listed in the BAM-C	Found throughout continental Australia except for the central arid regions. Occurs in a wide but sparse distribution in NSW. Core populations exist on the western slopes and plains and in some north-east coastal and escarpment forests. Sometimes extends home range into urban areas. Inhabit woodland and open forest, including fragmented remnants and partly cleared farmland. Flexible in its habitat use, hunting can extend in to closed forest and more open areas. Typically roosts in shaded portions of tree canopies, including tall midstorey trees with dense foliage such as Acacia and Casuarina species.	Species	Known. Responded to call playback conducted near the WaterNSW water tank. No nest tree identified.	Likely. Minor reduction of known foraging habitat and potential loss of breeding habitat.
Falco subniger	Black Falcon	V	-	Species or species habitat likely to occur within area (Commonwealth DCCEEW, 2025a); Species listed in the BAM-C	Widely, but sparsely, distributed in NSW, mostly occurring in inland regions. Occurs in plains, grasslands, foothills, timbered waterways, wetland environs, crops, and occasionally over towns and cities. Breeding occurs along timbered waterways in in land areas.	Ecosystem	Known. Individuals spotted soaring in the northern half of the subject land.	Likely. Minor reduction of known foraging habitat.
Hamirostra melanosternon	Black-breasted Buzzard	V	-	Species listed in the BAM-C	Sparsely found in areas of less than 500mm rainfall, from north-western NSW to the east coast. Lives in a range of inland habitats, especially along timbered waterways which is the preferred breeding habitat. Also hunts over grasslands and sparsely timbered woodlands.	Species	Low. Study occurs at the edge of its distribution range. May occur as a vagrant on occasion. No large stick nests recorded in study area.	Unlikely - noting the species was not recorded despite targeted seasonal survey in accordance with the BAM.

Scientific Name	Common Name	NSW Status	EPBC Act Status	Records	Distribution and habitat association	Credit type	Likelihood of occurrence	Likelihood of impact
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	V	-	2 records within 10 km, last recorded in 2004 (NSW DCCEEW, 2025a); Species listed in the BAM-C	Widespread in NSW, with records from the tablelands and western slopes of the Great Dividing Range to the north-west and central-west plains and the Riverina. Rarely recorded east of the Great Dividing Range, although regularly observed from the Richmond and Clarence River areas. Recorded at a few scattered sites in the Hunter, Central Coast and Illawarra regions, but very rare in the latter. Occupies mostly upper levels of drier open forests or woodlands dominated by box and ironbark eucalypts, especially Mugga Ironbark, White Box, Inland Grey Box, Yellow Box, Blakely's Red Gum and Forest Red Gum. Also inhabits open forests of smooth-barked gums, stringybarks, ironbarks, river sheoaks (nesting habitat) and tea-trees.	Ecosystem	Moderate. Broadly suitable habitat in Snow Gum and Scribbly Gum Forests. Preferred forests containing Box and Ironbark spp. are absent from the study area.	Possible. Limited clearing of potential habitat within open forests.
Monarcha melanopsis	Black-faced Monarch	-	M	Species or species habitat known to occur within area (Commonwealth DCCEEW, 2025a)	Found along the coast of eastern Australia, becoming less common further south. Occurs around the eastern slopes and tablelands of the Great Divide, inland to Coutts Crossing, Armidale, Widden Valley, Wollemi National Park, Wombeyan Caves and Canberra. Found in rainforests, eucalypt woodlands, coastal scrub and damp gullies. It may be found in more open woodland when migrating.	-	Low. Suitable habitat occurs within the study area. Not recorded during targeted surveys.	Unlikely.

Scientific Name	Common Name	NSW Status	EPBC Act Status	Records	Distribution and habitat association	Credit type	Likelihood of occurrence	Likelihood of impact
Ephippiorhynchus asiaticus	Black-necked Stork	E	-	Species listed in the BAM-C	Known to occur in floodplain wetlands of major coastal rivers. Forage in shallow water 5-30cm deep for fish, frogs and invertebrates. Nests are built high in trees close to water	Ecosystem	Moderate. May occur on occasion in wetlands associated with the Coxs River. Species not recorded in the locality.	Possible. Limited clearing of potential habitat along the Coxs River. Potential for indirect impacts.
Oxyura australis	Blue-billed Duck	V	-	22 records within 10 km (NSW DCCEEW, 2025a); Species listed in the BAM-C	Widespread in NSW, but most common in the southern Murray-Darling Basin area. Disperses during the breeding season to deep swamps up to 300 km away, and generally seen in coastal areas only during summer or in drier years. Prefers deep water in large permanent wetlands and swamps with dense aquatic vegetation.	Ecosystem	High. Local records in Lake Wallace. Suitable habitat within the study area in the adjoining Coxs River where channels are deep and *Typha/Phragmites* spp. is present. May forage within larger dams in private land to the north of Brays Lane.	Possible. Limited clearing of potential habitat along the Coxs River. Potential for indirect impacts.

Scientific Name	Common Name	NSW Status	EPBC Act Status	Records	Distribution and habitat association	Credit type	Likelihood of occurrence	Likelihood of impact
Neophema chrysostoma	Blue-winged Parrot	V	V	Species or species habitat may occur within area (Commonwealth DCCEEW, 2025a)	During the non-breeding period, from autumn to early spring, birds are recorded in western NSW, with some reaching south-eastern NSW, particularly on the southern migration. Inhabits a range of habitats from coastal, sub-coastal and inland areas, through to semi-arid zones. Tends to favour grasslands and grassy woodlands, often found near wetlands both near the coast and in semi-arid zones. Sometimes seen in altered environments such as airfields, golf-courses and paddocks. Pairs or small parties forage mainly near or on the ground for seeds of a wide range of native and introduced grasses, herbs and shrubs.	Species	None. Study area occurs outside the distribution range of the species.	Unlikely.
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V	V	42 records within 10 km (NSW DCCEEW, 2025a); Species or species habitat known to occur within area (Commonwealth DCCEEW, 2025a); Species listed in the BAM-C	Largely confined to Triassic and Permian sandstones, including the Hawkesbury, Narrabeen and Shoalhaven groups, within the coast and ranges in an area within approximately 250 km of Sydney. Shelters in rock crevices and under flat sandstone rocks on exposed cliff edges during autumn, winter and spring.	Ecosystem	High. Suitable habitat occurs within eucalypt woodland and forest throughout the study area.	Likely. Removal of potential foraging and breeding habitat.

Scientific Name	Common Name	NSW Status	EPBC Act Status	Records	Distribution and habitat association	Credit type	Likelihood of occurrence	Likelihood of impact
Burhinus grallarius	Bush-stone Curlew	E		Species listed in the BAM-C	Occurs from the Queensland border in the north to the Shoalhaven in the south, with the population in the Warrumbungle Ranges being the western limit. Occupies rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges, often facing north. It typically shelters or basks during the day in rock crevices, caves and overhangs and are most active at night when foraging. Browse on vegetation in and adjacent to rocky areas.	Species	Low. Study occurs at the edge of its distribution range. May occur as a vagrant on occasion. Not recorded despite targeted surveys over multiple survey periods.	Unlikely - noting the species was not recorded despite targeted seasonal survey in accordance with the BAM.
Actitis hypoleucos	Common Sandpiper	-	C, J, K	Species or species habitat may occur within area (Commonwealth DCCEEW, 2025a)	Found in Australia during non-breeding season, on all coastlines and in inland areas, but is concentrated in the north and west with important areas in WA, the NT and QLD. Utilises a wide range of coastal and inland wetlands with varying salinity levels.	-	Low. No suitable wetland habitat present in the study area.	Unlikely.

Scientific Name	Common Name	NSW Status	EPBC Act Status	Records	Distribution and habitat association	Credit type	Likelihood of occurrence	Likelihood of impact
Calidris ferruginea	Curlew Sandpiper	CE	CE, C, J, K	Species or species habitat may occur within area (Commonwealth DCCEEW, 2025a)	Distributed around most of the Australian coastline. Occurs along the entire coast of NSW, particularly in the Hunter Estuary, and sometimes in freshwater wetlands in the Murray-Darling Basin. Inland records are probably mainly of birds pausing for a few days during migration. Migrates to Australia for the non-breeding period, arriving between August and November, and departing between March and mid-April. Generally occupies littoral and estuarine habitats, and is mainly found in intertidal mudflats of sheltered coasts in NSW. Also occurs in non-tidal swamps, lakes and lagoons on the coast and sometimes inland. Forages in or at the edge of shallow water, occasionally on exposed algal mats or waterweed, or on banks of beach-cast seagrass or seaweed.	Dual	Low. Study area is outside important habitat mapped for the species (DPE, 2024). No suitable wetland habitat present in the study area.	Unlikely.
Stagonopleura guttata	Diamond Firetail	V	V	5 records within 10 km, last recorded 2007 (NSW DCCEEW, 2025a); Species or species habitat may occur within area (Commonwealth DCCEEW, 2025a); Species listed in the BAM-C	Widely distributed in NSW, with a concentration of records from the Northern, Central and Southern Tablelands, the Northern, Central and South Western Slopes and the North West Plains and Riverina. Not commonly found in coastal districts, though there are records from near Sydney, the Hunter Valley and the Bega Valley. Scattered distribution over the rest of NSW, though is very rare west of the Darling River. Found in grassy eucalypt woodlands, including Box-Gum Woodlands and Snow Gum Woodlands. Also occurs in open forest, mallee, Natural Temperate Grassland, and in secondary grassland derived from other communities, and often found in riparian areas (rivers and creeks),	Ecosystem	Moderate. Suitable foraging and breeding habitat occurs in Snow Gum woodlands and grassy woodlands throughout the easement and also within lightly wooded farmland off Brays Lane. Local records from Blackmans Flat to the north of the study area.	Possible. Removal of potential foraging and breeding habitat.

Scientific Name	Common Name	NSW Status	EPBC Act Status	Records	Distribution and habitat association	Credit type	Likelihood of occurrence	Likelihood of impact
					and sometimes in lightly wooded farmland.			
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V	-	49 records within 10 km (NSW DCCEEW, 2025a), Species or species habitat known to occur within area (Commonwealth DCCEEW, 2025a); Species listed in the BAM-C	Widely distributed in NSW, with a concentration of records from the Northern, Central and Southern Tablelands, the Northern, Central and South Western Slopes and the North West Plains and Riverina. Found in grassy eucalypt woodlands, including Box-Gum Woodlands and Snow Gum Woodlands. Also occurs in open forest, mallee, Natural Temperate Grassland, and in secondary grassland derived from other communities, and often found in riparian areas (rivers and creeks), and sometimes in lightly wooded farmland.	Ecosystem	Known. Species recorded at multiple locations during surveys. Local records occur in close proximity to the study area at Lidsdale and Lake Wallace.	Likely. Minor reduction of known foraging habitat and potential breeding habitat.
Numenius madagascariensis	Eastern Curlew	-	CE, C, J, K	Species or species habitat may occur within area (Commonwealth DCCEEW, 2025a)	Occurs throughout most of NSW, but is sparsely scattered in, or largely absent from, much of the upper western region. Most breeding activity occurs on the western slopes of the Great Dividing Range. Primarily inhabit dry, open eucalypt forests and woodlands, including mallee associations, with an open or sparse understorey of eucalypt saplings, acacias and other shrubs, and ground-cover of grasses or sedges and fallen woody debris. It has also been recorded in shrublands, heathlands and very occasionally in moist forest or rainforest. Also found in farmland, usually at the edges of forest or woodland.	-	Low. Study area does not occur near the coast and species is not known from the Blue Mountains. Lake Wallace may comprise broadly suitable habitat.	Unlikely.

Scientific Name	Common Name	NSW Status	EPBC Act Status	Records	Distribution and habitat association	Credit type	Likelihood of occurrence	Likelihood of impact
Petroica phoenicea	Flame Robin	V	-	369 records within 10km (NSW DCCEEW, 2025a); Species listed in the BAM-C	Breeds in upland areas in NSW and moves to the inland slopes and plains in winter. Likely two separate populations in NSW, one in the Northern Tablelands, and another ranging from the Central to Southern Tablelands. Breeds in upland tall moist eucalypt forests and woodlands, often on ridges and slopes. Prefers clearings or areas with open understoreys.	Ecosystem	High. Foraging habitat present throughout the study area. Local records concentrated within the former Newnes State Forest.	Likely. Removal of potential foraging and breeding habitat.
Apus pacificus	Fork-tailed Swift	-	C, J, K	1 record within 10 km (NSW DCCEEW, 2025a); Species or species habitat likely to occur within area (Commonwealth DCCEEW, 2025a)	Almost exclusively aerial, flying from less than 1 m to at least 300 m above ground and probably much higher. Many records occur east of the Great Divide, however, a few populations have been found west of the Great Divide. Mostly occur over inland plains but sometimes above foothills or in coastal areas. Mostly found over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh. Also found at treeless grassland and sandplains covered with spinifex, open farmland and inland and coastal sand-dunes. Sometimes occur above rainforests, wet sclerophyll forest or open forest or plantations of pines. Also found over settled areas, including towns, urban areas and cities.	-	Moderate. Wide range of habitat use and it may forage above the study area on occasion during migration.	Unlikely.

Scientific Name	Common Name	NSW Status	EPBC Act Status	Records	Distribution and habitat association	Credit type	Likelihood of occurrence	Likelihood of impact
Stictonetta naevosa	Freckled Duck	V	-	6 records within 10 km (NSW DCCEEW, 2025a); Species listed in the BAM-C	Found primarily in south-eastern and south-western Australia, occurring as a vagrant elsewhere. Breeds in large temporary swamps created by floods in the Bulloo and Lake Eyre basins and the Murray-Darling system, particularly along the Paroo and Lachlan Rivers, and other rivers within the Riverina. Forced to disperse during extensive inland droughts when wetlands in the Murray River basin provide important habitat. May also occur as far as coastal NSW and Victoria during such times. Prefers permanent freshwater swamps and creeks with heavy growth of Cumbungi, Lignum or Tea-tree. During drier times they move from ephemeral breeding swamps to more permanent waters such as lakes, reservoirs, farm dams and sewage ponds.	Ecosystem	High. Local records at Lake Wallace. Suitable habitat within the study area in the adjoining Coxs River where Typha/Phragmites spp. is present. May forage within larger dams in private land to the north of Brays Lane.	Possible. Limited clearing of potential habitat along the Coxs River. Potential for indirect impacts.
Callocephalon fimbriatum	Gang-gang Cockatoo	E	E	263 records within 10 km (NSW DCCEEW, 2025a), Species or species habitat known to occur within area (Commonwealth DCCEEW, 2025a); Species listed in the BAM-C	Distributed from the south-east coast to the Hunter region, and inland to the Central Tablelands and south-west slopes in NSW. Occurs regularly in the ACT. It is rare at the extremities of its range, with isolated records known from as far north as Coffs Harbour and as far west as Mudgee. In spring and summer the species is generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In autumn and winter, the species often moves to lower altitudes in drier more open eucalypt forests and woodlands, particularly box-gum and box-ironbark assemblages, or in dry forest in coastal areas and often found in urban areas.	Dual	Known. Species recorded during field survey in multiple locations within the study area and subject land. No nest tree identified.	Likely. Minor reduction of known foraging habitat and potential breeding habitat.

Scientific Name	Common Name	NSW Status	EPBC Act Status	Records	Distribution and habitat association	Credit type	Likelihood of occurrence	Likelihood of impact
Pachycephala inornata	Gilbert's Whistler	V		Species listed in the BAM-C	The species can use a wide variety of habitats but must have a dense shrub layer to occur. Known to occur in mallee shrublands, box-ironbark woodlands, Cypress Pine and Belah woodlands and River Red Gum forests.	Ecosystem	Low. No suitable habitat is present in the study area.	Unlikely
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V	-	2 records within 10 km, last recorded in 2010 (NSW DCCEEW, 2025a)	Occurs on the western slopes of the Great Dividing Range, and on the western plains reaching as far as Louth and Balranald. Also occurs in woodlands in the Hunter Valley and in several locations on the north coast of NSW. Inhabits open Box-Gum Woodlands on the slopes, Box-Cypress-pine and open Box Woodlands on alluvial plains and woodlands on fertile soils in coastal regions.	Ecosystem	Low. Box-gum woodlands are preferred by the species but absent from the study area.	Unlikely.
Falco hypoleucos	Grey Falcon	V	V	Species or species habitat likely to occur within area (Commonwealth DCCEEW, 2023a)	Sparsely distributed in NSW, chiefly throughout the Murray-Darling Basin, with the occasional vagrant east of the Great Dividing Range. Usually restricted to shrubland, grassland and wooded waterways of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast. Also occurs near wetlands where surface water attracts prey.	Ecosystem	Low. Outside usual distribution. May occur as a rare vagrant.	Unlikely.

Scientific Name	Common Name	NSW Status	EPBC Act Status	Records	Distribution and habitat association	Credit type	Likelihood of occurrence	Likelihood of impact
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	E	E	7 records within 10 km (NSW DCCEEW, 2025a), Foraging, feeding or related behaviour may occur within area (Commonwealth DCCEEW, 2025a); Species listed in the BAM-C	Found throughout much of inland NSW, with the exception of the extreme north-west, where it is replaced by subspecies *picata*. Prefers lightly wooded country, usually open eucalypt woodland, Acacia scrub and mallee, often in or near clearings or open areas. Requires structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses.	Ecosystem	Moderate. Potential foraging and breeding habitat in agricultural land north of Brays Lane and adjacent to the EA substation where regeneration has been observed as well as in dense forest and woodland along the central portion of the study area.	Possible. Removal of potential foraging and breeding habitat.
Gallinago hardwickii	Latham's Snipe	V	V, J, K	14 records within 10 km (NSW DCCEEW, 2025a), Species or species habitat known to occur within area (Commonwealth DCCEEW, 2025a)	Non-breeding migrant to the south-east of Australia. Breeds in Japan and on the east Asian mainland. Seen in small groups or singly in freshwater wetlands on or near the coast, generally among dense cover. Found in any vegetation around wetlands, in sedges, grasses, lignum, reeds and rushes and also in saltmarsh and creek edges on migration. Also uses crops and pasture.	-	Moderate. Extensive patches of tall dense vegetation such as *Typha* and *Phragmites* spp. occur along the Coxs River at the former Wallerawang Power Station. Small dams in private land to the north of Brays Lane may also provide potential foraging and breeding habitat for the species. Species not recorded in the locality. Not recorded during targeted surveys.	Possible. Limited clearing of potential habitat along the Coxs River. Potential for indirect impacts.

Scientific Name	Common Name	NSW Status	EPBC Act Status	Records	Distribution and habitat association	Credit type	Likelihood of occurrence	Likelihood of impact
Hieraaetus morphnoides	Little Eagle	V	-	13 records within 10 km (NSW DCCEEW, 2025a), Species or species habitat may occur within area (Commonwealth DCCEEW, 2025a); Species listed in the BAM-C	Found throughout the Australian mainland excepting the most densely forested parts of the Dividing Range escarpment. Occurs as a single population throughout NSW. Occupies open eucalypt forest, woodland or open woodland. Also found in Sheoak or Acacia woodlands and riparian woodlands of inland NSW. Nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter.	Dual	Moderate. No large stick nests recorded within the study area. Potential foraging habitat present throughout the study area. Local records from Lake Wallace and Blackmans Flat. Not recorded despite targeted surveys over multiple survey periods.	Unlikely - noting the species was not recorded despite targeted seasonal survey in accordance with the BAM
Glossopsitta pusilla	Little Lorikeet	V	-	6 records within 10 km (NSW DCCEEW, 2025a); Species listed in the BAM-C	Distributed widely across the coastal and Great Divide regions of eastern Australia from Cape York to South Australia. NSW provides a large portion of the species core habitat, with lorikeets found westward as far as Dubbo and Albury. Nomadic movements are common, influenced by season and food availability, although some areas retain residents for much of the year. Forages primarily in the canopy of open *Eucalyptus* forest and woodland, yet also finds food in *Angophora, Melaleuca* and other tree species. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity.	Ecosystem	Known. Suitable breeding and foraging habitat occurs throughout the study area, including along the Coxs River where trees are present. Local records from the former Ben Bullen and Newnes State Forests.	Likely. Minor reduction of foraging habitat and potential loss of breeding habitat.

Scientific Name	Common Name	NSW Status	EPBC Act Status	Records	Distribution and habitat association	Credit type	Likelihood of occurrence	Likelihood of impact
Leipoa ocellata	Malleefowl	-	V	Species or species habitat likely to occur within area (Commonwealth DCCEEW, 2025a)	Stronghold in the mallee in the south west centred on Mallee Cliffs NP and extending east to near Balranald and scattered records as far north as Mungo NP. Eastern boundary distribution follows a line from Wagga-Grenfell-Orange. Typically occurs in mallee eucalypt woodlands with a dense but discontinuous canopy and varied shrubby understorey, especially where the mallee trees are multi-stemmed. Prefers areas of light sandy to sandy loam soils. Occasionally occur in other types of dry eucalypt forests. Found in unburnt habitat, with habitat unburnt for 40–60 years preferred. Also occurs in Red Ironbark *E. sideroxylon* woodland at the eastern limit of their distribution	Ecosystem	None. Outside the distribution range of the species. No suitable habitat present.	Nil.
Tyto novaehollandiae	Masked Owl	V	-	6 records within 10 km (NSW DCCEEW, 2025a); Species or species habitat known to occur within area (Commonwealth DCCEEW, 2025a); Species listed in the BAM-C	Extends from the coast where it is most abundant to the western plains. Overall records for this species fall within approximately 90% of NSW, excluding the most arid north-western corner. Lives in dry eucalypt forests and woodlands from sea level to 1100 m and often hunts along the edges of forests, including roadsides. Roosts and breeds in moist eucalypt forested gullies, using large tree hollows or sometimes caves for nesting.	Species	Moderate. Potential foraging and breeding habitat in agricultural land north of Brays Lane and adjacent to the EA substation where regeneration has been observed. and within the existing easement in dense forest and woodland along the central portion of the study area. Local record along Coxs River at southern end of the former Ben Bullen State	Unlikely - noting the species was not recorded despite targeted seasonal survey in accordance with the BAM

Scientific Name	Common Name	NSW Status	EPBC Act Status	Records	Distribution and habitat association	Credit type	Likelihood of occurrence	Likelihood of impact
							Forest. Not recorded despite targeted surveys over multiple survey periods.	
Grantiella picta	Painted Honeyeater	V	V	1 record within 10 km (NSW DCCEEW, 2025a); Species or species habitat known to occur within area (Commonwealth DCCEEW, 2025a); Species listed in the BAM-C	Nomadic species occurring at low densities throughout its range. Most commonly found on the inland slopes of the Great Dividing Range in NSW, where almost all breeding occurs. More likely to be found in the north of its distribution in winter. Inhabits Boree/ Weeping Myall (*Acacia pendula*), Brigalow (*A. harpophylla*) and Box-Gum Woodlands and Box-Ironbark Forests. Specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus Amyema.	Ecosystem	Moderate. Broadly suitable habitat where mistletoe is present. Likely a vagrant to the study area when mistle is flowering. The species has previously been recorded adjacent to the study area in NPWS land. In the broader locality, clustered records occur to the north at Glen Davis.	Possible. Minor reduction of potential foraging habitat and potential loss of breeding habitat.
Calidris melanotos	Pectoral Sandpiper	-	J, K	Species or species habitat may occur within area (Commonwealth DCCEEW, 2025a)	Widespread but scattered records across NSW, east of the divide and in the Riverina and Lower Western regions. Prefers shallow fresh to saline wetlands and is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands. Usually in coastal or near-coastal habitats, and prefers wetlands with open mudflats and low emergent or fringing vegetation such as grass or samphire.	-	Low. No suitable wetland habitat present in the study area.	Unlikely.

Scientific Name	Common Name	NSW Status	EPBC Act Status	Records	Distribution and habitat association	Credit type	Likelihood of occurrence	Likelihood of impact
Pycnoptilus floccosus	Pilotbird	V	V	27 records within 10 km (NSW DCCEEW, 2025a), Species or species habitat known to occur within area (Commonwealth DCCEEW, 2025a)	Endemic to south-east Australia. Upland Pilotbird occurs above 600 m in the Brindabella Ranges in the ACT, and in the Snowy Mountains in NSW and north-east Victoria. Lowland Pilotbird occurs in forests from the Blue Mountains west of Newcastle, around the wetter forests of eastern Australia, to Dandenong near Melbourne. Habitat critical to the survival of the Pilotbird includes wet sclerophyll forests in temperate zones in moist gullies with dense undergrowth, and dry sclerophyll forests and woodlands occupying dry slopes and ridges.	Ecosystem	Low. Suitable habitat occurs within the study area, however the study area occurs at the edge of its distribution range and the species may occur as a vagrant.	Unlikely.
Ninox strenua	Powerful Owl	V	-	50 records within 10 km (NSW DCCEEW, 2025a); Species or species habitat likely to occur within area (Commonwealth DCCEEW, 2025a); Species listed in the BAM-C	Widely distributed throughout the eastern forests from the coast inland to tablelands, with scattered records on the western slopes and plains. Inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest. Requires large tracts of forest or woodland habitat but can also occur in fragmented landscapes. Breeds and hunts in open or closed sclerophyll forest or woodlands and occasionally hunts in open habitats. Roosts by day in dense vegetation comprising species such as Turpentine, Black She-oak, Blackwood, Rough-barked Apple, Cherry Ballart and a number of eucalypt species.	Species	Known. Species recorded during field survey in four locations. No nest tree identified.	Likely. Minor reduction of known foraging habitat and potential loss of breeding habitat.

Scientific Name	Common Name	NSW Status	EPBC Act Status	Records	Distribution and habitat association	Credit type	Likelihood of occurrence	Likelihood of impact
Anthochaera phrygia	Regent Honeyeater	CE	CE	2 records within 10 km (NSW DCCEEW, 2025a), Species or species habitat known to occur within area (Commonwealth DCCEEW, 2025a); Species listed in the BAM-C	Mainly inhabits temperate woodlands and open forests of the inland slopes of south-east Australia. Only two known key breeding regions remaining in NSW at Capertee Valley and the Bundarra-Barraba region. Very patchy distribution in NSW, mainly confined to the two main breeding areas and surrounding fragmented woodlands. Inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River Sheoak. Inhabit woodlands that support a significantly high abundance and species richness of bird species. These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes. Key eucalypt species include Mugga Ironbark, Yellow Box, White Box and Swamp Mahogany. Flowering of associated species such as Thin-leaved Stringybark and other Stringybark species, and Broad-leaved Ironbark can also contribute important nectar flows at times. Nectar and fruit from the mistletoes in the Amyema genus are also utilised.	Dual	Moderate. Study area is outside important habitat mapped for the species (NSW DCCEEW 2025a). Key eucalypt species are absent from the study area. No records in locality. However the nearest key breeding area (Capertee Valley) occurs ~20km north of the study area and nearest records occur in the Wolgan Valley ~15km to the east. Important foraging resources such as Mistletoe is present in the study area, primarily within woodland and forest between the EA substation and private land to the east.	Possible. Minor reduction of potential foraging habitat.

Scientific Name	Common Name	NSW Status	EPBC Act Status	Records	Distribution and habitat association	Credit type	Likelihood of occurrence	Likelihood of impact
Rhipidura rufifrons	Rufous Fantail	-	M	Species or species habitat known to occur within area (Commonwealth DCCEEW, 2025a)	Found along NSW coast and ranges. Inhabits rainforest, dense wet forests, swamp woodlands and mangroves. During migration, it may be found in more open habitats or urban areas.	-	Moderate. Wide range of habitat use and it may occur in the study area on occasion during migration. Not recorded during targeted surveys.	Possible. Minor reduction of potential foraging habitat.
Myiagra cyanoleuca	Satin Flycatcher	-	M	Species or species habitat known to occur within area (Commonwealth DCCEEW, 2025a)	Found along the east coast of Australia from far northern Queensland to Tasmania. Uncommonly seen species, especially in the far south of its range, where it is a summer breeding migrant. Inhabits heavily vegetated gullies in eucalypt-dominated forests and taller woodlands, and on migration, occur in coastal forests, woodlands, mangroves and drier woodlands and open forests.	-	Moderate. Wide range of habitat use and it may occur in the study area on occasion during migration. Not recorded during targeted surveys.	Possible. Minor reduction of potential foraging habitat.
Petroica boodang	Scarlet Robin	V	-	441 records within 10 km (NSW DCCEEW, 2025a); Species listed in the BAM-C	Occurs from the coast to the inland slopes in NSW. Disperses to the lower valleys and plains of the tablelands and slopes after breeding. Some birds may appear as far west as the eastern edges of the inland plains in autumn and winter. Found in dry eucalypt forests and woodlands with usually open and grassy understorey with few scattered shrubs. Lives in both mature and regrowth vegetation and occasionally occurs in mallee or wet forest communities, or in wetlands and tea-tree swamps. Abundant logs and fallen timber are important components of its habitat.	Ecosystem	Known. Species recorded on various occasions during field surveys.	Likely. Minor reduction of known foraging habitat and potential breeding habitat.

Scientific Name	Common Name	NSW Status	EPBC Act Status	Records	Distribution and habitat association	Credit type	Likelihood of occurrence	Likelihood of impact
Calidris acuminata	Sharp-tailed Sandpiper	-	C, J, K	Species or species habitat may occur within area (Commonwealth DCCEEW, 2025a)	Most of the population migrates to Australia during non-breeding season, mostly to the south-east and are widespread in both inland and coastal locations and in both freshwater and saline habitats. Many inland records are of birds on passage. Prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation.	-	Low. No suitable wetland habitat present in the study area.	Unlikely.
Calyptorhynchus lathami lathami	South-eastern Glossy Black-cockatoo	V	V	17 records within 10 km (NSW DCCEEW, 2025a); Species or species habitat known to occur within area (Commonwealth DCCEEW, 2025a); Species listed in the BAM-C	Uncommon although widespread throughout suitable forest and woodland habitats. Occurs from the central Queensland coast to East Gippsland in Victoria, and inland to the southern tablelands and central western plains of NSW, with a small population in the Riverina. Feeds almost exclusively on the seeds of several species of she-oak (Casuarina and Allocasuarina species)	Dual	Possibly recorded (chewed cones). Suitable foraging habitat is scarce in the study area, with a small planted Allocasuarina stand present south of the coal reject emplacement area along the new easement. Suitable hollows present for breeding throughout the study area between the EA substation and private land north of Brays Lane, however lack of good quality foraging habitat makes breeding less likely.	Likely. Minor reduction of known foraging habitat.

Scientific Name	Common Name	NSW Status	EPBC Act Status	Records	Distribution and habitat association	Credit type	Likelihood of occurrence	Likelihood of impact
Tyto tenebricosa	Sooty Owl	V	-	2 records within 10km (NSW DCCEEW, 2025a)	Occupies the eastern most one-eighth of NSW, occurring on the coast, coastal escarpment and eastern tablelands. Found in rainforest, including dry rainforest, subtropical and warm temperate rainforest, as well as moist eucalypt forests. Roost by day in the hollow of a tall forest tree or in heavy vegetation and nest in very large tree hollows.	Species	Low. No suitable moist eucalypt or rainforest habitat present in the study area.	Unlikely.
Aphelocephala leucopsis	Southern Whiteface	V	V	Species or species habitat known to occur within area (Commonwealth DCCEEW, 2025a)	Occur across most of mainland Australia south of the tropics, from the north- eastern edge of the Western Australian wheatbelt, east to the Great Dividing Range. Lives in a wide range of open woodlands and shrublands where there is an understorey of grasses or shrubs, or both. These areas are usually in habitats dominated by acacias or eucalypts on ranges, foothills and lowlands, and plains. Forages almost exclusively on the ground, favouring habitat with low tree densities and an herbaceous understorey litter cover.	Ecosystem	Low. Marginal habitat for the species present in the lowlands within the former Wallerawang Power Station and also agricultural land north of Brays Lane.	Unlikely.

Scientific Name	Common Name	NSW Status	EPBC Act Status	Records	Distribution and habitat association	Credit type	Likelihood of occurrence	Likelihood of impact
Chthonicola sagittata	Speckled Warbler	V	-	6 records within 10 km (NSW DCCEEW, 2025a); Species listed in the BAM-C	Patchy distribution throughout south-eastern Queensland, the eastern half of NSW and into Victoria, as far west as the Grampians. Most frequently reported from the hills and tablelands of the Great Dividing Range, and rarely from the coast. Lives in a wide range of Eucalyptus dominated communities that have a grassy understorey, often on rocky ridges or in gullies. Typical habitat would include scattered native tussock grasses, a sparse shrub layer, some eucalypt regrowth and an open canopy. Large, relatively undisturbed remnants are required for the species to persist in an area.	Ecosystem	Known. Recorded in one location adjacent to the EA substation in regenerating scrub.	Likely. Minor reduction of known foraging habitat and potential breeding habitat.
Circus assimilis	Spotted Harrier	V	-	Species listed in the BAM-C	The species is most commonly found in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands. It is not known to occur in densely forested or wooded habitats of the coast, escarpment and ranges	Species	Moderate. Broadly suitable habitat present in agricultural land adjacent to Brays Lane and along the Coxs River.	Possible. Minor reduction of potential foraging habitat.

Scientific Name	Common Name	NSW Status	EPBC Act Status	Records	Distribution and habitat association	Credit type	Likelihood of occurrence	Likelihood of impact
Lophoictinia isura	Square-tailed Kite	V		2 records within 10 km (NSW DCCEEW, 2025a); Species listed in the BAM-C	Ranges along coastal and subcoastal areas from south-western to northern Australia. Scattered records throughout NSW indicate that the species is a regular resident in the north, north-east and along the major west-flowing river systems. Summer breeding migrant to the south-east, including the NSW south coast, arriving in September and leaving by March. Found in a variety of timbered habitats including dry woodlands and open forests and shows a particular preference for timbered waterways. Observed in stony country with a ground cover of chenopods and grasses, open acacia scrub and patches of low open eucalypt woodland in arid north-western NSW.	Dual	Moderate. No large stick nests recorded within the study area. Broadly suitable habitat along the Coxs River. Not recorded despite targeted surveys over multiple survey periods.	Unlikely - noting the species was not recorded despite targeted seasonal survey in accordance with the BAM
Polytelis swainsonii	Superb Parrot	V	V	Species or species habitat may occur within area (Commonwealth DCCEEW, 2025a)	Found throughout eastern inland NSW. On the South-western Slopes their core breeding area is roughly bounded by Cowra and Yass in the east, and Grenfell, Cootamundra and Coolac in the west. Birds breeding in this region are mainly absent during winter, when they migrate north to the region of the upper Namoi and Gwydir Rivers. The other main breeding sites are in the Riverina along the corridors of the Murray, Edward and Murrumbidgee Rivers where birds are present all year round. Inhabit Box-Gum, Box-Cypress-pine and Boree Woodlands and River Red Gum Forest.	Dual	Low. The study area occurs outside key breeding areas and at the edge of the distribution range of the species.	Unlikely.

Scientific Name	Common Name	NSW Status	EPBC Act Status	Records	Distribution and habitat association	Credit type	Likelihood of occurrence	Likelihood of impact
Lathamus discolor	Swift Parrot	E	CE	Species or species habitat known to occur within area (Commonwealth DCCEEW, 2025a); Species listed in the BAM-C	Migrates from Tasmania to south-eastern Australia in the autumn and winter months. Mostly occurs on the coast and south-west slopes in NSW. Occurs on the mainland in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations. Favoured feed trees include winter flowering species such as Swamp Mahogany, Spotted Gum, Red Bloodwood, Forest Red Gum, Mugga Ironbark, and White Box.	Dual	Low. Favoured trees for foraging are not present in the study area. Study area is outside important habitat mapped for the species (DPE 2023). No breeding habitat is present.	Unlikely.
Neophema pulchella	Turquoise Parrot	V	-	1 record within 10 km, last recorded in 2004 (NSW DCCEEW, 2025a)	Extends from southern Queensland through to northern Victoria, from the coastal plains to the western slopes of the Great Dividing Range. Typically lives on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland.	Ecosystem	Moderate. Wide range of habitat use and it may occur in the study area on occasion. Not recorded during targeted surveys.	Possible. Minor reduction of potential foraging habitat.
Daphoenositta chrysoptera	Varied Sittella	V	-	39 records within 10 km (NSW DCCEEW, 2025a); Species or species habitat may occur within area (Commonwealth DCCEEW, 2025a); Species listed in the BAM-C	Sedentary species, inhabits most of mainland Australia except the treeless deserts and open grasslands. Distribution in NSW is nearly continuous from the coast to the far west. Found in eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland.	Ecosystem	Known. Recorded in dry eucalypt forest in NPWS land.	Likely. Minor reduction of known foraging habitat and potential breeding habitat.

Scientific Name	Common Name	NSW Status	EPBC Act Status	Records	Distribution and habitat association	Credit type	Likelihood of occurrence	Likelihood of impact
Haliaeetus leucogaster	White-bellied Sea-Eagle	V	-	13 records within 10 km (NSW DCCEEW, 2025a); Species or species habitat may occur within area (Commonwealth DCCEEW, 2025a); Species listed in the BAM-C	Widespread along the NSW coast, and along all major inland rivers and waterways. Habitats characterised by the presence of large areas of open water including larger rivers, swamps, lakes, and the sea. Occurs at sites near the sea or sea-shore, such as around bays and inlets, beaches, reefs, lagoons, estuaries and mangroves; and at, or in the vicinity of freshwater swamps, lakes, reservoirs, billabongs and saltmarsh. Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, and forest (including rainforest). Breeding habitat consists of mature tall open forest, open forest, tall woodland, and swamp sclerophyll forest close to foraging habitat.	Dual	Known. Recorded soaring in locations associated with the Coxs River and Lake Wallace. No large stick nests recorded.	Likely. Minor reduction of known foraging habitat.
Hirundapus caudacutus	White-throated Needletail	V	V, C, J, K	12 records within 10 km (NSW DCCEEW, 2025a); Species listed in the BAM-C	Migrates to eastern Australia from October to April. Almost exclusively aerial and most often seen before storms, low pressure troughs and approaching cold fronts and occasionally bushfire. Occurs over most types of habitat, but mostly recorded above wooded areas, including open forest and rainforest. May also fly between trees or in clearings, below the canopy. Recorded roosting in trees in forests and woodlands, both among dense foliage in the canopy or in hollows.	Ecosystem	Moderate. May forage above the study area on occasion. May roost on rare occasions within the study area.	Unlikely.
Epthianura albifrons	White-fronted Chat	V	-	Species listed in the BAM-C	In NSW, the species occurs in damp open habitats along the coast, and near waterways in the western part of the state. They can be found in n bare or grassy ground in wetland areas foraging on insects.	Ecosystem	Low. No suitable wetland habitat present in the study area.	Unlikely.

Scientific Name	Common Name	NSW Status	EPBC Act Status	Records	Distribution and habitat association	Credit type	Likelihood of occurrence	Likelihood of impact
Motacilla flava	Yellow Wagtail	-	C, J, K	Species or species habitat may occur within area (Commonwealth DCCEEW, 2025a)	Occurs within Australia in open country habitat with disturbed ground and some water. Recorded in short grass and bare ground, swamp margins, sewage ponds, saltmarshes, playing fields, airfields, ploughed land and town lawns. Breeds in temperate Europe and Asia.	-	Low. Suitable habitat occurs within the study area. Not recorded during targeted surveys. Very rare visitor to NSW.	Unlikely.
MAMMALS								
Phascogale tapoatafa	Brush-tailed Phascogale	V		Species listed in the BAM-C	Mainly found east of the Great Dividing Range in NSW, with occasional records west of the divide. Prefers dry sclerophyll open forest with sparse groundcover of herbs, grasses, shrubs or leaf litter. Also inhabit heath, swamps, rainforest and wet sclerophyll forest. Forages preferentially in rough barked trees of 25 cm DBH or greater.	Species	Low. Potentially suitable habitat in woodland and forest in the upper reaches of the study area. No local records and no evidence during targeted surveys.	Unlikely - noting the species was not recorded despite targeted seasonal survey in accordance with the BAM.

Scientific Name	Common Name	NSW Status	EPBC Act Status	Records	Distribution and habitat association	Credit type	Likelihood of occurrence	Likelihood of impact
Petrogale penicillata	Brush-tailed Rock-wallaby	E	V	Species listed in the BAM-C; Species or species habitat may occur within area (Commonwealth DCCEEW, 2025a)	Occurs from the Queensland border in the north to the Shoalhaven in the south, with the population in the Warrumbungle Ranges being the western limit. Occupies rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges, often facing north. It typically shelters or basks during the day in rock crevices, caves and overhangs and are most active at night when foraging. Browse on vegetation in and adjacent to rocky areas.	Species	Low. No expanses of cliff lines or escarpment are located in the study area. A small rocky outcrop within agricultural land north of Brays Lane provides broadly suitable habitat for the species. However the habitat is marginal, small and isolated from other rocky outcrops. No local records and no evidence during targeted surveys.	Unlikely.
Nyctophilus corbeni	Corben's Long-eared Bat	V	V	Species or species habitat may occur within area (Commonwealth DCCEEW, 2025a)	Found throughout the Murray-Darling Basin and the Pilliga Scrub region. Inhabits a variety of vegetation types, including mallee, bulloke *Allocasuarina leuhmanni* and box eucalypt dominated communities, but it is distinctly more common in box/ironbark/cypress-pine vegetation that occurs in a north-south belt along the western slopes and plains of NSW and southern Queensland. Roosts in tree hollows, crevices, and under loose bark.	Ecosystem	None. The study area occurs outside the distribution range of the species.	Unlikely.

Scientific Name	Common Name	NSW Status	EPBC Act Status	Records	Distribution and habitat association	Credit type	Likelihood of occurrence	Likelihood of impact
Vespadelus troughtoni	Eastern Cave Bat	V	-	9 records within 10 km (NSW DCCEEW, 2025a)	Found on both sides of the Great Dividing Range from Cape York to Kempsey, with records from the New England Tablelands and the upper north coast of NSW. The western limit appears to be the Warrumbungle Range, and there is a single record from southern NSW, east of the ACT. Cave-roosting species that is usually found in dry open forest and woodland, near cliffs or rocky overhangs; recorded roosting in disused mine workings. Occasionally found along cliff-lines in wet eucalypt forest and rainforest. Forage over a small area, but are capable of flying 500 m over clear paddocks.	Species	Moderate. Broadly suitable foraging habitat present in the study area in intact native vegetation. Potential to roost in cliff lines 1km to the south of the subject land. Not recorded despite Anabat surveys.	Possible. Minor reduction of potential foraging habitat.
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	V	-	2 records within 10 km (NSW DCCEEW, 2025a)	Found along the east coast from south Queensland to southern NSW. Occurs in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range. Roosts mainly in tree hollows but will also roost under bark or in man-made structures.	Ecosystem	Low. Generally known east of the Great Dividing Range. Broadly suitable habitat is present. Not recorded despite Anabat surveys.	Possible. Minor reduction of potential foraging and roosting habitat.
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V	-	105 records within 10km (NSW DCCEEW, 2025a); Species listed in the BAM-C	Found on the south-east coast and ranges of Australia, from southern Queensland to Victoria. Prefers moist habitats, with trees taller than 20 m. Generally roosts in eucalypt hollows but also found under loose bark on trees or in buildings.	Ecosystem	Known. Recorded in multiple locations within the study area through ultrasonic detection.	Likely. Minor reduction of known foraging habitat and potential roosting habitat.

Scientific Name	Common Name	NSW Status	EPBC Act Status	Records	Distribution and habitat association	Credit type	Likelihood of occurrence	Likelihood of impact
Cercatetus nanus	Eastern Pygmy-possum	V		30 records within 10 km (NSW DCCEEW, 2025a); Species listed in the BAM-C	Distribution extents from the coast inland as far as the Pilliga, Dubbo, Parkes and Wagga Wagga on the western slopes in NSW. Found in a broad range of habitats from rainforest through sclerophyll (including Box-Ironbark) forest and woodland to heath, but in most areas woodlands and heath appear to be preferred, except in north-eastern NSW where they are most frequently encountered in rainforest. Feeds largely on nectar and pollen collected from banksias, eucalypts and bottlebrushes and is an important pollinator of heathland plants such as banksias.	Species	Low. Potentially suitable habitat in woodland and forest in the upper reaches of the study area. No local records and no evidence during targeted surveys.	Unlikely - noting the species was not recorded despite targeted seasonal survey in accordance with the BAM.
Scoteanax rueppellii	Greater Broad-nosed Bat	V	-	15 records within 10 km (NSW DCCEEW, 2025a); Species listed in the BAM-C	Found mainly in the gullies and river systems that drain the Great Dividing Range, from north-eastern Victoria to the Atherton Tableland. Extends to the coast over much of its range. Widespread on the New England Tablelands in NSW, however does not occur at altitudes above 500 m. Found in a variety of habitats from woodland through to moist and dry eucalypt forest and rainforest, most commonly found in tall wet forest. Usually roosts in tree hollows but also found in buildings.	Ecosystem	Low. Study area occurs at elevations above where this species is known to occur.	Unlikely.

Scientific Name	Common Name	NSW Status	EPBC Act Status	Records	Distribution and habitat association	Credit type	Likelihood of occurrence	Likelihood of impact
Pteropus poliocephalus	Grey-headed Flying-fox	V	V	2 records within 10 km (NSW DCCEEW, 2025a); Foraging, feeding or related behaviour may occur within area (Commonwealth DCCEEW, 2025a); Species listed in the BAM-C	Generally found within 200 km of the eastern coast of Australia, from Rockhampton to Adelaide. May be found in unusual locations in times of natural resource shortage. Occurs in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy.	Dual	Moderate. Broadly suitable foraging habitat is present in the study area. No roost camps present.	Unlikely - noting the species was not recorded despite targeted seasonal survey in accordance with the BAM.
Phascolarctos cinereus	Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory)	E	E	6 records within 10 km (NSW DCCEEW, 2025a), Species or species habitat known to occur within area (DCCEEW, 2023a); Species listed in the BAM-C	Found on the central and north coasts, southern highlands, southern and northern tablelands, Blue Mountains, southern coastal forests of NSW, with some smaller populations on the plains west of the Great Dividing Range. Inhabits eucalypt woodlands and forests, and feeds on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but will select preferred browse species in any one area.	Species	Low. Suitable potential habitat present in the study area. No local records and no evidence during targeted surveys.	Unlikely - noting the species was not recorded despite targeted seasonal survey in accordance with the BAM.
Miniopterus orianae oceanensis	Large Bent-winged Bat	V	-	169 records within 10km (NSW DCCEEW, 2025a); Species listed in the BAM-C	Occurs along the east and north-west coasts of Australia. Uses caves as the primary roosting habitat, but also uses derelict mines, storm-water tunnels, buildings and other man-made structures. Hunts in forested areas, catching moths and other flying insects above the tree tops.	Dual	Known. Recorded in multiple locations within the study area through ultrasonic detection.	Likely. Minor reduction of known foraging habitat. No breeding habitat would be impacted.

Scientific Name	Common Name	NSW Status	EPBC Act Status	Records	Distribution and habitat association	Credit type	Likelihood of occurrence	Likelihood of impact
Chalinolobus dwyeri	Large-eared Pied Bat	E	E	102 records within 10 km (NSW DCCEEW, 2025a); Species listed in the BAM-C; Species known to occur within area (Commonwealth DCCEEW, 2025a)	Found mainly in areas with extensive cliffs and caves, from Rockhampton to Bungonia in the NSW Southern Highlands. Generally rare with a very patchy distribution in NSW and scattered records from the New England Tablelands and North West Slopes. Roosts in caves, crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin (*Petrochelidon ariel*), frequenting low to mid-elevation dry open forest and woodland close to these features. Found in well-timbered areas containing gullies.	Species	Known. Recorded in multiple locations within the study area through ultrasonic detection. Marginal potential roosting habitat present at small rocky outcrop in agricultural land north of Brays Lane. Suitable breeding habitat occurs around 2km from the study area on the south-western face of the range.	Likely. Minor reduction of known foraging habitat. No breeding habitat would be impacted.
Pseudomys novaehollandiae	New Holland Mouse	-	V	Species or species habitat likely to occur within area (Commonwealth DCCEEW, 2025a)	Largely restricted to the coast of central and northern NSW, with one inland occurrence near Parkes. Known from Royal National Park (NP), the Kangaroo Valley, Kuringai Chase NP, and Port Stephens to Evans Head near the Queensland border. Known to inhabit open heathlands, woodlands and forests with a heathland understorey and vegetated sand dunes. Soil type may be an important indicator of suitability of habitat, with deeper top soils and softer substrates being preferred for digging burrows.	-	None. The study area occurs outside the distribution range of the species.	Unlikely.

Scientific Name	Common Name	NSW Status	EPBC Act Status	Records	Distribution and habitat association	Credit type	Likelihood of occurrence	Likelihood of impact
Petauroides volans	Southern Greater Glider	E	E	796 records within 10 km (NSW DCCEEW, 2025a); Species or species habitat known to occur within area (Commonwealth DCCEEW, 2025a); Species listed in the BAM-C	Occurs in eastern Australia, in eucalypt forests and woodlands, where it has a broad distribution from around Proserpine in Queensland, south through NSW and the Australian Capital Territory into Victoria. Feeds exclusively on eucalypt leaves, buds, flowers and mistletoe. Shelter during the day in tree hollows and will use up to 18 hollows in their home range. Occupy a relatively small home range with an average size of 1 to 3 ha.	Species	Low. Moist sclerophyll forests and woodland preferred by the species are absent in the study area. No evidence of the species during targeted surveys.	Unlikely - noting the species was not recorded despite targeted seasonal survey in accordance with the BAM.
Myotis macropus	Southern Myotis	V		8 records within 10 km (NSW DCCEEW, 2025a), Species listed in the BAM-C	Mainly coastal but may occur inland along large river systems. Usually associated with permanent waterways at low elevations in flat/undulating country, usually in vegetated areas. Forages over streams and waterways feeding on fish and insects from the water surface. Roosts in a variety of habitats including caves, mine shafts, hollow-bearing trees, stormwater channels, buildings, under bridges and in dense foliage, typically in close proximity to water.	Species	Known. Recorded in multiple locations within the study area through ultrasonic detection.	Likely. Minor reduction of known foraging habitat and potential roosting habitat.

Scientific Name	Common Name	NSW Status	EPBC Act Status	Records	Distribution and habitat association	Credit type	Likelihood of occurrence	Likelihood of impact
Dasyurus maculatus	Spot-tailed Quoll	V	E	11 records within 10 km (NSW DCCEEW, 2025a); Species or species habitat known to occur within area (Commonwealth DCCEEW, 2025a); Species listed in the BAM-C	Found in eastern NSW, the species has been recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Uses hollow-bearing trees, fallen logs, small caves, rock outcrops and rocky-cliff faces as den sites. Females occupy home ranges of 200-500 ha, while males occupy very large home ranges from 500 to over 4000 ha. Known to traverse their home ranges along densely vegetated creek lines.	Ecosystem	Moderate. Suitable potential foraging and breeding habitat present in the study area.	Possible. Minor reduction of potential foraging and breeding habitat.
Petaurus norfolcensis	Squirrel Glider	V		10 records within 10 km (NSW DCCEEW, 2025a); Species listed in the BAM-C	Widely though sparsely distributed in eastern Australia, from northern Queensland to western Victoria. Inhabits mature or old growth Box, Box-Ironbark woodlands and River Red Gum forest west of the Great Dividing Range and Blackbutt-Bloodwood forest with heath understorey in coastal areas. Prefers mixed species stands with a shrub or Acacia midstorey. Require abundant tree hollows for refuge and nest sites.	Species	Known. Recorded within upper reaches of the study area through camera traps.	Likely. Minor reduction of known foraging habitat and potential breeding habitat.
Petaurus australis	Yellow-bellied Glider (south-eastern)	V	V	1 record within 10 km (NSW DCCEEW, 2025a); Species or species habitat likely to occur within area (Commonwealth DCCEEW, 2025a); Species listed in the BAM-C	Found along the eastern coast to the western slopes of the Great Dividing Range, from southern Queensland to Victoria. Occurs in tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils. Forest type preferences vary with latitude and elevation; mixed coastal forests to dry escarpment forests in the north; moist coastal gullies and creek flats to tall montane forests in the south	Ecosystem	Low. Potentially suitable habitat occurs in the study area. Low number of local records and no evidence during targeted surveys.	Unlikely.

Scientific Name	Common Name	NSW Status	EPBC Act Status	Records	Distribution and habitat association	Credit type	Likelihood of occurrence	Likelihood of impact
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V	-	29 records within 10 km (NSW DCCEEW, 2025a), Species listed in the BAM-C	Wide-ranging species found across northern and eastern Australia. Rare visitor of south-western NSW in late summer and autumn. Scattered records of this species across the New England Tablelands and North West Slopes. Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows. It forages in most habitats across its very wide range, with and without trees.	Ecosystem	Known. Recorded in multiple locations within the study area through ultrasonic detection.	Likely. Minor reduction of known foraging habitat and potential roosting habitat.
FROGS								
Litoria booroolongensis	Booroolong Frog	E	E	Species or species habitat likely to occur within area (Commonwealth DCCEEW, 2025a); Species listed in the BAM-C	Restricted to NSW and north-eastern Victoria, predominantly along the western-flowing streams of the Great Dividing Range. A population is known to occur to the north that is associated with the Turon River, a westerly flowing river. It has disappeared from much of the Northern Tablelands, however several populations have recently been recorded in the Namoi catchment. Rare throughout most of the remainder of its range. Lives along permanent streams with some fringing vegetation cover such as ferns, sedges or grasses, and shelter under rocks or amongst vegetation near the ground on the stream edge. Recorded on or near cobble banks and other rock structures within stream margins.	Species	None. The Coxs River is the only permanent stream in the study area but it does not contain suitable cobble habitat for the species.	Unlikely

Scientific Name	Common Name	NSW Status	EPBC Act Status	Records	Distribution and habitat association	Credit type	Likelihood of occurrence	Likelihood of impact
Heleioporus australiacus	Giant Burrowing Frog	V	V	1 record within 10 km (NSW DCCEEW, 2025a), Species or species habitat may occur within area (Commonwealth DCCEEW, 2025a); Species listed in the BAM-C	Distributed in south-eastern NSW as two distinct populations: a northern population largely confined to the sandstone geology of the Sydney Basin and extending as far south as Ulladulla, and a southern population occurring from north of Narooma through to Walhalla, Victoria. Found in heath, woodland and open dry sclerophyll forest on a variety of soil types except those that are clay based. Spends more than 95% of its time in non-breeding habitat in areas up to 300 m from breeding sites which are generally soaks or pools within first or second order streams.	Species	Low. No breeding habitat within PCT 3749 or within 300m of this PCT. The reach of the Coxs River that flow through and adjacent to patches of PCT 3932 at the study area does not comprise habitat on suitable geologies.	Unlikely.
Litoria aurea	Green and Golden Bell Frog	E	V	Species listed in the BAM-C	Approximately 50 recorded locations in NSW, most of which are small, coastal, or near coastal populations. Large populations are located around the metropolitan areas of Sydney, Shoalhaven and mid north coast. Only one known population on the NSW Southern Tablelands, and historically the species was known from the Bathurst area. Inhabits marshes, dams and stream-sides, particularly those containing bullrushes (*Typha* spp.) or spikerushes (*Eleocharis* spp.). Optimal habitat includes water-bodies that are unshaded, free of predatory fish such as Plague Minnow (*Gambusia holbrooki*), have a grassy area nearby and diurnal sheltering sites available. Also recorded in highly disturbed areas.	Species	Low. Suitable habitat present in dams and along Coxs Creek where emergent vegetation is present, however there are no historical records associated with the Coxs River, and the Bathurst population is considered extinct. Not recorded during targeted surveys.	Unlikely - noting the species was not recorded despite targeted seasonal survey in accordance with the BAM.

Scientific Name	Common Name	NSW Status	EPBC Act Status	Records	Distribution and habitat association	Credit type	Likelihood of occurrence	Likelihood of impact
Litoria littlejohni	Littlejohn's Tree Frog	E	E	1 record within 10 km (NSW DCCEEW, 2025a); Species or species habitat known to occur within area (Commonwealth DCCEEW, 2025a)	Distribution includes the plateaus and eastern slopes of the Great Dividing Range from Watagan State Forest (90 km north of Sydney) and south to Buchan in Victoria. Most records are within the Sydney Basin Bioregion with only scattered records south to the Victorian border. Records are isolated and tend to be at high altitude. Breeds in the upper reaches of permanent streams and in perched swamps. Non-breeding habitat is heath based forests and woodlands where it shelters under leaf litter and low vegetation.	Species	Low. Broadly suitable breeding habitat in dams where adjacent native vegetation is present and mostly confined to NPWS lands, however PCT 3932 does not occur in this area and creek habitat does not contain potholes/lateral rock bars that are either completely isolated from surrounding water bodies or larger connected pools known to be used by the species. No perched swamps or heathy habitat present.	Unlikely.
Pseudophryne australis	Red-crowned Toadlet	V		Species listed in the BAM-C	Restricted distribution, confined to the Sydney Basin, from Pokolbin in the north, the Nowra area to the south, and west to Mount Victoria in the Blue Mountains. Occurs in open forests, mostly on Hawkesbury and Narrabeen Sandstones. Inhabits periodically wet drainage lines below sandstone ridges that often have shale lenses or capping. Shelters under rocks and amongst masses of dense vegetation or thick piles of leaf litter.	Species	Low. No ephemeral streams or pools within native vegetation on Triassic sandstone in or within 100m of associated PCT.	Unlikely.

Scientific Name	Common Name	NSW Status	EPBC Act Status	Records	Distribution and habitat association	Credit type	Likelihood of occurrence	Likelihood of impact
Mixophyes balbus	Stuttering Frog	E	V	1 record within 10 km (NSW DCCEEW, 2025a); Species or species habitat known to occur within area (Commonwealth DCCEEW 2025a); Species listed in the BAM-C	Associated with flowing creeks and streams in temperate and sub-tropical rainforest, wet sclerophyll forest and Antarctic Beech forests. It has also been recorded in dry open tableland riparian vegetation and moist gullies in dry forests. They shelter in leaf litter or loose soil along the banks and lower slopes of streams during drier periods, but move about above ground at night after heavy rainfall.	Species	Low. No streams with permanent pools located near areas of rainforest and wet sclerophyll forest are present in the study area.	Unlikely.
REPTILES								
Eulamprus leuraensis	Blue Mountains Water Skink	E	E	47 records within 10 km (NSW DCCEEW, 2025a), Species or species habitat known to occur within area (Commonwealth DCCEEW 2025a)	Restricted to high elevation between 560m and 1140m of the middle and upper Blue Mountains. Known from approximately 70 threatened highland peat swamps extending from the Newnes Plateau in the north-west to just south of Hazelbrook in the south-east. Restricted to an isolated and naturally fragmented habitat of sedge and shrub swamps that have boggy soils and appear to be permanently wet.	Species	Low. Peat swamps not present in the study area. Study area is on the edge of the distribution range for the species.	Unlikely.

Scientific Name	Common Name	NSW Status	EPBC Act Status	Records	Distribution and habitat association	Credit type	Likelihood of occurrence	Likelihood of impact
Aprasia parapulchella	Pink-tailed Worm-lizard	V	V	Species or species habitat likely to occur within area (Commonwealth DCCEEW, 2025a)	Only known from the Central and Southern Tablelands, and the South Western Slopes. There is a concentration of populations in the Canberra/Queanbeyan Region. Other populations have been recorded near Cooma, Yass, Bathurst, Albury and West Wyalong. This species is also found in the Australian Capital Territory. Inhabit sloping, open woodland areas with predominantly native grassy ground layers, particularly those dominated by Kangaroo Grass (*Themeda australis*). Sites are typically well-drained, with rocky outcrops or scattered, partially-buried rocks. Commonly found beneath small, partially-embedded rocks and appear to spend considerable time in burrows below these rocks; the burrows have been constructed by and are often still inhabited by small black ants and termites.	Species	None. No suitable habitat is present in the study area.	Unlikely.
Varanus rosenbergi	Rosenberg's Goanna	V	-	1 record within 10 km (NSW DCCEEW, 2025a)	Occurs on the Sydney Sandstone in Wollemi National Park to the north-west of Sydney, in the Goulburn, near Cooma in the south. There are records from the South West Slopes near Khancoban and Tooma River. Found in heath, open forest and woodland. Associated with termite mounds, which are a critical habitat component. Individuals require large areas of habitat and shelters in hollow logs, rock crevices and in burrows.	Ecosystem	Moderate. Broadly suitable habitat present including the occasional termite mound	Likely. Minor reduction of potential foraging habitat

Scientific Name	Common Name	NSW Status	EPBC Act Status	Records	Distribution and habitat association	Credit type	Likelihood of occurrence	Likelihood of impact
Hoplocephalus bungaroides	Broad-headed Snake	E	E	1 record within 10 km (NSW DCCEEW, 2025a); Species or species habitat known to occur within area (Commonwealth DCCEEW, 2025a)	Largely confined to Triassic and Permian sandstones, including the Hawkesbury, Narrabeen and Shoalhaven groups, within the coast and ranges in an area within approximately 250 km of Sydney. Shelters in rock crevices and under flat sandstone rocks on exposed cliff edges during autumn, winter and spring.	Dual	Low. No exposed cliff lines present in the study area. A small rocky outcrop within agricultural land north of Brays Lane provides broadly suitable habitat for the species. However the habitat is marginal, small and isolated from other patches of vegetation.	Unlikely.
INSECTS								
Petalura gigantea	Giant Dragonfly	E	-	53 records within 10 km (NSW DCCEEW, 2025a)	Found along the east coast of NSW from the Victorian border to northern NSW, not found west of the Great Dividing Range. Known occurrences in the Blue Mountains and Southern Highlands, in the Clarence River catchment, and on a few coastal swamps from north of Coffs Harbour to Nadgee in the south. Lives in permanent swamps and bogs with some free water and open vegetation. Adults emerge from late October and are short-lived, surviving for one summer after emergence. Adults spend most of their time settled on low vegetation on or adjacent to swamps.	Species	Low. The species is known to occur in upland swamps. These habitat resources are not present in the study area. The dams at higher elevations and waterways associated with the Coxs River do not comprise habitat in the study area.	Unlikely.

Scientific Name	Common Name	NSW Status	EPBC Act Status	Records	Distribution and habitat association	Credit type	Likelihood of occurrence	Likelihood of impact
Paralucia spinifera	Purple Copper Butterfly	E	V	128 records within 10 km (NSW DCCEEW, 2025a), Species or species habitat known to occur within area (Commonwealth DCCEEW, 2025a); Species listed in the BAM-C	Occurs on the Central Tablelands of NSW in an area approximately bounded by Oberon, Hartley and Bathurst. Occurs above 850 m elevation, commonly found in open woodland or open forest with a sparse understorey dominated Native Blackthorn *Bursaria spinosa* subsp. *lasiophylla*, which the larvae of the species feed exclusively on.	Species	Low Potentially suitable habitat occurs in the study area where Native Blackthorn is present, however habitat is restricted in area and no evidence of the species was observed during targeted surveys.	Unlikely - noting the species was not recorded despite targeted seasonal survey in accordance with the BAM.
FLORA								
Acacia bynoeana	Bynoe's Wattle	E	V	Species or species habitat may occur within area (Commonwealth DCCEEW, 2025a); Species listed in the BAM-C	Endemic to central eastern NSW, known a limited number of locations, often comprising populations of few plants. Grows mainly in heath/ dry sclerophyll forest on sandy soils, prefers open, sometimes slightly disturbed sites such as trail margins, road edges, and in recently burnt open patches. Flowers September to March, and fruit matures in November.	Species	Low. No records in locality. Study area conditions are marginally suitable for this species. Species was not recorded despite targeted seasonal survey in accordance with the BAM.	Unlikely - noting the species was not recorded despite targeted seasonal survey in accordance with the BAM

Scientific Name	Common Name	NSW Status	EPBC Act Status	Records	Distribution and habitat association	Credit type	Likelihood of occurrence	Likelihood of impact
Acacia meiantha		E	E	Species listed in the BAM-C	It is only known from three disjunct locations, all within the Central Tablelands and each separated by more than 60 kms. These disjunct populations include Clarence, which covers an area of approximately 1 ha; Mullions Range State Forest north of Orange; and Carcalgong, which is confined to 2.5km of road easements and appears to occur within several adjacent private properties. Of the three populations, the majority (96%) are known to occur in Mullions Range State Forest occurring both within remnant native forest and in plantation forests. Where it occurs at both Carcalgong and Mullions Range State Forest, plants are among the tallest and most common shrub forming dense aggregates.	Species	Low. Limited distribution and no records in locality. Study area conditions are marginally suitable for this species. Species was not recorded despite targeted seasonal survey in accordance with the BAM.	Unlikely - noting the species was not recorded despite targeted seasonal survey in accordance with the BAM
Banksia penicillata	A Banksia	-	E	Species or species habitat known to occur within area (Commonwealth DCCEEW, 2025a)	*Banksia penicillata* occurs in sclerophyll forest or woodland (occasionally heaths) on sandstone soils. Disturbed areas may provide suitable recruitment niches for seedlings post fire.	-	Low. No records in locality. Study area conditions are marginally suitable for this species.	Unlikely
Boronia deanei	Deane's Boronia	V	V	1 record within 10 km (NSW DCCEEW 2025a); Species or species habitat known to occur within area (Commonwealth DCCEEW, 2025a)	Scattered populations between the far south-east of NSW and the Blue Mountains (including the upper Kangaroo River near Carrington Falls, the Endrick River near Nerriga and Nalbaugh Plateau), mainly in conservation reserves. Grows on the margins of high altitude swamps, in wet heath on sandstone, and in drier open forest.	Species	Low. Limited distribution. Study area conditions are marginally suitable for this species with one associated PCT present (PCT 3735)	Unlikely

Scientific Name	Common Name	NSW Status	EPBC Act Status	Records	Distribution and habitat association	Credit type	Likelihood of occurrence	Likelihood of impact
Caesia parviflora var. minor	Small Pale Grass-lily	E	-	159 records within 10 km (NSW DCCEEW, 2025a)	Found in damp places in open forest on wet heathland on sandstone and sand.	Species	Low. Species recorded in the locality however no open forest on wet heathland on sandstone and sand.	Unlikely
Carex klaphakei	Klaphake's Sedge	E	-	5 records within 10 km (NSW DCCEEW, 2025a)	Found in only three locations, from the Blue Mountains (at Blackheath and Mt Werong) to the Southern Highlands (at Penrose). Grows with other native sedges and rushes in swamps on sandstone at altitudes of greater than 600 m.	Species	Low. Species recorded in the locality however no swamps on sandstone.	Unlikely
Cryptostylis hunteriana	Leafless Tongue-orchid	V	V	Species or species habitat may occur within area (Commonwealth DCCEEW, 2023a)	Occurs in coastal areas from East Gippsland to southern Queensland. Habitat preferences not well defined. Grows mostly in coastal heathlands, margins of coastal swamps and sedgelands, coastal forest, dry woodland, and lowland forest. Prefers open areas in the understorey and is often found in association with Large Tongue Orchid and the Bonnet Orchid. Soils include moist sands, moist to dry clay loam and occasionally in accumulated eucalypt leaves. Flowers November-February.	Species	Low. Limited distribution and no records in locality. Study area does not contain PCTs associated with this species.	Unlikely
Dillwynia tenuifolia	-	V	-	1 record within 10 km, last recorded in 2012 (NSW DCCEEW, 2025a)	Occurs in western Sydney, predominately the Cumberland Plain as well as the Lower Blue Mountains and north to Yengo. Grows in scrubby/dry heath areas of Castlereagh Ironbark Forest and Shale Gravel Transition Forest on tertiary alluvium or laterised clays, and associated transitional communities including Castlereagh Scribbly Gum Woodland.	Species	Moderate. 1 Record in the locality, Scribbly Gum Woodland present	Possible

Scientific Name	Common Name	NSW Status	EPBC Act Status	Records	Distribution and habitat association	Credit type	Likelihood of occurrence	Likelihood of impact
Eucalyptus aggregata	Black Gum	V	V	683 records within 10 km (NSW DCCEEW, 2025a), Species or species habitat known to occur within area (Commonwealth DCCEEW, 2025a); Species listed in the BAM-C	Occurs in the South-eastern Highlands Bioregion and on the western fringe of the Sydney Basin Bioregion. Grows in the lowest parts of the landscape, on grassy woodlands on alluvial soils in moist sites along creeks on broad, cold and poorly-drained flats and hollows. Commonly occurs with Candlebark, Ribbon Gum, and White Sally with a grassy understorey of Tussock. Also occurs as isolated paddock trees in modified native, exotic pastures or travelling stock reserves.	Species	Known. Species recorded in multiple locations across the study area during field survey.	Likely, recorded individuals would be impacted
Eucalyptus cannonii	Capertee Stringybark	V	-	349 records within 10 km (NSW DCCEEW, 2025a); Species listed in the BAM-C	Mostly restricted to the central tablelands and slopes from Bathurst and Wallerawang to Mudgee, with isolated occurrences between Dunedoo and Merriwa. Broad altitudinal range (approximately 450 - 1050m asl), and appears to tolerate most situations except valley floors. Occurs in dry sclerophyll forests and woodlands with grassy/shrubby understoreys, associated with a diverse suite of eucalypts. Flowers between January to April.	Species	Known. Species recorded in multiple locations across the study area during field survey.	Likely, recorded individuals would be impacted
Eucalyptus pulverulenta	Silver-leafed Gum	V	V	7 records within 10 km (NSW DCCEEW, 2025a), Species or species habitat known to occur within area (Commonwealth DCCEEW, 2023a)	Found in two quite separate areas, the Lithgow to Bathurst area and the Monaro (Bredbo to Bombala). Grows in shallow soils as an understorey plant in open forest, typically dominated by Brittle Gum (*Eucalyptus mannifera*), Red Stringybark (*E. macrorhynca*), Broad-leafed Peppermint (*E. dives*), Silvertop Ash (*E. sieberi*) and Apple Box (*E. bridgesiana*).	Species	Low. Suitable habitat occurs in the study area and species previously recorded within the locality, however species was not recorded despite targeted seasonal survey in accordance with the BAM.	Unlikely

Scientific Name	Common Name	NSW Status	EPBC Act Status	Records	Distribution and habitat association	Credit type	Likelihood of occurrence	Likelihood of impact
Eucalyptus robertsonii subsp. hemisphaerica	Robertson's Peppermint	V	V	Species or species habitat likely to occur within area (Commonwealth DCCEEW, 2025a)	Known only from the central tablelands of NSW, at small disjunct localities from north of Orange to Burraga. Locally frequent in grassy or dry sclerophyll woodland or forest, on lighter soils and often on granite. Usually found in closed grassy woodlands in locally sheltered sites. Habitats include quartzite ridges, upper slopes and a slight rise of shallow clay over volcanics. Flowers from February to March.	Species	Low. No records in locality. Study area conditions are marginally suitable for this species. Species was not recorded despite targeted seasonal survey in accordance with the BAM.	Unlikely
Euphrasia arguta		CE	CE	Species or species habitat may occur within area (Commonwealth DCCEEW, 2025a)	Recently rediscovered near Nundle on the north-western slopes and tablelands, once known from scattered locations between Sydney, Bathurst and Walcha. Known populations occur in eucalypt forest with a mixed grass/shrub understorey, while previous records are described as occurring in open forest, grassy country and river meadows. Dense stands observed in cleared firebreak areas, suggesting it may respond well to disturbance.	Species	Low. No records in locality. Study area does not contain PCTs associated with this species.	Unlikely
Genoplesium superbum	Superb Midge Orchid	E	-	5 records within 10 km (NSW DCCEEW 2025a)	Restricted to the Central and Southern Tablelands of NSW, recorded from 2 locations near Nerriga and north of Wallerawang. Occurs predominantly in wet heathland on shallow soils above a sandstone cap but also found in open woodland interspersed with heath and dry open shrubby woodland.	Species	Moderate. Records in the locality, broadly suitable habitat present	Possible

Scientific Name	Common Name	NSW Status	EPBC Act Status	Records	Distribution and habitat association	Credit type	Likelihood of occurrence	Likelihood of impact
Haloragodendron lucasii		E	E	Species or species habitat may occur within area (Commonwealth DCCEEW, 2025a)	Known locations are confined to a very narrow distribution on the north shore of Sydney. Associated with dry sclerophyll forest and grows in moist sandy loam soils in sheltered aspects, and on gentle slopes below cliff-lines near creeks in low open woodland. Associated with high soil moisture and relatively high soil-phosphorus levels.	Species	Low. Species has a very narrow distribution which occurs outside the study area, no records in locality. Study area does not contain PCTs associated with this species.	Unlikely
Hibbertia acaulothrix		E	E	Species or species habitat may occur within area (Commonwealth DCCEEW, 2025a)	Known from several widely separated localities in New South Wales, from Wadbilliga National Park in the Southern Tablelands, through the Nattai-Wollondilly area in the southern Central Tablelands, to the Mt Baker and Mt Coricudgy (Wollemi) area in northern part of the Central Coast and Tablelands.	-	Low. No records in locality, associated species typically occurring in this species habitat are not present in the study area. Study area does not contain PCTs associated with this species.	Unlikely
Hibbertia cistiflora quadristaminea		E	E	Species or species habitat known to occur within area (Commonwealth DCCEEW, 2025a)	Heath on sandstone. Coast, ranges, and the eastern tablelands, mainly north of Kiama.	-	Low. No records in locality, no low open heath woodlands in study area.	Unlikely
Kunzea cambagei		V	V	19 records within 10 km (NSW DCCEEW, 2025a); Species or species habitat known to occur within area (Commonwealth DCCEEW, 2025a)	Mainly occurs in the Yerranderie/Mt Werong area with other populations also along the Wingecarribee River, Loombah Plateau east of Mount Werong, Kanangra-Boyd NP and the Nattai NP. Restricted to damp, sandy soils in wet heath or mallee open scrub at higher altitudes on sandstone outcrops or Silurian group sediments.	Species	Low - No records in locality, no low wet heath or mallee open scrub vegetation communities in study area.	Unlikely

Scientific Name	Common Name	NSW Status	EPBC Act Status	Records	Distribution and habitat association	Credit type	Likelihood of occurrence	Likelihood of impact
Lepidium hyssopifolium	Basalt Pepper-cress	E	E	Species or species habitat may occur within area (Commonwealth DCCEEW, 2025a)	Currently known near Bathurst, Bungendore and Crookwell, with historic records near Armidale. Known to have occurred in both woodland with a grassy understorey and in grassland. The species may be a disturbance opportunist, as it was discovered at the most recently discovered site (near Bungendore) following soil disturbance. The cryptic and non-descript nature (appearing like several weed species) of the species makes it hard to detect.	Species	Low. No records in the locality. Species is known to occur in Eucalypt woodland with a grassy ground cover and in areas with heavy modification and disturbance, however the study area does not contain PCTs associated with this species.	Unlikely
Leptospermum petraeum	-	-	CE	Species or species habitat may occur within area (Commonwealth DCCEEW, 2025a)	*Leptospermum petraeum* is known to grow in rock crevices of granite outcrops. The species distribution overlaps with three Plant Community Types (PCTs): Loombah Plateau Mallee Heath, Central Tableland Peppermint-Gum Montane Forest, and Kanangra Peaks Silvertop Ash Forest (DPE, 2022). The mean annual rainfall across the species range is approximately 970 mm (BOM 2022).	-	Low. No records in the locality, associated PCTs absent.	Unlikely
Leucochrysum albicans var. tricolor	Hoary Sunray	E	E	Species or species habitat may occur within area (Commonwealth DCCEEW, 2025a); Species listed in the BAM-C	Currently occurs on the Southern Tablelands adjacent areas in an area roughly bounded by Albury, Bega and Goulburn, with a few scattered localities know from beyond this region. Found in a wide variety of grassland, woodland and forest habitats, generally on relatively heavy soils. The species is highly dependent on the presence of bare ground for germination and can occur in modified habitats such as semi-urban areas and roadsides.	Species	Low. Suitable habitat occurs in the study area.	Unlikely - noting the species was not recorded despite targeted seasonal survey in accordance with the BAM

Scientific Name	Common Name	NSW Status	EPBC Act Status	Records	Distribution and habitat association	Credit type	Likelihood of occurrence	Likelihood of impact
Leucopogon exolasius	Woronora Beard-heath	V	V	Species or species habitat may occur within area (Commonwealth DCCEEW, 2025a)	Occurs along the upper Georges River and in Heathcote NP, Royal NP and is also known from the Blue Mountains along the Grose River. Grows in woodland on sandstone and prefers rocky hillsides along creek banks up to 100 m altitude. Associated species include Sydney Peppermint and Silvertop Ash and Graceful Bush-pea, Flaky-barked Tea-tree and *Dillwynia retorta*.	Species	Low. No records in study area, habitat in study area does not contain associated species or PCT's.	Unlikely
Persoonia hindi	-	E	E	726 records within 10 km (NSW DCCEEW, 2025a); Species or species habitat known to occur within area (Commonwealth DCCEEW, 2025a)	Occurs in dry sclerophyll forests and woodlands on sandy soils. *Persoonia hindii* is a woody species that grows clonally through rhizomatous growth. Hence, each location may comprise only one to a few individuals.	-	Moderate. High number of records in the locality and suitable habitat present.	Unlikely - noting the species was not recorded despite targeted seasonal survey in accordance with the BAM
Persoonia hirsuta	Hairy Geebung	E	E	Species or species habitat may occur within area (Commonwealth DCCEEW, 2025a)	Scattered distribution around Sydney, distributed from Singleton in the north, along the east coast to Hilltop in the south-west, Dombarton in the south-east and the Blue Mountains to the west. Found in clayey and sandy soils in dry sclerophyll open forest, woodland and heath, primarily on the Mittagong Formation and on the upper Hawkesbury Sandstone.	Species	Low. No records in the locality. There is broadly suitable habitat in the study area however no associated PCT's. Species was not recorded despite targeted seasonal survey in accordance with the BAM.	Unlikely

Scientific Name	Common Name	NSW Status	EPBC Act Status	Records	Distribution and habitat association	Credit type	Likelihood of occurrence	Likelihood of impact
Persoonia marginata	Clandulla Geebung	V	V	14 records within 10 km (NSW DCCEW, 2025a); Species or species habitat known to occur within area (Commonwealth DCCEEW, 2025a); Species listed in the BAM-C	Occurs between Kandos and Clarence in the western Blue Mountains. Grows in dry sclerophyll forest and woodland communities on sandstone.	Species	Low. No records in the locality, however there is broadly suitable habitat in the study area. Species was not recorded despite targeted seasonal survey in accordance with the BAM.	Unlikely - noting the species was not recorded despite targeted seasonal survey in accordance with the BAM
Pomaderris brunnea	Rufous Pomaderris	E	V	Species or species habitat likely to occur within area (Commonwealth DCCEEW, 2025a)	Found in a very limited area around the Colo, Nepean and Hawkesbury Rivers, including the Bargo area and near Camden. Also occurs near Walcha on the New England tablelands. Grows in moist woodland or forest on clay and alluvial soils of flood plains and creek lines.	Species	Low. No records in the locality, marginal suitable habitat however commonly associated species such as E. amplifolia, Angophora floribunda, Acacia parramattensis and Kunzea ambigua from recorded specimen locations are not present in the study area.	Unlikely

Scientific Name	Common Name	NSW Status	EPBC Act Status	Records	Distribution and habitat association	Credit type	Likelihood of occurrence	Likelihood of impact
Pomaderris cotoneaster	Cotoneaster Pomaderris	E	E	Species or species habitat likely to occur within area (Commonwealth DCCEEW, 2025a)	Disjunct distribution including the Nungatta area, Tumut, the Tantawangalo area, near Tallong, the Yerranderie area, the Canyonleigh area and Ettrema Gorge. Found in wide range of habitats, including forest with deep, friable soil, amongst rock beside a creek, on rocky forested slopes and in steep gullies between sandstone cliffs.	Species	Low. No records in the locality, marginal suitable habitat however commonly associated PCT's or species such as *E. fastigata*, *E. cypellocarpa*, *E. muelleriana*, *E. radiata*, *E. maidenii*, *E. elata*, *Grevillea lanigera*, *Acacia pravissima* and *Kunzea ericoides* from recorded specimen locations are not present in the study area.	Unlikely
Prasophyllum pallens	Musty Leek Orchid	V	-	6 records within 10 km (NSW DCCEEW, 2025a)	Known only from the Blue Mountains, west of Sydney, from four distinct populations: Mt Banks and Mt Hay in Blue Mountains National Park, and near the townships of Blackheath and Wentworth Falls. Grows in dense low heath, often along seepage lines, in moist to wet shallow sandy soils over sandstone, mostly at altitudes greater than 900 m above sea level. Flowering strongly promoted by fires that occur during the previous summer season.	Species	Moderate. Records in the locality, broadly suitable habitat present.	Possible

Scientific Name	Common Name	NSW Status	EPBC Act Status	Records	Distribution and habitat association	Credit type	Likelihood of occurrence	Likelihood of impact
Prasophyllum petilum	Tarengo Leek Orchid	E	E	Species or species habitat may occur within area (Commonwealth DCCEEW, 2025a)	Known from five sites near Boorowa, Queanbeyan area, Ilford, Delegate and west of Muswellbrook. Grows in open sites within Natural Temperate Grassland at the Boorowa and Delegate sites. Grows in grassy woodland in association with River Tussock, Black Gum and tea-trees near Queanbeyan and within grassy groundlayer dominated by Kangaroo Grass under Box-Gum Woodland at Ilford. Flowers in October at Boorowa and Ilford, and December at sites near Queanbeyan and Delegate.	Species	Low. No records in locality. Grassy woodlands with *E. pauciflora* and *E. aggregata* are present in study area, however associated PCT's for this species do not occur in the study area.	Unlikely
Prasophyllum sp. Wybong (C.Phelps ORG 5269)	a leek-orchid	-	CE	Species or species habitat may occur within area (Commonwealth DCCEEW, 2025a)	Endemic to NSW and known from near Ilford, Premer, Muswellbrook, Wybong, Yeoval, Inverell, Tenterfield, Currabubula and the Pilliga area. Known to occur in open eucalypt woodland and grassland.	Species	Low. No records in locality. Grassy woodlands with *E. pauciflora* and *E. aggregata* are present in study area, however associated PCT's for this species do not occur in the study area.	Unlikely

Scientific Name	Common Name	NSW Status	EPBC Act Status	Records	Distribution and habitat association	Credit type	Likelihood of occurrence	Likelihood of impact
Prostanthera cryptandroides subsp. cryptandroides	Wollemi Mint-bush	V	V	2 records within 10 km (NSW DCCEEW, 2025a)	Distributed between Lithgow and Sandy Hollow on the NSW central west slopes, central tablelands and western parts of the central coast botanical regions. Associated communities include: Narrabeen Rocky Heath, Narrabeen Acacia Woodland, Narrabeen Exposed Woodland; Open Heath of *Calytrix tetragona*, *Leptospermum parviflorum* and *Isopogon dawsonii*; and Open Scrubland of *Eucalyptus dwyeri, Baeckea densifolia, Dillwynia floribunda, Aotus ericoides* and *Hemigenia cunefolia.*	Species	Moderate. Records in the locality, broadly suitable habitat present however associated communities not present	Unlikely
Pultenaea glabra	Smooth Bush-pea	V	V	Species or species habitat known to occur within area (Commonwealth DCCEEW, 2025a)	Restricted to the higher Blue Mountains and recorded from the Katoomba-Hazelbrook and Mount Victoria areas, with unconfirmed sightings in the Mount Wilson and Mount Irvine areas. All known populations occur within the Blue Mountains Local Government Area. Primarily associated with riparian or swamp habitat areas in the mid to upper altitudes of the central Blue Mountains on sandstone derived soils. Grows in swamp margins, hillslopes, gullies and creekbanks and occurs within dry sclerophyll forest and tall damp heath on sandstone.	Species	Low. No records in locality, marginal suitable habitat however commonly associated PCT's and species such as *Angophora costata, E. piperita, E. muelleriana, Acacia linifolia, Leptospermum polygalifolium* and *Hakea teretifolia* from recorded specimen locations are not present in the study area.	Unlikely

Scientific Name	Common Name	NSW Status	EPBC Act Status	Records	Distribution and habitat association	Credit type	Likelihood of occurrence	Likelihood of impact
Pultenaea parrisiae		V	V	Species or species habitat may occur within area (Commonwealth DCCEEW, 2025a)	Only known from three sites in NSW (Wadbilliga Trig area and two sites south of Nalbaugh). Grows on loam soils between 550-600 m elevation, sometimes at the margins of woodlands and also in riparian vegetation. Grows in moist heathland in swamps or seasonal seepage areas in loam soils.	Species	Low. No records in study area. Species has a very narrow distribution well outside the study area and no associated PCT's occur within or adjacent to the study area.	Unlikely
Rhizanthella slateri	Eastern Underground Orchid	V	E	Species or species habitat may occur within area (Commonwealth DCCEEW, 2025a)	Currently known only from 10 locations, including near Bulahdelah, the Watagan Mountains, the Blue Mountains, Wiseman's Ferry area, Agnes Banks and near Nowra. Habitat requirements are poorly understood and no particular vegetation type has been associated with the species, although it is known to occur in sclerophyll forest. Highly cryptic given that it grows almost completely below the soil surface, with flowers being the only part of the plant that can occur above ground. Therefore usually located only when the soil is disturbed. Flowers September to November.	Species	Low. Habitat requirements poorly understood, however no associated PCT's in the study area.	Unlikely
Rhodamnia rubescens	Scrub Turpentine	CE	CE	1 record within 10km (Commonwealth DCCEEW, 2025a)	Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils.	-	Low. No suitable habitat in subject land.	Unlikely

Scientific Name	Common Name	NSW Status	EPBC Act Status	Records	Distribution and habitat association	Credit type	Likelihood of occurrence	Likelihood of impact
Swainsona recta	Small Purple-pea	E	E	Species or species habitat may occur within area (Commonwealth DCCEEW, 2025a)	Current populations exist in the Queanbeyan and Wellington-Mudgee areas, previous populations thought extinct include Carcoar, Culcairn and Wagga Wagga. Inhabits grassy woodlands and open-forests dominated by Blakely's Red Gum, Yellow Bloodwood, Candlebark and Long-leaved Box and in association with understorey dominants that include Themeda australis, Poa spp. and Austrostipa spp. Flowers throughout spring, with a peak in October.	Species	Low. No records in locality, no associated Box-Gum woodlands species in subject land	Unlikely
Thesium australe	Austral Toadflax	V	V	4 records within 10 km (NSW DCCEEW, 2025a), Species or species habitat known to occur within area (Commonwealth DCCEEW, 2025a)	Found in very small populations scattered across eastern NSW, along the coast, and from the Northern to Southern Tablelands. Occurs in grassland or grassy woodland, and is often found in association with Kangaroo Grass.	Species	Low. Records in the locality, however no associated PCT's present in study area.	Unlikely
Velleia perfoliata		V	V	Species or species habitat likely to occur within area (Commonwealth DCCEEW, 2025a)	Only known from the Hawkesbury district and upper Hunter Valley. Found in shallow depressions on Hawkesbury sandstone shelves, on rocky hill sides, under cliffs or on rocky/sandy soils along tracks and trails. Occurs on fairly shallow soils of sandy loam texture, Often found growing on moss and lichen mats formed on rock.	Species	Low. No records in the locality, no habitat with shallow sandy soils in study area.	Unlikely

Scientific Name	Common Name	NSW Status	EPBC Act Status	Records	Distribution and habitat association	Credit type	Likelihood of occurrence	Likelihood of impact
Veronica blakelyi		E	-	615 records within 10 km (NSW DCCEEW, 2025a); Species listed in the BAM-C	Restricted to the western Blue Mountains, near Clarence, Mt Horrible, on Nullo Mountain and in the Coricudgy Range. Occurs in eucalypt forest, often in moist and sheltered areas. Associated canopy species include *Eucalyptus dives*, *E. dalrympleana*, *E. rossii* and *E. pauciflora*. Flowering occurs in late spring to early summer.	Species	Low. Suitable habitat occurs in the study area and multiple records in the locality, however species was not recorded despite targeted seasonal survey in accordance with the BAM.	Unlikely - noting the species was not recorded despite targeted seasonal survey in accordance with the BAM
Xerochrysum palustre	Swamp Everlasting	-	V	Species or species habitat likely to occur within area (Commonwealth DCCEEW, 2025a)	Found in Kosciuszko National Park and the eastern escarpment south of Badja. Grows in wetlands including sedge-swamps and shallow freshwater marshes, often on heavy black clay soils.	-	Low. No records in study, no suitable habitat with black clay soils.	Unlikely

Notes: V= vulnerable, E= endangered, CE= critically endangered, Ex= currently presumed extinct in NSW, C= listed as migratory under the China-Australia Migratory Bird Agreement (CAMBA), J= listed as migratory under the Japan-Australia Migratory Bird Agreement (JAMBA), K= listed as migratory under the Republic of Korea-Australia Migratory Bird Agreement (KAMBA), M = migratory (terrestrial)
BAM-C = identified as a candidate or predicted threatened species by the BAM-C based on site data and information in the TBDC (DPE, 2025a)
See below for definitions of 'Likelihood of occurrence' and 'Likelihood of impact' categories

Appendix C

Species recorded in the study area

C-1 Flora recorded

Table C.1 Flora recorded in PCT 3369

Family	Scientific name	Common name	Exotic	BH8 Cover	BH8 Anundance	BH9 Cover	BH9 Abundance	BH21 Cover	BH21 Abundance	JR4 Cover	Jr4 Abundance	JR16 Cover	JR16 Abundance	JR18 Cover	JR18 Abundance	JR22 Cover	JR22 Abundance	JR 26 Cover	JR 26 Abundance	JR 29 Cover	JR 29 Abundance
	Unidentified forb																	0.1	5		
Anthericaceae	*tricoryne elatior*	*Yellow Autumn-lily*		0.1	1																
Apiaceae	*Centella asiatica*	*Indian Pennywort*						0.2	100												
Apiaceae	*Hydrocotyle laxiflora*	*Stinking Pennywort*						0.2	50	0.3	100					0.1	100				
Apiaceae	*Trachymene incisa*	*Trachymene*												0.1	100						
Apocynaceae	*Araujia sericifera*	*Moth Vine*	*			0.1	2														
Asteraceae	*Calotis cuneifolia*	*Purple Burr-Daisy*						0.1	20												
Asteraceae	*carthamus lanatus*	*Saffron Thistle*	*									0.1	2								
Asteraceae	*Cassinia aculeata*	*Dolly Bush*								40	300	4	20	0.1	10	5	100				
Asteraceae	*Cassinia sifton*			1	20	0.5	10	20	200									30	500	1.5	6
Asteraceae	*Cirsium vulgare*	*Spear Thistle*	*	0.2	10	0.2	10			0.2	5	0.1	1								
Asteraceae	*conyza bonariensis*	*Flaxleaf Fleabane*	*	0.1	10																
Asteraceae	*conyza sumatrensis*	*Tall fleabane*	*					0.1	1												
Asteraceae	*Cymbonotus lawsonianus*	*Bear's Ear*														0.1	1				
Asteraceae	*euchiton sphaericus*	*Star Cudweed*						0.1	20												
Asteraceae	*Hypochaeris glabra*	*Smooth Catsear*	*							0.3	250	0.1	80					0.1	10		
Asteraceae	*hypochaeris radicata*	*Catsear*	*	1	200	0.5	50	0.1	10					0.3	300					0.1	20
Asteraceae	*Leucochrysum albicans subsp. albicans*							0.5	100												
Asteraceae	*Podolepis jaceoides*	*Showy Copper-wire Daisy*						0.1	20												
Asteraceae	*senecio quadridentatus*	*Cotton Fireweed*				0.5	10														
Asteraceae	*Solenogyne bellioides*	*Solengyne*						0.1	20												
Asteraceae	*solenogyne gunnii*	*Solengyne*														0.1	10				
Asteraceae	*Sonchus spp.*	*Sowthistle*	*									0.1	1								
Asteraceae	*taraxacum officinale*	*Dandelion*	*																	0.2	80
Asteraceae	*Viola betonicifolia*																	0.1	30		
Boraginaceae	*Cynoglossum australe*					0.1	5														
Boraginaceae	*Cynoglossum suaveolens*	*Sweet Hound's-tongue*				0.1	10														
Boraginaceae	*Echium vulgare*	*Viper's Bugloss*	*			0.2	20														
Campanulaceae	*wahlenbergia communis*	*Tufted Bluebell*				0.1	10														
Chenopodiaceae	*Einadia nutans*	*Climbing Saltbush*				0.1	5														
Clusiaceae	*Hypericum gramineum*	*Small St John's Wort*				0.1	5														
Clusiaceae	*Hypericum perforatum*	*St. Johns Wort*	*	0.5	100	0.5	100	0.1	5					0.1	250	0.1	80				
Convolvulaceae	*Convolvulus erubescens*	*Pink Bindweed*				0.1	5														
Convolvulaceae	*Dichondra repens*	*Kidney Weed*						0.2	20												
Cyperaceae	*Carex breviculmis*			5	500																
Dilleniaceae	*hibbertia obtusifolia*	*Hoary Guinea Flower*														0.3	18	0.5	30		
Ericaceae	*Lissanthe strigosa*	*Peach Heath*				0.2	2	0.5	20					0.1	1	1	20	1	30		
Fabaceae (Faboideae)	*bossiaea buxifolia*															0.2	50				
Fabaceae (Faboideae)	*Bossiaea prostrata*							0.1	5												
Fabaceae (Faboideae)	*Desmodium varians*	*Slender Tick-trefoil*				0.1	5														
Fabaceae (Faboideae)	*glycine tabacina*	*Variable Glycine*				0.1	10														
Fabaceae (Faboideae)	*Hardenbergia violacea*	*False Sarsaparilla*																0.1	5		

Family	Scientific name	Common name	Exotic	BH8 Cover	BH8 Anundance	BH9 Cover	BH9 Abundance	BH21 Cover	BH21 Abundance	JR4 Cover	Jr4 Abundance	JR16 Cover	JR16 Abundance	JR18 Cover	JR18 Abundance	JR22 Cover	JR22 Abundance	JR 26 Cover	JR 26 Abundance	JR 29 Cover	JR 29 Abundance
Fabaceae (Faboideae)	*indigofera australis*	*Australian Indigo*						0.1	1									0.1	15		
Fabaceae (Faboideae)	*Indigofera spp.*		*							0.1	5										
Fabaceae (Faboideae)	*medicago lupulina*	*Black Medic*	*	0.2	10									0.1	10						
Fabaceae (Mimosoideae)	*Acacia buxifolia*	*Box-leaved Wattle*						0.2	1												
Fabaceae (Mimosoideae)	*Acacia dealbata*	*Silver Wattle*						2	10	0.5	4			0.1	6	0.4	5	0.1	2		
Fabaceae (Mimosoideae)	*acacia decurrens*	*Black Wattle*				0.5	10									0.3	1				
Fabaceae (Mimosoideae)	*Acacia Dorothea*	*Dorothy's Wattle*								4	2										
Fabaceae (Mimosoideae)	*Acacia falciformis*	*Broad-leaved Hickory*								2	3										
Fabaceae (Mimosoideae)	*acacia terminalis*	*Sunshine Wattle*														0.3	5	0.2	5		
Gentianaceae	*centaurium erythraea*	*Common Centaury*	*	0.2	10	0.2	20	0.1	20												
Geraniaceae	*Geranium solanderi*	*Native Geranium*		0.1	5	0.2	30			0.1	8										
Geraniaceae	*Geranium solanderi var. solanderi*											0.2	20			0.1	50				
Goodeniaceae	*Goodenia spp.*									0.5	50					0.1	20				
Haloragaceae	*gonocarpus tetragynus*	*Poverty Raspwort*						0.5	100							0.1	50	0.1	200		
Juncaceae	*Juncus acutus subsp. acutus*	*Sharp Rush*	*									0.1	3	1.5	50						
Juncaceae	*Juncus bufonius*	*Toad Rush*	*											1	100						
Juncaceae	*Juncus usitatus*							0.2	5												
Juncaceae	*Luzula densiflora*	*Woodrush*																0.1	2		
Linaceae	*linum trigynum*	*French Flax*	*	0.1	10									0.1	50						
Lomandraceae	*Lomandra filiformis*	*Wattle Matt-rush*								20	350			0.2	10	15	300	15	350		
Lomandraceae	*Lomandra filiformis subsp. filiformis*					0.2	10	20	200												
Lomandraceae	*lomandra glauca*	*Pale Mat-rush*						0.2	20												
Lomandraceae	*lomandra longifolia*	*Spiny-headed Mat-rush*						1	20									2	100		
Lomandraceae	*Lomandra multiflora*	*Many-flowered Mat-rush*						0.5	30			0.4	50			10	200				
Malaceae	*crataegus monogyna*	*Hawthorn*	*	0.5	1	0.1	1													0.1	1
Malvaceae	*Modiola caroliniana*	*Red-flowered Mallow*	*			1	10														
Myrsinaceae	*Lysimachia arvensis*	*Scarlet Pimpernel*	*	0.1	5	0.1	10							0.1	200						
Myrtaceae	*Eucalyptus bridgesiana*	*Apple Box*				30	5														
Myrtaceae	*eucalyptus cannonii*	*Capertee Stringybark*														25	22				
Myrtaceae	*Eucalyptus dalrympleana*	*Mountain Gum*						5	20	8	4										
Myrtaceae	*Eucalyptus dives*	*Broad-leaved Peppermint*				10	2			5	3	7	1			10	7				
Myrtaceae	*Eucalyptus macrorhyncha*	*Red Stringybark*						0.1	1	45	16										
Myrtaceae	*Eucalyptus mannifera*	*Brittle Gum*								30	8										
Myrtaceae	*eucalyptus rossii*	*Inland Scribbly Gum*																0.1	2		
Myrtaceae	*eucalyptus rubida*	*Candlebark*														15	17				
Orchidaceae	*Diuris pardina*	*Leopard Orchid*																0.1	20		
Orchidaceae	*microtis spp.*							0.1	1												
Orchidaceae	*Microtis unifolia*	*Common Onion Orchid*														0.1	1				
Orchidaceae	*Pterostylis spp.*	*Greenhood*						0.1	1												
Oxalidaceae	*Oxalis perennans*			0.2	20	0.1	20							0.1	20	0.1	40	0.1	3		

Family	Scientific name	Common name	Exotic	BH8 Cover	BH8 Anundance	BH9 Cover	BH9 Abundance	BH21 Cover	BH21 Abundance	JR4 Cover	Jr4 Abundance	JR16 Cover	JR16 Abundance	JR18 Cover	JR18 Abundance	JR22 Cover	JR22 Abundance	JR 26 Cover	JR 26 Abundance	JR 29 Cover	JR 29 Abundance
Phormiaceae	*Dianella caerulea*	*Blue Flax-lily*														4	25				
Phormiaceae	*Dianella revoluta*	*Blueberry Lily*						1	50	5	50										
Phormiaceae	*Dianella spp.*													1	50			1	20		
Pittosporaceae	*bursaria spinosa*	*Native Blackthorn*		2	2	3	30														
Plantaginaceae	*Plantago debilis*	*Shade Plantain*						0.1	1												
Plantaginaceae	*Plantago lanceolata*	*Lamb's Tongues*	*	0.5	50	0.5	50							0.7	800						
Plantaginaceae	*Plantago varia*					0.2	20														
Plantaginaceae	*veronica plebeia*	*Trailing Speedwell*				0.1	10	0.1	5												
Poaceae	*Agrostis capillaris*	*Browntop Bent*	*			1	20														
Poaceae	*Aira caryophyllea*	*Silvery Hairgrass*	*															0.2	50		
Poaceae	*Anthoxanthum odoratum*	*Sweet Vernal Grass*	*									0.1	10								
Poaceae	*Aristida ramosa*	*Purple Wiregrass*						0.5	100												
Poaceae	*Austrostipa rudis subsp. nervosa*	*A Speargrass*						0.5	20												
Poaceae	*Austrostipa scabra*	*Speargrass*						0.2	5												
Poaceae	*Austrostipa spp.*	*A Speargrass*														1	50				
Poaceae	*avena barbata*	*Bearded Oats*	*	5	200																
Poaceae	*briza minor*	*Shivery Grass*	*	0.1	10									0.1	3						
Poaceae	*bromus catharticus*	*Praire Grass*	*	1	50																
Poaceae	*Bromus hordeaceus*	*Soft Brome*	*									0.1	2								
Poaceae	*bromus molliformis*	*Soft Brome*	*	5	100																
Poaceae	*cynodon dactylon*		*									10									
Poaceae	*cynodon dactylon*	*Common Couch*		5	100															25	200
Poaceae	*dactylis glomerata*	*Cocksfoot*	*	10	100	20	500													20	400
Poaceae	*Echinochloa crus-galli*	*Barnyard Grass*	*									1	150								
Poaceae	*Echinopogon caespitosus*	*Bushy Hedgehog-grass*						0.1	5												
Poaceae	*Echinopogon ovatus*	*Forest Hedgehog Grass*								0.2	30										
Poaceae	*Eleusine tristachya*	*Goose Grass*	*			0.2	20														
Poaceae	*eragrostis brownii*	*Brown's Lovegrass*						0.2	20												
Poaceae	*eragrostis curvula*	*African Lovegrass*	*	0.5	10							40	700	50	200					10	150
Poaceae	*Eragrostis spp.*	*A Lovegrass*	*							0.4	50			5	100						
Poaceae	*Holcus lanatus*	*Yorkshire Fog*	*																	40	700
Poaceae	*lolium perenne*	*Perennial Ryegrass*	*	0.5	50	0.5	20														
Poaceae	*Microlaena stipoides*	*Weeping Grass*		5	100	5	100														
Poaceae	*Nassella trichotoma*	*Serrated Tussock*	*																	0.1	2
Poaceae	*Panicum decompositum*	*Native Millet*				1	20														
Poaceae	*Panicum effusum*	*Hairy Panic*												0.1	2						
Poaceae	*Panicum simile*	*Two-colour Panic*						0.1	10												
Poaceae	*Panicum spp.*	*Panicum*										0.1	1								
Poaceae	*Paspalum dilatatum*	*Paspalum*	*	0.5	10	1	20														
Poaceae	*Phalaris aquatica*	*Phalaris*	*	5	100	30	500					30	400							3	50
Poaceae	*Poa Sieberiana*	*Snowgrass*						20	50									35	600		
Poaceae	*Poa spp.*		*							90	700					15	100				
Poaceae	*rytidosperma pallidum*	*Redanther Wallaby Grass; Silvertop Wallaby Grass*				5	50	20	200												
Poaceae	*rytidosperma pilosum*	*Smooth-flowered Wallaby Grass*		0.5	20	20	200														
Poaceae	*Rytidosperma racemosum var. racemosum*	*Wallaby Grass*		1	100			0.5	50												

Family	Scientific name	Common name	Exotic	BH8 Cover	BH8 Anundance	BH9 Cover	BH9 Abundance	BH21 Cover	BH21 Abundance	JR4 Cover	Jr4 Abundance	JR16 Cover	JR16 Abundance	JR18 Cover	JR18 Abundance	JR22 Cover	JR22 Abundance	JR 26 Cover	JR 26 Abundance	JR 29 Cover	JR 29 Abundance
Poaceae	*Rytidosperma spp.*					1	20			10	400	0.1	5	25	500	2	150	3	200		
Poaceae	*sorghum halepense*	*Johnson Grass*	*	0.5	10																
Poaceae	*Themeda triandra*			30	200			10	100												
Poaceae	*vulpia muralis*	*Wall Fescue*	*	20	500																
Poaceae	*vulpia myuros*	*Rat's Tail Fescue*	*																	0.2	300
Polygonaceae	*Juncus usitatus*		*																	2	40
Polygonaceae	*Rumex acetosella*	*Sheep Sorrel*	*			0.2	20					0.2	100							1	350
Polygonaceae	*Rumex brownii*	*Swamp Dock*				0.2	20	0.1	3												
Proteaceae	*Persoonia linearis*	*Narrow-leaved Geebung*								0.1	1					0.3	2				
Pteridaceae	*Cheilanthes sieberi*	*Rock Fern*						0.1	1							0.2	200				
Rhamnaceae	*Cryptandra amara*	*Bitter Cryptandra*														0.1	2				
Rosaceae	*Acaena echinata var. echinata*									0.2	100										
Rosaceae	*Acaena novae-zelandiae*	*Bidgee-widgee*						0.2	20					0.2	150	0.1	50				
Rosaceae	*rosa rubiginosa*	*Sweet Briar*	*	0.5	10	0.1	5							0.1	4	0.1	5			0.2	1
Rosaceae	*Rubus fruticosus sp. agg.*	*Blackberry complex*	*	5	20	1	10	0.1	2	0.3	1	0.2	4	0.2	50	0.2	5				
Rubiaceae	*asperula conferta*	*Common Woodruff*		0.5	50																
Rubiaceae	*Galium gaudichaudii*	*Rough Bedstraw*						0.1	10												
Rubiaceae	*Galium leiocarpum*									2	400					0.2	150				
Rubiaceae	*Opercularia spp.*																				
Scrophulariaceae	*Verbascum thapsus subsp. thapsus*	*Great Mullein*	*			0.1	5														
Solanaceae	*Solanum nigrum*	*Black-berry Nightshade*	*			0.1	2														
Stackhousiaceae	*Stackhousia monogyna*	*Creamy Candles*																0.1	2		
Stylidiaceae	*Stylidium graminifolium*	*Grass Triggerplant*																0.1	2		
Valerianaceae	*Centranthus ruber subsp. ruber*	*Red Valerian*	*													0.1	40				

Notes: Cover: 0.1, 0.2, 0.3…1, 2, 3…10, 15, 20, 25…100%
1. Listed as a priority weed within the Ligthgow LGA

Table C.2 Flora recorded in PCT 3385 Poor

Family	Scientific name	Common name	Exotic	BH2 Cover	BH2 Abundance	BH3 Cover	BH3 Abundance	BH19 Cover	BH19 Abundance	JR9 Cover	JR9 Abundance	JR15 Cover	JR15 Abundance
Anthericaceae	*tricoryne elatior*	Yellow Autumn-lily				0.2	50						
Apiaceae	*Centella asiatica*	Indian Pennywort						5	500				
Apiaceae	*Hydrocotyle tripartita*	Pennywort						20	1000				
Asteraceae	*Brachyscome multifida var. multifida*					0.1	20						
Asteraceae	*Cassinia sifton*	Sifton Bush		20	100	10	100	1	20				
Asteraceae	*Cirsium vulgare*	Spear Thistle	*					0.5	10	0.1	1		
Asteraceae	*conyza bonariensis*	Flaxleaf Fleabane	*			0.2	10						
Asteraceae	*Conyza sumatrensis*	Tall fleabane	*					1	50				
Asteraceae	*coronidium scorpioides*	Button Everlasting						0.1	10				
Asteraceae	*Cotula coronopifolia*	Water Buttons	*					0.2	200				
Asteraceae	*euchiton sphaericus*	Star Cudweed				0.1	2	0.5	200				
Asteraceae	*Gamochaeta americana*	Cudweed	*	0.5	50	10	300	0.5	100				
Asteraceae	*glossocardia bidens*	Cobbler's Tack		0.5	50								
Asteraceae	*Hypochaeris glabra*	Smooth Catsear	*									0.3	150
Asteraceae	*hypochaeris radicata*	Catsear	*	5	100	5	100	1	200	10	1000	0.1	20
Asteraceae	*Solenogyne gunnii*	Solengyne						0.1	10				
Asteraceae	*soliva spp.*		*							0.1	500		
Asteraceae	*Sonchus oleraceus*	Common Sowthistle	*							2	200		
Clusiaceae	*hypericum gramineum*	Small St John's Wort				0.1	5						
Clusiaceae	*Hypericum perforatum*	St. Johns Wort	*	0.5	50	0.2	10	0.5	50				
Cyperaceae	*carex appressa*	Tall Sedge								5	20		
Cyperaceae	*Carex breviculmis*					0.1	3						
Cyperaceae	*carex spp.*									0.1	300		
Cyperaceae	*cyperus eragrostis*	Umbrella Sedge	*	0.1	2								
Cyperaceae	*schoenus apogon*	Fluke Bogrush				0.2	20						
Fabaceae (Faboideae)	*medicago spp.*	A Medic	*							0.1	500		
Fabaceae (Mimosoideae)	*Acacia dealbata*	Silver Wattle						0.5	10				
Fabaceae (Mimosoideae)	*Acacia Dorothea*	Dorothy's Wattle						0.5	1				
Gentianaceae	*centaurium erythraea*	Common Centaury	*	0.1	10	0.2	20	0.1	20				
Gentianaceae	*Schenkia spicata*	Spike Centaury						0.1	20				
Geraniaceae	*geranium solanderi*	Native Geranium								0.1	150		
Haloragaceae	*gonocarpus tetragynus*	Poverty Raspwort						2	500			0.1	50
Haloragaceae	*haloragis heterophylla*	Variable Raspwort				0.1	10	5	500				
Juncaceae	*Juncus usitatus*			5	50	5	50	1	10	10	80	5	100
Lamiaceae	*Scutellaria humilis*	Dwarf Skullcap						0.1	10				
Liliaceae	*Lilium spp.*		*			0.1	5						
Linaceae	*linum trigynum*	French Flax	*			0.1	5						
Lomandraceae	*lomandra longifolia*	Spiny-headed Mat-rush						1	10				
Loranthaceae	*Lomandra multiflora*	Many-flowered Mat-rush						1	10				
Malvaceae	*Modiola caroliniana*	Red-flowered Mallow	*					0.1	20				
Myrsinaceae	*Lysimachia arvensis*	Scarlet Pimpernel	*					0.1	20				
Myrtaceae	*Eucalyptus viminalis*	Ribbon Gum						0.1	2				
Myrtaceae	*leptospermum scoparium*	Manuka						0.1	1				

Family	Scientific name	Common name	Exotic	BH2 Cover	BH2 Abundance	BH3 Cover	BH3 Abundance	BH19 Cover	BH19 Abundance	JR9 Cover	JR9 Abundance	JR15 Cover	JR15 Abundance
Orchidaceae	*diuris spp.*					0.1	5						
Orchidaceae	*microtis spp.*					0.1	5						
Oxalidaceae	*Oxalis perennans*			0.2	20	0.2	50	1	200				
Plantaginaceae	*Plantago lanceolata*	Lamb's Tongues	*	10	200	1	50	0.1	1	5	300	1	500
Plantaginaceae	*Plantago spp.*	Plantain										2	300
Plantaginaceae	*veronica plebeia*	Trailing Speedwell						2	100				
Poaceae	*Aira cupaniana*	Silvery Hairgrass	*			0.2	20						
Poaceae	*Anthoxanthum odoratum*	Sweet Vernal Grass	*	30	400	30	500					15	400
Poaceae	*austrostipa scabra*	Speargrass						0.1	5				
Poaceae	*Bothriochloa macra*	Red Grass						0.2	10				
Poaceae	*bromus molliformis*	Soft Brome	*							2	250		
Poaceae	*Cenchrus clandestinus*	Kikuyu Grass	*							30	400		
Poaceae	*cynodon dactylon*	Common Couch				5	100					30	
Poaceae	*dactylis glomerata*	Cocksfoot	*							2	100		
Poaceae	*Dichelachne micrantha*	Shorthair Plumegrass						1	20				
Poaceae	*Echinochloa crus-galli*	Barnyard Grass	*									3	100
Poaceae	*eragrostis brownii*	Brown's Lovegrass						5	200				
Poaceae	*eragrostis curvula*	African Lovegrass	*							15	500		
Poaceae	*Eragrostis spp.*	A Lovegrass	*									3	30
Poaceae	*lolium perenne*	Perennial Ryegrass	*							1	300		
Poaceae	*Microlaena stipoides*	Weeping Grass		0.1	5			5	100				
Poaceae	*Panicum capillare*	Witchgrass	*					0.1	200				
Poaceae	*Paspalum dilatatum*	Paspalum	*					0.5	20			1	50
Poaceae	*Phalaris aquatica*	Phalaris	*							5	400	50	800
Poaceae	*poa sieberiana*	Snowgrass				0.1	3	10	100				
Poaceae	*Rytidosperma laeve*	Wallaby Grass						5	50				
Poaceae	*Rytidosperma monticola*	Mountain Wallaby Grass				0.2	10						
Poaceae	*rytidosperma spp.*					0.1	10						
Poaceae	*Setaria parviflora*		*					0.5	50				
Poaceae	*themeda triandra*											5	100
Poaceae	*vulpia myuros*	Rat's Tail Fescue	*	40	1000	10	300			10	1000		
Polygonaceae	*Rumex acetosella*	Sheep Sorrel	*	0.1	5			0.2	20				
Portulacaceae	*Portulaca oleracea*	Pigweed						0.5	200				
Rosaceae	*Acaena echinata var. echinata*							1	20				
Rosaceae	*Acaena novae-zelandiae*	Bidgee-widgee				0.2	50	0.2	10				
Rosaceae	*Acaena ovina*	Acaena				0.1	5						
Rosaceae	*rosa rubiginosa*	Sweet Briar	*			0.2	1	0.1	1	1	7	0.1	1
Rosaceae	*Rubus fruticosus sp. agg.*	Blackberry complex	*			0.2	5	0.5	10	2	3	0.1	2
Rubiaceae	*opercularia varia*	Variable Stinkweed						0.1	1				

Table C.3 Flora recorded in PCT 3385, Good, Paddock trees and Moderate

Family	*Scientific name*	Common name	Exotic	BH1 Cover	BH1 Abundance	BH10 Cover	BH10 Abundance	JR6 Cover	JR6 Abundance	JR11 Cover	JR11 Abundance	JR 27 Cover	JR 27 Abundance	JR 30 Cover	JR 30 Abundance
Anthericaceae	*Dichopogon strictus*	Chocolate Lily				0.1	5								
Apiaceae	*Hydrocotyle laxiflora*	Stinking Pennywort				1	500	0.2	50	2	1000	0.1	100		
Apiaceae	*Oreomyrrhis eriopoda*	Australian Carraway				0.2	20								
Asteraceae	*Cassinia sifton*					5	50			0.1	1	5	150	10	300
Asteraceae	*Chrysocephalum apiculatum*	Common Everlasting				1	50								
Asteraceae	*Cirsium vulgare*	Spear Thistle	*			0.2	10	0.1	1	3	45				
Asteraceae	*Conyza bonariensis*	Flaxleaf Fleabane	*							0.1	4				
Asteraceae	*Coronidium scorpioides*	Button Everlasting				5	200								
Asteraceae	*Cymbonotus lawsonianus*	Bear's Ear				0.1	10								
Asteraceae	*Euchiton japonicus*											0.1	50		
Asteraceae	*Euchiton sphaericus*	Star Cudweed								0.1	40				
Asteraceae	*Hypochaeris glabra*	Smooth Catsear	*					2	100						
Asteraceae	*Hypochaeris radicata*	Catsear	*	0.5	100	0.5	100					0.1	10	0.1	50
Asteraceae	*Leptorhynchos squamatus*	Scaly Buttons										0.1	30		
Asteraceae	*Leucochrysum albicans*											0.1	100		
Asteraceae	*Leucochrysum albicans subsp. Albicans*										20			0.5	80
Asteraceae	*Senecio diaschides*					0.5	20								
Asteraceae	*Senecio minimus*					2	20								
Asteraceae	*Senecio prenanthoides*					1	50								
Asteraceae	*Senecio quadridentatus*	Cotton Fireweed				0.5	20			0.1	20				
Asteraceae	*Solenogyne spp.*											0.1	3		
Asteraceae	*Taraxacum officinale*	Dandelion	*							0.1	50				
Asteraceae	*Themeda triandra*													7	200
Boraginaceae	*Cynoglossum australe*					1	50								
Boraginaceae	*Echium plantagineum*	Patterson's Curse	*	0.1	1										
Campanulaceae	*Wahlenbergia communis*	Tufted Bluebell				0.1	10								
Campanulaceae	*Wahlenbergia stricta*	Tall Bluebell				0.1	3								
Caryophyllaceae	*Stellaria media*	Common Chickweed	*	0.1	5										
Clusiaceae	*Hypericum gramineum*	Small St John's Wort				0.1	20	4	100	0.1	5	0.1	20		
Clusiaceae	*Hypericum perforatum*	St. Johns Wort	*	0.5	200	0.1	10							0.1	10
Convolvulaceae	*Dichondra repens*	Kidney Weed										1	300		
Cyperaceae	*Carex breviculmis*			5	100										
Cyperaceae	*Carex inversa*	Knob Sedge								3	150				
Cyperaceae	*Carex longebrachiata*			0.2	10										

Family	*Scientific name*	Common name	Exotic	BH1 Cover	BH1 Abundance	BH10 Cover	BH10 Abundance	JR6 Cover	JR6 Abundance	JR11 Cover	JR11 Abundance	JR 27 Cover	JR 27 Abundance	JR 30 Cover	JR 30 Abundance
Dilleniaceae	*Hibbertia obtusifolia*	Hoary Guinea Flower												0.2	10
Ericaceae	*Lissanthe strigosa*	Peach Heath				0.1	1					0.2	2	0.1	1
Fabaceae (Faboideae)	*Desmodium varians*	Slender Tick-trefoil				0.3	50								
Fabaceae (Faboideae)	*Dillwynia phylicoides*	Parrot-pea										0.3	6		
Fabaceae (Faboideae)	*Dillwynia prostrata*	Matted Parrot-pea										0.2	5	0.3	15
Fabaceae (Faboideae)	*Dillwynia spp.*					0.1	1								
Fabaceae (Faboideae)	*Glycine clandestina*	Twining glycine				0.5	100								
Fabaceae (Faboideae)	*Glycine microphylla*	Small-leaf Glycine				0.2	20								
Fabaceae (Faboideae)	*Glycine tabacina*	Variable Glycine				0.5	200								
Fabaceae (Faboideae)	*Trifolium repens*	White Clover	*							2	200				
Fabaceae (Mimosoideae)	*Acacia buxifolia*	Box-leaved Wattle										0.1	1		
Fabaceae (Mimosoideae)	*Acacia dealbata subsp. Dealbata*	Silver Wattle				5	20								
Fabaceae (Mimosoideae)	*Acacia decurrens*	Black Wattle				1	5					0.2	10		
Fabaceae (Mimosoideae)	*Acacia terminalis*	Sunshine Wattle										0.1	1		
Gentianaceae	*Centaurium erythraea*	Common Centaury	*			0.1	5			0.1	5				
Geraniaceae	*Geranium homeanum*									0.1	20				
Geraniaceae	*Geranium solanderi*	Native Geranium				0.5	50			40	1000				
Goodeniaceae	*Goodenia bellidifolia*											0.1	30		
Goodeniaceae	*Goodenia hederacea*	Ivy Goodenia										0.1	40	0.1	4
Goodeniaceae	*Goodenia spp.*													0.1	5
Haloragaceae	*Gonocarpus tetragynus*	Poverty Raspwort				5	1000			5	1000	0.2	300	0.2	50
Haloragaceae	*Haloragis heterophylla*	Variable Raspwort				0.1	1								
Hypoxidaceae	*Hypoxis hygrometrica var. Villosisepala*					0.1	10								
Juncaceae	*Juncus filicaulis*											8	150		
Juncaceae	*Juncus spp.*	A Rush								5	500				
Juncaceae	*Juncus usitatus*									20	200				
Juncaceae	*Luzula flaccida*	Woodrush		0.1	2										
Lamiaceae	*Mentha diemenica*	Slender Mint								0.1	50				
Lamiaceae	*Mentha satureioides*	Native Pennyroyal				2	100								
Lobeliaceae	*Isotoma axillaris*	Showy Isotome										0.1	20		
Lobeliaceae	*Isotoma fluviatilis*	Swamp Isotome								0.1	30				
Lomandraceae	*Lomandra filiformis*	Wattle Matt-rush		0.2	10			10	500			2	150	2	80
Lomandraceae	*Lomandra filiformis subsp. Filiformis*					0.5	50								
Lomandraceae	*Lomandra longifolia*	Spiny-headed Mat-rush						10	20						

Family	*Scientific name*	Common name	Exotic	BH1 Cover	BH1 Abundance	BH10 Cover	BH10 Abundance	JR6 Cover	JR6 Abundance	JR11 Cover	JR11 Abundance	JR 27 Cover	JR 27 Abundance	JR 30 Cover	JR 30 Abundance
Lomandraceae	*Lomandra multiflora*	Many-flowered Mat-rush				1	20								
Lomandraceae	*Lomandra multiflora subsp. Multiflora*	Many-flowered Mat-rush		0.1	5										
Malaceae	*Crataegus monogyna*	Hawthorn	*					0.3	3						
Malaceae	*Pyracantha angustifolia*	Orange Firethorn	*					1	1						
Myrsinaceae	*Lysimachia arvensis*	Scarlet Pimpernel	*			0.1	5			0.1	5	0.1	10		
Myrtaceae	*Callistemon spp.*	0										0.1	1		
Myrtaceae	*Eucalyptus aggregata*	Black Gum		40	12			20	5	3	1				
Myrtaceae	*Eucalyptus bridgesiana*	Apple Box								0.1	2			35	4
Myrtaceae	*Eucalyptus dives*	Broad-leaved Peppermint										0.2	40		
Myrtaceae	*Eucalyptus pauciflora*	White Sally				20	15	0.5	1					30	30
Myrtaceae	*Eucalyptus rubida*	Candlebark		5	2			15	16	0.1	1	0.1	5		
Myrtaceae	*Eucalyptus viminalis*	Ribbon Gum				20	3								
Myrtaceae	*Leptospermum scoparium*	Manuka										10	40		
Oxalidaceae	*Oxalis perennans*			0.2	50	0.2	20			7	1000	0.1	3		
Phormiaceae	*Dianella revoluta*	Blueberry Lily				0.5	5								
Phormiaceae	*Dianella spp.*											0.1	2		
Phyllanthaceae	*Poranthera microphylla*	Small Poranthera				0.5	100								
Pinaceae	*Pinus spp.*		*					70	82						
Plantaginaceae	*Plantago lanceolata*	Lamb's Tongues	*	1	100	0.2	10			3	500			0.1	30
Plantaginaceae	*Plantago varia*					1	50								
Plantaginaceae	*Veronica gracilis*													0.1	20
Plantaginaceae	*Veronica plebeia*	Trailing Speedwell				0.5	100								
Plantaginaceae	*Veronica spp.*		*									0.1	3		
Poaceae	*Aira caryophyllea*	Silvery Hairgrass	*									0.1	5	0.2	40
Poaceae	*Anthoxanthum odoratum*	Sweet Vernal Grass	*			20	500	5	300	20	400			5	200
Poaceae	*Aristida ramosa*	Purple Wiregrass												0.1	10
Poaceae	*Austrostipa pubescens*									0.1	20				
Poaceae	*Austrostipa rudis subsp. Nervosa*	A Speargrass				0.5	50								
Poaceae	*Austrostipa scabra*	Speargrass												1.5	50
Poaceae	*Avena barbata*	Bearded Oats	*	15	200										
Poaceae	*Bromus molliformis*	Soft Brome	*	5	100										
Poaceae	*Cenchrus clandestinus*	Kikuyu Grass	*	40	200										
Poaceae	*Cynodon dactylon*	Common Couch												5	1
Poaceae	*Dactylis glomerata*	Cocksfoot	*	5	100			4	100	30	600				
Poaceae	*Dichelachne micrantha*	Shorthair Plumegrass				1	20			0.1	1				
Poaceae	*Echinopogon caespitosus*	Bushy Hedgehog-grass				5	50								
Poaceae	*Eleusine indica*	Crowsfoot Grass	*							0.1	10				

Family	*Scientific name*	Common name	Exotic	BH1 Cover	BH1 Abundance	BH10 Cover	BH10 Abundance	JR6 Cover	JR6 Abundance	JR11 Cover	JR11 Abundance	JR 27 Cover	JR 27 Abundance	JR 30 Cover	JR 30 Abundance
Poaceae	*Entolasia stricta*	Wiry Panic				0.5	50								
Poaceae	*Eragrostis brownii*	Brown's Lovegrass								2	600				
Poaceae	*Eragrostis curvula*	African Lovegrass	*			1	5							3	20
Poaceae	*Eragrostis leptostachya*	Paddock Lovegrass										5	50		
Poaceae	*Eragrostis spp.*	A Lovegrass	*					4	20						
Poaceae	*Hordeum leporinum*	Barley Grass	*	5	100										
Poaceae	*Lolium perenne*	Perennial Ryegrass	*	10	300										
Poaceae	*Microlaena stipoides*	Weeping Grass		1	50	1	20								
Poaceae	*Nassella neesiana*	Chilean Needle Grass	*	10	100										
Poaceae	*Nassella trichotoma*	Serrated Tussock	*	5	100	0.2	5								
Poaceae	*Paspalum dilatatum*	Paspalum	*							0.1	2				
Poaceae	*Phalaris aquatica*	Phalaris	*	10	100										
Poaceae	*Phragmites australis*	Common Reed						2	10						
Poaceae	*Poa labillardierei var. Labillardierei*	Tussock						15	30	35	300				
Poaceae	*Poa sieberiana*	Snowgrass				30	200								
Poaceae	*Poa spp.*		*									15	200	5	20
Poaceae	*Rytidosperma caespitosum*	Ringed Wallaby Grass				5	200								
Poaceae	*Rytidosperma pilosum*	Smooth-flowered Wallaby Grass				1	50								
Poaceae	*Rytidosperma racemosum var. Racemosum*	Wallaby Grass										3	100		
Poaceae	*Rytidosperma spp.*													20	500
Poaceae	*Sorghum halepense*	Johnson Grass	*			0.5	50								
Poaceae	*Themeda triandra*			0.1	5	0.5	20								
Poaceae	*Vulpia myuros*	Rat's Tail Fescue	*											0.2	80
Polygonaceae	*Acetosella vulgaris*	Sheep Sorrel	*	0.1	5										
Rosaceae	*Acaena echinata var. Echinata*					0.5	20								
Rosaceae	*Acaena novae-zelandiae*	Bidgee-widgee		0.1	5	5	200								
Rosaceae	*Acaena ovina*	Acaena		0.5	200										
Rosaceae	*Rubus fruticosus sp. Agg.*	Blackberry complex	*	0.1	10	0.1	2	10	10	1	3			0.1	10
Rubiaceae	*Galium gaudichaudii*	Rough Bedstraw				1	500								
Rubiaceae	*Galium leptogonium*									0.1	2				
Rubiaceae	*Opercularia varia*	Variable Stinkweed				0.7	150								
Solanaceae	*Solanum nigrum*	Black-berry Nightshade	*			0.1	3								
Stylidiaceae	*Stylidium graminifolium*	Grass Triggerplant										0.1	3		
Verbenaceae	*Verbena bonariensis*	Purpletop	*							4	200				
Violaceae	*Viola betonicifolia*	Native Violet				0.1	10								

Note: 1. Listed as a priority weed within the Ligthgow LGA

Table C.4 Flora recorded in PCT 3375

Family	*Scientific name*	Common name	Exotic	BH4 Cover	BH4 Abundance	BH12 Cover	BH12 Abundance	BH13 Cover	BH13 Abundance	BH13B Cover	BH13B Abundance	JR1 Cover	JR1 Abundance	JR2 Cover	JR2 Abundance	JR14 Cover	JR14 Abundance	JR 25 Cover	JR 25 Abundance
Amaryllidaceae	*Calostemma purpureum*	Garland Lily														0.1	1		
Anthericaceae	*Tricoryne elatior*	Yellow Autumn-lily				0.1	5												
Apiaceae	*Centella asiatica*	Indian Pennywort								0.5	100								
Apiaceae	*Hydrocotyle laxiflora*	Stinking Pennywort		0.1	10	0.1	5	0.5	100	0.5	50							0.1	50
Apiaceae	*Hydrocotyle tripartita*	Pennywort								0.5	50								
Apocynaceae	*Araujia sericifera*	Moth Vine	*					0.1	1										
Asphodelaceae	*Bulbine bulbosa*	Bulbine Lily														0.1	20		
Asteraceae	*Cassinia aculeata*	Dolly Bush						1	3									5	300
Asteraceae	*Cassinia arcuata*	Sifton Bush														0.2	15		
Asteraceae	*Cassinia laevis*	Cough Bush						0.5	5										
Asteraceae	*Cassinia longifolia*											70	500	20	300				
Asteraceae	*Cassinia sifton*			25	300	30	200	30	100	10	200								
Asteraceae	*Chrysocephalum apiculatum*	Common Everlasting				0.1	10												
Asteraceae	*Cirsium vulgare*	Spear Thistle	*					0.1	1			0.1	5					0.1	2
Asteraceae	*Conyza spp.*	A Fleabane	*									0.2	50						
Asteraceae	*Coronidium scorpioides*	Button Everlasting		0.5	50														
Asteraceae	*Euchiton sphaericus*	Star Cudweed				0.1	3			0.5	100								
Asteraceae	*Hypochaeris glabra*	Smooth Catsear	*									0.2	100	1	400				
Asteraceae	*Hypochaeris radicata*	Catsear	*			0.5	100			0.5	50					0.5	1000		
Asteraceae	*Leucochrysum albicans*													2.5	300				
Asteraceae	*Leucochrysum albicans subsp. Albicans*			0.1	2	0.1	10									0.1	50	0.1	8
Asteraceae	*Solenogyne bellioides*	Solengyne								0.1	20								
Asteraceae	*Viola betonicifolia*																	0.1	80
Asteraceae	*Vittadinia cuneata*	A Fuzzweed												0.3	100				
Asteraceae	*Vittadinia cuneata var. Cuneata*	A Fuzzweed		0.1	5														
Asteraceae	*Vittadinia muelleri*	A Fuzzweed				0.5	200												
Asteraceae	*Xerochrysum viscosum*	Sticky Everlasting										0.1	2	0.1	2				
Boraginaceae	*Echium plantagineum*	Patterson's Curse	*			0.1	1												
Campanulaceae	*Wahlenbergia communis*	Tufted Bluebell		0.1	1														
Campanulaceae	*Wahlenbergia gracilis*	Sprawling Bluebell																0.1	4
Clusiaceae	*Hypericum gramineum*	Small St John's Wort				0.2	50	0.1	10	0.2	50								
Clusiaceae	*Hypericum perforatum*	St. Johns Wort	*			0.5	100	0.2	10	0.2	20	0.1	2	0.1	3				
Cyperaceae	*Schoenus apogon*	Fluke Bogrush				0.1	5												

Family	*Scientific name*	Common name	Exotic	BH4 Cover	BH4 Abundance	BH12 Cover	BH12 Abundance	BH13 Cover	BH13 Abundance	BH13B Cover	BH13B Abundance	JR1 Cover	JR1 Abundance	JR2 Cover	JR2 Abundance	JR14 Cover	JR14 Abundance	JR 25 Cover	JR 25 Abundance
Dennstaedtiaceae	*Pteridium esculentum*	Bracken										5	100						
Dilleniaceae	*Hibbertia aspera*	Rough Guinea Flower				1	50												
Dilleniaceae	*Hibbertia obtusifolia*	Hoary Guinea Flower		1	20													0.1	10
Droseraceae	*Drosera spp.*															0.1	100		
Ericaceae	*Brachyloma daphnoides*	Daphne Heath		0.5	20														
Ericaceae	*Leucopogon virgatus*															0.1	10		
Ericaceae	*Lissanthe strigosa*	Peach Heath		0.5	20					0.5	10	4	35	5	60	0.3	10	4	100
Ericaceae	*Monotoca scoparia*			0.2	20														
Euphorbiaceae	*Monotaxis linifolia*											1	150						
Fabaceae (Faboideae)	*Bossiaea buxifolia*									0.2	10								
Fabaceae (Faboideae)	*Bossiaea prostrata*					0.5	50												
Fabaceae (Faboideae)	*Dillwynia phylicoides*	Parrot-pea		2	50														
Fabaceae (Faboideae)	*Dillwynia spp.*											0.1	1						
Fabaceae (Faboideae)	*Glycine clandestina*	Twining glycine						0.2	10										
Fabaceae (Faboideae)	*Glycine microphylla*	Small-leaf Glycine						0.2	20										
Fabaceae (Faboideae)	*Gompholobium minus*	Dwarf Wedge Pea		1	50														
Fabaceae (Faboideae)	*Hardenbergia violacea*	False Sarsaparilla		0.2	20							0.2	3						
Fabaceae (Faboideae)	*Hovea heterophylla*			0.1	10														
Fabaceae (Faboideae)	*Medicago lupulina*	Black Medic	*													0.2	30		
Fabaceae (Faboideae)	*Phyllota phylicoides*	Heath Phyllota										0.2	5						
Fabaceae (Faboideae)	*Platylobium montanum subsp. Montanum*	(blank)												0.1	2				
Fabaceae (Faboideae)	*Pultenaea dentata*											1	100						
Fabaceae (Faboideae)	*Pultenaea microphylla*	A Bush Pea		0.2	5														
Fabaceae (Faboideae)	*Pultenaea spp.*					0.1	1												
Fabaceae (Mimosoideae)	*Acacia buxifolia*	Box-leaved Wattle		2	30					0.5	5	5	30	0.1	1				
Fabaceae (Mimosoideae)	*Acacia dealbata*	Silver Wattle								1	10	2	20					0.4	50
Fabaceae (Mimosoideae)	*Acacia dealbata subsp. Dealbata*	Silver Wattle				0.2	5	0.5	10										
Fabaceae (Mimosoideae)	*Acacia deanei*	Green Wattle												0.4	10				
Fabaceae (Mimosoideae)	*Acacia decurrens*	Black Wattle		0.2	1														
Fabaceae (Mimosoideae)	*Acacia elongata*	Swamp Wattle		0.1	1														

Family	*Scientific name*	Common name	Exotic	BH4 Cover	BH4 Abundance	BH12 Cover	BH12 Abundance	BH13 Cover	BH13 Abundance	BH13B Cover	BH13B Abundance	JR1 Cover	JR1 Abundance	JR2 Cover	JR2 Abundance	JR14 Cover	JR14 Abundance	JR 25 Cover	JR 25 Abundance
Fabaceae (Mimosoideae)	*Acacia melanoxylon*	Blackwood										0.1	3						
Fabaceae (Mimosoideae)	*Acacia parramattensis*	Parramatta Wattle		0.1	1	0.5	10	1	10										
Fabaceae (Mimosoideae)	*Acacia terminalis*	Sunshine Wattle																1	6
Gentianaceae	*Centaurium erythraea*	Common Centaury	*			0.5	200	0.2	20	0.5	100								
Gentianaceae	*Schenkia spicata*	Spike Centaury				0.1	5	0.1	3										
Geraniaceae	*Geranium solanderi*	Native Geranium																0.1	10
Goodeniaceae	*Goodenia bellidifolia*																	0.1	5
Goodeniaceae	*Goodenia hederacea*	Ivy Goodenia		1	200	0.2	10					0.2	5						
Goodeniaceae	*Goodenia spp.*			0.1	10														
Haloragaceae	*Gonocarpus tetragynus*	Poverty Raspwort		0.5	200			0.5	100	10	1000					0.3	500	0.1	300
Haloragaceae	*Haloragis heterophylla*	Variable Raspwort				2	30	0.1	20	1	500								
Hypoxidaceae	*Hypoxis hygrometrica var. Villosisepala*									0.1	20								
Iridaceae	*Patersonia sericea*	Silky Purple-Flag										0.6	40						
Iridaceae	*Patersonia spp.*			0.1	1														
Juncaceae	*Juncus acutus subsp. Acutus*	Sharp Rush	*											0.1	2				
Juncaceae	*Juncus usitatus*															0.1	2		
Lamiaceae	*Mentha diemenica*	Slender Mint								0.1	10								
Lamiaceae	*Mentha satureioides*	Native Pennyroyal						0.5	100										
Linaceae	*Linum trigynum*	French Flax	*															0.1	20
Lomandraceae	*Lomandra cylindrica*			0.5	30														
Lomandraceae	*Lomandra filiformis*	Wattle Matt-rush										2	80	20	300			40	800
Lomandraceae	*Lomandra filiformis subsp. Coriacea*	Wattle Matt-rush				0.5	50	1	100										
Lomandraceae	*Lomandra filiformis subsp. Filiformis*			5	200					5	200								
Lomandraceae	*Lomandra glauca*	Pale Mat-rush		1	100														
Lomandraceae	*Lomandra longifolia*	Spiny-headed Mat-rush								0.2	1								
Lomandraceae	*Lomandra multiflora*	Many-flowered Mat-rush				0.5	10									0.05			
Lomandraceae	*Lomandra spp.*	Mat-rush												15	35				
Myrtaceae	*Eucalyptus bridgesiana*	Apple Box				0.5	10	2	10										
Myrtaceae	*Eucalyptus cannonii*	Capertee Stringybark																0.3	1
Myrtaceae	*Eucalyptus dalrympleana*	Mountain Gum		20	20	0.5	10	10	12									5	5

Family	*Scientific name*	Common name	Exotic	BH4 Cover	BH4 Abundance	BH12 Cover	BH12 Abundance	BH13 Cover	BH13 Abundance	BH13B Cover	BH13B Abundance	JR1 Cover	JR1 Abundance	JR2 Cover	JR2 Abundance	JR14 Cover	JR14 Abundance	JR 25 Cover	JR 25 Abundance
Myrtaceae	*Eucalyptus dives*	Broad-leaved Peppermint		20	10			20	7					1.5	69				
Myrtaceae	*Eucalyptus macrorhyncha*	Red Stringybark						1	1									40	45
Myrtaceae	*Eucalyptus rossii*	Inland Scribbly Gum																5	10
Myrtaceae	*Leptospermum arachnoides*													10	30	0.1	1		
Myrtaceae	*Leptospermum parvifolium*											0.2	10						
Myrtaceae	*Leptospermum polygalifolium*	Tantoon												0.1	2				
Myrtaceae	*Leptospermum scoparium*	Manuka								30	500								
Oxalidaceae	*Oxalis perennans*					0.2	10	0.1	20	0.2	100	0.1	3	0.1	5				
Phormiaceae	*Dianella revoluta*	Blueberry Lily		1	20			0.2	5			0.5	8	10	100			0.1	2
Pittosporaceae	*Bursaria spinosa subsp. Lasiophylla*	Native Blackthorn						0.1	1										
Plantaginaceae	*Plantago lanceolata*	Lamb's Tongues	*			0.2	20							0.5	200				
Plantaginaceae	*Plantago spp.*	Plantain										0.2	50			0.1	20		
Plantaginaceae	*Plantago varia*					0.2	15	0.5	50										
Plantaginaceae	*Veronica plebeia*	Trailing Speedwell		0.1	1					0.1	10								
Plantaginaceae	*Veronica spp.*		*									1	100	0.1	20				
Poaceae	*Aira caryophyllea*	Silvery Hairgrass	*													0.1	30		
Poaceae	*Aristida jerichoensis*	Jericho Wiregrass								1	50								
Poaceae	*Aristida ramosa*	Purple Wiregrass												0.2	30				
Poaceae	*Aristida spp.*	A Wiregrass										0.3	40						
Poaceae	*Austrostipa rudis subsp. Nervosa*	A Speargrass						1	20										
Poaceae	*Austrostipa scabra*	Speargrass						30	200										
Poaceae	*Austrostipa scabra subsp. Scabra*	Rough Speargrass				10	200			10	200								
Poaceae	*Austrostipa spp.*	A Speargrass										0.4	60	15	200				
Poaceae	*Briza minor*	Shivery Grass	*													0.1	30		
Poaceae	*Bromus spp.*	A Brome	*													0.2	50		
Poaceae	*Cynodon dactylon*	Common Couch														35			
Poaceae	*Dichelachne micrantha*	Shorthair Plumegrass								5	50								
Poaceae	*Echinopogon caespitosus*	Bushy Hedgehog-grass						0.5	5	1	50								
Poaceae	*Echinopogon ovatus*	Forest Hedgehog Grass										0.1	1						
Poaceae	*Elymus scaber*	Common Wheatgrass						0.1	10										
Poaceae	*Eragrostis brownii*	Brown's Lovegrass				0.5	50	1	50	1	100								

Family	*Scientific name*	Common name	Exotic	BH4 Cover	BH4 Abundance	BH12 Cover	BH12 Abundance	BH13 Cover	BH13 Abundance	BH13B Cover	BH13B Abundance	JR1 Cover	JR1 Abundance	JR2 Cover	JR2 Abundance	JR14 Cover	JR14 Abundance	JR 25 Cover	JR 25 Abundance
Poaceae	*Eragrostis cilianensis*	Stinkgrass	*									0.1	10	0.1	50				
Poaceae	*Eragrostis leptostachya*	Paddock Lovegrass								5	200								
Poaceae	*Eragrostis spp.*	A Lovegrass	*											0.2	20	0.01	10	0.1	2
Poaceae	*Microlaena stipoides*	Weeping Grass								5	200								
Poaceae	*Microlaena stipoides var. Stipoides*	Weeping Grass				0.5	20												
Poaceae	*Nassella trichotoma*	Serrated Tussock	*											0.2	20				
Poaceae	*Panicum effusum*	Hairy Panic								5	100								
Poaceae	*Panicum simile*	Two-colour Panic				0.2	10												
Poaceae	*Poa labillardierei var. Labillardierei*	Tussock												5	30			0.5	3
Poaceae	*Poa sieberiana*	Snowgrass				10	50	10	100			1	30	30	250			5	100
Poaceae	*Rytidosperma pallidum*	Redanther Wallaby Grass; Silvertop Wallaby Grass		5	100					20	500								
Poaceae	*Rytidosperma pilosum*	Smooth-flowered Wallaby Grass				5	100	6	200										
Poaceae	*Rytidosperma racemosum var. Racemosum*	Wallaby Grass				5	100												
Poaceae	*Rytidosperma spp.*											5	100	8	350	10	100	2	200
Poaceae	*Setaria parviflora*		*					0.1	10										
Poaceae	*Themeda triandra*					40	300					15	30	40	400	45	1000		
Polygalaceae	*Comesperma ericinum*	Pyramid Flower		0.5	10														
Proteaceae	*Persoonia linearis*	Narrow-leaved Geebung		0.1	1														
Pteridaceae	*Cheilanthes sieberi*	Rock Fern						0.2	20										
Rosaceae	*Acaena echinata var. Echinata*							0.1	5										
Rosaceae	*Acaena novae-zelandiae*	Bidgee-widgee				0.1	5											0.1	200
Rosaceae	*Rosa rubiginosa*	Sweet Briar	*					0.2	1									0.1	3
Rosaceae	*Rubus fruticosus sp. Agg.*	Blackberry complex	*			0.2	10			0.2	5	0.1	1	0.2	1	0.1	2	0.1	10
Rubiaceae	*Coprosma quadrifida*	Prickly Currant Bush								0.5	10								
Rubiaceae	*Galium gaudichaudii*	Rough Bedstraw						0.5	50										
Rubiaceae	*Opercularia varia*	Variable Stinkweed		0.1	1	0.1	5	0.5	50	0.2	50			2	400				
Santalaceae	*Exocarpos cupressiformis*	Cherry Ballart		0.5	2			5	2									0.5	2
Violaceae	*Viola betonicifolia*	Native Violet						0.1	10	0.1	10								

Note: 1. Listed as a priority weed within the Ligthgow LGA

Table C.5 Flora recorded in PCT 3747 Good

Family	*Scientific name*	Common name	Exotic	BH5 Cover	BH5 Abundance	BH11 Cover	BH11 Abundance	JR10 Cover	JR10 Abundance	JR20 Cover	JR20 Abundance	JR 21 Cover	JR 21 Abundance
N/A	*Unidentified forb*	N/A										0.1	10
Apiaceae	*Hydrocotyle laxiflora*	Stinking Pennywort								0.1	15	0.2	350
Apiaceae	*Platysace ericoides*					3	50						
Apocynaceae	*Vinca major*	Periwinkle	*									0.2	150
Asteraceae	*Cassinia aculeata*	Dolly Bush								0.3	30	4	250
Asteraceae	*Cassinia longifolia*							0.1	3				
Asteraceae	*Cassinia sifton*			2	20								
Asteraceae	*Chrysocephalum apiculatum*	Common Everlasting				0.1	10						
Asteraceae	*Chrysocephalum semipapposum*	Clustered Everlasting		0.1	10								
Asteraceae	*Coronidium scorpioides*	Button Everlasting				1	100						
Asteraceae	*Euchiton sphaericus*	Star Cudweed				0.1	1						
Asteraceae	*Gamochaeta americana*		*	0.1	5								
Asteraceae	*Hypochaeris radicata*	Catsear	*			0.2	20	0.1	30				
Asteraceae	*Lagenifera stipitata*	Blue Bottle-daisy				0.1	1						
Asteraceae	*Lagenophora stipitata*	Common Lagenophora		0.1	1								
Asteraceae	*Senecio diaschides*					0.1	5						
Asteraceae	*Xerochrysum viscosum*	Sticky Everlasting		0.5	50								
Campanulaceae	*Wahlenbergia communis*	Tufted Bluebell				0.1	1						
Campanulaceae	*Wahlenbergia gracilis*	Sprawling Bluebell				0.2	20						
Campanulaceae	*Wahlenbergia stricta*	Tall Bluebell		0.1	1								
Dilleniaceae	*Hibbertia aspera*	Rough Guinea Flower				0.1	3						
Dilleniaceae	*Hibbertia obtusifolia*	Hoary Guinea Flower		1	50					0.1	5	0.1	30
Ericaceae	*Brachyloma daphnoides*	Daphne Heath								0.1	3	0.3	3
Ericaceae	*Lissanthe strigosa*	Peach Heath		1	20					0.1	2	0.1	2
Ericaceae	*Monotoca ledifolia*					0.2	5						
Fabaceae (Faboideae)	*Bossiaea buxifolia*			0.2	10								
Fabaceae (Faboideae)	*Dillwynia spp.*					0.2	10						
Fabaceae (Faboideae)	*Glycine tabacina*	Variable Glycine		0.1	1								
Fabaceae (Faboideae)	*Gompholobium huegelii*	Pale Wedge Pea				1	20						
Fabaceae (Faboideae)	*Hardenbergia violacea*	False Sarsaparilla		0.1	5								
Fabaceae (Faboideae)	*Indigofera australis*	Australian Indigo		0.1	1							0.1	1
Fabaceae (Faboideae)	*Podolobium ilicifolium*	Prickly Shaggy Pea								10	100	0.4	10
Fabaceae (Faboideae)	*Pultenaea microphylla*	A Bush Pea				1	30						
Fabaceae (Mimosoideae)	*Acacia buxifolia*	Box-leaved Wattle		5	20	1	20						
Fabaceae (Mimosoideae)	*Acacia elongata*	Swamp Wattle				0.2	1						
Fabaceae (Mimosoideae)	*Acacia gunnii*	Ploughshare Wattle				0.5	20	5	12				

Family	*Scientific name*	Common name	Exotic	BH5 Cover	BH5 Abundance	BH11 Cover	BH11 Abundance	JR10 Cover	JR10 Abundance	JR20 Cover	JR20 Abundance	JR 21 Cover	JR 21 Abundance
Fabaceae (Mimosoideae)	*Acacia implexa*	Hickory Wattle						6	10				
Fabaceae (Mimosoideae)	*Acacia parramattensis*	Parramatta Wattle		2	5								
Fabaceae (Mimosoideae)	*Acacia terminalis*	Sunshine Wattle				0.1	1	5	16	0.2	10		
Fabaceae (Mimosoideae)	*Acacia ulicifolia*	Prickly Moses		0.5	5								
Gentianaceae	*Centaurium erythraea*	Common Centaury	*			0.1	5						
Goodeniaceae	*Goodenia bellidifolia*			0.2	20								
Goodeniaceae	*Goodenia bellidifolia subsp. Bellidifolia*					0.5	20						
Goodeniaceae	*Goodenia hederacea*	Ivy Goodenia		0.5	50	0.5	50	0.3	400				
Haloragaceae	*Gonocarpus tetragynus*	Poverty Raspwort		1	100	0.5	50			0.1	30		
Iridaceae	*Patersonia spp.*					0.5	20						
Lauraceae	*Cassytha glabella*					0.1	5						
Lomandraceae	*Lomandra cylindrica*			5	100								
Lomandraceae	*Lomandra filiformis*	Wattle Matt-rush								0.1	10	5	300
Lomandraceae	*Lomandra filiformis subsp. Filiformis*			10	100	1	50						
Lomandraceae	*Lomandra glauca*	Pale Mat-rush						0.1	5				
Lomandraceae	*Lomandra multiflora subsp. Multiflora*	Many-flowered Mat-rush		2	20								
Loranthaceae	*Amyema pendula*			0.2	1								
Myrtaceae	*Eucalyptus agglomerata*	Blue-leaved Stringybark				10	2	35	19				
Myrtaceae	*Eucalyptus cannonii*	Capertee Stringybark		10	10							4	2
Myrtaceae	*Eucalyptus dives*	Broad-leaved Peppermint				1	1						
Myrtaceae	*Eucalyptus macrorhyncha*	Red Stringybark		10	10							55	50
Myrtaceae	*Eucalyptus mannifera*	Brittle Gum		10	8								
Myrtaceae	*Eucalyptus rossii*	Inland Scribbly Gum				30	13			1	5	15	24
Myrtaceae	*Eucalyptus sparsifolia*	Narrow-leaved Stringybark								50	24		
Orchidaceae	*Dipodium roseum*			0.1	1								
Orchidaceae	*Pterostylis pedoglossa*	Prawn Greenhood				0.1	1						
Phormiaceae	*Dianella caerulea*	Blue Flax-lily								4	150	0.5	15
Phormiaceae	*Dianella revoluta*	Blueberry Lily		0.5	10	1	50						
Phyllanthaceae	*Poranthera microphylla*	Small Poranthera				0.2	20						
Pittosporaceae	*Billardiera scandens*	Hairy Apple Berry		0.1	5								
Plantaginaceae	*Veronica calycina*	Hairy Speedwell						0.1	10				
Plantaginaceae	*Veronica plebeia*	Trailing Speedwell		0.1	10								
Poaceae	*Aristida ramosa*	Purple Wiregrass				0.5	20						
Poaceae	*Austrostipa pubescens*					30	500						
Poaceae	*Austrostipa scabra*	Speargrass		20	100								
Poaceae	*Austrostipa spp.*	A Speargrass		5	20								
Poaceae	*Cynodon dactylon*	Common Couch						0.1	1				
Poaceae	*Poa sieberiana*	Snowgrass				20	300						
Poaceae	*Poa spp.*		*							20	250	25	200
Poaceae	*Rytidosperma caespitosum*	Ringed Wallaby Grass				1	20						

Family	*Scientific name*	Common name	Exotic	BH5 Cover	BH5 Abundance	BH11 Cover	BH11 Abundance	JR10 Cover	JR10 Abundance	JR20 Cover	JR20 Abundance	JR 21 Cover	JR 21 Abundance
Poaceae	*Rytidosperma erianthum*	Wallaby Grass						0.1	3				
Poaceae	*Rytidosperma pallidum*	Redanther Wallaby Grass; Silvertop Wallaby Grass		5	20								
Poaceae	*Rytidosperma pilosum*	Smooth-flowered Wallaby Grass				5	100						
Poaceae	*Rytidosperma racemosum var. Racemosum*	Wallaby Grass						0.1	50				
Poaceae	*Rytidosperma spp.*									0.2	50	0.4	100
Polygalaceae	*Polygala japonica*	Dwarf Milkwort								0.1	20		
Polygonaceae	*Rumex acetosella*	Sheep Sorrel	*					0.2	100				
Proteaceae	*Persoonia linearis*	Narrow-leaved Geebung				0.1	1					0.2	5
Ranunculaceae	*Clematis aristata*	Old Man's Beard										0.2	22
Rubiaceae	*Opercularia varia*	Variable Stinkweed		0.1	10								
Rutaceae	*Boronia microphylla*	Small-leaved Boronia				0.5	20						
Santalaceae	*Exocarpos cupressiformis*	Cherry Ballart		0.5	5								

Note: 1. Listed as a priority weed within the Ligthgow LGA

Table C.6 Flora recorded in PCT 3747 Shrubland

Family	*Scientific name*	Common name	Exotic	BH17 Cover	BH17 Abundance	BH20 Cover	BH20 Abundance	JR3 Cover	JR3 Abundance	JR12 Cover	JR12 Abundance	JR23 Cover	JR23 Abundance	JR 31 Cover	JR 31 Abundance
N/A	*Unidentified forb spp.*	N/A										0.1	3		
Adiantaceae	*Adiantum aethiopicum*	Common Maidenhair						0.1	5						
Apiaceae	*Hydrocotyle laxiflora*	Stinking Pennywort								0.1	40				
Apiaceae	*Platysace ericoides*					1	100								
Apiaceae	*Trachymene incisa*	Trachymene										0.1	1		
Asteraceae	*Cassinia aculeata*	Dolly Bush										5	200		
Asteraceae	*Cassinia arcuata*	Sifton Bush		50	500										
Asteraceae	*Cassinia longifolia*							50	400						
Asteraceae	*Cassinia sifton*					20	200			25	160			0.4	8
Asteraceae	*Chrysocephalum apiculatum*	Common Everlasting		0.1	5										
Asteraceae	*Chrysocephalum semipapposum*	Clustered Everlasting		0.5	50										
Asteraceae	*Cirsium vulgare*	Spear Thistle	*					0.1	1						
Asteraceae	*Conyza bonariensis*	Flaxleaf Fleabane	*							0.2	20				
Asteraceae	*Coronidium gunnianum*											0.1	5		
Asteraceae	*Hypochaeris glabra*	Smooth Catsear	*					0.3	150						
Asteraceae	*Hypochaeris radicata*													0.1	20
Asteraceae	*Hypochaeris radicata*	Catsear	*	0.2	50					0.1	20	0.1	100		
Asteraceae	*Leucochrysum albicans*							0.2	80						
Asteraceae	*Leucochrysum albicans subsp. Albicans*			0.2	20					0.1	15				
Asteraceae	*Senecio quadridentatus*	Cotton Fireweed								0.1	2				
Asteraceae	*Solenogyne spp.*											0.1	20		
Asteraceae	*Vittadinia cuneata*	A Fuzzweed		0.2	50										
Asteraceae	*Xerochrysum viscosum*	Sticky Everlasting		1	100										
Campanulaceae	*Wahlenbergia stricta*	Tall Bluebell								0.1	1				
Clusiaceae	*Hypericum gramineum*	Small St John's Wort		0.1	10			0.2	40	0.1	5				
Clusiaceae	*Hypericum perforatum*	St. Johns Wort	*	0.1	10			0.1	3						
Convolvulaceae	*Dichondra repens*	Kidney Weed						1	150						
Dennstaedtiaceae	*Pteridium esculentum*	Bracken				0.1	1	0.1	3						
Dilleniaceae	*Hibbertia obtusifolia*	Hoary Guinea Flower				0.1	5							0.2	1
Ericaceae	*Brachyloma daphnoides*	Daphne Heath				1	20								
Ericaceae	*Leucopogon ericoides*	Pink Beard-heath										0.1	15		
Ericaceae	*Leucopogon esquamatus*							0.3	30						
Ericaceae	*Lissanthe strigosa*	Peach Heath		0.5	20	1	20	0.1	2	0.2	5	1	45		
Ericaceae	*Monotoca scoparia*					1	20								
Euphorbiaceae	*Micrantheum ericoides*							5	40						
Fabaceae (Faboideae)	*Bossiaea buxifolia*			0.5	50										
Fabaceae (Faboideae)	*Daviesia leptophylla*					0.1	1								
Fabaceae (Faboideae)	*Dillwynia phylicoides*	Parrot-pea		5	100	0.2	10					0.5	85		
Fabaceae (Faboideae)	*Glycine microphylla*	Small-leaf Glycine		0.1	5										

Family	*Scientific name*	Common name	Exotic	BH17 Cover	BH17 Abundance	BH20 Cover	BH20 Abundance	JR3 Cover	JR3 Abundance	JR12 Cover	JR12 Abundance	JR23 Cover	JR23 Abundance	JR 31 Cover	JR 31 Abundance
Fabaceae (Faboideae)	*Hardenbergia violacea*	False Sarsaparilla		0.5	20	0.1	1			0.1	1				
Fabaceae (Faboideae)	*Medicago lupulina*	Black Medic	*											0.1	20
Fabaceae (Faboideae)	*Platylobium montanum subsp. Montanum*							0.1	7						
Fabaceae (Faboideae)	*Podolobium ilicifolium*	Prickly Shaggy Pea				1	10								
Fabaceae (Faboideae)	*Pultenaea microphylla*	A Bush Pea		2	50										
Fabaceae (Mimosoideae)	*Acacia buxifolia*	Box-leaved Wattle		1	20							1	18		
Fabaceae (Mimosoideae)	*Acacia dealbata*	Silver Wattle		1	5			0.5	4	0.1	3	0.1	1		
Fabaceae (Mimosoideae)	*Acacia decurrens*	Black Wattle				0.2	1								
Fabaceae (Mimosoideae)	*Acacia dorothea*	Dorothy's Wattle						0.2	1						
Fabaceae (Mimosoideae)	*Acacia terminalis*	Sunshine Wattle		0.5	10	2	20			0.1	3	1	8		
Gentianaceae	*Centaurium erythraea*	Common Centaury	*	0.2	50					0.1	30				
Gentianaceae	*Sebaea ovata*	Yellow Centaury										0.1	10		
Geraniaceae	*Geranium homeanum*			0.1	3										
Goodeniaceae	*Goodenia bellidifolia*									0.1	10				
Goodeniaceae	*Goodenia hederacea*	Ivy Goodenia		2	500	1	200			0.1	1				
Goodeniaceae	*Goodenia spp.*							0.3	50						
Haloragaceae	*Gonocarpus tetragynus*	Poverty Raspwort		5	500	0.1	20					0.1	30	0.2	200
Haloragaceae	*Gonocarpus teucrioides*	Germander Raspwort								2	250				
Iridaceae	*Patersonia sericea*	Silky Purple-Flag				1	50								
Juncaceae	*Juncus bufonius*	Toad Rush	*											0.1	20
Juncaceae	*Juncus usitatus*													0.1	1
Linaceae	*Linum trigynum*	French Flax	*									0.1	30		
Lomandraceae	*Lomandra filiformis*	Wattle Matt-rush						3	50			2	80	0.1	2
Lomandraceae	*Lomandra filiformis subsp. Filiformis*			5	500	5	100								
Lomandraceae	*Lomandra glauca*	Pale Mat-rush		1	30	1	50								
Lomandraceae	*Lomandra longifolia*	Spiny-headed Mat-rush				5	20								
Lomandraceae	*Lomandra multiflora*	Many-flowered Mat-rush								30	1000	5	200		
Lomandraceae	*Lomandra multiflora subsp. Multiflora*							0.2	10						
Myrsinaceae	*Lysimachia arvensis*	Scarlet Pimpernel	*							0.1	5	0.1	5		
Myrtaceae	*Eucalyptus dives*	Broad-leaved Peppermint										0.1	2		
Myrtaceae	*Eucalyptus rossii*	Inland Scribbly Gum		0.5	10	0.5	20			5	28				
Myrtaceae	*Leptospermum arachnoides*							0.4	1						
Orchidaceae	*Microtis unifolia*	Common Onion Orchid												0.1	3
Orchidaceae	*Pterostylis spp.*	Greenhood				0.1	10								
Orchidaceae	*Thelymitra spp.*					0.1	4								
Oxalidaceae	*Oxalis perennans*							0.2	200	0.7	100				
Phormiaceae	*Dianella caerulea*	Blue Flax-lily										0.4	20		
Phormiaceae	*Dianella revoluta*	Blueberry Lily				0.2	10			4	40				

Family	*Scientific name*	Common name	Exotic	BH17 Cover	BH17 Abundance	BH20 Cover	BH20 Abundance	JR3 Cover	JR3 Abundance	JR12 Cover	JR12 Abundance	JR23 Cover	JR23 Abundance	JR 31 Cover	JR 31 Abundance
Pittosporaceae	*Rhytidosporum procumbens*							1	60						
Plantaginaceae	*Plantago lanceolata*	Lamb's Tongues	*							0.1	10				
Plantaginaceae	*Plantago spp.*	Plantain						0.3	100						
Poaceae	*Aira caryophyllea*	Silvery Hairgrass	*											0.1	10
Poaceae	*Anthoxanthum odoratum*	Sweet Vernal Grass	*							0.1	20			40	1000
Poaceae	*Aristida jerichoensis*	Jericho Wiregrass		5	100										
Poaceae	*Aristida ramosa*	Purple Wiregrass		1	50	5	300	15	350	2	250				
Poaceae	*Aristida vagans*	Threeawn Speargrass						0.1	2			5	100		
Poaceae	*Austrostipa rudis subsp. Nervosa*	A Speargrass				0.5	5								
Poaceae	*Austrostipa scabra*	Speargrass		40	500	0.5	50	3	50			2	80		
Poaceae	*Austrostipa spp.*	A Speargrass						2	30						
Poaceae	*Bothriochloa macra*	Red Grass								0.1	20				
Poaceae	*Briza minor*	Shivery Grass	*											0.1	30
Poaceae	*Cynodon dactylon*	Common Couch								2	5			15	400
Poaceae	*Dactylis glomerata*	Cocksfoot	*											20	300
Poaceae	*Dichelachne micrantha*	Shorthair Plumegrass								5	40				
Poaceae	*Echinopogon caespitosus*	Bushy Hedgehog-grass		0.5	20	0.5	10								
Poaceae	*Echinopogon ovatus*	Forest Hedgehog Grass						0.1	2	0.1	30				
Poaceae	*Eragrostis brownii*	Brown's Lovegrass		0.5	20					0.5	80	0.1	2		
Poaceae	*Eragrostis cilianensis*	Stinkgrass	*					0.1	10						
Poaceae	*Eragrostis curvula*	African Lovegrass	*											25	300
Poaceae	*Eragrostis leptostachya*	Paddock Lovegrass		0.2	20										
Poaceae	*Eragrostis spp.*	A Lovegrass	*					5	30						
Poaceae	*Microlaena stipoides*	Weeping Grass		0.5	20										
Poaceae	*Panicum simile*	Two-colour Panic				0.2	5								
Poaceae	*Rytidosperma fulvum*	Wallaby Grass								3	100				
Poaceae	*Rytidosperma pallidum*	Redanther Wallaby Grass; Silvertop Wallaby Grass		10	200										
Poaceae	*Rytidosperma spp.*					0.1	10	13	508			36	220		
Poaceae	*Themeda triandra*													10	250
Proteaceae	*Persoonia linearis*	Narrow-leaved Geebung				0.2	1								
Pteridaceae	*Cheilanthes sieberi*	Rock Fern						0.1	2	1	100				
Rosaceae	*Acaena echinata var. Echinata*			0.1	1										
Rosaceae	*Rosa rubiginosa*	Sweet Briar	*											0.1	1
Rosaceae	*Rubus fruticosus sp. Agg.*	Blackberry complex	*	0.1	1							0.1	1	0.2	1
Rubiaceae	*Opercularia varia*	Variable Stinkweed		0.5	100			1	50						
Santalaceae	*Exocarpos cupressiformis*	Cherry Ballart				1	10					0.1	2		
Violaceae	*Viola betonicifolia*	Native Violet		0.2	50	0.1	5								

Note: 1. Listed as a priority weed within the Ligthgow LGA

Table C.7 Flora recorded in PCT 3747 Poor

Family	Scientific name	Common name	Exotic	BH7 Cover	BH7 Abundance	BH18 Cover	BH18 Abundance	JR8 Cover	JR8 Abundance	JR13 Cover	JR13 Abundance
Asteraceae	*Brachyscome melanocarpa*	Black-seeded Daisy								0.1	20
Asteraceae	*Brachyscome multifida var. multifida*					0.2	50				
Asteraceae	*Cassinia sifton*	Sifton Bush		5	14	10	200			10	100
Asteraceae	*Celmisia longifolia*	Snow Daisy						1	150		
Asteraceae	*Cirsium vulgare*	Spear Thistle	*	0.5	5						
Asteraceae	*conyza bonariensis*	Flaxleaf Fleabane	*							0.1	5
Asteraceae	*euchiton sphaericus*	Star Cudweed				0.1	10			0.1	35
Asteraceae	*Hypochaeris glabra*	Smooth Catsear	*					0.5	500		
Asteraceae	*hypochaeris radicata*	Catsear	*	5	200	0.2	20			0.1	20
Asteraceae	*senecio quadridentatus*	Cotton Fireweed						0.1	1		
Boraginaceae	*echium plantagineum*	Patterson's Curse	*							0.1	10
Clusiaceae	*Hypericum perforatum*	St. Johns Wort	*	0.2	20	10	500	0.5	300	20	300
Cyperaceae	*Carex breviculmis*			0.2	20	0.1	3				
Cyperaceae	*Cyperus spp.*					0.1	1				
Dipsacaceae	*Sixalix atropurpurea*	Pincushion	*					0.3	100		
Fabaceae (Faboideae)	*Trifolium repens*	White Clover	*			10	500				
Fabaceae (Faboideae)	*trifolium spp.*	A Clover	*					0.1	50		
Fabaceae (Mimosoideae)	*Acacia dealbata*	Silver Wattle				3	5	0.1	1	0.2	1
Gentianaceae	*centaurium erythraea*	Common Centaury	*			0.5	200	0.3	150	0.1	20
Haloragaceae	*gonocarpus tetragynus*	Poverty Raspwort				0.2	100				
Haloragaceae	*haloragis heterophylla*	Variable Raspwort						0.2	100		
Juncaceae	*Juncus acutus subsp. acutus*	Sharp Rush	*			0.3	3				
Juncaceae	*Juncus usitatus*			0.5	10	0.1	1				
Linaceae	*linum marginale*	Native Flax		0.1	2			0.1	30		
Linaceae	*linum trigynum*	French Flax	*			0.1	100	2	100		
Malvaceae	*Modiola caroliniana*	Red-flowered Mallow	*			0.1	1				
Myrsinaceae	*Lysimachia arvensis*	Scarlet Pimpernel	*	0.1	10						
Oxalidaceae	*Oxalis perennans*					0.5	50			0.1	30
Pittosporaceae	*bursaria spinosa*	Native Blackthorn				0.1	1				
Plantaginaceae	*Plantago lanceolata*	Lamb's Tongues	*	2	50	20	500	2	1000	3	450
Plantaginaceae	*veronica plebeia*	Trailing Speedwell				0.1	1				
Poaceae	*aira spp.*	A Hairgrass	*					0.5	150		
Poaceae	*Aristida calycina*					0.5	50				
Poaceae	*Austrostipa pubescens*									0.2	80
Poaceae	*avena barbata*	Bearded Oats	*	5	100						
Poaceae	*Bothriochloa decipiens var. decipiens*	Pitted Bluegrass						0.3	10		
Poaceae	*Bothriochloa macra*	Red Grass				0.2	20			50	800
Poaceae	*bromus molliformis*	Soft Brome	*	20	500						
Poaceae	*Cenchrus clandestinus*	Kikuyu Grass	*			5	50				

Family	Scientific name	Common name	Exotic	BH7 Cover	BH7 Abundance	BH18 Cover	BH18 Abundance	JR8 Cover	JR8 Abundance	JR13 Cover	JR13 Abundance
Poaceae	*Chloris truncata*	Windmill Grass				0.2	20			4	200
Poaceae	*cynodon dactylon*	Common Couch				0.2	10	5	10		
Poaceae	*dactylis glomerata*	Cocksfoot	*	20	200						
Poaceae	*Dichelachne micrantha*	Shorthair Plumegrass				0.5	50				
Poaceae	*eragrostis brownii*	Brown's Lovegrass		0.2	20	0.5	100			4	200
Poaceae	*eragrostis curvula*	African Lovegrass	*	1	10						
Poaceae	*lolium perenne*	Perennial Ryegrass	*	1	50						
Poaceae	*microlaena stipoides var. stipoides*	Weeping Grass		1	20						
Poaceae	*nassella trichotoma*	Serrated Tussock	*	1	10						
Poaceae	*Panicum capillare*	Witchgrass	*			0.2	10			15	350
Poaceae	*Paspalum dilatatum*	Paspalum	*	0.5	20	0.5	10			0.3	100
Poaceae	*Phalaris aquatica*	Phalaris	*	10	100						
Poaceae	*Rytidosperma fulvum*	Wallaby Grass								0.1	20
Poaceae	*Rytidosperma laeve*	Wallaby Grass				0.5	50				
Poaceae	*rytidosperma pilosum*	Smooth-flowered Wallaby Grass		2	50						
Poaceae	*Rytidosperma racemosum var. racemosum*	Wallaby Grass		0.1	10	0.5	100	10	350	0.3	150
Poaceae	*rytidosperma setaceum*	Small-flowered Wallaby-grass						55	1000		
Poaceae	*rytidosperma spp.*							0.1	10		
Poaceae	*Setaria parviflora*		*							0.1	50
Poaceae	*themeda triandra*			0.5	20	0.1	5				
Poaceae	*vulpia muralis*	Wall Fescue	*	30	500						
Poaceae	*vulpia spp.*	Rat's-tail Fescue	*					0.2	300		
Polygonaceae	*Rumex acetosella*	Sheep Sorrel	*							0.1	1
Polygonaceae	*Rumex brownii*	Swamp Dock				0.2	10				
Rhamnaceae	*Cryptandra spinescens*					0.1	2				
Rosaceae	*Acaena novae-zelandiae*	Bidgee-widgee								0.1	50
Rosaceae	*Acaena spp.*	Sheep's Burr				0.1	10				
Rosaceae	*rosa rubiginosa*	Sweet Briar	*	0.2	5	0.1	1	0.3	2	3	8
Rosaceae	*Rubus fruticosus sp. agg.*	Blackberry complex	*	2	5			0.4	7	0.1	1
Rosaceae	*Sanguisorba minor subsp. muricata*	Sheep's Burnet	*					0.5	400		
Verbenaceae	*Verbena bonariensis*	Purpletop	*			1	50				

Note: 1. Listed as a priority weed within the Ligthgow LGA

Table C.8 Flora recorded in PCT 3749

Family	Scientific name	Common name	Exotic	BH6 Cover	BH6 Abundance	BH14 Cover	BH14 Abundance	JR19 Cover	JR19 Abundance	JR20 Cover	JR 20 Abundance
Apiaceae	*hydrocotyle laxiflora*	Stinking Pennywort		0.1	10	0.2	10			0.1	15
Apiaceae	*Hydrocotyle tripartita*	Pennywort				0.2	20				
Asteraceae	*Cassinia aculeata*	Dolly Bush						0.3	50	0.3	30
Asteraceae	*Cassinia sifton*	Sifton Bush		0.2	5	30	300				
Asteraceae	*Chrysocephalum apiculatum*	Common Everlasting				0.5	20				
Asteraceae	*coronidium scorpioides*	Button Everlasting		0.5	30	0.2	10				
Asteraceae	*Euchiton involucratus*	Star Cudweed				0.5	100				
Asteraceae	*hypochaeris radicata*	Catsear	*	0.1	5	0.5	50				
Asteraceae	*Leucochrysum albicans subsp. albicans*					0.1	5				
Asteraceae	*Podolepis jaceoides*	Showy Copper-wire Daisy				1	50				
Asteraceae	*senecio quadridentatus*	Cotton Fireweed		0.1	1	0.1	2				
Asteraceae	*Vittadinia cuneata*	A Fuzzweed				0.1	10				
Asteraceae	*Xerochrysum viscosum*	Sticky Everlasting		0.2	10						
Campanulaceae	*wahlenbergia stricta*	Tall Bluebell		0.1	5						
Clusiaceae	*hypericum gramineum*	Small St John's Wort				0.5	100				
Cyperaceae	*schoenus apogon*	Fluke Bogrush		0.1	1						
Dilleniaceae	*hibbertia obtusifolia*	Hoary Guinea Flower								0.1	5
Ericaceae	*brachyloma daphnoides*	Daphne Heath		0.2	5	0.1	2	0.2	3	0.1	3
Ericaceae	*lissanthe strigosa*	Peach Heath		0.5	10	0.5	20	0.1	2	0.1	2
Ericaceae	*monotoca scoparia*					0.2	2				
Fabaceae (Faboideae)	*bossiaea buxifolia*			0.1	3						
Fabaceae (Faboideae)	*Dillwynia phylicoides*	Parrot-pea		0.2	5						
Fabaceae (Faboideae)	*Glycine microphylla*	Small-leaf Glycine				0.1	1				
Fabaceae (Faboideae)	*hardenbergia violacea*	False Sarsaparilla		0.1	10	0.1	2				
Fabaceae (Faboideae)	*hovea heterophylla*			0.1	1						
Fabaceae (Faboideae)	*podolobium ilicifolium*	Prickly Shaggy Pea		0.5	3	0.2	2	15	80	10	100
Fabaceae (Mimosoideae)	*acacia buxifolia*	Box-leaved Wattle		0.5	5			0.2	5		
Fabaceae (Mimosoideae)	*Acacia dealbata*	Silver Wattle				0.2	1	0.1	1		
Fabaceae (Mimosoideae)	*acacia elongata*	Swamp Wattle		0.1	2						
Fabaceae (Mimosoideae)	*Acacia longifolia subsp. longifolia*	Sydney Golden Wattle		0.2	1						
Fabaceae (Mimosoideae)	*acacia terminalis*	Sunshine Wattle		5	10	1	10	0.4	30	0.2	10
Gentianaceae	*centaurium erythraea*	Common Centaury	*			0.2	20				
Goodeniaceae	*goodenia bellidifolia*			0.1	5	0.5	200				
Goodeniaceae	*goodenia spp.*							0.1	1		
Haloragaceae	*gonocarpus tetragynus*	Poverty Raspwort		0.5	100	1	200			0.1	30

Family	Scientific name	Common name	Exotic	BH6 Cover	BH6 Abundance	BH14 Cover	BH14 Abundance	JR19 Cover	JR19 Abundance	JR20 Cover	JR 20 Abundance
Iridaceae	*Patersonia sericea*	Silky Purple-Flag				0.2	5				
Lomandraceae	*lomandra cylindrica*			5	50						
Lomandraceae	*Lomandra filiformis*	Wattle Matt-rush		10	50					0.1	10
Lomandraceae	*Lomandra filiformis subsp. filiformis*					5	100				
Lomandraceae	*lomandra glauca*	Pale Mat-rush		2	50	0.5	50				
Lomandraceae	*lomandra longifolia*	Spiny-headed Mat-rush		0.2	1	0.2	2				
Myrtaceae	*eucalyptus cannonii*	Capertee Stringybark		10	5						
Myrtaceae	*eucalyptus macrorhyncha*	Red Stringybark		5	5						
Myrtaceae	*eucalyptus mannifera*	Brittle Gum		10	5						
Myrtaceae	*eucalyptus rossii*	Inland Scribbly Gum		10	15	1	50			1	5
Myrtaceae	*Eucalyptus sparsifolia*	Narrow-leaved Stringybark		10	5	0.2	20			50	24
Myrtaceae	*Kunzea opposita*							0.2	3		
Oxalidaceae	*Oxalis perennans*					0.2	20				
Phormiaceae	*Dianella caerulea*	Blue Flax-lily						5	250	4	150
Phormiaceae	*dianella revoluta*	Blueberry Lily		0.1	3						
Phyllanthaceae	*Phyllanthus spp.*		*					0.1	50		
Phyllanthaceae	*Poranthera microphylla*	Small Poranthera				0.1	1				
Poaceae	*Aristida jerichoensis*	Jericho Wiregrass				5	100				
Poaceae	*austrostipa scabra*	Speargrass		1	20						
Poaceae	*Austrostipa scabra subsp. scabra*	Rough Speargrass				1	20				
Poaceae	*Enneapogon spp.*	Nineawn Grass, Bottlewashers						0.1	1		
Poaceae	*eragrostis brownii*	Brown's Lovegrass				5	200				
Poaceae	*Eragrostis leptostachya*	Paddock Lovegrass				1	100				
Poaceae	*microlaena stipoides var. stipoides*	Weeping Grass				0.5	20				
Poaceae	*poa sieberiana*	Snowgrass				1	10				
Poaceae	*Poa spp.*		*					40	500	20	250
Poaceae	*rytidosperma pallidum*	Redanther Wallaby Grass; Silvertop Wallaby Grass		30	100	20	100				
Poaceae	*rytidosperma pilosum*	Smooth-flowered Wallaby Grass				0.5	20				
Poaceae	*rytidosperma spp.*							0.1	50	0.2	50
Polygalaceae	*Polygala japonica*	Dwarf Milkwort								0.1	20
Proteaceae	*persoonia linearis*	Narrow-leaved Geebung		0.1	1	1	5	0.2	3		
Pteridaceae	*cheilanthes sieberi*	Rock Fern		0.1	3	0.1	5				
Rosaceae	*Rubus fruticosus sp. agg.*	Blackberry complex	*			0.1	1				
Rubiaceae	*opercularia varia*	Variable Stinkweed				0.2	20				
Santalaceae	*exocarpos cupressiformis*	Cherry Ballart						0.1	1		
Stylidiaceae	*Stylidium graminifolium*	Grass Triggerplant				0.1	2				

Table C.9 Flora recorded in PCT 3932

Family	Scientific name	Common name	Exotic	JR5 Cover	JR5 Abundance	JR17 Cover	JR17 Abundance
Asteraceae	*Cirsium vulgare*	Spear Thistle	*			0.1	2
Asteraceae	*Hypochaeris glabra*	Smooth Catsear	*	3	200		
Asteraceae	*hypochaeris radicata*	Catsear	*			0.1	50
Asteraceae	*sonchus asper*	Prickly Sowthistle	*	0.1	1		
Clusiaceae	*hypericum gramineum*	Small St John's Wort		10	150		
Cyperaceae	*carex appressa*	Tall Sedge				2	20
Cyperaceae	*carex spp.*			5	40	1	10
Cyperaceae	*Eleocharis acuta*					3	50
Fabaceae (Faboideae)	*medicago lupulina*	Black Medic	*			0.1	10
Fabaceae (Faboideae)	*medicago spp.*	A Medic	*	0.1	1		
Fabaceae (Faboideae)	*Trifolium repens*	White Clover	*			0.4	100
Fabaceae (Faboideae)	*vicia sativa*	Common vetch	*	2	30		
Geraniaceae	*Geranium molle subsp. molle*	Cranesbill Geranium	*	1	30		
Geraniaceae	*Geranium solanderi var. solanderi*					0.1	5
Haloragaceae	*gonocarpus tetragynus*	Poverty Raspwort				0.1	20
Haloragaceae	*Myriophyllum aquaticum*	Parrots Feather	*			1	100
Juncaceae	*Juncus acutus subsp. acutus*	Sharp Rush	*	2	10		
Juncaceae	*Juncus bufonius*	Toad Rush	*			0.1	5
Juncaceae	*Juncus usitatus*					2	20
Juncaceae	*Luzula ovata*					0.4	50
Lamiaceae	*mentha spp.*		*	3	200		
Lythraceae	*Lythrum hyssopifolia*	Hyssop Loosestrife				0.1	5
Myrsinaceae	*Lysimachia arvensis*	Scarlet Pimpernel	*	0.1	2		
Myrtaceae	*Eucalyptus aggregata*	Black Gum		1	5		
Myrtaceae	*leptospermum scoparium*	Manuka		0.5	2		
Oxalidaceae	*Oxalis perennans*			0.2	150	0.1	5
Plantaginaceae	*Plantago lanceolata*	Lamb's Tongues	*	30	450	0.3	400
Poaceae	*Anthoxanthum odoratum*	Sweet Vernal Grass	*	10	250	0.1	10
Poaceae	*cynodon dactylon*	Common Couch		15	1000		
Poaceae	*dactylis glomerata*	Cocksfoot	*	25	300		
Poaceae	*Echinochloa crus-galli*	Barnyard Grass	*			1	50
Poaceae	*festuca pratensis*	Meadow Fescue	*	25	400		
Poaceae	*Phalaris aquatica*	Phalaris	*	20	250	65	500
Poaceae	*phragmites australis*	Common Reed		50	1000		
Poaceae	*Poa annua*	Winter Grass	*			0.1	10
Poaceae	*Poa labillardierei var. labillardierei*	Tussock		10	30		
Poaceae	*rytidosperma spp.*			5	200	1	30
Poaceae	*themeda triandra*			25	100		
Polygonaceae	*persicaria spp.*	Knotweed	*	0.1	1		
Polygonaceae	*Rumex acetosella*	Sheep Sorrel	*			0.1	10
Polygonaceae	*Rumex crispus*	Curled Dock	*			0.1	1
Rosaceae	*Rubus fruticosus sp. agg.*	Blackberry complex	*	40	100	4	12

Family	Scientific name	Common name	Exotic	JR5 Cover	JR5 Abundance	JR17 Cover	JR17 Abundance
Rosaceae	*Sanguisorba minor subsp. muricata*	Sheep's Burnet	*	5	500		
Salicaceae	*salix spp.*		*	35	5		
Typhaceae	*Typha domingensis*	Narrow-leaved Cumbungi				2	30
Urticaceae	*Urtica dioica*	Giant Nettle	*			0.1	1

C-2 Fauna recorded

Table C.10 Fauna recorded in the study area

Family	Common name	Scientific name	NSW status	EPBC status	Exotic	Mount Piper to Lidsdale forested easement (includes Ivanhoe Coal, Gardens of Stone SCA)	Pinecrest – agricultural land on hillside from Brays Lane to Gardens of Stone SCA (near the conveyor)	Coxs River floodplain – former Wallerawang Power Station site including agricultural lands	Observation type
Birds									
Acanthizidae	Brown Thornbill	*Acanthiza pusilla*				X		X	OW
Acanthizidae	Buff-rumped Thornbill	*Acanthiza reguloides*				X		X	OW
Acanthizidae	Speckled Warbler	*Chthonicola sagittata*	V			X			OW
Acanthizidae	Striated Thornbill	*Acanthiza lineata*				X		X	OW
Acanthizidae	White-browed Scrubwren	*Sericornis frontalis*				X		X	OW
Acanthizidae	White-throated Gerygone	*Gerygone olivacea*				X		X	OW
Acanthizidae	Yellow Thornbill	*Acanthiza nana*				X		X	OW
Acanthizidae	Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*				X			OW
Accipitridae	Black-shouldered Kite	*Elanus axillaris*					X		O
Accipitridae	Collared Sparrowhawk	*Accipiter cirrocephalus*				X			O
Accipitridae	Wedge-tailed Eagle	*Aquila audax*				X	X		O
Accipitridae	White-bellied Sea-eagle	*Haliaeetus leucogaster*	V					X	O
Accipitridae	Whistling Kite	*Haliastur sphenurus*					X	X	O
Acrocephalidae	Australian Reed-Warbler	*Acrocephalus australis*						X	OW
Aegothelidae	Australian Owlet-nightjar	*Aegotheles cristatus*				X		X	OW

Family	Common name	Scientific name	NSW status	EPBC status	Exotic	Mount Piper to Lidsdale forested easement (includes Ivanhoe Coal, Gardens of Stone SCA)	Pinecrest – agricultural land on hillside from Brays Lane to Gardens of Stone SCA (near the conveyor)	Coxs River floodplain – former Wallerawang Power Station site including agricultural lands	Observation type
Alcedinidae	Laughing Kookaburra	*Dacelo novaeguineae*				X	X	X	OW
Alcedinidae	Sacred Kingfisher	*Todiramphus sanctus*						X	OW
Anatidae	Australian Wood Duck	*Chenonetta jubata*				X	X	X	OW
Anatidae	Grey Teal	*Anas gracilis*						X	OW
Anatidae	Pacific Black Duck	*Anas superciliosa*					X	X	OW
Ardeidae	Cattle Egret	*Ardea ibis*		J			X	X	O
Ardeidae	Nankeen Night-Heron	*Nycticorax caledonicus*						X	O
Ardeidae	White-necked Heron	*Ardea pacifica*						X	OW
Artamidae	Australian Magpie	*Cracticus tibicen*				X	X	X	OW
Artamidae	Dusky Woodswallow	*Artamus cyanopterus cyanopterus*	V					X	O
Artamidae	Grey Butcherbird	*Cracticus torquatus*				X		X	OW
Artamidae	Grey Currawong	*Strepera versicolor*				X			O
Artamidae	Pied Butcherbird	*Cracticus nigrogularis*				X		X	OW
Artamidae	Pied Currawong	*Strepera graculina*				X	X	X	OW
Cacatuidae	Galah	*Eolophus roseicapillus*				X	X	X	OW
Cacatuidae	Gang-gang Cockatoo	*Callocephalon fimbriatum*	V			X			OW
Cacatuidae	Glossy Black-cockatoo	*Calyptorhynchus lathami*	V			X			O^2

Family	Common name	Scientific name	NSW status	EPBC status	Exotic	Mount Piper to Lidsdale forested easement (includes Ivanhoe Coal, Gardens of Stone SCA)	Pinecrest – agricultural land on hillside from Brays Lane to Gardens of Stone SCA (near the conveyor)	Coxs River floodplain – former Wallerawang Power Station site including agricultural lands	Observation type
Cacatuidae	Sulphur-crested Cockatoo	*Cacatua galerita*				X	X	X	OW
Cacatuidae	Yellow-tailed Black-Cockatoo	*Calyptorhynchus funereus*				X			OW
Campephagidae	Black-faced Cuckoo-shrike	*Coracina novaehollandiae*				X	X	X	OW
Charadriidae	Masked Lapwing	*Vanellus miles*				X	X	X	OW
Cisticolidae	Golden-headed Cisticola	*Cisticola exilis*						X	OW
Climacteridae	Brown Treecreeper[1]	*Climacteris picumnus*	V	V		X			U[2]
Climacteridae	Red-browed Treecreeper	*Climacteris erythrops*				X			OW
Climacteridae	White-throated Treecreeper	*Cormobates leucophaea*				X		X	OW
Columbidae	Brown cuckoo-Dove	*Macropygia amboinensis*				X			O
Columbidae	Common Bronzewing	*Phaps chalcoptera*				X			OW
Columbidae	Crested Pigeon	*Ocyphaps lophotes*				X	X	X	OW
Corcoracidae	White-winged Chough	*Corcorax melanorhamphos*				X	X	X	OW
Corvidae	Australian Raven	*Corvus coronoides*				X	X	X	OW
Corvidae	Little Raven	*Corvus mellori*					X		OW
Cuculidae	Channel-billed Cuckoo	*Scythrops novaehollandiae*				X			W
Cuculidae	Eastern Koel	*Eudynamys orientalis*				X			W
Cuculidae	Fan-tailed Cuckoo	*Cacomantis flabelliformis*				X		X	W

Family	Common name	Scientific name	NSW status	EPBC status	Exotic	Mount Piper to Lidsdale forested easement (includes Ivanhoe Coal, Gardens of Stone SCA)	Pinecrest – agricultural land on hillside from Brays Lane to Gardens of Stone SCA (near the conveyor)	Coxs River floodplain – former Wallerawang Power Station site including agricultural lands	Observation type
Cuculidae	Horsfield's Bronze-Cuckoo	*Chalcites basalis*				X			W
Cuculidae	Shining Bronze-Cuckoo	*Chalcites lucidus*				X			W
Estrildidae	Red-browed Finch	*Neochmia temporalis*				X	X	X	OW
Falconidae	Black Falcon	*Falco subniger*	V			X			O
Falconidae	Nankeen Kestrel	*Falco cenchroides*					X		O
Hirundinidae	Fairy Martin	*Petrochelidon ariel*					X	X	O
Hirundinidae	Tree Martin	*Petrochelidon nigricans*				X	X	X	O
Hirundinidae	Welcome Swallow	*Hirundo neoxena*					X	X	O
Maluridae	Superb Fairy-wren	*Malurus cyaneus*				X	X	X	OW
Meliphagidae	Brown-headed Honeyeater	*Melithreptus brevirostris*				X			OW
Meliphagidae	Eastern Spinebill	*Acanthorhynchus tenuirostris*				X			OW
Meliphagidae	Noisy Friarbird	*Philemon corniculatus*				X		X	OW
Meliphagidae	Noisy Miner	*Manorina melanocephala*				X	X	X	OW
Meliphagidae	Red Wattlebird	*Anthochaera carunculata*				X		X	OW
Meliphagidae	Scarlet Honeyeater	*Myzomela sanguinolenta*				X			OW
Meliphagidae	White-eared Honeyeater	*Nesoptilotis leucotis*				X		X	OW
Meliphagidae	White-naped Honeyeater	*Melithreptus lunatus*				X			OW

Family	Common name	Scientific name	NSW status	EPBC status	Exotic	Mount Piper to Lidsdale forested easement (includes Ivanhoe Coal, Gardens of Stone SCA)	Pinecrest – agricultural land on hillside from Brays Lane to Gardens of Stone SCA (near the conveyor)	Coxs River floodplain – former Wallerawang Power Station site including agricultural lands	Observation type
Meliphagidae	White-plumed Honeyeater	*Ptilotula penicillatus*				X			OW
Meliphagidae	Yellow-faced Honeyeater	*Caligavis chrysops*				X		X	OW
Monarchidae	Leaden Flycatcher	*Myiagra rubecula*				X			OW
Monarchidae	Magpie-Lark	*Grallina cyanoleuca*				X	X	X	OW
Neosittidae	Varied Sittella	*Daphoenositta chrysoptera*	V			X			O
Pachycephalidae	Golden Whistler	*Pachycephala pectoralis*				X		X	OW
Pachycephalidae	Grey Shrike-thrush	*Colluricincla harmonica*				X	X	X	OW
Pachycephalidae	Rufous Whistler	*Pachycephala rufiventris*				X		X	OW
Pardalotidae	Spotted Pardalote	*Pardalotus punctatus*				X		X	OW
Pardalotidae	Striated Pardalote	*Pardalotus striatus*				X		X	OW
Petroicidae	Eastern Yellow Robin	*Eopsaltria australis*				X		X	OW
Petroicidae	Scarlet Robin	*Petroica boodang*	V			X			OW
Phalacrocoracidae	Great Cormorant	*Phalacrocorax carbo*						X	O
Phalacrocoracidae	Little Pied Cormorant	*Microcarbo melanoleucos*						X	O
Podargidae	Tawny Frogmouth	*Podargus strigoides*				X			OW
Psittacidae	Crimson Rosella	*Platycercus elegans*				X	X	X	OW
Psittacidae	Eastern Rosella	*Platycercus eximius*				X	X	X	OW
Psittacidae	Little Lorikeet	*Glossopsitta pusilla*	V			X			O

Family	Common name	Scientific name	NSW status	EPBC status	Exotic	Mount Piper to Lidsdale forested easement (includes Ivanhoe Coal, Gardens of Stone SCA)	Pinecrest – agricultural land on hillside from Brays Lane to Gardens of Stone SCA (near the conveyor)	Coxs River floodplain – former Wallerawang Power Station site including agricultural lands	Observation type
Psittacidae	Rainbow Lorikeet	*Trichoglossus haematodus*				X		X	OW
Psittacidae	Red-rumped Parrot	*Psephotus haematonotus*				X	X	X	OW
Psophodidae	Spotted Quail-thrush	*Cinclosoma punctatum*				X			O
Rallidae	Eurasian Coot	*Fulica atra*						X	OW
Rallidae	Purple Swamphen	*Porphyrio porphyrio*						X	OW
Rhipiduridae	Grey Fantail	*Rhipidura albiscapa*				X	X	X	OW
Rhipiduridae	Willie Wagtail	*Rhipidura leucophrys*				X	X	X	OW
Strigidae	Barking Owl	*Ninox connivens*	V			X			OW
Strigidae	Powerful Owl	*Ninox strenua*	V			X			O
Strigidae	Southern Boobook	*Ninox novaeseelandiae*				X		X	OW
Sturnidae	Common Myna	*Sturnus tristis*			*	X	X	X	OW
Sturnidae	Common Starling	*Sturnus vulgaris*			*		X		O
Threskiornithidae	Australian White Ibis	*Threskiornis molucca*					X	X	OW
Timaliidae	Silvereye	*Zosterops lateralis*				X		X	OW
Crustaceans									
Parastacidae	Dam Yabby	*Cherax destructor*				X		X	O
Frogs									
Hylidae	Peron's Tree Frog	*Litoria peronii*				X	X	X	OW
Hylidae	Screaming Tree Frog	*Litoria quiritatus*				X		X	OW
Hylidae	Verreaux's Frog	*Litoria verreauxii*						X	O

Family	Common name	Scientific name	NSW status	EPBC status	Exotic	Mount Piper to Lidsdale forested easement (includes Ivanhoe Coal, Gardens of Stone SCA)	Pinecrest – agricultural land on hillside from Brays Lane to Gardens of Stone SCA (near the conveyor)	Coxs River floodplain – former Wallerawang Power Station site including agricultural lands	Observation type
Myobatrachidae	Bibron's Toadlet	*Pseudophryne bibronii*				X			OW
Myobatrachidae	Brown-striped Frog	*Limnodynastes peronii*				X			OW
Myobatrachidae	Common Eastern Froglet	*Crinia signifera*				X	X	X	OW
Myobatrachidae	Eastern Sign-bearing Froglet	*Crinia parinsignifera*				X	X	X	OW
Myobatrachidae	Smooth Toadlet	*Uperoleia laevigata*				X			W
Myobatrachidae	Spotted Grass Frog	*Limnodynastes tasmaniensis*				X	X	X	OW
Myobatrachidae	Wrinkled Toadlet	*Uperoleia rugosa*				X		X	W
Butterflys									
Lycaenidae	Blotched Blue	*Erina acasta*				X			O
Mammals									
Bovidae	European Cattle	*Bos taurus*			*		X		OW
Canidae	Dingo	*Canis lupus dingo*				X			O
Canidae	Fox	*Vulpes vulpes*			*	X	X	X	O
Canidae	Unidentified Canid	*Canidae* sp.			*	X			O
Dasyuridae	Brown Antechinus	*Antechnus stuartii*				X			C
Emballonuridae	Yellow-bellied Sheathtail-bat	*Saccolaimus flaviventris*	V			X	X		U (PR)
Leporidae	Rabbit	*Oryctolagus cuniculus*			*		X	X	O
Macropodidae	Common Wallaroo	*Macropus robustus*				X	X		O

Family	Common name	Scientific name	NSW status	EPBC status	Exotic	Mount Piper to Lidsdale forested easement (includes Ivanhoe Coal, Gardens of Stone SCA)	Pinecrest – agricultural land on hillside from Brays Lane to Gardens of Stone SCA (near the conveyor)	Coxs River floodplain – former Wallerawang Power Station site including agricultural lands	Observation type
Macropodidae	Eastern Grey Kangaroo	*Macropus giganteus*				X	X	X	O,C
Macropodidae	Red-necked Wallaby	*Macropus rufogriseus*				X	X		O
Macropodidae	Swamp Wallaby	*Wallabia bicolor*				X		X	O
Molossidae	White-striped Freetail-bat	*Austronomus australis*				X	X	X	W,U (D)
Molossidae		*Ozimops ridei/l.planiceps*						X	U (D)
Petauridae	Squirrel Glider	*Petaurus norfolcensis*	V			X			O
Petauridae	Sugar Glider	*Petaurus breviceps*				X			O,C
Phalangeridae	Common Brushtail Possum	*Trichosurus vulpecula*				X	X	X	O,C
Pseudocheiridae	Common Ringtail Possum	*Pseudocheirus peregrinus*				X		X	O
Rhinolophidae	Eastern Horseshoe-bat	*Rhinolophus megaphyllus*				X		X	U (D)
Suidae	Pig	*Sus scrofa*			*	X			O,C
Tachyglossidae	Short-beaked Echidna	*Tachyglossus aculeatus*				X			O
Vespertilionidae	Chocolate Wattled Bat	*Chalinolobus morio*				X	X	X	U (D)
Vespertilionidae	Eastern Broad-nosed Bat	*Scotorepens orion*				X		X	U (D)
Vespertilionidae	Eastern False Pipistrelle	*Falsistrellus tasmaniensis*	V			X	X	X	

Family	Common name	Scientific name	NSW status	EPBC status	Exotic	Mount Piper to Lidsdale forested easement (includes Ivanhoe Coal, Gardens of Stone SCA)	Pinecrest – agricultural land on hillside from Brays Lane to Gardens of Stone SCA (near the conveyor)	Coxs River floodplain – former Wallerawang Power Station site including agricultural lands	Observation type
Vespertilionidae	Gould's Wattled Bat	*Chalinolobus gouldii*				X	X	X	U (D)
Vespertilionidae	Large-bentwinged Bat	*Miniopterus orianae oceanensis*	V			X	X	X	U (PR)
Vespertilionidae	Larged-eared Pied Bat	*Chalinolobus dwyeri*	V	V		X	X	X	U (D)
Vespertilionidae	Southern Myotis	*Myotis macropus*	V					X	U (D)
Vespertilionidae	Large Forest Bat	*Vespadelus darlingtoni*				X	X	X	U (D)
Vespertilionidae	Southern Forest Bat	*Vespadelus regulus*					X	X	U (D)
Vespertilionidae	Little Forest Bat	*Vespadelus vulturnus*				X	X	X	U (D)
Vespertilionidae		*Nyctophilus spp.*				X	X	X	U (D)
Vombatidae	Common Wombat	*Vombatus ursinus*				X			O
Reptiles									
Agamidae	Eastern Water Dragon	*Intellagama lesueurii*				X		X	O
Agamidae	Jacky Lizard	*Amphibolurus muricatus*				X			O
Chelidae	Eastern Snake-necked Turtle	*Chelodina longicollis*					X	X	O
Elapidae	Eastern Brown Snake	*Pseudonaja textilis*					X		O
Elapidae	Highland Copperhead	*Austrelaps ramsayi*						X	O
Elapidae	Red-bellied black snake	*Pseudechis porphyriacus*				X		X	O
Scincidae	Eastern Blue-tongue	*Tiliqua scincoides*					X		O

Family	Common name	Scientific name	NSW status	EPBC status	Exotic	Mount Piper to Lidsdale forested easement (includes Ivanhoe Coal, Gardens of Stone SCA)	Pinecrest – agricultural land on hillside from Brays Lane to Gardens of Stone SCA (near the conveyor)	Coxs River floodplain – former Wallerawang Power Station site including agricultural lands	Observation type
Scincidae	Robust Ctenotus	*Ctenotus robustus*				X			O
Scincidae	White's Skink	*Liopholis whitii*				X			O

Notes: V = vulnerable species under the BC Act, O= direct observation, W= heard, U (D)= 'definite' ultrasonic call identified to the species
1. Recorded by Umwelt 2022 in the study area
2. Observation type unknown

Appendix D

Vegetation integrity plot data

Table D.1 Vegetation integrity plots

Veg zone	PCT	Condition	Plot	Composition (number of species)							Structure (% cover)					
				TG	SG	GG	FG	EG	OG	Total	TG	SG	GG	FG	EG	OG
	3369		**Benchmark**	4	7	10	19	1	2	43	30.0	6.0	40	12	0.0	0.0
1	3369	good	JR4	5	5	5	6	0	0	21	88.5	46.2	120.6	8.1	0	0
1	3369	good	BH9	3	4	6	11	0	3	27	40.5	4.7	32.2	1.8	0	0.3
1	3369	good	JR16	1	1	4	1	0	0	7	7	4	10.6	0.2	0	0
1	3369	good	JR22	5	7	5	11	1	0	29	50.7	7.2	43.0	5.1	0.2	0.0
2	3369	shrubland	BH8	0	2	6	4	0	0	12	0	3	46.5	0.9	0	0
2	3369	shrubland	BH21	3	4	15	18	1	0	41	7.1	20.8	74.0	3.9	0.1	0
2	3369	shrubland	JR18	1	2	4	4	0	0	11	0.1	0.2	30.3	1.4	0.0	0.0
2	3369	shrubland	JR26	2	5	5	8	0	1	21	0.2	31.8	55.1	1.7	0.0	0.1
2	3369	shrubland	JR29	0	1	2	0	0	0	3	0.0	1.5	27.0	0.0	0.0	0.0
	3385		**Benchmark**	4	8	8	18	1	2	41	7.0	9.0	45.0	11.0	0.0	0.0
3	3385	good	JR6	3	0	5	2	0	0	10	36.5	0	41.0	4.2	0	0
3	3385	good	BH10	4	3	11	30	0	4	52	46	5.2	46.0	30.4	0	1.5
3	3385	good	JR30	2	4	7	5	0	0	18	65.0	10.6	40.6	1.0	0.0	0.0
4	3385	moderate	JR11	3	1	7	11	0	0	22	3.2	0.1	65.2	54.6	0.0	0.0
4	3385	moderate	JR27	3	8	5	15	0	0	31	0.5	16.0	33.0	2.5	0.0	0.0
5	3385	paddock_trees	BH1	2	0	7	3	0	0	12	45	0	6.7	0.8	0	0
6	3385	poor	BH2	0	1	2	2	0	0	5	0	20	5.1	0.7	0	0
6	3385	poor	BH3	0	1	8	10	0	0	19	0	10	10.8	1.3	0	0
6	3385	poor	JR9	0	0	3	1	0	0	4	0	0	15.1	0.1	0	0
6	3385	poor	BH19	2	3	10	15	0	0	30	0.6	1.6	19.8	36.8	0	0
6	3385	poor	JR15	0	1	4	2	0	0	7	0	50	43.0	2.1	0	0
N/A	3385	Non-native	JR7	0	0	0	1	0	0	1	0	0	0	0.1	0	0
N/A	3385	Non-native	BH15	0	0	2	2	0	0	4	0	0	1.5	0.7	0	0
N/A	3385	Non-native	BH16	0	0	1	3	0	0	4	0	0	2	10.2	0	0
	3735		**Benchmark**	5	11	7	12	1	2	36	43.0	17.0	27.0	7.0	0.0	0.0
7	3735	good	BH4	4	13	4	13	0	1	35	40.3	33.6	11.5	3.9	0	0.2
7	3735	good	BH13	6	5	8	13	1	2	35	34.5	36.6	49.6	3.8	0.2	0.4
7	3735	good	JR25	5	5	5	9	0	0	24	50.7	10.6	47.6	0.9	0.0	0.0

Veg zone	PCT	Condition	Plot	Composition (number of species)							Structure (% cover)					
				TG	SG	GG	FG	EG	OG	Total	TG	SG	GG	FG	EG	OG
8	3735	shrubland	JR1	2	7	7	8	1	1	26	2.1	80.5	23.8	3.7	5	0.2
8	3735	shrubland	JR2	1	7	11	7	0	0	26	1.5	35.7	133.5	15.1	0.0	0.0
8	3735	shrubland	BH12	4	3	11	15	0	0	33	1.7	31.1	72.3	4.6	0.0	0.0
8	3735	shrubland	BH13B	1	6	11	14	0	0	32	1.0	41.7	58.2	14.1	0.0	0.0
8	3735	shrubland	JR14	0	5	6	6	0	0	17	0	45.7	45.4	0.8	0	0
	3747		**Benchmark**	5	11	7	12	1	2	38	43.0	17.0	27.0	7.0	0.0	0.0
9	3747	good	BH5	4	8	6	11	0	4	33	32.0	10.3	47.0	3.3	0.0	0.5
9	3747	good	BH11	3	12	6	14	0	1	36	41.0	7.9	57.5	5.0	0.0	0.1
9	3747	good	JR10	1	4	4	2.0	0.0	0.0	11	35.0	16.1	0.4	0.4	0.0	0.0
9	3747	good	JR20	2	6	3	4	0	0	15	51.0	10.8	20.3	4.3	0.0	0.0
9	3747	good	JR21	3	7	3	3	0	1	17	74.0	5.2	30.4	0.8	0.0	0.2
10	3747	poor	BH7	0	1	7	1	0	0	9	0.0	5.0	4.5	0.1	0.0	0.0
10	3747	poor	JR8	1	0	5	4	0	0	10	0.1	0.0	70.4	1.4	0.0	0.0
10	3747	poor	BH18	1	2	12	7	0	0	22	3.0	10.1	3.5	1.4	0.0	0.0
10	3747	poor	JR13	1	1	6	4.0	0.0	0.0	12	0.2	10.0	58.6	0.4	0.0	0.0
10	3747	poor	JR32	0	1	3	1	0	0	5	0.0	0.3	35.8	0.1	0.0	0.0
11	3747	shrubland	JR3	1	8	11	7	3	0	30	0.5	57.1	41.4	3.2	0.3	0.0
11	3747	shrubland	JR12	2	3	8	10.0	1.0	1.0	25	5.1	25.3	42.7	7.4	1.0	0.1
11	3747	shrubland	BH17	2	7	10	12.0	0.0	2.0	33	1.5	59.5	63.7	10.0	0.0	0.6
11	3747	shrubland	BH20	2	12	9	7.0	1.0	1.0	32	0.7	28.6	17.8	2.6	0.1	0.1
11	3747	shrubland	JR23	2	7	7	7.0	0.0	0.0	23	0.2	8.7	50.1	1.0	0.0	0.0
11	3747	shrubland	JR31	0	2	5	2	0	0	9	0.0	0.6	25.3	0.3	0.0	0.0
	3749		**Benchmark**	5	11	7	12	1	2	38	43.0	17.0	27.0	7.0	0.0	0.0
12	3749	good	BH6	5	11	7	9	1	1	34	45.0	7.6	48.3	1.8	0.1	0.1
13	3749	shrubland	BH14	3	7	11	17	1	2	41	1.4	33.0	39.7	5.7	0.1	0.2
13	3749	shrubland	JR4B	1	8	11	7	3	0	30	0.5	57.1	41.4	3.2	0.3	0.0
13	3749	shrubland	JR19	1	10	3	2	0	0	16	0.1	16.8	40.2	5.1	0.0	0.0
	3932		**Benchmark**	1	5	9	11	1	0	27	0.0	2.0	102.0	7.0	0.0	0.0
14	3932	moderate	JR5	1	1	7	4	0	0	13	1.0	0.5	112.0	13.3	0.0	0.0
14	3932	moderate	JR17	0	0	8	4	0	0	12	0.0	0.0	11.5	0.4	0.0	0.0
14	3932	moderate	JR28	1	0	4	1	0	0	6	5.0	0.0	30.4	0.1	0.0	0.0

Table D.2 Vegetation integrity plots

Veg zone	PCT	Condition	Plot	Large trees	Hollow trees	Litter cover (%)	Fallen logs (m)	Tree DBH 5-10 (cm)	Tree DBH 10-20 (cm)	Tree DBH 20-30 (cm)	Tree DBH 30-50 (cm)	Tree DBH 50-80 (cm)	Tree regen	HTW cover (total)	Zone	Easting	Northing	Bearing
	3369	**Benchmark**		**3**		**45**	**50**											
1	3369	good	JR4	0	1	66	51.5	1	1	1	1	0	1	0.3	55	224323	6303779	303
1	3369	good	BH9	6	2	56	31	0	1	1	1	1	1	32.8	55	227384	6301891	359
1	3369	good	JR16	0.0	0	37.0	31.0	1	1	0	0.0	1	1	70.6	55	226956	6303200	6
1	3369	good	JR22	1	0	38.0	46.0	1	1	1	1	1	1	0.4	55	222555	6305034	206
2	3369	shrubland	BH8	0	0	7	5	0	0	0	0	0	0	12.5	55	227398	6301838	142
2	3369	shrubland	BH21	0	0	3.4	5.5	0	0	0	0	0	1	0.2	55	224315	6303378	300
2	3369	shrubland	JR18	0	0	8.0	0.0	0	0	0	0	0	1	51.9	55	222943	6305911	131
2	3369	shrubland	JR26	0	0	10.0	10.0	0	0	0	0	0	1	0.0	55	224241	6303776	285
2	3369	shrubland	JR29	0	0	5.0	0.0	0	0	0	0	0	0	54.4	55	227209	6303404	257
	3385	**Benchmark**		**3**		**55**	**83**											
3	3385	good	JR6	0	0	59	0	1	1	1	1	1	1	81	55	228891	6300219	172
3	3385	good	BH10	4	2	46	40	1	1	1	1	1	1	1.9	55	227177	6301928	100
3	3385	good	JR30	2	0	53.0	8.0	1	1	1	1	1	1	3.2	55	226718	6303163	0
4	3385	moderate	JR11	0	0	11.0	14.0	1	0	0	0	0	1	1.1	55	225523	6303080	131
4	3385	moderate	JR27	0	0	18.0	1.0	0	0	0	0	0	1	0.0	55	225863	6302897	220
5	3385	paddock_trees	BH1	1	0	31	0	1	1	1	0	1	1	65.7	55	228615	6300787	106
6	3385	poor	BH2	0	0	12	0	0	0	0	0	0	0	0.7	55	228279	6299692	40
6	3385	poor	BH3	0	0	13	0	0	0	0	0	0	0	0.6	55	228435	6299656	50
6	3385	poor	JR9	0	0	10	0	0	0	0	0	0	0	53	55	227816	6301348	98
6	3385	poor	BH19	0	0	12.6	5.5	1	1	0	0	0	1	1.6	55	223757	6303745	10
6	3385	poor	JR15	0.0	0	3.6	0	0	0	0	0.0	0	0	1.2	55	226624	6303131	15
N/A		3385	Non-native	0	0	5	0	0	0	0	0	0	0	70	55	228542	6299575	138
N/A		3385	Non-native	0	0	6	0	0	0	0	0	0	0	45.7	55	228313	6301047	100
N/A		3385	Non-native	0	0	38	0	0	0	0	0	0	0	61.5	55	228915	6300574	340

Veg zone	PCT	Condition	Plot	Large trees	Hollow trees	Litter cover (%)	Fallen logs (m)	Tree DBH 5-10 (cm)	Tree DBH 10-20 (cm)	Tree DBH 20-30 (cm)	Tree DBH 30-50 (cm)	Tree DBH 50-80 (cm)	Tree regen	HTW cover (total)	Zone	Easting	Northing	Bearing
	3735	**Benchmark**		**3**		**75**	**87**											
7	3735	good	BH4	0	0	48	25	1	1	1	0	0	1	0	55	223605	6303893	304
7	3735	good	BH13	3	3	68	61	1	1	1	1	1	1	0.5	55	226560	6302529	280
7	3735	good	JR25	4	2	48.0	42.0	1	1	1	1	1	1	0.2	55	223537	6304039	315
8	3735	shrubland	JR1	0	0	5.6	26	1	0	0	0	0	1	0.2	55	224975	6303372	275
8	3735	shrubland	JR2	0	0	8.7	0.0	1	0	0	0	0	1	0.5	55	224838	6303454	283
8	3735	shrubland	BH12	0	0	40.0	0.0	0	0	0	0	0	1	0.7	55	226581	6302479	290
8	3735	shrubland	BH13B	0	0	41.0	36.0	0	0	0	0	0	0	0.4	55	223263	6304062	270
8	3735	Shrubland	JR14	0	0	2	0	0	0	0	0	0	0	0.1	55	226556	6306020	300
	3747	**Benchmark**		**3**		**75**	**87**											
9	3747	good	BH5	0	1	78.0	19.0	1	1	1	1	1	1	0.0	55	223605	6303893	125
9	3747	good	BH11	2	3	90.0	33.0	1	1	1	1	1	1	0.0	55	225970	6302860	290
9	3747	good	JR10	1.0	0	5.8	51	1	1	1	1	0	1	0.0	55	227177	6301928	35
9	3747	good	JR20	2	0	88.0	56.0	1	1	1	1	1	1	0.0	55	222739	6305519	272
9	3747	good	JR21	2	1	77.0	71.0	1	1	1	1	1	1	0.2	55	222623	6305494	38
10	3747	poor	BH7	0	0	11.0	0.0	0	0	0	0	0	0	14.9	55	227285	6301926	350
10	3747	poor	JR8	0	0	0.6	0.0	0	0	0	0	0	0	1.2	55	222960	6304598	68
10	3747	poor	BH18	0	0	44.0	0.0	1	1	0	0	0	1	15.9	55	223134	6304353	105
10	3747	poor	JR13	0	0	7.8	0.0	1	0	0	0	0	1	23.4	55	223493	6304555	125
10	3747	poor	JR32	0	0	3.4	0.0	0	0	0	0	0	0	7.5	55	227157	6302066	167
11	3747	shrubland	JR3	0	0	10.0	97.5	0	0	0	0	0	0	0.1	55	224548	6303616	279
11	3747	shrubland	JR12	0	0	22.0	38.5	1	1	0	0	0	1	0.0	55	226581	6302479	131
11	3747	shrubland	BH17	0	0	62.0	11.0	0	0	0	0	0	1	0.2	55	223561	6303871	310
11	3747	shrubland	BH20	0	0	18.0	42.0	0	0	0	0	0	1	0.0	55	224868	6303032	113
11	3747	shrubland	JR23	0	0	3.4	0.0	0	0	0	0	0	1	0.1	55	222721	6304935	11
11	3747	shrubland	JR31	0	0	9.0	0.0	0	0	0	0	0	0	25.3	55	226806	6303124	92
	3749	**Benchmark**		**3**		**75**	**87**											
12	3749	good	BH6	0	1	67.0	34.5	1	1	1	1	1	1	0.0	55	223874	6303783	50
13	3749	shrubland	BH14	0	0	48.0	0.0	0	0	0	0	0	1	0.1	55	223898	6303761	60

Veg zone	PCT	Condition	Plot	Large trees	Hollow trees	Litter cover (%)	Fallen logs (m)	Tree DBH 5-10 (cm)	Tree DBH 10-20 (cm)	Tree DBH 20-30 (cm)	Tree DBH 30-50 (cm)	Tree DBH 50-80 (cm)	Tree regen	HTW cover (total)	Zone	Easting	Northing	Bearing
13	3749	shrubland	JR4B	0	0	10.0	97.5	0	0	0	0	0	0	0.1	55	224304	6303823	279
13	3749	shrubland	JR19	0	0	1.0	0.0	0	0	0	0	0	0	0.0	55	222816	6305605	146
	3932	**Benchmark**		**2**		**25**	**60**											
14	3932	moderate	JR5	0	0	7.2	0.0	1	0	0	0	0	0	95.0	55	228878	6300283	18
14	3932	moderate	JR17	0	0	4.0	0.0	0	0	0	0	0	0	69.1	55	228032	6301211	330
14	3932	moderate	JR28	0	0	39.0	1.0	0	0	0	0	0	1	35.1	55	229007	6300462	303

Appendix E

Matters of National Environmental Significance

E-1 Introduction

On 2 August 2024, a delegate of the Federal Minister for the Environment and Water determined that the Mount Piper to Wallerawang Transmission Line Project was a controlled action (EPBC 2024/09855) under Section 75 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) for potential impacts on listed threatened species and communities and listed migratory species.

The proposed action will be assessed in accordance with the bilateral agreement (Amending Agreement No.1), including addressing matters in Schedule 4 of the Environment Protection and Biodiversity Conservation Regulation 2000 (EPBC Regulation).

Supplementary SEARs issued on 4 October 2024 (DPHI 2024) consider the following MNES to be significantly impacted by the project:

– Gang-gang Cockatoo (*Callocephalon fimbria*tum)
– Black Gum (*Eucalyptus aggregata*)
– Brown Treecreeper (*Climacteris picumnus victoriae*).

The supplementary SEARs also consider the following MNES to be at risk of significant impact and require further information to determine the extent and potential for a significant impact:

– White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland
– Regent Honeyeater (*Anthochaera phrygia*)
– South-eastern Glossy Black-cockatoo (*Calyptorhynchus lathami lathami*)
– Large-eared Pied Bat (*Chalinolobus dwyeri*)
– Superb Parrot (*Polytelis swainsonii*)
– Hoary Sunray (*Leucochrysum albicans* var*. tricolor*)
– Purple Copper Butterfly (*Paralucia spinifera*)
– Greater Glider (*Petauroides volans*).

Item 16 of the supplementary SEARs outlines the requirements for each species listed above. Table 1.2 outlines these requirements.

Other MNES matters comprising World Heritage properties, National heritage places, Wetlands of international importance (Ramsar sites) would not be directly or indirectly impacted by the project, would not be significantly impacted and are not discussed further.

Migratory species would not be significantly impacted as habitat in the study area is not likely to support an ecologically significant proportion of the population of any of these species, be of critical importance to the species at particular life-cycle stages, is not located at the limit of any of the species' range, and/or located within an area where the species is declining. As such, migratory species are not considered further.

Assessment documentation relevant to the EPBC Act for projects being assessed under the NSW Assessment Bilateral (i.e. this Appendix) has been written with reference to the '*Guidance for accredited assessors on the assessment of MNES*' (DPHI undated). A Significance impact criteria assessment has been conducted a) for MNES recorded during targeted surveys (Black Gum, Brown Treecreeper, Gang-gang Cockatoo, South-eastern Glossy Black Cockatoo and Large-eared Pied Bat) and b) for MNES with potential for a significant impact (Regent Honeyeater). Significance impact criteria assessments have not been conducted for MNES listed for consideration in the supplementary SEARs that weren't recorded, with limited habitat present and unlikely to be significantly impacted (Superb Parrot, *Leucochrysum albicans* var. *tricolor*, Purple Copper Butterfly, Greater Glider and White Box – Yellow Box -Blakely's Red Gum grassy woodland and Derived Native Grassland). Other species considered in Table 9.8 are not carried forward for detailed assessment as they are unlikely to be significantly impacted.

Note that Table 9.8 summarises the quantum of biodiversity credits that would be purchased and retired for all potentially affected MNES, even though offsets would only strictly be required for significantly impacted MNES according to the EPBC Act Offsets Policy (DSEWPaC, 2012). Notwithstanding that most species in Table 9.8 are considered unlikely to be significantly impacted, ecosystem and/or species credits have been calculated, and offsets will be secured in accordance with the BOS. Appendix B provides evidence why species and communities potentially located in the subject land or in the vicinity are not likely to be impacted.

Offset requirements to identify the number and class of biodiversity credits that need to be offset to achieve a standard of 'no net loss' of biodiversity have been calculated in BAM-C in accordance with the BAM for impacted MNES and will be delivered in accordance with the BOS and BC Act, pursuant to the agreement bilateral. Biodiversity credits are summarised in Table 9.9 of the BDAR and Table E.1 below.

Table E.1 Summary table for assessment of predicted impacts on EPBC Act-listed threatened species and communities

MNES	Associated vegetation zones associated with the MNES matter in the subject land	Area of predicted impact (ha)	Credits to be secured	Offsetting approach	Page references (EIS, BDAR)
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	None	0 The TEC occurs ~200 m from the subject land and would not be impacted. A constraints assessment of potential access tracks was conducted and the access track adjacent to this patch of vegetation was removed from the project in order to avoid impacts on this TEC.	0	N/A	BDAR sections 4.5, 5.3.1 and 7.2
Black Gum (*Eucalyptus aggregata*)	3385_Good 3385_Moderate 3385_Paddock_trees 3932_Moderate	5.89 ha. A species polygon has been prepared for impacts on 274 individuals (see section 5.2.2).	**548**	Refer to section 9.4	BDAR sections 5, 8, 9.1.3 and 9.4
Gang-gang Cockatoo (*Callocephalon fimbriatum*)	3369_Good 3385_Good 3735_Good 3747_Good 3749_Good	10.39 ha. A species polygon has been prepared for this species (see section 5.2.2).	**420**	Refer to section 9.4	BDAR sections 5, 8, 9.1.3 and 9.4
Brown Treecreeper (*Climacteris picumnus victoriae*)	3369_Good 3369_Shrubland 3385_Good 3385_Moderate 3385_Paddock_trees 3735_Good 3735_Shrubland 3747_Good 3747_Shrubland 3749_Good 3749_Shrubland	40.15 ha. A species polygon is not required for this ecosystem credit species.	914	Refer to section 9.4	BDAR sections 5, 8 and 9.4
South-eastern Glossy Black-cockatoo (*Calyptorhynchus lathami lathami*)	3369_Good 3369_Shrubland 3385_Good 3385_Moderate 3385_Paddock_trees 3735_Good 3735_Shrubland 3747_Good 3747_Shrubland 3749_Good 3749_Shrubland	40.15 ha. A species polygon is not required for this ecosystem credit species.	914	Refer to section 9.4	BDAR sections 5, 8, 9.1.3 and 9.4

MNES	Associated vegetation zones associated with the MNES matter in the subject land	Area of predicted impact (ha)	Credits to be secured	Offsetting approach	Page references (EIS, BDAR)
Regent Honeyeater (*Anthochaera phrygia*)	None	0	0	Refer to section 9.4	BDAR sections 5, 8 and 9.4
Large-eared Pied Bat (*Chalinolobus dwyeri*)	3369_Good 3369_Shrubland 3735_Good 3735_Shrubland 3747_Good 3747_Shrubland 3747_Poor 3749_Good 3749_Shrubland 3932_Moderate	55.43 ha. A species polygon has been prepared for this species (see section 5.2.2).	1,806	Refer to section 9.4	BDAR sections 5, 8, 9.1.3 and 9.4
Superb Parrot (*Polytelis swainsonii*)	None	0	0	Refer to section 9.4	BDAR sections 5, 8 and 9.4
Hoary Sunray (*Leucochrysum albicans* var. *tricolor*)	3747_Good 3747_Shrubland 3747_Poor	0	0	Refer to section 9.4	BDAR sections 5, 8 and 9.4
Purple Copper Butterfly (*Paralucia spinifera*)	3369_Good 3369_Shrubland 3385_Good 3385_Moderate 3385_Paddock_trees 3735_Good 3735_Shrubland 3747_Good 3747_Shrubland 3749_Good 3749_Shrubland	0	0	Refer to section 9.4	BDAR sections 5, 8 and 9.4
Greater Glider (*Petauroides volans*)	3369_Good 3369_Shrubland 3385_Good 3385_Moderate 3385_Paddock_trees 3735_Good 3735_Shrubland 3747_Good 3747_Shrubland 3749_Good 3749_Shrubland	0	0	Refer to section 9.4	BDAR sections 5, 8 and 9.4

Notes: Bold – species that are likely to be significantly impacted

E-2 Gang-gang Cockatoo

E-2-1 Description

Distribution

The Gang-gang Cockatoo is adapted to cooler conditions and has always been more common at higher elevations and more southern latitudes. The Gang-gang Cockatoo was previously widespread in eastern New South Wales, ranging from the central slopes and tablelands, east to the south coast and central-eastern New South Wales. The species was once widespread and numerous in Sydney and its surrounding areas, with records indicating that the majority of remaining NSW populations of Gang-gang Cockatoos occur in the Greater Blue Mountains World Heritage Area and Mid and Lower Central Coast (DAWE 2022). The Conservation Advice for the species notes that an estimated 54 per cent of the species' distribution occurs within New South Wales Gardens of Stone SCA (DAWE 2022).

Habitat requirements

Gang-gang Cockatoo primarily occur within the temperate eucalypt forests and woodlands of mainland south-east Australia. The species is an altitudinal migrant. During summer months, Gang-gang Cockatoos primarily inhabit mature, wet sclerophyll forests, typically dominated by eucalypts. Eucalyptus dominated assemblages with dense, shrubby acacia, wattle and banksia understory support the highest density of birds. The species has also been reported in more open eucalypt assemblages, subalpine snow gum woodland, temperate rainforests, and occasionally regenerating forests. The species is often seen within Blackbutt (*Eucalyptus pilularis*), Sydney Red Gum (*Angophora costata*), and Turpentine (*Syncarpia glomulifera*) tall open forest and occasional in Sydney peppermint (*Eucalyptus piperita*) open forest. During winter months, Gang-gang Cockatoos inhabit woodland assemblages at lower and drier altitudes. Overlapping of winter and summer ranges is common, with some individuals choosing to winter at higher altitudes, and others remaining at lower altitudes during summer (Higgins 1999).

Foraging is primarily arboreal in the canopy of eucalypt forests and less often in the understory. The species is known to feed on a range of native and introduced plant species. Outside of the ACT region, Gang-gang Cockatoo have been observed feeding on up to 50 different native species, with a preference for eucalyptus and acacia. Gang-gang Cockatoos regularly feed on flower buds and seed pods, but also on blossoms, leaf buds, fruits and seeds from both native and introduced species. The species feed opportunistically depending on food availability. Outside of breeding season the species has been observed feeding in flocks of up to 25 individuals or more. During the breeding season the species feed in small family groups or pairs (DAWE 2022).

Breeding occurs between October and January, generally in tall mature sclerophyll forests with a dense understory. Gang-gang Cockatoos nest in the hollows of tree trunks and limbs, or within the dead sprout of large living eucalyptus, often near water where larger hollow-bearing trees are more common. Hollow entrances range between 9-24 cm, with a preference of around 21 cm. Hollow chambers are around 20 cm in floor diameter and 50.5 cm deep (range 22-90 cm) and range from 5-9.4 m above the ground. The monogamous pairs work to prepare the nest by chewing around the edge of the hollow to enlarge it and then use the remnant wood chips as a lining. Pairs will occupy multiple nest trees over different years. Breeding aggregations are often formed where multiple nests are situated within a few hundred metres of each other. This is dependent on the availability of suitable stands of hollow bearing trees. Stands of trees close to known breeding areas, likely to produce hollows in the future, are also considered important features of the species habitat. (DAWE 2022).

Critical habitat

No Critical Habitat as defined under Section 207A of the EPBC Act has been identified or included in the Register of Critical Habitat.

Habitat critical to the survival of the Gang-gang Cockatoo according to the conservation advice (DAWE 2022) includes all foraging habitat during both the breeding and non-breeding season. Critical foraging habitat does not include exotic feeding grounds such as ornamental trees, shrubs, and hedges within urban and suburban areas. Gang-gang Cockatoos rely on stands of suitable hollow-bearing trees, which are a key component of their breeding habitat. Habitat critical to the survival includes hollow bearing trees with known or potential Gang-gang Cockatoo hollow chambers that are generally around 20 cm in floor diameter, around 50.5 cm deep

(range 22–90 cm) and occur between around 7.5 m (range 5–9.4 m) above the ground. Stands of trees within or adjacent to known breeding areas, that are likely to become hollow-bearing in future years, are also key components of this species' habitat.

Important populations

Important populations have not been defined for the Gang-gang Cockatoo. Important populations may include:

– 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.

E-2-2 Relevant guidelines and policy statements

Relevant guidelines and policy statements include:

– Approved Conservation Advice for Gang-gang Cockatoo (DAWE 2022).

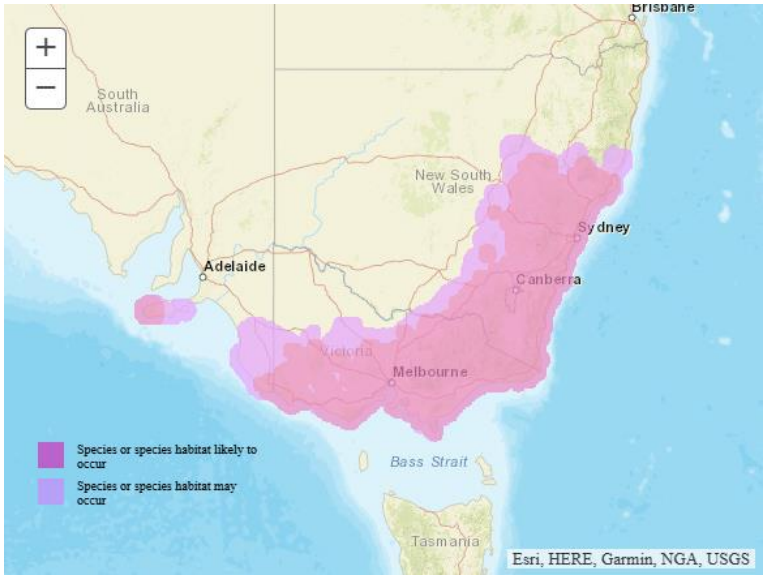
Note the Listing Advice is incorporated within the Conservation Advice for the species. There is no recovery plan or threat abatement plan available.

E-2-3 NSW Bilateral assessment requirements

The NSW bilateral assessment requirement considerations for the Gang-gang Cockatoo are presented in Table E.2.

Table E.2 Consideration of Gang-gang Cockatoo against supplementary SEARs requirements

Item 16 requirement in supplementary SEARS	Gang-gang Cockatoo
Description of habitat	The vegetation zones in the subject land that comprise habitat for the Gang-gang Cockatoo are: – 3369_good – 3385_good – 3385_paddock_trees – 3735_good – 3747_good – 3749_good. There is approximately 10.39 ha of suitable foraging and breeding habitat for the species within the subject land. Details of the floristic composition of each vegetation zone is provided in section 4.4.3. The species is known to generally use mature wet sclerophyll forest in the summer (Frith 1969; NSW Scientific Committee 2008), which is not present in the subject land. However, the overlapping of winter and summer ranges is common, with some individuals choosing to winter at higher altitudes, and others remaining at lower altitudes during summer (Higgins 1999), as is likely the case in the subject land. Several Gang-gang Cockatoos were recorded during surveys, including individuals, pairs and family groups. A juvenile Gang-gang Cockatoo was recorded perched in a tree and then flying over the subject land in a family group in January. Potential breeding habitat is likely present in hollow bearing trees along the fertile drainage lines intersecting the 132kV and 500kV easements (within 300 m) but may also occur also within suitable hollow-bearing trees within other PCTs within the higher elevation forested portions of the subject land. A species polygon showing potential breeding habitat has been provided in Figure 5.13. The locations of Gang-gang Cockatoo in the study area and potential habitat for the species is shown in Figure 5.13. The modelled distribution map of the Gang-gang Cockatoo (Cth DCCEEW 2024) in Australia is provided in Figure E.1 below.

Item 16 requirement in supplementary SEARS	Gang-gang Cockatoo
	 ***Figure E.1 Distribution map for the Gang-gang Cockatoo***
Survey methodology	The Gang-gang Cockatoo is a dual credit species under the BAM. According to the TBDC (NSW DCCEEW 2025b), the species must be surveyed from October to January for breeding habitat. Breeding habitat consists of hollow-bearing trees in eucalypt tree species with hollows at least 3 m above the ground and with hollow diameter of 7 cm or larger. A nest tree census and diurnal bird survey targeting the species was conducted in the nominal survey period over 1 day in September 2023 and 1 day in October 2023 and outside the nominal survey period in 4 days in August 2023, 1 day in June 2024 and 4 days in July 2024. Additional diurnal bird survey outside nominal TBDC survey season (NSW DCCEEW 2025b), to ascertain general use of the subject land by the species was conducted over 4 days in March 2024 and 5 days in October 2024. Further details on the general methodology for bird surveys and nest tree census (which is also appropriate for this species) is provided in section 2.6 of the BDAR.
Construction impacts	Quantum of impact: Up to 10.39 ha of potential foraging and breeding habitat (including 84 hollow-bearing trees with hollows of suitable size) would be directly impacted in the construction phase of the project. This would include vegetation clearing and modification required for site establishment and setup of construction compounds and laydown facilities, establishment of new temporary access tracks, upgrade works to existing access tracks and drainage features where required, footings for new transmission structures, widening of existing easements and managing hazard trees identified around the easement by the project. Duration of impact: Construction would be undertaken in stages and in multiple locations over a period of up to 24 months. Consequence of impact: High
Operational impacts	The Gang-gang Cockatoo has the potential to fly at the height of the overhead transmission lines with collision risk an outside possibility if they are not familiar with changes to their local habitat following operation. Given the overhead transmission lines are fixed (as opposed to the moving blades of a wind turbine), and habituation to the existing transmission line, collision risk is expected to be low. Overall, the operational impact on the Gang-gang Cockatoo from this project is low.

Item 16 requirement in supplementary SEARS	Gang-gang Cockatoo
MNES specific avoidance and mitigation	Avoidance and minimisation measures have been considered as part of the route selection of the project and also development of the project elements such as the following: – Refinement of new easement through Gardens of Stone SCA to include vegetation removal on the north side of existing easement only – Limited additional clearing along access tracks in the SCA. Further details on avoidance and minimisation of impacts is provided in provided in Chapter 7 and section 8.8 of the BDAR. Mitigation measures relevant to this species include: – Identify opportunities to avoid and minimise impacts during detailed design with consideration to retaining vegetation and trees, where possible, to improve connectivity values and/or minimise impacts on threatened species and their habitats, such as hollow bearing trees. For example, this may include refinement of the new easement through the Gardens of Stone SCA to include vegetation removal on the north side of the existing easement only and to reduce additional clearing along access tracks in the SCA. – Pre-clearing surveys to confirm threatened species habitat within and adjacent to the project footprint including hollow bearing trees and occupied nests that are to be avoided or impacts to be minimised. – Prepare and implement a Fauna Handling and Rescue Procedure for the management of fauna and habitats which will include: – A procedure for the felling of hollow-bearing trees to prevent or minimise mortality of fauna, and the salvage of hollows and logs where practicable – Supervision of hollow-bearing tree removal and salvage by a qualified ecologist – Prepare and implement a Nest Box Strategy for tree hollows impacted during the clearing of vegetation, developed in consultation with NPWS. The strategy will consider (at a minimum): • reuse of hollows • identification of target species that best benefit from installation of nest boxes • identification of alternative methods of replacing or creating hollows, cavity sizes • the number required when assessed against retained hollows monitoring • the use of nest boxes as an immediate measure (ie for rescue and relocation of fauna during clearing). – A Vegetation Clearance Procedure, which will require the limit of clearing and construction boundary to be surveyed and clearly demarcated using high visibility tape. All vegetation outside the boundary will be clearly sign posted and marked on plans as an exclusion zone. Signage will be maintained for the duration of the construction period. Further details on mitigation is provided section 8.8 of the BDAR.
Residual impact	A Significant Impact Criteria assessment for the Gang-gang Cockatoo is provided in Table E.3. The assessment concluded that the project would have a high likelihood of significant residual impact on the species, requiring offsets.
Offsets required	Section 9.5 of the BDAR outlines the offset strategy for the project. Under the bilateral agreement, only one decision including conditions on approval is made by NSW, accounting for NSW MNES. The EPBC Act condition setting policy (DAWE 2020) notes that where a project demonstrates compliance with an endorsed state or territory policy, the proponent will not be required to simultaneously comply with the corresponding Australian Government policy. As such, Transgrid is not required to calculate offsets separately using the *EPBC Act offsets policy* (DSEWPAc 2012) and associated calculator, unless offsets are required for a species not listed under the BC Act or MNES are likely to be significantly impacted by the project. The Gang-gang Cockatoo is a dual credit species, listed as an endangered species under both Acts with offsets under the BOS dependant on whether foraging or breeding habitat is being impacted. Breeding has been assumed given the record of lone males and a young individual flying over the subject land in a family group during breeding season and the number of suitable hollows in the study area. The species has a high likelihood of significant residual impact (requiring offsets). Under the BOS, offsets for Gang-gang Cockatoo would be generated as species credits associated with potential breeding habitat (refer to section 9.1.3). Under the *EPBC Act offsets policy*, 420 ecosystem credits would be required to offset significant impacts to this MNES (see Table 9.8).

E-2-4 Significant impact criteria assessment for Gang-gang Cockatoo

The significant impact criteria assessment for Gang-gang Cockatoo is presented in Table E.3 below.

Table E.3 Significant impact criteria assessment for Gang-gang Cockatoo

Criteria	Discussion
According to the DotE (2013) 'significant impact criteria', an action is likely to have a significant impact on an endangered or critically endangered species if there is a real chance or possibility that it will:	
Lead to a long-term decrease in the size of a population of a species	The project will remove Gang-gang Cockatoo habitat, for the construction and operation of a new 330 kV transmission line and double circuit transmission structures between the Mount Piper 330 kV/500 kV substation and the Wallerawang 330 kV substation The project involves widening an existing 8 km easement by 15 m, removing a total of 10.39 ha of known foraging and potential breeding habitat for this species, with impacts concentrated along the 4 km long portion in the upper elevations of the subject land. Clearing of vegetation will result in the loss of an estimated 84 hollow-bearing trees with openings of over 5 cm diameter. Various individuals and family groups were observed during surveys, showing regular use of the subject land and surrounds. The species is highly mobile and large patches of foraging and breeding habitat occur in the locality, particularly in nearby parks and reserves. It is estimated that 54% of the species' distribution occurs within NSW Gardens of Stone SCA (DAWE 2022), however the 2019/20 bushfires impacted large areas of Gang-gang Cockatoo habitat in the locality and region. The 2019/20 bushfires, including the Gosper's Mountain Fire which burnt large areas of the Blue Mountains World Heritage Area and surrounds, were unprecedented in their intensity and extent and are likely to have had a significant effect on Gang-gang Cockatoo population size (DAWE 2022). These fires were a key reason that the species was listed as endangered. Areas not affected by the 2019/2020 fires, such as that found in the study area, would have a much greater importance to the local population. The loss of 10.39 ha of known foraging habitat and many hollow-bearing trees that may be used for breeding would exacerbate loss of habitat that has occurred in the locality in recent years. While this clearing occurs along the edges of an existing easement it may lead to a long-term decrease in the size of a population. Operational impacts including the low risk of collision or entanglement from overhead transmission lines, is unlikely to lead to a long-term risk in the population, noting the species is already habituated to powerlines along existing transmission lines within the subject land.
Reduce the area of occupancy of a population	There are an estimated 25,300 (range 17,600 – 35,200) mature individuals in the wild with a declining trend. The species' extent of occurrence and area of occupancy are estimated to be stable at 400,000 km^2 and 30,000 km^2, respectively (DAWE 2022). Previously Gang-gang Cockatoos were widespread in eastern NSW, ranging from the central slopes and tablelands, east to the south coast and central-eastern NSW. Records indicate the species is present in the Greater Blue Mountains World Heritage Area, the Mid and Lower Central Coast. Isolated records are known to occur as far north as Coffs Harbour and west as Mudgee. The species was once widespread in Sydney; however, this population has greatly reduced. It is estimated that 54% of the species occurs in within New South Wales Gardens of Stone SCA (DAWE 2022), although as noted above, large areas of this habitat were impacted by the 2019/2020 bushfires. The loss of 10.39 ha of habitat (including probable breeding habitat) along 4 km of an existing easement is unlikely to reduce the area of occupancy of a population. Impacts would mainly occur within a 15 m wide strip along the edge of the easement. Surrounding vegetation, particularly within the Gardens of Stone SCA, would continue to provide habitat for the species.
Fragment an existing population into two or more populations	The project would remove 10.39 ha of habitat for the Gang-gang Cockatoo, predominantly from with a 15 m wide strip of vegetation along the edges of an existing easement, expanding the gap between canopied vegetation from 45 m to 60 m wide. The project would further fragment existing habitat for this highly mobile, wide-ranging species but would not provide a barrier to the movement of Gang-gang Cockatoos between foraging grounds and breeding grounds. The project would not isolate any areas of habitat or sever any connecting links. While the project will remove 10.39 ha of habitat, impacts are spread along the edge of 4 km of an existing cleared easement. Given the species is highly mobile, the project is unlikely to fragment a population into two or more populations.

Criteria	Discussion
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. The Conservation Advice for the species notes that habitat critical to the survival of the Gang-gang Cockatoo includes all foraging habitat during both the breeding and non-breeding season (DAWE 2022). The species feeds opportunistically depending on food availability, therefore may not occupy areas that constitute habitat critical to the survival in any one given year. The species is more likely to occur in the study area during the breeding season and move to lower altitudes during winter. Gang-gang Cockatoos rely on stands of suitable hollow-bearing trees, which are a key component of their breeding habitat. Habitat critical to the survival includes hollow bearing trees with known or potential Gang-gang Cockatoo hollow chambers that are generally around 20 cm in floor diameter, around 50.5 cm deep (range 22–90 cm) and occur between around 7.5 m (range 5–9.4 m) above the ground. Stands of trees within or adjacent to known breeding areas, that are likely to become hollow bearing in future years, are also key components of this species' habitat (DAWE 2022). The project would remove 10.39 ha of foraging habitat and 84 hollow-bearing trees that may provide breeding habitat from along the edge of an existing cleared easement. This would result in a moderate loss in foraging resources. While larger patches of foraging and breeding habitat occur in the locality, particularly in nearby parks and reserves, unburnt habitat such as that present in the subject land is likely to have a greater importance. Given the loss of foraging habitat and likely impacts to breeding habitat, the project is likely to adversely affect habitat critical to the survival of a species.
Disrupt the breeding cycle of a population	Gang-gang Cockatoos have been recorded on site during the breeding season. Breeding aggregations are often formed where multiple nests are situated within a few hundred metres of each other. This is dependent on the availability of suitable stands of hollow bearing trees. Gang-gang cockatoos breed in multiple nest trees over different years, which is thought to decrease nest parasitism and predation. Around half of the known nest trees are used each year. Stands of trees close to known breeding areas, likely to produce hollows in the future, are also considered important features of the species habitat (DAWE 2022). The project involves widening an existing easement by 15 m, removing a total of 10.39 ha of known foraging and potential breeding habitat for this species, with impacts concentrated along the 4 km long portion in the upper elevations of the subject land. Clearing of vegetation will result in the loss of an estimated 84 hollow-bearing trees with openings of over 5 cm diameter that may be suitable for nesting. Large numbers of hollow-bearing trees were recorded adjacent to the subject site and would occur throughout the Gardens of Stone SCA and surrounds. As noted earlier, habitat in the study area may have a greater importance for the local population given the substantial impact of the 2019/2020 fires on habitat in the locality. The project would further fragment existing habitat but would not provide a barrier to the movement of Gang-gang Cockatoos between foraging grounds and breeding grounds. The project would not isolate any areas of habitat or sever any connecting links. The loss of 10.39 ha of known foraging habitat and many hollow-bearing trees that may be used for breeding would exacerbate loss of habitat critical to the survival of the species that has occurred in the locality in recent years. While this clearing occurs along the edges of an existing easement it may disrupt the breeding cycle of a population.
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 remove 10.39 ha of foraging habitat for the Gang-gang Cockatoo from along the edge of an existing easement, expanding the gap between native vegetation. The project would not isolate any areas of habitat or sever any connecting links. Clearing of vegetation from the easement would not affect the ability of the species to move between breeding and non-breeding areas. The project would remove patches of potential breeding habitat especially within Gardens of Stone SCA. Occupied breeding hollows could not be verified during surveys, however breeding has been assumed given the observations of a juvenile with a family group and lone males during breeding season. Large areas of similar habitat occur in the adjacent Gardens of Stone SCA and surrounds. While suitable foraging and breeding habitat is present, the loss of 10.39 ha of habitat spread along a 15 m wide x 4 km long strip of vegetation is unlikely to result in the decline of the species.

Criteria	Discussion
Result in invasive species that are harmful to a vulnerable species becoming established in the endangered or critically endangered species habitat	Both invasive and predator species already occur in the locality and surrounds. Historical land use in the study area (for the construction and operation of an existing easement) has led to the establishment of invasive species that are potentially harmful to the species' habitat. The project is unlikely to result in additional invasive species in the woodland habitat. Predator species have been shown to prefer moving down linear clearings which could increase predation risk for native species (Dawson et al 2017). The widening of an existing easement is unlikely to increase the number of predator species or introduce new predator species into the existing habitat.
Introduce disease that may cause the species to decline	Gang-gang Cockatoo are vulnerable to Psittacine circoviral (beak and feather) disease (Sarker et al. 2014). The disease is naturally occurring and the project is unlikely to introduce Psittacine circoviral (beak and feather) disease to the local Gang-gang population.
Interfere substantially with the recovery of the species	At the time of writing, there was no published Recovery Plan for the species, however the Conservation Advice notes the significance of habitat loss through land clearing as a key conservation and management objective (DAWE 2022). The project will remove 10.39 ha of known Gang-gang Cockatoo foraging habitat and likely breeding habitat. The widening of the existing easement will not fragment habitat or further create a barrier to movement of Gang-gang Cockatoo into and around these areas. Given the extent of habitat that would be removed and the likelihood of breeding habitat being impacted, the project is likely to interfere with the recovery of the Gang-gang Cockatoo.
Conclusion	The project is likely to have a high likelihood of significant residual impact on the Gang-gang Cockatoo as: – 10.39 ha of known Gang-gang Cockatoo foraging habitat would be removed. – 84 hollow-bearing trees that are potential breeding habitat would be removed. – This loss of vegetation would exacerbate loss of habitat critical to the survival of the species that has occurred in the locality in recent years as a result of the 2019/2020 fires.

E-3 Black Gum

E-3-1 Description

Distribution

Black Gum (*Eucalyptus aggregata*) is endemic to south-eastern Australia and is found in the ACT, NSW and in a small isolated sub-population in Victoria. The species occurs mainly in the wetter, cooler and higher parts of the tablelands, and is found at altitudes of 600–1200 m and in areas with annual rainfall of 600–900 mm. In NSW, the species occurs predominantly in the South-eastern Highlands IBRA bioregion with the most eastern part of the distribution being located just within the Sydney Basin IBRA bioregion (TSSC 2015).

Habitat requirements

Black Gum grows on alluvial soils in, poorly drained flats and hollows adjacent to swamps, creeks and small rivers and up adjoining slopes (up to 8 m above waterline) onto Ordovician Sandstones and shales. It is usually found in open woodland with a grassy understory dominated by River Tussock (*Poa labillardierei*) or Kangaroo Grass (*Themeda triandra*) and with few shrubs present. Black Gum is often found with other eucalypts including Snow Gum *(Eucalyptus. pauciflora*), Ribbon Gum (*E. viminalis*), Candlebark (*E. rubida*), Black Sallee (*E. stellutata*) and Swamp Gum (*E. ovata*) (TSSC 2015).

Critical habitat

No Critical Habitat as defined under Section 207A of the EPBC Act has been identified or included in the Register of Critical Habitat.

No habitat critical to the survival of the species has been defined. Most stands consist of scattered trees on grazed privately owned land or as linear clusters along road edges. Only nine per cent of stands had more than 200 mature trees and occurred in continuous woodland vegetation habitat (TSSC 2015). Habitat that supports larger or more viable populations may be considered critical to the survival of the species.

Important populations

The larger and more viable stands of Black Gum in NSW are important and include locations at Black Springs, Wallerawang, south of Braidwood near the Shoalhaven River, and the Bendoura Travelling Stock Reserve (Field, pers. comm., 2014, in TSSC 2015). Given its disjunct location, the Woodend sub-population is considered to be important, as is the Wingecarribee local government area sub- population that has been listed as an endangered population by the NSW Scientific Committee. The NSW OEH ‘Saving Our Species’ program has identified four management sites, including a site in the Bendoura area, Back Creek Travelling Stock Reserve, Cox Rivers area and one potential translocation site (NSW OEH 2013), all of which should be considered important stands. The ACT stand of Black Gum is important as it occurs on the edge of the species’ distribution and may contain important genetic variability which could be of assistance to the conservation of the species in a changing climate (EPD, pers. comm., 2014).

E-3-2 Relevant guidelines and policy statements

Relevant guidelines and policy statements include:

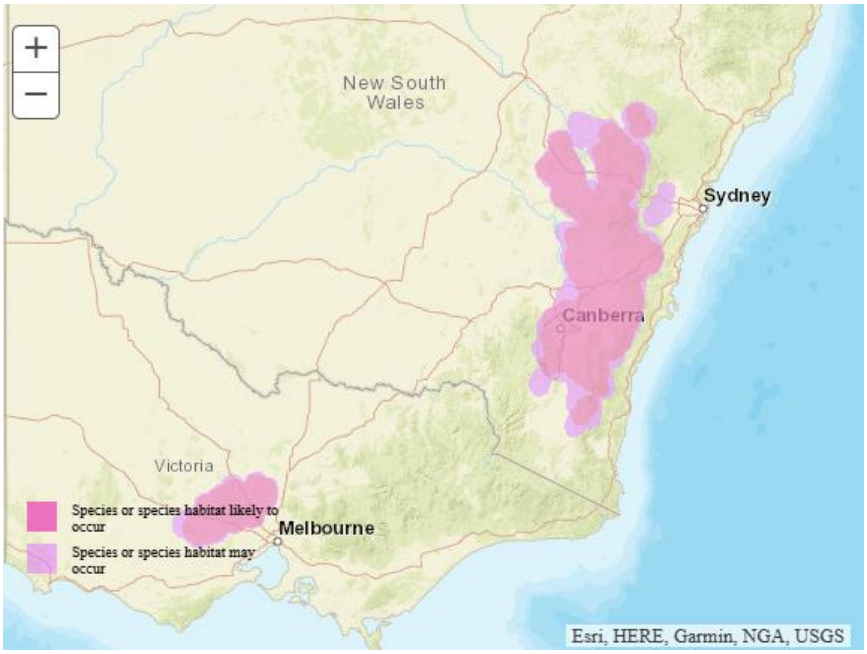
– Approved Conservation Advice for *Eucalyptus aggregata* (TSSC 2015).

Note the Listing Advice is incorporated within the Conservation Advice for the species. There is no recovery plan or threat abatement plan available.

E-3-3 NSW Bilateral assessment requirements

The NSW bilateral assessment requirement considerations for the Black Gum are presented in Table E.4.

Table E.4 Consideration of Eucalyptus aggregata against supplementary SEARs requirements

Item 16 requirement in supplementary SEARS	Black Gum (*Eucalyptus aggregata*)
Description of habitat	Occupied habitat for the Black Gum in the study area is associated with the following vegetation zones: – 3385_Good – 3385_Moderate – 3385_Paddock_trees – 3932_Moderate The species has mostly been recorded on alluvium soils along damp drainage flats at the bottom of slopes and creek lines, within PCT 3385. This PCT is described as tall open woodland with a mixed canopy of Silver Wattle (*Acacia dealbata* subsp. *dealbata*), Snow Gum (*Eucalyptus pauciflora*), Manna Gum (*Eucalyptus viminalis*), Black Gum (*Eucalyptus aggregata*) and Candlebark (*Eucalyptus rubida*), with a mixed understory of native and exotic species. Black Gums are restricted to the habitat adjacent to the drainage flats and quickly taper out of the woodland composition beyond drainage and creek lines. A small number of Black Gum are present within PCT 3932 at the southern end of the subject land. This PCT occupies 2.38 ha of the subject land and comprises an overstory of Black Gum with a midstorey of Manuka (*Leptospermum scoparium*), with a mixed native and exotic understory. High levels of recruitment were observed in PCT 3385. This PCT occupies 10.98 ha of the subject land. The locations of Black Gum in the study area and potential habitat for the species is shown in Figure 5.1 and Figure 5.7. The modelled distribution map of Black Gum (Cwth DCCEEW 2025b) in Australia is provided in Figure E.2 below.  ***Figure E.2 Distribution map for Eucalyptus aggregata***
Survey methodology	Black Gum is a species credit species under the BAM and is surveyed with reference to the BAM guidelines (DPIE 2020). This involved systematic traverses of the subject land by qualified ecologists at 20m spacing. Samples of Black Gum were also collected and sent to the Australian Botanic Gardens which confirmed a positive identification of the species on site. Further details on the general methodology and threatened flora traverses (which is also appropriate for this species) is provided in section 2.5.3 of the BDAR.

Item 16 requirement in supplementary SEARS	Black Gum (*Eucalyptus aggregata*)
Construction impacts	Quantum of impact: Up to 5.89 ha of occupied habitat (refer to section 5.2.2) and 274 individual species would be directly impacted in the construction phase of the project. These are predominately occurring in stands within and adjacent to the decommissioned Wallerawang Power Station and includes up to 60 seedlings and resprouting saplings within a slashed electricity easement. This would include vegetation clearing and modification such as pruning required for site establishment and setup of construction compounds and laydown facilities, establishment of new temporary access tracks, upgrade works to existing access tracks and drainage features where required, footings for new transmission structures, widening of existing easements and managing hazard trees identified around the easement by the project. Duration of impact: Construction would be undertaken in stages and in multiple locations over a period of up to 24 months. Consequence of impact: High.
Operational impacts	The populations on either side of the alignment will experience a minor increase in fragmentation from the operational impacts, widening areas from 45 m to 60 m and pruning and continued maintenance of trees to prevent contact with the overhead powerlines. Given the areas are already separated by a 45 m easement and undergo regular maintenance the risk is expected to be low. Overall, the operational impacts on Black Gum are low.
MNES specific avoidance and mitigation	Avoidance and minimisation measures have been considered as part of the route selection of the project and also development of the project elements such as the following: – Refinement of new easement through Gardens of Stone SCA to include vegetation removal on the north side of existing easement only – Limited additional clearing along access tracks in the SCA. Further details on avoidance and minimisation of impacts is provided in provided in Chapter 7 and section 8.8 of the BDAR. Mitigation measures recommended for this species include: – Identify opportunities to avoid and minimise impacts during detailed design with consideration to retaining vegetation and trees, where possible, to improve connectivity values and/or minimise impacts on threatened species and their habitats, such as Eucalyptus species (e.g. *Eucalyptus aggregata*). – Pre-clearing surveys to confirm species for removal and species for retention, with the aim to avoid and minimise impacts on Black Gum, where possible. – A Vegetation Clearance Procedure, which will require the limit of clearing and construction boundary to be surveyed and clearly demarcated using high visibility tape. All vegetation outside the boundary will be clearly sign posted and marked on plans as an exclusion zone. Signage will be maintained for the duration of the construction period. Further details on mitigation is provided section 8.8 of the BDAR.
Residual impact	A Significant Impact Criteria assessment for Black Gum is provided in Table E-5. The assessment concluded that the project would have a significant impact on the species.
Offsets required	Section 9.5 of the BDAR outlines the offset strategy for the project. Under the bilateral agreement, only one decision including conditions on approval is made by NSW, accounting for NSW MNES. The EPBC Act condition setting policy (DAWE 2020) notes that where a project demonstrates compliance with an endorsed state or territory policy, the proponent will not be required to simultaneously comply with the corresponding Australian Government policy. As such, Transgrid is not required to calculate offsets separately using the *EPBC Act offsets policy* (DSEWPAc 2012) and associated calculator, unless offsets are required for a species not listed under the BC Act or MNES are likely to be significantly impacted by the project. Black Gum is a species credit species, listed as a vulnerable species under the BC Act and an endangered species under the EPBC Act. The species has a high likelihood of significant residual impact (requiring offsets). Residual impacts to the species will be offset in accordance with the BOS through the generation of species credits (refer to section 9.1.3). Under the *EPBC Act offsets policy*, 548 species credits would be required to offset significant impacts to this MNES (see Table 9.8).

E-3-4 Significant impact criteria assessment for Black Gum

The significant impact criteria assessment for *Eucalyptus aggregata* is presented in Table E.5 below.

Table E.5 Significant impact criteria assessment for Eucalyptus aggregata

Criteria	Discussion
According to the DotE (2013) 'significant impact criteria', an action is likely to have a significant impact on an endangered or critically endangered species if there is a real chance or possibility that it will:	
Lead to a long-term decrease in the size of an important population of a species	The Conservation Advice indicates that there are fewer than 10,000 mature trees left, with the majority (6300 – 8000) occurring in NSW. The major threats to the species are mortality as a result of habitat clearance, suppression of gene flow due to habitat fragmentation, lack of recruitment and genetic hybridisation (TSSC 2015). The Conservation Advice identifies several important populations in NSW, including the population at Wallerawang (TSSC 2015). It is assumed this population incorporates all individuals in the study area. The project will remove or modify patches of native vegetation including 274 individuals of *Eucalyptus aggregata*, most of which occur within on the Coxs River flats near the former Wallerawang power station. Some individuals would also be removed from riparian vegetation in the Gardens of Stone SCA in upper elevations of the study area. There is evidence of natural recruitment of the species within the study area. There are areas of intact native vegetation that support numerous specimens of the species in the study area, including along creek lines that cross the subject land in the SCA, and adjacent to the subject land at Wallerawang. There are 627 records of the species within 10km of the subject land. The removal of 274 individuals, that were not included in the 627 records from the locality, would result in a loss of 30.4% of the total known population of the species from the locality. The removal of 274 individuals may lead to a long-term decrease in the size of the Wallerawang important population.
Reduce the area of occupancy of an important population	The area of occupancy of the Wallerawang population has not been defined (TSSC 2015), however records occur from Lithgow in the south to Cullen Bullen in the north-west and Angus Place in the north. The area of occupancy of this population is estimated to be less than 15 km^2 and much less if it only includes individuals in the Wallerawang area. The project will remove 5.89 ha of land that supports 274 specimens of the species, representing around 0.4% of the area of occupancy of the important population (based on the large area), or up to 30.4% of the total known population of the species from the locality. The project could reduce the area of occupancy of the population.
Fragment an existing important population into two or more populations	The project would require the removal or substantial pruning of specimens of *Eucalyptus aggregata* along the edges of the existing cleared easement. The proposed actions would increase the fragmentation between the two existing large patches of intact vegetation present on each side of the alignment in the Gardens of Stone SCA by increasing the width of the easement from 45 m to 60 m. In this area the project will only slightly increase the existing fragmentation but will not create a new level of fragmentation in the landscape for the local important population. On the Coxs River flats many individuals would be removed from scattered stands of trees separated by cleared land. While individuals would be retained adjacent to the subject land, the distances between stands of trees would increase. All individuals in the study area are considered to be part of the Wallerawang important population which occurs as various scattered patches of trees within a 15 km^2 area. The loss of individuals from stands would increase fragmentation of the important population but would not fragment the population into two or more populations.
Adversely affect habitat critical to the survival of a species	No areas of habitat critical to the survival of the species are identified in the conservation advice for the species (TSSC 2015). The project will remove or modify patches of native vegetation including 274 individuals of *Eucalyptus aggregata*, most of which occur within on the Coxs River flats near the former Wallerawang power station and are part of the Wallerawang important population. Few important populations are identified, and thus stands in the study area are considered critical to the survival for the species. While these individuals often occur as monotypic stands over a highly disturbed ground layer, the loss of 274 individuals is likely to affect habitat critical to the survival of the species.

Criteria	Discussion
Disrupt the breeding cycle of an important population	The Conservation Advice refers to several important populations in NSW, including at Wallerawang (TSSC 2015). *Eucalyptus aggregata* flowers from November to May and pollination occurs by insects, birds and mammals. Seed is dispersed locally by wind, water and gravity and there is no dormancy phase. Maximum seed fall is thought to be between late summer and early autumn (TSSC 2015). The project will remove 274 individuals throughout the existing easement. Individuals to be removed include both mature individuals and seedlings. The project is unlikely to represent a barrier to movement for seed dispersal, but management of the easement would prevent growth of seedlings and therefore this may disrupt the breeding cycle of *Eucalyptus aggregata.*
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 will remove 5.89 ha of land that supports 274 specimens of the species. The majority of this clearing will occur on the river flats of the Coxs River, which is already subject habitat disturbance as a result of existing management practises in and around the former Wallerawang power station. The loss of a substantial number of individuals from an important population and the decrease in the availability of habitat may lead to a decline in the species. Available survey data indicates there are 6,300 to 8,100 mature Black Gum trees in NSW (NSW Scientific Committee, 2010). The loss of 274 individuals as a result of the project would represent a decrease of the population in NSW between 3.4% and 4.3% per cent.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Invasion by weeds is identified in the conservation advice for the species as a known threat (TSSC 2015). Invasion by Blackberry (*Rubus* sp.) is noted as a particular concern in the local region. Blackberry is established across large portions of the subject land, including within the existing cleared alignment and edges. It is likely that existing infestations would continue to grow in size and number, potentially endangering the ongoing persistence of the species in the subject land.
Introduce disease that may cause the species to decline	Diseases are potential threats to the species. These include *Phytophthora cinnamomi* (Cinnamon Fungus) and *Puccinia psidii* (Myrtle Rust). Both are found in NSW and Victoria but their impact on this species is currently unknown (TSSC 2015). The project is unlikely to introduce disease into the subject land that may cause the species to decline. Mitigation measures are included in this BDAR and are recommended for inclusion in the CEMP for the project to limit the potential for introduction of any diseases of relevance to this species.
Interfere substantially with the recovery of the species	There is no recovery plan for *Eucalyptus aggregata*. The Conservation Advice for the species identifies the main threats and recommended recovery activities for the species. Threats include: – habitat clearance – suppression of gene flow due to habitat fragmentation – lack of recruitment – genetic hybridisation (TSSC 2015). The project will remove 5.89 ha of known habitat and 274 individuals from an important population of this species. Given the extent of habitat that would be removed, the project is likely to interfere with the recovery of the species.
Conclusion	The project has a high likelihood of a significant impact on *Eucalyptus aggregata* as: – It will remove 5.89 ha of land that supports 274 specimens of the species. – Trees to be removed make up around 30.4% of the total known population of the species from the locality. – The loss of *Eucalyptus aggregata* as a result of the project could substantially affect the extent of the Wallerawang important population.

E-4 Brown Treecreeper

E-4-1 Description

Distribution

Brown Treecreepers (south-eastern) are endemic to south-eastern Australia from the Grampians in western Victoria, through central New South Wales to the Bunya Mountains in Queensland, and from the coast to the inland slopes of Great Dividing Range. In New South Wales the western boundary of the range of *Climacteris picumnus victoriae* runs approximately through Corowa, Wagga Wagga, Temora, Forbes, Dubbo and Inverell and along this line the subspecies intergrades with the arid zone subspecies *C. p. picumnus* (Cth DCCEEW 2024b). The species is considered sedentary within its range, occupying permanent territory, although some birds may disperse after breeding (Cth DCCEEW 2024b).

Habitat requirements

The Brown Treecreeper occurs in woodlands and dry open forest, usually dominated by stringybarks or rough-barked species with open grassy understorey. Fallen timber is important foraging habitat. The Brown Treecreeper nests in hollows in standing trees or stumps. It spends about half of its foraging time on the ground, and the other half on tree trunks. Brown Treecreeper use scattered trees to move outside their natal remnants more than they used corridors, but only rarely crossed gaps of more than about 100 m between trees. Brown Treecreepers are reluctant to cross gaps of more than 60 m between patches of vegetation and have consequently declined across fragmented habitat. The species is rare in woodlands with a dense shrub layer and is absent from degraded woodlands and steep rocky hills. Preferred habitat includes that subject to ongoing disturbance to prevent a build-up of dense understory (Cth DCCEEW 2024b).

Breeding takes place between July and February, typically within a cooperative breeding group comprising a breeding pair and subordinate males. The Brown Treecreeper (south-eastern) utilises a variety of eucalypt species for nesting and roosting. Hollows in large living and dead trees are essential for breeding and roosting. Breeding is more successful in areas with lower densities of shrubs, moderate levels of ground cover, greater amounts of foraging substrate and greater invertebrate biomass and substantial amounts of fallen timber (Cth DCCEEW 2024b).

Critical habitat

No Critical Habitat as defined under Section 207A of the EPBC Act has been identified or included in the Register of Critical Habitat.

According to the conservation advice for the species, habitat critical to the survival of the Brown Treecreeper (south-eastern) includes areas that have:

– relatively undisturbed grassy woodland with native understorey
– open habitat structure at the ground level mostly often created by moderate levels of disturbance by fire and/or grazing
– large living and dead trees (essential for roosting, nesting sites and foraging)
– fallen timber (essential for foraging)
– hollows in standing dead or live trees and tree stumps (essential for nesting).

Important populations

Important populations have not been defined for the Brown Treecreeper. Important populations may include:

– 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.

E-4-2 Relevant guidelines and policy statements

Relevant guidelines and policy statements include:

– Approved Conservation Advice for Brown Treecreeper (Cth DCCEEW 2024b).

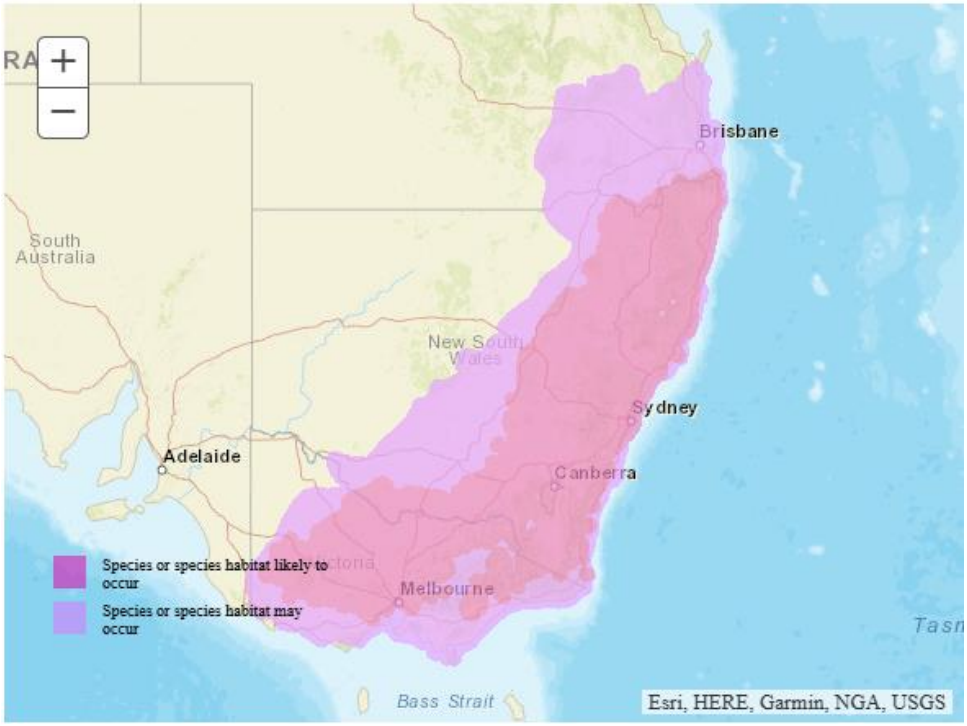
Note the Listing Advice is incorporated within the Conservation Advice for the species. There is no recovery plan or threat abatement plan available.

E-4-3 NSW Bilateral assessment requirements

The NSW bilateral assessment requirement considerations for the Brown Treecreeper are presented in Table E6.

Table E.6 Consideration of Brown Treecreeper against supplementary SEARs requirements

Item 16 requirement in supplementary SEARS	Brown Treecreeper
Description of habitat	Habitat for the Brown Treecreeper in the study area is associated with the following vegetation zones: – 3369_Good – 3369_Shrubland – 3385_Good – 3385_Moderate – 3385_Paddock_trees – 3735_Good – 3735_Shrubland – 3747_Good – 3747_Shrubland – 3749_Good – 3749_Shrubland. In total, 40.15 ha of potential habitat is present, comprised of up to 13.49 ha of woodland and forest containing hollow-bearing trees, and 26.66 ha of derived shrubland. Poor condition vegetation is not considered suitable due to the low cover and lack of fallen timber. The vegetation in the study area is generally open although some forested areas can occasionally comprise a low to moderate midstory of Sifton Bush, Box-leaved Wattle, Swamp Wattle, Parramatta Wattle, Black Wattle or Dolly Bush. The species requires ongoing disturbance to keep its habitat open and evidence of fire was recorded within the Gardens of Stone SCA. It is presumed that a fire-burning regime is in place for this National Park, which would create better quality habitat for this species. It is unlikely that lands owned by former Wallerawang Power Station, Centennial Springvale Coal Services Facility or EnergyAustralia would be subject to these mandatory fire-burning regimes, thus these areas would likely provide lower quality contiguous habitat for the species. Scribbly Gum forest in the SCA and surrounds generally had an open structure and would provide good quality habitat for the subspecies. The species was incidentally recorded during site investigations by Umwelt in 2022. Historical records of the species occur in the locality (10 km). Two of these historical records occur within the subject land, over 13 years ago (NSW DCCEEW 2025a). No individuals were recorded during the 2023-2025 surveys, although two common treecreeper species were recorded. Suitable potential habitat occurs within eucalypt woodland and forest throughout the subject land; however the species has not been recorded during field surveys over multiple seasons and years, despite the species being described as sedentary, noisy and conspicuous with permanent territories (Cth DCCEEW 2024b). Individuals in the locality are most likely to use the subject land only on occasion and not as part of their core habitat. Low density firewood collection/clearing and hazard tree removal was noted from within the Gardens of Stone SCA and adjacent woodland areas owned by Energy Australia and Centennial Springvale Coal Services Facility along the existing easement, which may benefit this species due to creation of tree stumps which may be used for nesting. The project may result in the removal of hollow-bearing trees which may comprise potential breeding habitat as well as potential foraging habitat for this species. The modelled distribution map of the Brown Treecreeper (Cth DCCEEW 2024b) in Australia is provided in Figure E.3 below.

Item 16 requirement in supplementary SEARS	Brown Treecreeper
	 ***Figure E.3 Distribution map for Brown Treecreeper***
Survey methodology	The Brown Treecreeper is an ecosystem credit species under the BAM, and does not have formal guidelines which recommend how to adequately survey for the species. According to the TBDC (NSW DCCEEW 2024b), the species can be surveyed all year around. Surveys for the Brown Treecreeper have occurred between August 2023 and October 2024, as part of a nest tree census, where the same hollow-bearing tree and/or nest has been visited on multiple occasions, or as part of a dedicated bird survey where GHD ecologists random meander for at least 40 person minutes, recording all observations (via sight and call). Further details on the general methodology for bird surveys and nest tree census (which is also appropriate for this species) is provided in section 2.6 of the BDAR.
Construction impacts	Quantum of impact: Up to 40.15 ha of potential foraging habitat, including up to 13.5 ha of potential forest or woodland containing hollow-bearing trees, would be directly impacted in the construction phase of the project. This would include vegetation clearing and modification required for site establishment and setup of construction compounds and laydown facilities, establishment of new temporary access tracks, upgrade works to existing access tracks and drainage features where required, footings for new transmission structures, widening of existing easements and managing hazard trees identified around the easement by the project. Duration of impact: Construction would be undertaken in stages and in multiple locations over a period of up to 24 months. Consequence of impact: Moderate
Operational impacts	The Brown Treecreeper has the potential to fly at the height of the overhead transmission lines with collision risk an outside possibility. Given the overhead transmission lines will remain mobile (as opposed to the blades of a wind turbine), collision risk is expected to be low. Overall, the operational impact on the Brown Treecreeper from this project is low.
MNES specific avoidance and mitigation	Mitigation measures relevant to this species include: – protocols for pre-clearing surveys and clearing of vegetation to minimise the risk of mortality of fauna. Design refinements which may minimise impacts to this species includes: – refinement of new easement through Gardens of Stone SCA include vegetation removal on the north side of existing easement only – limited additional clearing along access tracks in the SCA. Further details on avoidance and mitigation is provided in Chapter 7 and section 8.8 of the BDAR.

Item 16 requirement in supplementary SEARS	Brown Treecreeper
Residual impact	A Significant Impact Criteria assessment for the Brown Treecreeper is provided in Table. The assessment concluded that the project would not have a significant impact on the species.
Offsets required	Section 9.5 of the BDAR outlines the offset strategy for the project. Under the bilateral agreement, only one decision including conditions on approval is made by NSW, accounting for NSW MNES. The EPBC Act condition setting policy (DAWE 2020) notes that where a project demonstrates compliance with an endorsed state or territory policy, the proponent will not be required to simultaneously comply with the corresponding Australian Government policy. As such, Transgrid is not required to calculate offsets separately using the *EPBC Act offsets policy* (DSEWPAc 2012) and associated calculator, unless offsets are required for a species not listed under the BC Act or MNES are likely to be significantly impacted by the project. The Brown Treecreeper is listed as a vulnerable species under both the BC and EPBC Act. The species has a low likelihood of significant residual impact. No credits are required for this species under the *EPBC Act offsets policy*, however offsets have been calculated and would be generated through retirement of 914 ecosystem credits (see Table E.1).

E-4-4 Significant impact criteria assessment for Brown Treecreeper

The significant impact criteria assessment for Brown Treecreeper is presented in Table E.7 below.

Table E.7 Significant impact criteria assessment for Brown Treecreeper

Criteria	Discussion
According to the DotE (2013) 'significant impact criteria', an action is likely to have a significant impact on an endangered species if there is a real chance or possibility that it will:	Important populations for the Brown Treecreeper have not been defined in the conservation advice for the species. No individuals were recorded during surveys for the BDAR, however scattered records occur in the locality and there is a previous record in the study area, and many records are present in the Capertee Valley over 20 km north of the study area. The Brown Treecreeper in the study area is unlikely to be a key source population for breeding or dispersal, necessary for maintaining genetic diversity, and/or near the limit of the species' range.
Lead to a long-term decrease in the size of an important population of a species	The project will remove a total of 40.15 ha of Brown Treecreeper habitat, including up to 13.5 ha of potential forest or woodland containing hollow-bearing trees, for the construction and operation of a new, approximately 8 km long, 330 kV transmission line and double circuit transmission structures between the Mount Piper 330 kV/500 kV substation and the Wallerawang 330 kV substation. The project involves widening an existing 8 km easement, with most impacts on habitat for this species occur along a strip 15 m wide by 4 km long. Whilst this would remove foraging habitat and potential breeding habitat for the species, large patches of potential foraging and breeding habitat occur in the locality, particularly in nearby parks and reserves such as the adjacent Gardens of Stone SCA. The project will widen the easement through the Gardens of Stone SCA by 15 m, extending the existing gap of 45 m to 60 m. While the project has been assessed for full loss, shrub and groundcover vegetation will be able to grow in the easement similar to the existing easement. Connectivity would be impacted during construction, but would be retained in the long term. No Brown Treecreepers were recorded during surveys for the BDAR, and as such no resident population is likely to be present. Individuals may occur on occasion while dispersing through the area. The loss of a small amount of habitat, predominantly occurring along the edges of an existing easement is unlikely lead to a long-term decrease in the size of an important population.

Criteria	Discussion
Reduce the area of occupancy of an important population	There are an estimated 68,000 (range 36,000–113,000) mature individuals in the wild, though the reliability of this estimate is low. The area of occupancy is contracting and is estimated at 30,000 km^2 (range 24,000–50,000 km^2) (Cth DCCEEW 2024b). The project would directly clear up to 40.15 ha of potential habitat, equating to ~0.53, km^2 and is 0.002% of the area of occupancy of the species. This woodland species has a widespread, though occasionally patchy, distribution across south-eastern Australia. The removal of 13.05 ha of eucalypt woodland and forest habitat and 26.66 ha of shrubland along an 8 km alignment is not likely to reduce the area of occupancy of an important population.
Fragment an existing important population into two or more populations	The Conservation Advice for the species advises to avoid gaps of greater than 100 m between scattered paddock trees or linear corridors (Cth DCCEEW 2024b). The proposed action will remove vegetation within an existing easement and also on its edges, expanding the gap between native vegetation from 45 m to 60 m. Brown Treecreepers are reluctant to cross gaps of over 60 m, and only rarely cross gaps of more than about 100 m between trees. While the easement will be near the limit of gaps Brown Treecreepers would cross, the regrowth of shrubby vegetation in the easement in the long-term is likely to help encourage movement, and as such the project would not isolate any areas of habitat or sever any connecting links. Given the species' ability to cross gaps of 60 m, and the lack of evidence of a resident population in the study area, the proposed action is unlikely to fragment an important population into two or more populations.
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 (Cth DCCEEW 2024b). The Conservation Advice for the species notes that habitat critical to the survival of the Brown Treecreeper include areas that have: – relatively undisturbed grassy woodland with native understory – large living and dead trees for roosting, nesting and foraging – fallen timber for foraging – hollows in standing dead or live trees and tree stumps for nesting (Cth DCCEEW 2023a). Any known or likely habitat should be considered as habitat critical to the survival of the species (Cth DCCEEW 2024b). The proposed action will remove 40.15 ha of potential habitat along an 8 km easement, comprising 13.5 ha of woodland and forest containing hollow-bearing trees, with the remainder being derived shrubland, the latter not being habitat critical to the survival of the species. While the subject land provides habitat features such as fallen timbers and hollows in live and dead trees, the site is already disturbed and fragmented. The proposed action may affect a small area of habitat critical to the survival of the species, however there is no recent evidence of a resident population in the study area.
Disrupt the breeding cycle of an important population	The Brown Treecreeper requires hollows in standing dead or live trees and tree stumps for breeding. The subject land contains these features on the edge of the existing transmission line in the north and also within former Wallerawang Power Station in the south. Up to 40.15 ha of potential habitat would be cleared for the project. Within this, the clearing of 13.5 ha of woodland and forest vegetation will result in the loss of an estimated 133 hollow-bearing trees that may be suitable for nesting. Large numbers of hollow-bearing trees were recorded adjacent to the subject site and would occur throughout the Gardens of Stone SCA and surrounds. Indirect impacts to breeding individuals may occur in the broader study area, where noise and vibration from construction may lead adults to abandon nests (if present). The Brown Treecreeper was not recorded during targeted field surveys in 2023/2024, although two common species were regularly observed and heard. The species is known to be sedentary, noisy and conspicuous and as such a resident population is unlikely to be present in the study area. The species was recorded incidentally in 2022. Individuals may occur on occasion while dispersing through the area. Given the limited extent of clearing along the easement compared to surrounding habitat, and lack of evidence of a resident population, the project is unlikely to lead to a long-term decrease in the size of an important population of the species.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The project would remove a mixture of habitats primarily along the edges of an existing transmission line and consisting of treed areas with a midstory, treed areas without a midstory and treeless areas with a midstory. Shrubland vegetation (26.66 ha) within the easement would provide foraging and movement habitat but not breeding habitat. While the subject land provides up to 13.05 ha of habitat features such as fallen timbers and hollows in live and dead trees, the site is disturbed, fragmented and subject to habitat degradation through illegal firewood collection and recreational use by motorbike riders.

Criteria	Discussion
	The clearing of the edges of an existing transmission line is likely to increase the gap between native vegetation, but is unlikely to prevent the ability of the Brown Treecreeper to travel between patches of vegetation. The species is known to be able to cross gaps of 60 m, which will be width of the easement once constructed. The project would not isolate any areas of habitat or sever any connecting links. The subject land is unlikely to currently provide breeding habitat for the species or be a core component of an individuals' home range, given that the species is conspicuous but was not detected during targeted surveys during the breeding season and at other times of the year. The one observation of the species in 2022 by Umwelt may be a lone individual travelling through the region to better areas of potential habitat or be a misidentification of the White-throated Treecreeper or Red-browed Treecreeper, both of which have been commonly recorded in the study area. The project is considered unlikely to reduce the availability and quality of habitat to an extent that it would lead to a decline in the species.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Operation of the project has the potential to spread weeds and pests. The surrounding agricultural land already contains a high diversity of non-native species, and construction impacts could exacerbate the spread of these weeds into areas containing a predominantly more native understory. Predator species have been shown to prefer moving down linear clearings which could increase predation risk for native species (Dawson et al 2017). The widening of an existing easement is unlikely to increase the number of predator species or introduce new predator species into the existing habitat. Both invasive and predator species already occur in the locality and surrounds.
Introduce disease that may cause the species to decline	There are no diseases identified that are a threat to this species. The proposed action is unlikely to introduce disease that may cause the species to decline.
Interfere substantially with the recovery of the species	At the time of writing, there was no published Recovery Plan for the species (DCCEEW 2024b). The Conservation Advice for the species notes habitat loss and fragmentation as primary concern for the Brown Treecreeper, specifically that gaps greater than 100 m between trees should be avoided. Inappropriate firewood collection is also of concern (Cth DCCEEW 2024b). The project would remove vegetation primarily within an existing 8 km easement and also on its edges, expanding the gap between native vegetation from 45 m to 60 m. The project would not isolate any areas of habitat or sever any connecting links. The removal of known habitat is unlikely to substantially interfere with the recovery of the species given the lack of evidence of a resident population.
Conclusion	Commonwealth DCCEEW considered the impact to the Brown Treecreeper likely to be significant based on preliminary information provided in the referral, however taking into account the results of the detailed surveys conducted for the BDAR, the project is considered to have a low likelihood of a significant impact on the species as: – There is no evidence an important population or a resident population occurs in the study area. This species is conspicuous but was not detected during targeted surveys during the breeding season or at other times of the year during surveys undertaken between 2023-2025. The one observation of the species in 2022 by Umwelt may be a lone individual travelling through the region to better areas of potential habitat or be a misidentification of the White-throated Treecreeper or Red-browed Treecreeper, both of which have been commonly recorded in the study area. – While the project would remove up to 40.15 ha of potential habitat, 26.66 ha is shrubland vegetation only that is not suitable for breeding and is only limited value for foraging. The clearing of 13.5 ha of woodland and forest vegetation will result in the loss of an estimated 133 hollow-bearing trees. – The project will widen the easement through the Gardens of Stone SCA by 15 m, extending the existing gap of 45 m to 60 m, which is within the distance that the brown Treecreeper is willing to cross. While the project has been assessed for full loss, shrub and groundcover vegetation will be able to grow in the easement similar to the existing easement. Connectivity would be impacted during construction, but would be retained in the long term.

E-5 Regent Honeyeater

E-5-1 Description

Distribution

The Regent Honeyeater has a patchy distribution which extends from south-east Queensland, through NSW and the ACT, to central Victoria. Records are widely distributed across its range, but it is only found regularly at a few localities in NSW and Victoria where most of the sightings have been recorded.

Habitat requirements

The Regent Honeyeater is a generalist forager, although it feeds mainly on the nectar from a relatively small number of eucalypts that produce high volumes of nectar. Most records of regent honeyeaters come from box-ironbark eucalypt associations, where the species seems to prefer more fertile sites with higher soil water content, including creek flats, broad river valleys and lower slopes. Regent Honeyeaters may use different areas in different years depending on food resources. Historically, the Regent Honeyeater infrequently occurred in large aggregations at nectar sources, mostly during autumn and winter (DotE 2016).

Key eucalypt species include Mugga Ironbark, Yellow Box and White Box, as well as Swamp Mahogany in coastal areas. Flowering of associated species such as Thin-leaved Stringybark (*Eucalyptus eugenioides*) and other Stringybark species, and Broad-leaved Ironbark (*E. fibrosa*) can also contribute important nectar flows at times. Nectar and fruit from the mistletoes *Amyema miquelii, A. pendul*a and *A. cambagei* are also utilised.

Critical habitat

No Critical Habitat as defined under Section 207A of the EPBC Act has been identified or included in the Register of Critical Habitat.

Habitat critical to the survival of the Regent Honeyeater includes:

– Any breeding or foraging areas where the species is likely to occur
– Any newly discovered breeding or foraging locations.

Important populations

There are four known key breeding regions remaining for the Regent Honeyeater: north-east Victoria (Chiltern-Albury), and in NSW at the Capertee Valley (20 km north of the study area), the Bundarra-Barraba region near Gunnedah and the Hunter Valley. In NSW the distribution is very patchy and mainly confined to the two main breeding areas (Capertee Valley and Bundarra-Barraba) and surrounding fragmented woodlands. Nests are usually placed in the canopy of mature trees with rough bark, e.g. ironbarks, sheoaks (*Casuarina*) and rough-barked Apple (*Angophora*) (DotE 2016).

E-5-2 Relevant guidelines and policy statements

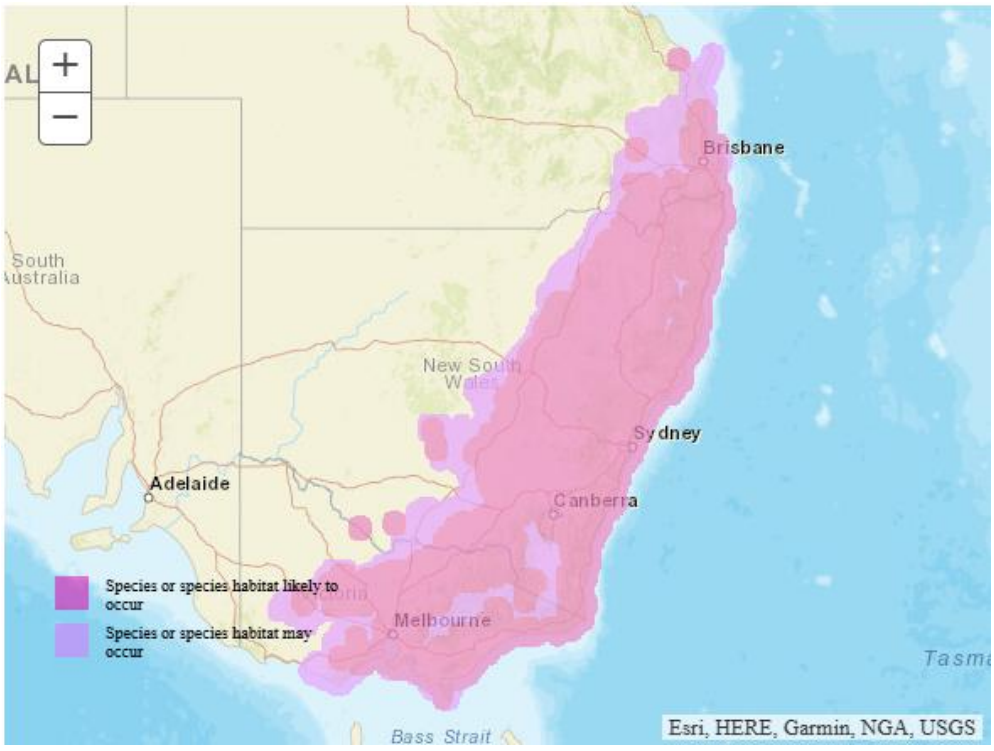
Relevant guidelines and policy statements include:

– Conservation advice Regent Honeyeater (DotE 2015b)
– National recovery plan for the Regent Honeyeater (DotE 2016).

E-5-3 NSW Bilateral assessment requirements

The NSW bilateral assessment requirement considerations for the Regent Honeyeater are presented in Table E.8.

Table E.8 Consideration of Regent Honeyeater against supplementary SEARs requirements

Item 16 requirement in supplementary SEARS	Regent Honeyeater
Description of habitat	The Regent Honeyeater is not a predicted or candidate species in the BAMC for the project due to an absence of associated PCTs. The vegetation zones in the subject that may broadly comprise potential habitat for the Regent Honeyeater are: – 3369_good – 3385_good – 3385_paddock_trees – 3735_good – 3747_good – 3749_good. The study area does not support of the favoured habitat for the Regent Honeyeater (Box Gum woodland PCTs). No key tree species or favoured mistletoe species presented in the national recovery plan (DoE 2016) have been recorded in the study area. However, there is still potential foraging habitat present in other flowering eucalyptus and mistletoe throughout the open woodland in the study area. Mapped important habitat for the species under the BAM identifies areas that are considered important for the species (e.g. breeding areas or sites where multiple records have been located over multiple years. No areas of mapped important habitat for the species occurs in the subject land. Breeding occurs in the Capertee Valley, located over 20 km north of the study area. The modelled distribution map of Regent Honeyeater (Cth DCCEEW 2025b) in Australia is provided in Figure E.4 below.  *Figure E.4 Distribution map for Regent Honeyeater*

Item 16 requirement in supplementary SEARS	Regent Honeyeater
Survey methodology	Extensive bird surveys were undertaken seasonally throughout multiple survey windows between 2023 – 2025 which would have likely recorded the species if it was regularly present in the study area. Further details on the general methodology for bird surveys is provided in section 2.6 of the BDAR.
Construction impacts	Quantum of impact: Up to 12.67 ha of non-preferred foraging habitat would be directly impacted in the construction phase of the project. This would include vegetation clearing and modification required for site establishment and setup of construction compounds and laydown facilities, establishment of new temporary access tracks, upgrade works to existing access tracks and drainage features where required, footings for new transmission structures, widening of existing easements and managing hazard trees identified around the easement by the project. The study area occurs 20 km south of a key breeding area in the Capertee Valley which would not be impacted. Duration of impact: Construction would be undertaken in stages and in multiple locations over a period of up to 24 months. Consequence of impact: Moderate
Operational impacts	The Regent Honeyeater has the potential to fly at the height of the overhead transmission lines with collision risk an outside possibility. Given the overhead transmission lines will remain fixed (as opposed to the moving blades of a wind turbine), collision risk is expected to be low. Overall, the operational impact on the Regent Honeyeater from this project is negligible.
MNES specific avoidance and mitigation	The project has not developed mitigation measures specific for this species. Design refinements which may minimise impacts to this species includes: – refinement of new easement through Gardens of Stone SCA include vegetation removal on the north side of existing easement only. Further details on avoidance and mitigation are provided in Chapter 7 and section 8.8 of the BDAR.
Residual impact	A Significant Impact Criteria assessment for the Regent Honeyeater is provided in Table E.9. The assessment concluded that the project would not have a significant impact on the species.
Offsets required	The species has a low likelihood of significant residual impact. No ecosystem or species credits have been calculated for the Regent Honeyeater as no associated PCTs for the species occur in the subject land and there would be no impact on mapped important habitat.

E-5-4 Significant impact criteria assessment for Regent Honeyeater

The significant impact criteria assessment for Regent Honeyeater is presented in Table E.9 below.

Table E.9 Significant impact criteria assessment for Regent Honeyeater

Criteria	Discussion
According to the DotE (2013) 'significant impact criteria', an action is likely to have a significant impact on an endangered species if there is a real chance or possibility that it will:	
Lead to a long-term decrease in the size of a population of a species	Due to the small number of Regent Honeyeaters left it is assumed that they comprise a single population with some exchange between areas (DotE 2016). There have been no records of Regent Honeyeaters, or any suitable habitat recorded within the subject land outside of the marginal foraging habitat present. Therefore it is assumed no population of this species occurs in the subject land and it is unlikely the project would result in a long-term decreases to the size of a\ population.
Reduce the area of occupancy of a population	There are an estimated 350-400 mature individuals in the wild, though the reliability of this estimate is low. The area of occupancy is contracting and is estimated at 300,000 km2 (DotE 2016). The removal of 12.67 ha of eucalypt woodland and forest habitat that is not preferred foraging habitat along an 8 km alignment would have a negligible reduction (0.000004%) in the area of occupancy of the Regent Honeyeater population.
Fragment an existing population into two or more populations	The proposed action would remove vegetation within an existing easement, primarily along the edge, expanding the gap between native vegetation from 45 to 60 m. The project would not isolate any areas of habitat or sever any connecting links for this species.
Adversely affect habitat critical to the survival of a species	The national recovery plan lists habitat critical to the survival of the species as below: – Any breeding or foraging areas where the species is likely to occur – Any newly discovered breeding or foraging locations. The project was refined to avoid impacts on a small patch of Box Gum Woodland located 200 m north of the subject land. No known breeding or foraging habitat is present within the subject land and there are no records of Regent Honeyeaters in the locality. Therefore, no critical habitat for this species occurs in the subject land and the proposed actions will not have an adverse effect on critical habitat for the species.
Disrupt the breeding cycle of a population	The local area is not known as a key breeding ground for the Regent Honeyeater and there is no key habitat tree species recorded in the subject land. The Capertee Valley breeding area for the species and occurs 31km to the north of the subject land. Therefore, the project would not disrupt the breeding cycle of a population of this species.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	No preferred feed trees or breeding habitat for the species are present in the subject land. The project would remove 12.67 ha of non-preferred eucalypt woodland and forest within an existing easement and also along its edges, expanding the gap between native vegetation. This vegetation to be removed comprises marginal foraging habitat for this species and no important habitat for the species occurs in the subject land or study area. The project would not decrease the available quality habitat for the species or bring a decline in the availability of habitat.
Result in invasive species that are harmful to a vulnerable species becoming established in the critically endangered species' habitat	Operation of the project has the potential to spread weeds and pests. The surrounding agricultural land already contains a high diversity of non-native species, and construction impacts could exacerbate the spread of these weeds into areas containing a predominantly more native understory. Predator species have been shown to prefer moving down linear clearings which could increase predation risk for native species (Dawson et al 2017). The widening of an existing easement is unlikely to increase the number of predator species or introduce new predator species into the existing habitat. Both invasive and predator species already occur in the locality and surrounds.
Introduce disease that may cause the species to decline	There are no diseases identified that are a threat to this species. The proposed action is unlikely to introduce disease that may cause the species to decline.
Interfere substantially with the recovery of the species	The objectives of the recovery plan for this species are to: – reverse the long-term population trend of decline – enhance the condition of habitat across the regent honeyeater range to maximise survival and reproductive success, and provide refugia during periods of extreme environmental fluctuation. The project is unlikely to interfere with any of the objectives outlined in the National recovery plan for the Regent Honeyeater (DotE 2016) given the lack of suitable habitat in the subject land.

Criteria	Discussion
Conclusion	Commonwealth DCCEEW considered the impact on the Regent Honeyeater likely to be significant based on preliminary information provided in the referral, however taking into account the results of the detailed surveys conducted for the BDAR, the project is considered to have a low likelihood of a significant impact on the species as: – The project was refined to avoid impacts on a small patch of Box Gum Woodland located 200 m north of the subject land. – No associated PCTs or important habitat is mapped within the subject land. – The project would remove 12.67 ha of non-preferred eucalypt woodland and forest. – The project will widen the easement through the Gardens of Stone SCA by 15 m, extending the existing gap of 45 m to 60 m. This would not affect movement of this highly mobile species.

E-6 South-eastern Glossy Black-cockatoo

E-6-1 Description

Distribution

The South-eastern Glossy Black-cockatoo (*Calyptorhynchus lathami lathami)* occurs in a range of suitable forest and woodland communities throughout NSW (Cth DCCEEW 2022a).

Habitat requirements

The species is uncommon although widespread throughout suitable forest and woodland habitats, from the central Queensland coast to East Gippsland in Victoria, and inland to the southern tablelands and central western plains of NSW, with a small population in the Riverina. It inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of Sheoak occur. Black Sheoak (*Allocasuarina littoralis*) and Forest Sheoak (*A. torulosa*) are important foods. Inland populations feed on a wide range of Sheoaks, including Drooping Sheoak (*Allocasuarina diminuta*) and *A. gymnathera*. Belah is also utilised and may be a critical food source for some populations (Cth DCCEEW 2022a).

The Glossy Black-cockatoo generally nests within 1 km of their primary feed tree species, and 200 m of permanent water (Mooney and Pedler 2005). Glossy Black-cockatoos tend to nest in the same areas as other nesting pairs. Because pairs prefer to nest close to one another, areas with a relatively high density of suitable nest hollows will be favoured for nesting (Cameron 2006).

Critical habitat

No Critical Habitat as defined under Section 207A of the EPBC Act has been identified or included in the Register of Critical Habitat.

No habitat critical to the survival to the species has been identified for the South-eastern Glossy Black-cockatoo but generally the species relies on Sheoaks (*Allocasuarina spp*. and *Casuarina spp*.) for feeding, using various species depending on the region. Mature Eucalyptus are also important for breeding habitat in which they contain large hollows that can be used for nesting (Cth DCCEEW 2022a).

Important populations

No important populations have been identified for this species.

E-6-2 Relevant guidelines and policy statements

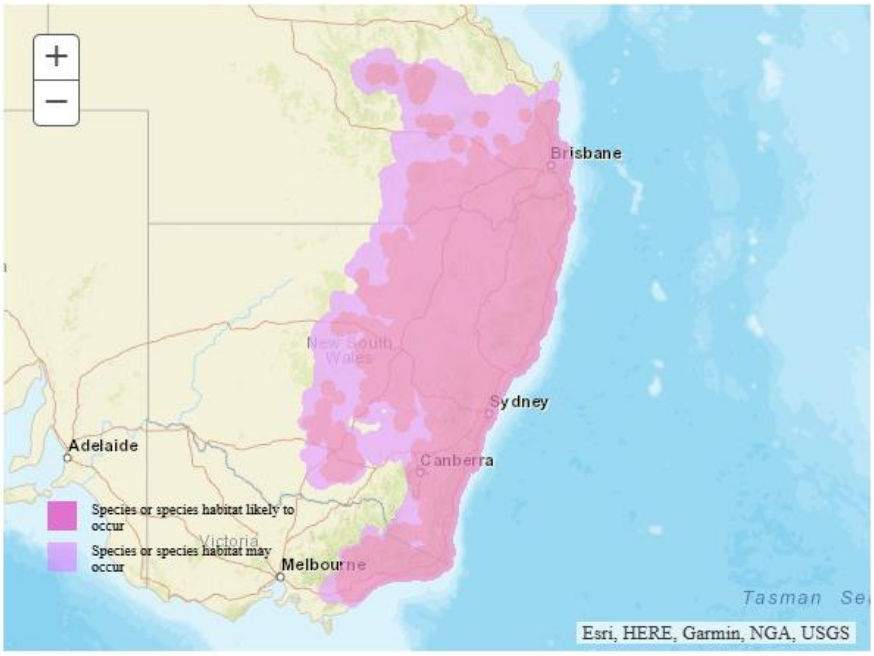
Relevant guidelines and policy statements include:

– Conservation advice for the Glossy Black-cockatoo (Cth DCCEEW 2022a).

E-6-3 NSW Bilateral assessment requirements

The NSW bilateral assessment requirement considerations for the Glossy Black-cockatoo are presented in Table E.10.

Table E.10 Consideration of Glossy Black-cockatoo against supplementary SEARs requirements

Item 16 requirement in supplementary SEARS	Glossy Black-cockatoo
Description of habitat	PCT 3369, 3385, 3735, 3747 and 3749 in the subject land are associated with the Glossy Black-cockatoo. However, there are very few individuals of *Allocasuarina* and *Casuarina* species in the subject land, comprising scarce foraging habitat for the Glossy Black-cockatoo in associated PCTs. The species is known to spend as much as 88% of each day foraging (Clout 1989) and these individuals are unlikely to provide a regular source of food for the species. One very small patch of regenerating vegetation comprising *Allocasuarina* and *Casuarina* species is present on the north side of the existing 132 kV easement and adjacent to the existing coal mine. The location of potential evidence of Glossy Black-cockatoos in the study area (possible chewed cones) are shown in Figure 5.1. The modelled distribution map of Glossy Black-cockatoo (Cth DCCEEW 2024) is provided in Figure E.5 below.  ***Figure E.5 Distribution map for Glossy Black-cockatoo***
Survey methodology	Active searches for chewed cones, diurnal bird surveys and a nest tree census was also conducted over 2023-2025. Audiomoths where deployed for up to 20 nights in June-July 2024 (in breeding season) to record nocturnal species but also nesting cockatoos which may be more vocal during dawn and dusk. Further details on the general methodology for active searches, bird surveys and nest tree census (which is also appropriate for this species) is provided in section 2.6, with timing of surveys in section 5.2.1 of the BDAR.
Construction impacts	Quantum of impact: Low. The project would remove vegetation comprising scarce amounts of potential foraging habitat comprising *Casuarina* and *Allocasuarina* which is likely to be used only on occasion, or when passing through the subject land. The subject land is unlikely to be part of the core territory of any individual, given signs of the species was only detected once over two years of targeted and opportunistic surveys, and no occupied breeding hollows were detected.

Item 16 requirement in supplementary SEARS	Glossy Black-cockatoo
	Vegetation clearing and modification required for site establishment and setup of construction compounds and laydown facilities, establishment of new temporary access tracks, upgrade works to existing access tracks and drainage features where required, footings for new transmission structures, widening of existing easements and managing hazard trees identified around the easement by the project. Duration of impact: Construction would be undertaken in stages and in multiple locations over a period of up to 24 months. Consequence of impact: Low
Operational impacts	The Glossy Black-cockatoo has the potential to fly at the height of the overhead transmission lines with collision risk an outside possibility. Given the overhead transmission lines will remain mobile (as opposed to the blades of a wind turbine), collision risk is expected to be low. Overall, the operational impact on the Glossy Black-cockatoo from this project is negligible.
MNES specific avoidance and mitigation	Mitigation measures relevant to this species include: – protocols for pre-clearing surveys and clearing of vegetation to minimise the risk of mortality of fauna. Design refinements which may minimise impacts to this species included: – refinement of new easement through Gardens of Stone SCA include vegetation removal on the north side of the existing easement only – limited additional clearing along access tracks in the SCA. Further details on avoidance and mitigation are provided in Chapter 7 and section 8.8 of the BDAR.
Residual impact	A Significant Impact Criteria assessment for the Glossy Black-cockatoo is provided in Table E.11. The assessment concluded that the project would not have a significant impact on the species.
Offsets required	Section 9.5 of the BDAR outlines the offset strategy for the project. Under the bilateral agreement, only one decision including conditions on approval is made by NSW, accounting for NSW MNES. The EPBC Act condition setting policy (DAWE 2020) notes that where a project demonstrates compliance with an endorsed state or territory policy, the proponent will not be required to simultaneously comply with the corresponding Australian Government policy. As such, Transgrid is not required to calculate offsets separately using the *EPBC Act offsets policy* (DSEWPAc 2012) and associated calculator, unless offsets are required for a species not listed under the BC Act or MNES are likely to be significantly impacted by the project. The South-eastern Glossy Black-cockatoo is listed as a vulnerable species under both Acts with offsets for the species under the BOS generated through retirement of ecosystem credits for impacts on foraging habitat (see Table 9.8). The species has a low likelihood of significant residual impact. No credits are required for this species under the *EPBC Act offsets policy,* however offsets have been calculated and would be generated through retirement of 914 ecosystem credits (see Table E.1).

E-6-4 Significant impact criteria assessment for Glossy Black-cockatoo

The significant impact criteria assessment for the Glossy Black-cockatoo is presented in Table E.11 below.

Table E.11 Significant impact criteria assessment for Glossy Black-cockatoo

Criteria	Discussion
According to the DotE (2013) 'significant impact criteria', an action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:	
Lead to a long-term decrease in the size of an important population of a species	Vegetation clearing is required for the construction and operation of a new, approximately 8 km long, 330 kV transmission line and double circuit transmission structures between the Mount Piper 330 kV/500 kV substation and the Wallerawang 330 kV substation. The project will remove a total of 44.68 ha of associated habitat, most of which does not contain food trees such as *Allocasuarina* and *Casuarina*. The species would forage on occasion in the subject land within small stands that are present. An important population of this species is not present in the subject land. The project would not remove known breeding habitat for the species, but would remove 13.5 ha of woodland and forest containing hollow-bearing trees. No Glossy Black-cockatoos were observed or heard in the study area during surveys. Given the species' preference for nesting in groups, it is likely the species would have been recorded if resident in the study area. Larger unfragmented patches of potential foraging and breeding habitat occur in the locality, particularly in nearby parks and reserves. The loss of a small amount of foraging habitat occurring along the edges of an existing easement is unlikely lead to a long-term decrease in the size of an important population. Operational impacts including the low risk of collision or entanglement from overhead transmission lines, is unlikely to lead to a long-term risk in the population, noting the species is already habituated to powerlines along existing transmission lines within the subject land.
Reduce the area of occupancy of an important population	There are an estimated 7500 (range 10,500–6,000) mature individuals in the wild. The area of occupancy is contracting and is estimated at 470,000 km^2 (range 447,000–395,500 km^2) (Cth DCCEEW 2022a). This woodland species has a widespread, though patchy, distribution across south-eastern Australia. The removal of 40.15 ha of associated habitat along an 8 km alignment would have a negligible (0.00001%) reduction in the area of occupancy of an important population.
Fragment an existing important population into two or more populations	The project will remove vegetation within an existing easement, primarily along the edges, expanding the gap between native vegetation from 45 to 60 m. The project would not isolate any areas of habitat or sever any connecting links for this highly mobile species. Given the species reluctance to occupy fragmented landscapes and the absence of recent records on the subject land, the project is unlikely to fragment an important population into two or more populations.
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 (Cth DCCEEW 2022a). The Conservation Advice for the species notes that habitat critical to the survival of the Glossy Black-cockatoo include areas that are necessary for: – For activities such as foraging, breeding, roosting, or dispersal; or the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community such as pollinators); – To maintain genetic diversity and long-term evolutionary development; or – For the reintroduction of populations or recovery of the species or ecological community. Any known or likely habitat should be considered as habitat critical to the survival of the species (Cth DCCEEW 2022a). Given the absence of breeding and high-quality foraging habitat, the project is unlikely to adversely affect habitat critical to the survival of the species.

Criteria	Discussion
Disrupt the breeding cycle of an important population	The Glossy Black-cockatoo nests almost exclusively in ironbark species (*E. crebra* and *E. nubila*) (up to 86% of nests recorded), with the remaining being red gum in the southern population (Cth DCCEEW 2022a). None of these eucalyptus species have been recorded in the subject land. Glossy Black-cockatoos generally nest in close proximity to large areas of foraging habitat, which is also absent from the subject land (except for occasional small stands). No Glossy Black-cockatoos were observed or heard in the study area during surveys. Given the species' preference for nesting in groups, it is likely the species would have been recorded if resident in the study area. It is therefore very unlikely that the Glossy Black-cockatoo breed in the subject land. The project would not disrupt the breeding cycle of the species.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	There is very little habitat for the Glossy Black-cockatoo present in the subject land, with small strands of *Allocasuarina* and *Casuarina* present. There is higher quality foraging habitat for the species in neighbouring patches of woodland in the Gardens of Stone SCA and adjacent areas outside the subject land. The modification of the habitat within the subject land would be unlikely to cause a decline in the species as there is very little foraging habitat present and no known breeding habitat.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Operation of the project has the potential to spread weeds and pests. The surrounding agricultural land already contains a high diversity of non-native species, and construction impacts could exacerbate the spread of these weeds into areas containing a predominantly more native understory. Predator species have been shown to prefer moving down linear clearings which could increase predation risk for native species (Dawson et al 2017). The widening of an existing easement is unlikely to increase the number of predator species or introduce new predator species into the existing habitat. Both invasive and predator species already occur in the locality and surrounds.
Introduce disease that may cause the species to decline	Glossy Black-cockatoos are vulnerable to Psittacine circoviral (beak and feather) disease (Sarker et al. 2014). The disease is naturally occurring and the project is unlikely to introduce Psittacine circoviral (beak and feather) disease to the local Glossy Black-cockatoo population.
Interfere substantially with the recovery of the species	At the time of writing, there was no published Recovery Plan for the species. The Conservation Advice for the species notes habitat loss, fragmentation and competition for hollows are the main threats facing the species. The project would not impact any breeding habitat for this species. Very marginal foraging habitat would be impacted by the project. Given the above, and the abundance of nearby parks and reserves containing feed trees, the project is unlikely to interfere with the recovery of these species.
Conclusion	Commonwealth DCCEEW considered the impact on the South-eastern Glossy Black-cockatoo as likely to be significant based on preliminary information provided in the referral, however taking into account the results of the detailed surveys conducted for the BDAR, the project is considered unlikely to have a significant impact on the species as: – There is no evidence an important population or a resident population occurs in the study area. This species is conspicuous but was only detected via possible chewed cones. – While the project would remove up to 40.15 ha of potential habitat, only small stands of *Allocasuarina* are present. The clearing of 13.5 ha of woodland and forest vegetation will result in the loss of an estimated 6 hollow-bearing trees suitable for breeding, however there was no evidence of the species using the study area more than as an occasional foraging site. – The project will widen the easement through the Gardens of Stone SCA by 15 m, extending the existing gap of 45 m to 60 m. This would not affect this highly mobile species.

E-7 Large-eared Pied Bat

E-7-1 Description

Distribution

The Large-eared Pied Bat (*Chalinolobus dwyeri*) is patchily distributed in central-eastern NSW and south-eastern and central Queensland, from the area bounded by Shoalwater Bay, north of Rockhampton (QLD), south to Ulladulla, NSW (DAWE 2021a). The population size is estimated to range between 10,000 and 20,000 individuals; however, the number of mature individuals is lower (DAWE 2021a). The population structure and number of locations are poorly known, although in NSW maternity roosts are known from at least five locations. DAWE 2021 notes that it is likely that there are additional as yet undiscovered maternity roosts, particularly noting that the species has a relatively small foraging range but has been recorded from many areas without known maternity roosts. As the species' Area of Occupancy (AOO) is defined by the area supporting maternity roost sites, this is considerably smaller than its Extent of Occurrence (EOO). The species' AOO is estimated to be <500 km² in the recently published 2023 conservation advice, and its EOO is estimated to be 276,333 km² (DAWE 2021a).

Much of the known distribution of the Large-eared Pied Bat occurs in NSW. Its main strongholds are in the Sydney sandstone region and Pilliga region where it is uncommon and patchily distributed (DAWE 2021a). In NSW it is also known from Coolah Tops and Mt Kaputar (DAWE 2021a). The species distribution is fragmented given that most individuals occur in small and relatively isolated subpopulations (DAWE 2021a) The species is known from several conservation reserves in NSW, including Pilliga National Park, Coolah Tops National Park and Morton National Park (DAWE 2021a).

Habitat requirements

The modelled distribution of the Large-eared Pied Bat suggests the species needs a combination of suitable roosting and foraging habitat, namely areas with cliffs, escarpments or rocky outcrops for roosting (typically sandstone but also rhyolite), and fertile valleys and plains, as well as areas with woodland along waterways for foraging (DAWE 2021a). Notably, the presence of suitable 'caves, overhangs and cracks' are identified as being potentially more important than the precise geology in DAWE (2021). This is a relatively restricted combination of habitat factors, and the extent of woodlands on fertile soils within its range has been greatly diminished by broad scale clearing.

The Large-eared Pied Bat is dependent on the presence of diurnal roosts for shelter. Roosts are also used at night when bats are not feeding, as well as used for raising young. The species is known to roost in caves, overhangs, disused mine shafts, and abandoned Fairy Martin (*Petrochelidon ariel*) nests. The value of mine shafts and disused Fairy Martin nests as roost sites has not been evaluated but may offer important roost sites in areas where natural roosts are uncommon or absent, allowing the Large-eared Pied Bat to inhabit and/or disperse through otherwise unsuitable areas. The number of known breeding sites is limited and the structure of maternity roosts appears to be very specific (arch caves with dome roofs). Caves need to be high and deep enough to allow juvenile bats to learn to fly inside and have indentations in the roof. Roosting bats cluster in these indentations, most likely to allow the capture of heat. These physical characteristics are uncommon in the landscape and their scarcity poses a limiting factor in the distribution of the Large-eared Pied Bat. The species has been recorded foraging in a range of vegetation types, including dry and wet sclerophyll forest, grassy woodland, Callitris dominated forest, tall open eucalypt forest with a rainforest sub-canopy, subtropical rainforest and small clearings adjacent to rainforest, sub-alpine woodland and sandstone outcrop country (DAWE 2021a). The occurrence of high-fertility forest or woodland near suitable roosting habitat is rare in the landscape, which implies that the species may always have been uncommon; however preferential clearing of fertile forests and woodlands has almost certainly reduced the amount of available habitat considerably (DAWE 2021a).

Williams and Thomson (2018) conducted a study of this species in the western Blue Mountains of NSW and found that all bats foraged within 700m of a day roost (which were all western facing sandstone cliff faces without cave or caverns, which may suggest that this is a key component of day roost selection for thermal properties), with a transition from riparian or forest vegetation to grassland. Williams and Thompson (2018) also found that the bats they studied changed roost sites almost daily, however stayed relatively close to the preceding roost. Foraging ranges were between 71 and 113 ha for the species, confirming the species can travel substantial distances each night.

Critical habitat

No Critical Habitat as defined under Section 207A of the EPBC Act has been identified or included in the Register of Critical Habitat.

Habitat critical to the survival of the species is noted to include 'any known roost site, or caves that could be roost sites, are considered habitat critical to the survival of the species', along with any areas that support the necessary foraging and roosting habitat within a few kilometres of each other should be considered habitat critical to the survival of the species.

Important populations

Further research is required throughout the species' known range to determine the size and distribution of existing populations. Within NSW, the largest concentration of populations appears to be in the sandstone escarpments of the Sydney basin and north-west slopes of NSW. Much of this habitat occurs within conservation areas. The species has also been recorded from a few locations in the sandstone escarpments of Morton National Park. Within the Qld part of the range, targeted surveys have not been undertaken to determine the size or distribution of populations (DERM 2011).

All populations are considered important due to their likely role in maintaining genetic diversity necessary for the ecological survival of the species.

E-7-2 Relevant guidelines and policy statements

Relevant guidelines and policy statements include:

– Approved Conservation Advice for Large-eared Pied Bat (DAWE 2021a)
– National Recovery Plan for the Large-eared Pied Bat (DERM 2011).

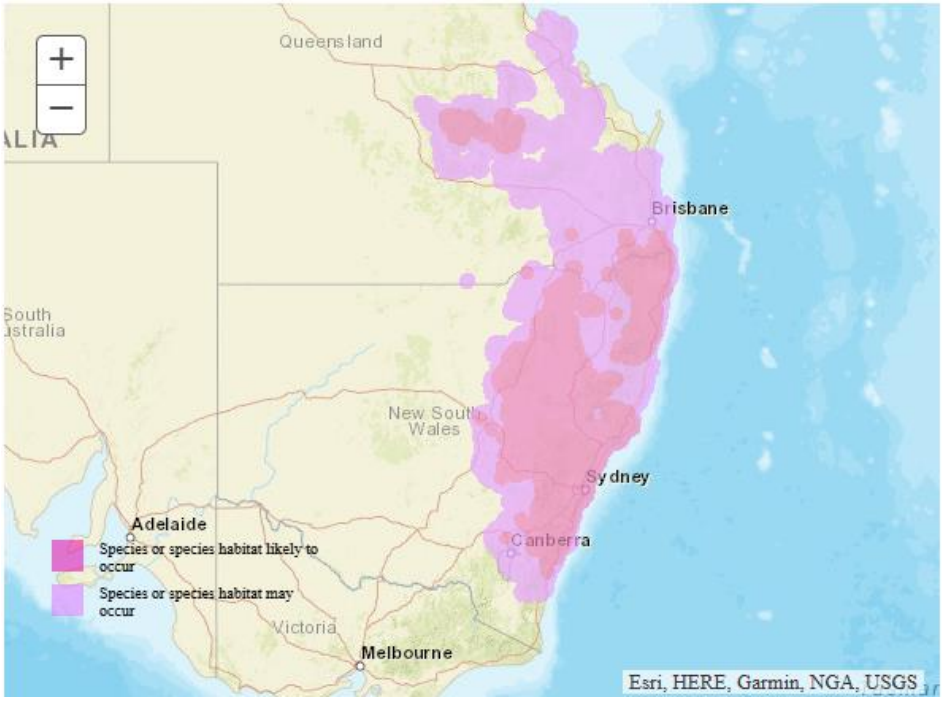
Note the Listing Advice is incorporated within the Conservation Advice for the species. There is no threat abatement plan available.

E-7-3 NSW Bilateral assessment requirements

The NSW bilateral assessment requirement considerations for the Large-eared Pied Bat are presented Table E.12.

Table E.12 Consideration of Large-eared Pied Bat against supplementary SEARs requirements

Item 16 requirement in supplementary SEARS	Large-eared Pied Bat
Description of habitat	Habitat for the Large-eared Pied Bat in the study area is associated with all native PCTs: – 3369 – 3735 – 3747 – 3749 – 3932. The Large-eared Pied Bat is dependent on the presence of diurnal roosts for shelter that can be utilised during the day and at night when not feeding. The species is known to roost in disused mine shafts, caves and overhangs. The small rocky outcrop on the southern edge of the subject land within agricultural land, provides marginal temporary roosting habitat for the species. Larger extents of escarpments around 1 km from the subject land in the south are likely to comprise better quality roosting and breeding habitat for the species. The species is known to forage in plains and in areas with moderately tall trees along waterways. Lower elevations in the subject land including agricultural land and floodplains associated with the Coxs River provide foraging habitat for the species. The locations of Large-eared Pied Bat and habitat in the study area is shown in Figure 5.2 and Figure 5.9. The modelled distribution map of Large-eared Pied Bat (Cth DCCEEW 2024b) in Australia is provided in Figure E.6 below.

Item 16 requirement in supplementary SEARS	Large-eared Pied Bat
	 *Figure E.6 Distribution map for Large-eared Pied Bat*
Survey methodology	Anabat detectors were used to survey for the species over 16 nights of survey effort within the nominal TBDC survey season (NSW DCCEEW 2025b). The Large-eared Pied Bat was recorded multiple times in the alignment using foraging resources available. Multiple roost inspections of the rock outcrop adjacent to the subject site were undertaken (including in January 2025 in breeding season) and found no evidence of use, i.e. guano. Breeding habitat is not present in other structures such as the rail bridge or the steel gantries that are located within the subject site. The species would not breed on site, likely preferring the higher quality rocky outcroppings and caves located 1km outside of the study area. Further details on the general methodology for bat surveys (which are also appropriate for this species) is provided in section 2.6 of the BDAR.
Construction impacts	Quantum of impact: Up to 55.43 ha of foraging habitat would be directly impacted in the construction phase of the project. This would include vegetation clearing and modification required for site establishment and setup of construction compounds and laydown facilities, establishment of new temporary access tracks, upgrade works to existing access tracks and drainage features where required, footings for new transmission structures, widening of existing easements and managing hazard trees identified around the easement by the project. The rock outcrop comprising marginal roosting habitat for the species would not be directly impacted. Duration of impact: Construction would be undertaken in stages and in multiple locations over a period of up to 24 months. Consequence of impact: Moderate
Operational impacts	The Large-eared Pied Bat has the potential to fly at the height of the overhead transmission lines with collision risk an outside possibility. Given the overhead transmission lines will remain mobile (as opposed to the blades of a wind turbine), collision risk is expected to be low. The use of an existing access track adjacent to the rock outcrop may cause some noise and vibration. The rocky outcrop is adjacent to tracks regularly used to access the WaterNSW water tank and has cattle grazing regularly immediately adjacent. The factors further reduce the suitability of the overhang for roosting. Overall, the operational impact on the Large-eared Pied Bat from this project is low.

Item 16 requirement in supplementary SEARS	Large-eared Pied Bat
MNES specific avoidance and mitigation	Specific measures to address impacts to the rock outcrop providing potential habitat for the Large-eared Pied Bat include: – The proposed easement through Gardens of Stone SCA has been refined to include vegetation removal on the north side of existing easement only. – Refinement of new easement and access track upgrades to avoid the rocky outcrop in agricultural land. An existing access track that occurs between sections of the rocky outcrop would not be used during construction and operation of the project. – Piling for structure foundations within 80 m of the rock outcrop will be conducted outside the breeding period (November - January) wherever possible within the required work program. Note this work is likely to be outside of the breeding period under the current program however there needs to be flexibility in the program to allow works in this period if unavoidable. – Establishment of biodiversity exclusion zones including a minimum 10m buffer around the rock outcrop. The boundary of this is to be delineated using a method that does not restrict access for microbats to potential habitat. – Pre-clearing targeted surveys by the Project Ecologist of the rocky outcrop to confirm the presence / absence of active roosts prior to construction. – Weekly inspections by an Environment Officer of potential breeding habitat within the rocky outcrop during construction where this includes the breeding period (November-January). – Diversion of light vehicles to avoid the adjacent access track during the breeding season if any microbats are recorded in pre-clearance or weekly inspections. Heavy vehicles are unable to be divert due to existing constraints including narrow bridges along alternate access tracks. Alternative lower impact piling methods and foundation designs will be explored during detailed design, however, are subject to geotechnical findings. This includes the use of smaller drill rigs and methods of piling with lower noise and vibration impact. Measures to mitigate impacts to the rock outcrop will be included within the Construction Environmental Management Plan for the project. Further details on avoidance and mitigation is provided in Chapter 7 and section 8.8 of the BDAR. Mitigation measures B19 - B24 in Table 8.16, although are general, will mitigate impacts of the project to Large-eared Pied Bat. Mitigation measure B24 relates to impacts of collision with new lines and electrocution to fauna including the Large-eared Pied Bat. Mitigation measures specific to potential Large-eared Pied Bat roosting/breeding habitat are listed in B25 in Table 8.16.
Residual impact	A Significant Impact Criteria assessment for the Large-eared Pied Bat is provided in Table E.13. The assessment concluded that the project would not have a significant impact on the species.
Offsets required	Under the bilateral agreement, only one decision including conditions on approval is made by NSW, accounting for NSW MNES. The EPBC Act condition setting policy (DAWE 2020) notes that where a project demonstrates compliance with an endorsed state or territory policy, the proponent will not be required to simultaneously comply with the corresponding Australian Government policy. As such, Transgrid is not required to calculate offsets separately using the *EPBC Act offsets policy* (DSEWPaC 2012) and associated calculator, unless offsets are required for a species not listed under the BC Act. Offsets for the Large-eared Pied Bat would be generated in accordance with the BOS as species credits associated with foraging habitat (refer to section 9.1.3). The species has a low likelihood of significant residual impact. No credits are required for this species under the *EPBC Act offsets policy*, however offsets have been calculated and generated through retirement of 1,806 credits (see Table E.1).

E-7-4 Significant impact criteria assessment for Large-eared Pied Bat

The significant impact criteria assessment for Large-eared Pied Bat is presented in Table E.13 below.

Table E.13 Significant impact criteria assessment for Large-eared Pied Bat

Criteria	Discussion
According to the DotE (2013) 'significant impact criteria', an action is likely to have a significant impact on an endangered species if there is a real chance or possibility that it will:	
Lead to a long-term decrease in the size of a population of a species	The Large-eared Pied Bat was recorded at several locations in the study area using Anabat detectors. The project would remove a total of 55.43 ha of foraging habitat for the species, mostly clearing fringing habitat along the edges of the existing easement and extending the corridor between vegetation stands. Clearing of good quality foraging habitat would mainly occur along a 4 km long and 15 m wide strip of vegetation adjacent to the existing easement. Whilst this may remove potential foraging habitat for the species, larger unfragmented patches of potential foraging and breeding habitat and occur in the locality, particularly in nearby parks and reserves. Large areas of suitable breeding habitat are present away from the subject land, with several cliff lines located around 1 km to the south of the subject land, between Mount Piper and the existing 500 kV transmission easement, as well as around 2 km to the north, 2.5 km to the north-east and around 1.3 km to the east. These cliff lines are associated with escarpments and pagodas of the Gardens of Stone SCA and adjacent areas. There would be no impact on this potential breeding habitat. No escarpment or cave habitat is present within the subject land. Several low quality potential roost sites occur adjacent to the subject land that are not suitable for breeding. The loss of foraging habitat occurring along the edges of an existing easement is unlikely lead to a long-term decrease in the size of an important population. The project would not remove potential breeding or roosting habitat for the species. The species is tends to be low to mid-canopy flyers and flies low over cleared land (Churchill 2009), therefore, are less likely to be susceptible to transmission line strike during operation of the project and lead to a long term decrease in population size.
Reduce the area of occupancy of a population	There are an estimated 20,000 individuals (DAWE 2021a) with an area of occupancy of around 280,000 km^2. This species has a widespread, though very patchy, distribution across south-eastern Australia. The removal of 55.43 ha of eucalypt woodland and forest habitat and derived shrubland along an 8 km alignment is not likely to reduce the area of occupancy of an important population.
Fragment an existing population into two or more populations	Evidence of the species was captured via Anabat detectors in multiple parts of the subject land. The proposed action will remove vegetation within an existing easement and also along its edges, expanding the gap between native vegetation from 45 to 60 m. Clearing for access tracks will also occur. This clearing is unlikely to fragment or isolate any foraging habitat for this highly mobile species.
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 (Cth DCCEEW 2025b). The National Recovery Plan for the species notes that habitat critical to the survival of the Large-eared Pied Bat include areas that have: – maternity roosts – large cave systems. Any known or likely habitat should be considered as habitat critical to the survival of the species (Cth DCCEEW 2025b). Large areas of suitable breeding habitat are present around 1 km and more away from the subject land. No maternity roosts have been found within the subject land. The rocky habitat at the subject land is of poor quality, not containing large caves which are essential to the species (DAWE 2021a). The project is unlikely to affect habitat critical to the survival of the species.
Disrupt the breeding cycle of a population	It is likely that the Large-eared Pied Bat roosts in nearby rocky outcropping outside of the subject land (1 km and more from the subject land) which contain higher quality roosts and caves.

Criteria	Discussion
	No escarpment or cave habitat is present within the subject land. Several low quality potential roost sites occur adjacent to the subject land. One small overhang is located adjacent to an access track in the subject land near the Water NSW water tank north-west of Brays Lane, but not located within the subject land (see rocky outcrop shown on Figure 5.2D). This overhang is around 20 m long as part of a larger rocky outcrop that extends around 400 m. Given the location of the overhang near the ground surface, lack of depth and lack of flying space, breeding is unlikely to occur. No other crevices or caves occur in the remainder of the rocky outcrop. This overhang was inspected and no evidence of use found (no guano). It is located adjacent to cleared agricultural land used for cattle grazing. The overhang may support occasional individuals, but is not suitable for breeding. An arched rail bridge comprising of brick and sandstone is present in the subject land at the former Wallerawang Power Station in the south-east portion of the project footprint. This bridge has limited roost habitat given the lack of overhangs or crevices with suitable shelter. This rail bridge is the main line and subject to regular rail traffic. An existing access track under the bridge would be used for the project. No structural changes to the bridge are proposed. Various disused buildings are located outside the subject land, including the Wallerawang cooling tower (over 100 m from the subject land) and other buildings at the former power station. No removal of any of these low quality potential roost sites is proposed. There would be noise and vibration from vehicle use and construction in nearby areas. These areas are or have been subject to regular noise and vibration through use of access tracks, train movements, cattle grazing, and previously the operation of the power station. The project will result in the clearing of 55.43 ha of foraging habitat within the subject land, comprising a mix of forested and partially cleared land. Clearing of good quality foraging habitat would mainly occur along a 4 km long and 15 m wide strip of vegetation adjacent to the existing easement. Large areas of suitable foraging habitat are present in the adjacent Gardens of Stone SCA and surrounding land. Given the lack of impact on breeding habitat, limited impact on marginal roosting habitat, and presence of large areas of suitable foraging habitat in the locality, it is unlikely that the project will disrupt the breeding cycle of the individuals present.
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 will result in the clearing of 55.43 ha of foraging habitat along the 8 km easement, access tracks and associated areas. This is likely to have a minor impact on the species by reducing the availability of foraging resources given the large areas of foraging habitat in the locality. Widening the cleared area of the easement from 45 m to 60 m would not affect movement of this highly mobile species. Given the lack of impact on breeding habitat, limited impact on marginal roosting habitat, and presence of large areas of suitable foraging habitat in the locality, it is unlikely that the project will lead to the decline of the species.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Operation of the project has the potential to spread weeds and pests. The surrounding agricultural land already contains a high diversity of non-native species, and construction impacts could exacerbate the spread of these weeds into areas containing a predominantly more native understory. Predator species have been shown to prefer moving down linear clearings which could increase predation risk for native species (Dawson et al 2017). The widening of an existing easement is unlikely to increase the number of predator species or introduce new predator species into the existing habitat. Both invasive and predator species already occur in the locality and surrounds.
Introduce disease that may cause the species to decline	There are no diseases identified that are a threat to this species. The proposed action is unlikely to introduce disease that may cause the species to decline.
Interfere substantially with the recovery of the species	The National Recovery Plan has a primary objective by 2030 to have the distribution and abundance of the species maintained. It is unlikely that the proposed actions will interfere with the recovery of the species due to the minimal impacts on foraging habitat and the absence of recorded roosting and maternity habitat in the subject land.
Conclusion	The project is unlikely to have a significant impact on the Large-eared Pied Bat as: – No escarpment or cave habitat is present within the subject land. It is likely that the Large-eared Pied Bat roosts in nearby rocky outcropping outside of the subject land (1 km and more from the subject land) which contain higher quality roosts and caves. – The project would remove a total of 55.43 ha of foraging habitat for the species, comprising 13.5 ha of forest and woodland, with the remaining habitat being partially cleared shrubland and grassland. – Clearing of good quality foraging habitat would mainly occur along a 4 km long and 15 m wide strip of vegetation adjacent to the existing easement.

E-8 Superb Parrot

E-8-1 Description

Distribution

The Superb Parrot is mainly found in NSW and northern Victoria, where it occurs on the inland slopes of the Great Divide and on adjacent plains, especially along the major river-systems (TSSC 2016c).

Habitat requirements

The breeding range of the Superb Parrot is divided into three main areas: the first, along the Murray and Edward Rivers; the second, along the Murrumbidgee River; and the third, in a triangle bounded by Molong, Yass and Young. Superb Parrots breed in either River Red Gum forests and woodlands or box woodlands (Webster 1988).

At least part of the population of the Superb Parrot undertakes regular seasonal movements, vacating the breeding area after the conclusion of the breeding season, and then returning in spring, while others remain in the breeding areas throughout the year. In central NSW, movements are said to occur when eucalypts flower, and when food becomes scarce due to drought and birds seek alternative sources of food (Higgins 1999).

The species seasonally occurs in non-breeding foraging habitat in Box-Cypress Pine (*Callitris* spp.) and Weeping Myall (*Acacia pendula*) woodlands. The Superb Parrot feeds mainly on the ground, on the seeds of grasses as well as cereal crops and spilt grain. They also eat the seed-pods of many understorey species of wattles, and flowers and fruits of eucalypts, berries of mistletoe and lerps (TSSC 2016c).

Critical habitat

No Critical Habitat as defined under Section 207A of the EPBC Act has been identified or included in the Register of Critical Habitat.

The National Recovery Plan outlines habitat critical to the survival of the Superb Parrot as habitat necessary for foraging, breeding, roosting and dispersal. The main known breeding areas are the riverine forests in the Riverina and Box Gum woodland in the tablelands and slopes of NSW (TSSC 2016c).

Important populations

The Superb Parrot is considered a single population with a size of around 20,000 mature individuals (DSE 2011a).

E-8-2 Relevant guidelines and policy statements

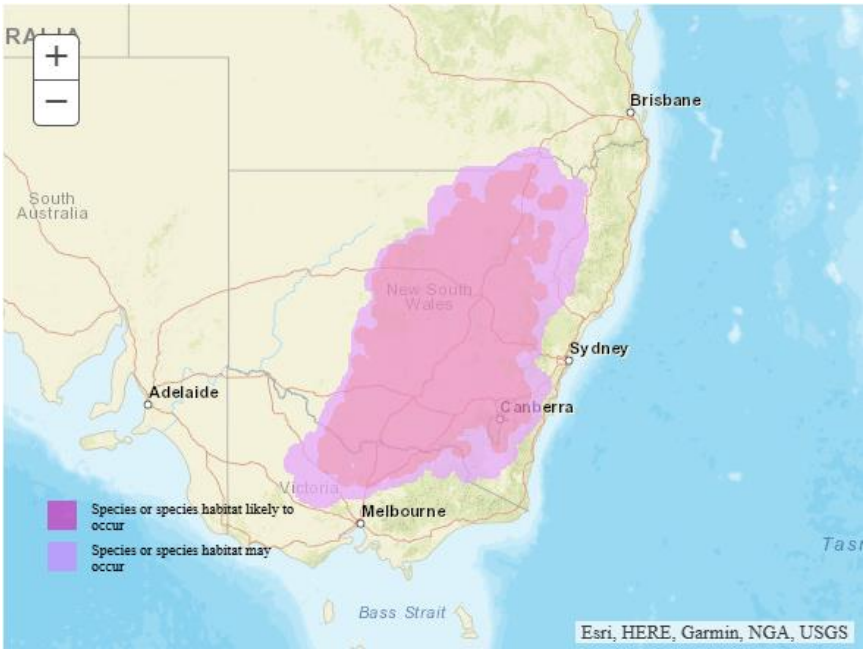
Relevant guidelines and policy statements include:

– National Recovery Plan for the Superb Parrot (*Polytelis swainsonii*). (DSE 2011a)
– Approved conservation advice for the Superb Parrot. (TSSC 2016c).

E-8-3 NSW Bilateral assessment requirements

The NSW bilateral assessment requirement considerations for the Superb Parrot are presented in Table E.14.

Table E.14 Consideration of Superb Parrot against supplementary SEARs requirements

Item 16 requirement in supplementary SEARS	Superb Parrot
Description of habitat	The subject land is outside the known range of the Superb Parrot and does not contain favoured Box-Gum woodland or River Red Gum Forest. No PCTs associated with the species in the TBDC occur in the study area. Given that there is no favoured foraging habitat it is unlikely there is any habitat suitable for the Superb Parrot outside of occasional migrating individuals. The modelled distribution map of Superb Parrot (Cth DCCEEW 2025b) in Australia is provided in Figure E.7 below.  *Figure E.7 Distribution map for Superb Parrot*
Survey methodology	Extensive bird surveys were undertaken seasonally throughout multiple survey windows between 2023 – 2025 which did not record the Superb Parrot. Further details on the general methodology for bird surveys and nest tree census (which is also appropriate for this species) is provided in section 2.6 of the BDAR.
Construction impacts	No suitable habitat has been recorded for the Superb Parrot in the subject land and therefore the species will not be impacted by the construction phase of the project.
Operational impacts	The Superb Parrot has the potential to fly at the height of the overhead transmission lines with collision risk an outside possibility. Given the overhead transmission lines will remain stationary (as opposed to the moving blades of a wind turbine), collision risk is expected to be low. Overall, the operational impact on the Superb Parrot from this project is negligible.
MNES specific avoidance and mitigation	The project has not developed mitigation measures specific for this species given the lack of habitat in the subject land. Design refinements which may minimise impacts to this species includes: – refinement of new easement through Gardens of Stone SCA include vegetation removal on the north side of existing easement only. Further details on avoidance and mitigation is provided in Chapter 7 and section 8.8 of the BDAR.
Residual impact	A Significant Impact Criteria assessment for the Superb Parrot has not been provided given the lack of suitable habitat and absence of records despite multiple targeted bird surveys.

Item 16 requirement in supplementary SEARS	Superb Parrot
Offsets required	The species has a low likelihood of significant residual impact (and does not occur within the subject land). No credits are required for this species under the *EPBC Act offsets policy* (see Table E.1) and the species has not been offset under the BAM.

E-9 *Leucochrysum albicans* var. *tricolor*

E-9-1 Description

Distribution

Endemic to south-eastern Australia, where it is currently known from three geographically separate areas in Tasmania, Victoria and south-eastern NSW and ACT. In NSW and ACT, *Leucochrysum albicans* var. *tricolor* currently occurs on the Southern Tablelands and some adjacent areas (e.g. Tarcutta, Bega valley) in an area roughly bounded by Albury, Bega and Goulburn, in the South-eastern Highlands, Australian Alps and Sydney Basin bioregions. It once occurred more widely in inland NSW, with records from near Cobar, Dubbo, Lithgow, Moss Vale and Delegate. The taxon is now absent from the NSW South West Slopes, South Eastern Corner, Cobar Peneplain and Brigalow Belt South bioregions (DAWE 2021b, DSE 2011b).

Habitat requirements

Leucochrysum albicans var. *tricolor* occurs in a wide variety of grassland, woodland and forest habitats, generally on relatively heavy soils. Within all these habitats, the taxon relies on the presence of bare ground for germination and establishment. In high altitude grasslands (e.g. Monaro region of NSW), there is generally a sparser grass sward with more inter-tussock spaces, which provide suitable sites for germination in the absence of periodic disturbance (DAWE 2021b, DSE 2011b).

Critical habitat

No Critical Habitat as defined under Section 207A of the EPBC Act has been identified or included in the Register of Critical Habitat.

No habitat critical to the survival of this species has been defined.

Important populations

important populations have not yet been determined for this taxon, as there are no data on population location and size for most of the NSW and ACT populations and many populations in Victoria and Tasmania (DSE 2011b).

E-9-2 Relevant guidelines and policy statements

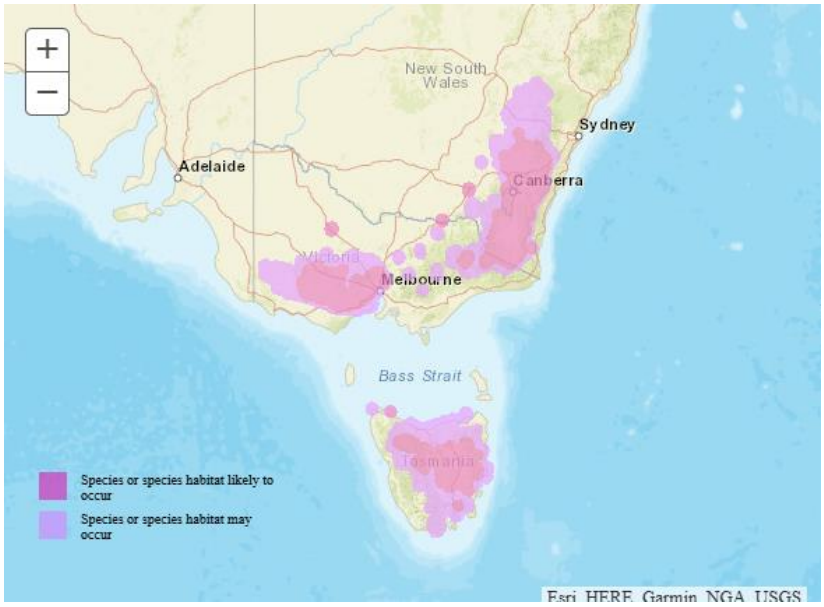
Relevant guidelines and policy statements include:

– National Recovery plan for the *Leucochrysum albicans* var. *tricolor* (DSE 2011b)
– Conservation Advice for *Leucochrysum albicans* subsp. *tricolor* (DAWE 2021b).

E-9-3 NSW Bilateral assessment requirements

The NSW bilateral assessment requirement considerations for *Leucochrysum albicans* var. *tricolor* are presented in Table E.15.

Table E.15 Consideration of Leucochrysum albicans var. tricolor against supplementary SEARs requirements

Item 16 requirement in supplementary SEARS	*Leucochrysum albicans* var. *tricolor*
Description of habitat	Habitat for the *Leucochrysum albicans* var. *tricolor* in the study area is associated with the following vegetation zones: – 3747_Good – 3747_Shrubland – 3747_Poor. The species was not detected despite intensive survey effort in accordance with the BAM. The modelled distribution map of *Leucochrysum albicans* var. *tricolor* (Cth DCCEEW 2025b) in Australia is provided in Figure E.8 below.  ***Figure E.8 Distribution map for Leucochrysum albicans var. tricolor***
Survey methodology	*Leucochrysum albicans* var. *tricolor* was surveyed for extensively with reference to the BAM methodology (DPIE 2020), using threatened flora traverses at a 5m spacing for forbs. *Leucochrysum albicans* var. *tricolor* was recorded on site, however despite extensive surveying no *Leucochrysum albicans var. tricolor* was recorded. Further details on the general methodology for threatened flora traverses (which is also appropriate for this species) is provided in section 2.6 and section 5.2 of the BDAR.
Construction impacts	No *Leucochrysum albicans* var. *tricolor* was recorded therefore there will be no construction phase impacts. Consequence of impact: None
Operational impacts	No *Leucochrysum albicans* var. *tricolor* was recorded therefore there will be no operational phase impacts. Consequence of impact: None
MNES specific avoidance and mitigation	The project has not developed mitigation measures specific for this species. An unexpected finds protocol will be developed as part of the Biodiversity Management Plan.
Residual impact	A Significant Impact Criteria assessment for the *Leucochrysum albicans var. tricolor* is not required as the species is not present.
Offsets required	The species has a low likelihood of significant residual impact (and was not recorded in the subject land). No credits are required for this species under the *EPBC Act offsets policy* (see Table E.1).

E-10 Purple Copper Butterfly

E-10-1 Description

Distribution

The Purple Copper Butterfly is endemic to New South Wales, where it occurs on the Central Tablelands in an area approximately bounded by Capertee, Black Springs, Hartley and Bathurst. It occurs in eucalypt woodland, mainly in open clearings. All locations are above 900 m in altitude and are associated with the presence of the larval food plant; *Bursaria spinosa. subsp. lasiophylla* (Blackthorn) and a species of attendant ant; *Anonychomyrma itinerans*. The Purple Copper Butterfly has been recorded from 35 locations, all within the Greater Lithgow, Bathurst Regional and Oberon local government areas (TSSC 2016b).

Habitat requirements

The distribution of the butterfly is specifically limited by elevation. All sites where the butterfly has been located are above 850 m elevation. Its host plant, native Blackthorn, *Bursaria spinosa subsp. lasiophylla*, is an altitudinal variant of the widespread and common species and is generally only found above 850 m. Although the attendant ant, *Anonychomyrma itinerans*, has a wider distribution than the butterfly, it too is restricted to regions above 850 m in altitude. Given the reliance on elevation of both the host plant and attendant ant, the distribution of the Purple Copper Butterfly would always have been restricted by the distribution of these associated species. The distribution of the species may have been significantly reduced, the present distribution now representing refuges resulting from climate changes. Additionally, there may be other biotic factors dictating the distribution of the species, as some potential habitat may contain both the host plant and the attendant ant, but not the Purple Copper Butterfly (TSSC 2016b).

Critical habitat

No Critical Habitat as defined under Section 207A of the EPBC Act has been identified or included in the Register of Critical Habitat.

Habitat critical to the survival of the species would comprise suitable patches *Bursaria spinosa* subsp. *lasiophylla* that also support the attendant ant *Anonychomyrma itinerans*.

Important populations

No important populations for this species have been identified.

E-10-2 Relevant guidelines and policy statements

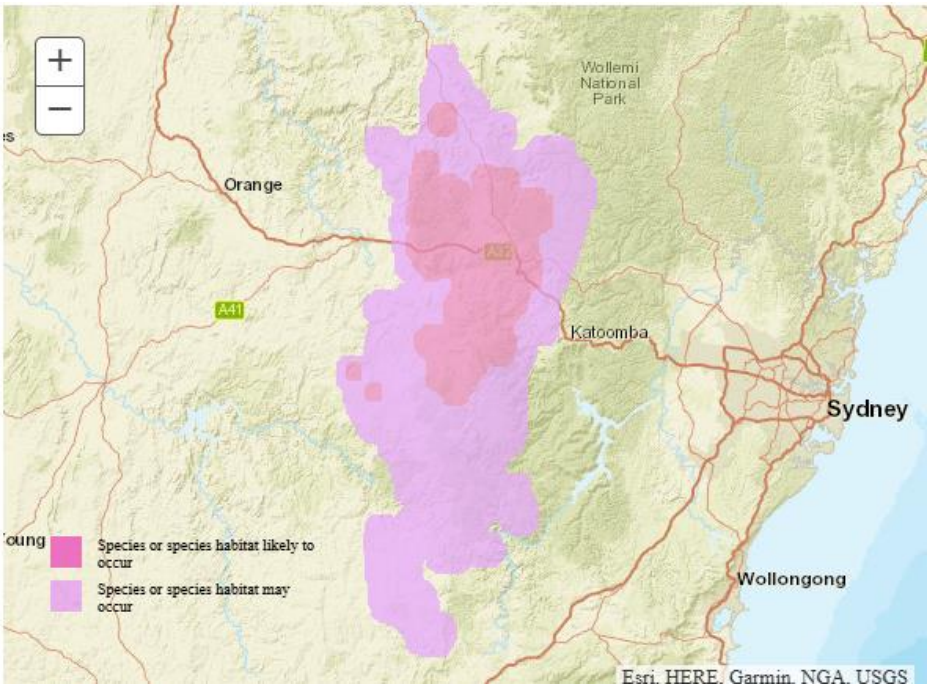
Relevant guidelines and policy statements include:

– Bathurst Copper Butterfly *Paralucia spinifera* Recovery Plan (NSW NPWS 2001)
– Approved Conservation advice *Paralucia spinifera.* (TSSC 2016b).

E-10-3 NSW Bilateral assessment requirements

The NSW bilateral assessment requirement considerations for the Purple Copper Butterfly are presented in Table E.16.

Table E.16 Consideration of Purple Copper Butterfly against supplementary SEARs requirements

Item 16 requirement in supplementary SEARS	Purple Copper Butterfly
Description of habitat	Habitat for the Purple Copper in the study area is associated with the following PCTs: – 3369 – 3385 – 3735 – 3747 – 3749. There is suitable habitat for the Purple Copper Butterfly within the subject land where the host plant *Bursaria spinosa* subsp. *lasiophylla* is present at elevations above 850 m. *Bursaria spinosa* subsp. *lasiophylla* occurs as several small patches in and adjacent to the subject land, often in shady locations. A larger patch is located mostly outside the subject land near the WaterNSW watertank. The associated ant species *Anonychomyrma itinerans* was not detected in any of the patches. The modelled distribution map *of the Purple Copper Butterfly* (Cth DCCEEW 2024) in Australia is provided in Figure E.9 below.  *Figure E.9 Distribution map for the Purple Copper Butterfly*
Survey methodology	The Purple Copper Butterfly was surveyed for with reference to the BAM, using targeted surveys in which two ecologists walked slowly between *Bursaria spinosa* subsp. *lasiophylla* plants brushing a butterfly net against vegetation to detect adult butterflies, who generally do not travel more than 10-40m from host plants (TSSC 2016). No Purple Copper Butterfly were detected during the survey rounds. Further details on the general methodology are provided in section 2.6 and section 5.2 of the BDAR.
Construction impacts	There are likely to be impacts to the *Bursaria spinosa* subsp. *lasiophylla* recorded on site during the construction phase, however, these plants do not currently provide habitat to the Purple Copper Butterfly which has not been recorded in the area.
Operational impacts	No associated operational impacts on the Purple Copper butterfly.

Item 16 requirement in supplementary SEARS	Purple Copper Butterfly
MNES specific avoidance and mitigation	The project has not developed mitigation measures specific for this species. An unexpected finds protocol will be developed as part of the Biodiversity Management Plan.
Residual impact	A Significant Impact Criteria assessment for the Purple Copper Butterfly has not been provided given the absence of the species in the study area.
Offsets required	The species has a low likelihood of significant residual impact (and does not occur within the subject land). No credits are required for this species under the *EPBC Act offsets policy* (see Table E.1).

E-11 Southern Greater Glider

E-11-1 Description

Distribution

The Southern Greater Glider occurs in eastern Australia, where it has a broad distribution but somewhat patchy distribution from around Proserpine in QLD, through eastern NSW and the ACT, to central Victoria. It prefers taller, wetter eucalyptus forests but is found at all elevations between 0-1200m (Cth DCCEEW 2022b).

Habitat requirements

The Southern Greater Glider is an arboreal nocturnal marsupial, predominantly solitary and largely restricted to eucalypt forests and woodlands of eastern Australia. It is typically found in highest abundance in taller, montane, moist eucalypt forests on fertile soils, with relatively old trees and abundant hollows. Den trees provide important shelter for the greater glider during the day with a preference for large, older hollowed trees.

The Southern Greater Glider is primarily florivorous, with a diet mostly comprising eucalypt leaves supplemented by buds and flowers. They feed on a restricted range of Eucalyptus but the tree species favoured by greater gliders varies regionally.

Critical habitat

No Critical Habitat as defined under Section 207A of the EPBC Act has been identified or included in the Register of Critical Habitat

The conservation advice for the Southern Greater Glider outlines that habitat critical to the survival of the species can be considered:

– Large contiguous areas of eucalypt forest, which contain mature hollow-bearing trees and a diverse range of the species' preferred food species in a particular region; and
– Smaller or fragmented habitat patches connected to larger patches of habitat, that can facilitate dispersal of the species and/or that enable recolonization; and
– Cool microclimate forest/woodland areas (e.g. protected gullies, sheltered high elevation areas, coastal lowland areas, southern slopes); and • areas identified as refuges under future climate changes scenarios; and
– Short-term or long-term post-fire refuges (i.e. unburnt habitat within or adjacent to recently burnt landscapes) that allow the species to persist, recover and recolonise burnt areas.

Habitat meeting any one of the criteria above is considered habitat critical to the survival of greater glider (southern and central), irrespective of the current abundance or density of greater gliders or the perceived quality of the site.

Important populations

Given the Endangered status, all populations of the Southern Greater Glider are important for the conservation of the species across its range (Cth DCCEEW 2022b).

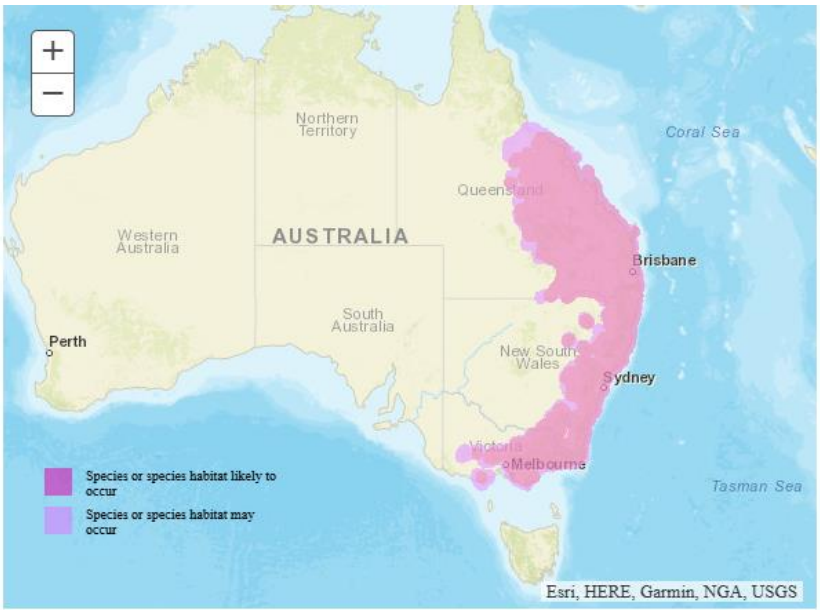
E-11-2 Relevant guidelines and policy statements

Relevant guidelines and policy statements include the Approved Conservation advice for the Southern Greater Glider (southern and central) (Cth DCCEEW 2022b).

E-11-3 NSW Bilateral assessment requirements

The NSW bilateral assessment requirement considerations for the Greater Glider are presented in Table E.17.

Table E.17 Consideration of Greater Glider against supplementary SEARs requirements

Item 16 requirement in supplementary SEARS	Greater Glider
Description of habitat	Habitat for the Southern Greater Glider has been identified in the study area associated with the following PCTs: – 3369 – 3385 – 3735 – 3747 – 3949. The edges of the easement throughout the subject land make up habitat that is broadly suitable for the Southern Greater Glider, comprising large, connected strands of woodland and forest. Patches of mature eucalyptus and hollows are present throughout. Favoured feed species such as *Eucalyptus viminalis* are present in the subject land, however, they are generally in low abundance and make up a relatively minor portion of the dominant tree species in the area. There are significant numbers of recent records of Southern Greater Glider in the broader area, occurring mostly in the former Newnes State Forest which is approximately 10 km from Mount Piper. This forest includes taller, wetter vegetation which is the more preferred habitat for the Southern Greater Glider (Cth DCCEEW 2022b). The subject land is isolated from the former Newnes State Forest across a stretch of the Castlereagh Highway and areas cleared for residential and agricultural purposes. No evidence of the Southern Greater Glider has been recorded on site throughout two years of spotlighting surveys and camera trapping. The modelled distribution map of the Southern Greater Glider (Cth DCCEEW 2025b) in Australia is provided in Figure E.10 below.  ***Figure E.10 Distribution map for Southern Greater Glider***
Survey methodology	Spotlighting and cameras were used to survey for the Southern Greater Glider throughout multiple rounds of survey, however the species was not detected in the subject site or surrounds.

Item 16 requirement in supplementary SEARS	Greater Glider
	Further details on the general methodology for mammal surveys and spotlighting is provided in section 2.6 of the BDAR. Further details and timing of camera trap and spotlighting surveys is provided in section 2.6 and section 5.2 of the BDAR.
Construction impacts	There are no construction phase impacts associated with the Southern Greater Glider as it has not been recorded in the study area.
Operational impacts	There are no operational phase impacts associated with the Southern Greater Glider as it has not been recorded in the study area.
MNES specific avoidance and mitigation	Mitigation measures potentially relevant to this species include: – protocols for pre-clearing surveys and clearing of vegetation to minimise the risk of mortality of fauna.
Residual impact	A Significant Impact Criteria assessment for the Southern Greater Glider has not been provided given it has not been recorded in the study area despite targeted arboreal mammal surveys.
Offsets required	The species has a low likelihood of significant residual impact (and was not recorded in the subject land). No credits are required for this species under the *EPBC Act offsets policy* (see Table E.1).

E-12 White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland

E-12-1 Description

Distribution

White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Box Gum Woodland) is an ecological community that is associated with both woodlands and derived native grasslands in which the tree overstorey has been removed.

The woodland is dominated (or was formerly dominated) by a range of eucalypts, most commonly including *Eucalyptus albens* (White Box), *E. melliodora* (Yellow Box) and/or *E. blakelyi* (Blakely's Red Gum), and in some areas the Grey Box species *E. microcarpa* and/or *E. moluccana* (DSE 2011c).The ground layer is diverse and has been recorded with over 400 native species (DSE 2011c) and is usually dominated by perennial tussock grasses.

Habitat requirements

Box Gum Woodland in found in a broad range of habitats ranging from coastal areas to dry inland environments. Broadly the most important features are moderate to highly fertile soils of the western slopes of NSW (Cth DCCEEW 2023).

Critical habitat

No Critical Habitat as defined under Section 207A of the EPBC Act has been identified or included in the Register of Critical Habitat.

No habitat has been identified as critical habitat for Box Gum Woodland (Cth DCCEEW 2023).

Important populations

There are very few examples of the fully intact ecological community in its entirety anywhere throughout its extensive former range. Patches with a high-quality ground layer and trees present represent those parts of the ecological community that retain the highest diversity and most intact structure and ecological function and therefore have the highest chance of persisting in the long-term (Cth DCCEEW 2023).

E-12-2 Relevant guidelines and policy statements

Relevant guidelines and policy statements include:

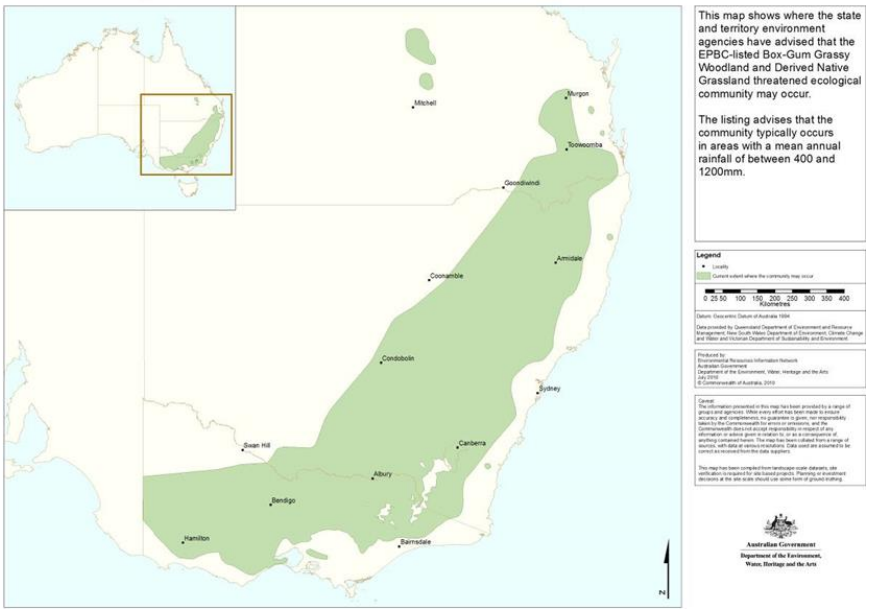
– National Recovery Plan White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland. (Cth DCCEEW 2010)

– Approved conservation advice for the White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Cth DCCEEW 2023).

E-12-3 NSW Bilateral assessment requirements

The NSW bilateral assessment requirement considerations for Box Gum Woodland are presented in Table E.18.

Table E.18 Consideration of Box Gum Woodland against supplementary SEARs requirements

Item 16 requirement in supplementary SEARS	Box Gum Woodland
Description of habitat	Box Gum Woodland does not occur within the subject land, however, stands of Box Gum Woodland are found in the broader study area, 200 m from the subject land. The modelled distribution map of Box Gum Woodland (Cth DCCEEW 2010) in Australia is provided in Figure E.11 below.  ***Figure E.11 Distribution map for Box Gum Woodland***
Survey methodology	Box-Gum Woodland was surveyed in reference to the BAM through PCT mapping. No areas within the footprint were dominated or contained White Box, Yellow Box or Red Gum. Constraints surveys along access tracks and surrounding vegetation identified some areas of Box Gum Woodland in the study area. The access track adjacent to this patch of Box Gum Woodland was subsequently removed from the project to avoid direct and indirect impacts on this community.
Construction impacts	No areas will be directly or indirectly impacted during this phase. Consequence of impact: Nil
Operational impacts	Box Gum Woodland falls outside of the footprint and will not be impacted by ongoing maintenance and trimming of trees within the corridor of the subject land. Consequence of impact: Nil
MNES specific avoidance and mitigation	The project has not developed mitigation measures specific for this community. Design refinements have avoided impacts on this community entirely. Further details on avoidance and mitigation are provided in Chapter 7 and section 8.8 of the BDAR.

Item 16 requirement in supplementary SEARS	Box Gum Woodland
Residual impact	A Significant Impact Criteria Assessment Box Gum Woodland is not required as the community is not present in or adjacent to the subject land.
Offsets required	The TEC has a low likelihood of significant residual impact (and does not occur within the subject land). No credits are required for this TEC under the *EPBC Act offsets policy* (see Table E.1).

E-13 References

Cameron (2006). Nesting habitat of the Glossy Black-Cockatoo in central New South Wales. Biological Conservation. 127(4):402-410. 127(4):402-410. DOI: 10.1016/j.biocon.2005.08.019

Commonwealth DCCEEW (2010). National Recovery Plan White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland. Accessed at: dcceew.gov.au/sites/default/files/documents/white-and-yellow-box.pdf

Commonwealth DCCEEW (2022a), Conservation Advice for Calyptorhynchus lathami lathami (South-eastern Glossy Black Cockatoo). Accessed at: environment.gov.au/biodiversity/threatened/species/pubs/67036-conservation-advice-10082022.pdf

Commonwealth DCCEEW (2022b), Conservation Advice for Petauroides volans (greater glider (southern and central)). Accessed at: environment.gov.au/biodiversity/threatened/species/pubs/254-conservation-advice-05072022.pdf

Commonwealth DCCEEW (2023). Conservation Advice for the White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland. Accessed at: environment.gov.au/biodiversity/threatened/communities/pubs/43-conservation-advice.pdf

Commonwealth DCCEEW (2024a), Conservation Advice for Chalinolobus dwyeri (large-eared pied bat). Accessed at: https://www.environment.gov.au/biodiversity/threatened/species/pubs/183-conservation-advice-15112023.pdf

Commonwealth DCCEEW (2024b). Conservation Advice for Climacteris picummus victoriae (brown treecreeper (south-eastern)). Accessed at: environment.gov.au/biodiversity/threatened/species/pubs/67062-conservation-advice-31032023.pdf

Commonwealth DCCEEW (2025a). *Protected Matters Online Search Tool*. Accessed at: https://www.environment.gov.au/epbc/protected-matters-search-tool.

Commonwealth DCCEEW (2025b). *Species profiles and threats database* (SPRAT). Accessed at: environment.gov.au/cgi-bin/sprat/public/sprat.pl**.**

DAWE (2021a) Conservation Advice for Chalinolobus dwyeri (Large-eared Pied Bat). Accessed at: http://www.environment.gov.au/biodiversity/threatened/species/pubs/183-conservation-advice-23112021.pdf

DAWE (2021b) Conservation Advice for Leucochrysum albicans subsp. tricolor (Hoary Sunray). Accessed at: environment.gov.au/biodiversity/threatened/species/pubs/89104-conservation-advice-20122021.pdf

DAWE (2022) Approved Conservation Advice for the Gang-gang Cockatoo. Accessed at: environment.gov.au/biodiversity/threatened/species/pubs/768-conservation-advice-02032022.pdf

DERM (2011) National Recovery Plan for the Large-eared Pied Bat. Accessed at: National recovery plan for the large-eared pied bat Chalinolobus dwyeri**.**

DotE (2016) National Recovery Plan for the Regent Honeyeater. Accessed at: National Recovery Plan for the Regent Honeyeater (Anthochaera phrygia)

DotE (2015) Approved Conservation advice for the Regent Honeyeater. Accessed at: Conservation Advice - regent honeyeater

DSE (2011a). National Recovery Plan for the Superb Parrot (*Polytelis swainsonii). Accessed at:* agriculture.gov.au/sites/default/files/documents/polytelis-swainsonii-recovery-plan.pdf

DSE (2011b). National Recovery Plan for the Hoary Sunray Leucochrysum albicans var. tricolor Accessed at: dcceew.gov.au/environment/biodiversity/threatened/recovery-plans/national-recovery-plan-hoary-sunray-leucochrysum-albicans-var-tricolor

Mooney, P.A. and Pedler, L.P. (2005). Recovery plan for the South Australian subspecies of the Glossy Black Cockatoo (Calyptorhynchus lathami halmaturinus): 2005-2010. (Department of Environment and Heritage: South Australia)

NSW DCCEEW (2025a) BioNet Atlas, accessed at: bionet.nsw.gov.au/UI_Modules/ATLAS_/AtlasSearch.aspx

NSW DCCEEW (2025b), *Threatened Biodiversity Data Collection*. Accessed at: environment.nsw.gov.au/AtlasApp/UI_Modules/TSM_/Default.aspx?a=1

NSW NPWS (2001) National Recovery Plan Bathurst Copper Butterfly. Accessed at: Recovery Plan for the Bathurst Copper Butterfly (Paralucia spinifera) 2001-2006

Sarker S, Ghorashi S, Forwood J, Bent S, Peters A & Raidal S (2014) Phylogeny of beak and feather disease virus in cockatoos demonstrates host generalism and multiple-variant infections within Psittaciformes. Virology 460, 72-82

TSSC (2015) Approved Conservation Advice for *Eucalyptus aggregata*. Accessed at: Conservation Advice Eucalyptus aggregata

TSSC (2016a). Final determination for the White-bellied Sea-eagle. Threatened Species Scientific Committee. Accessed at: environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Scientific-Committee/Determinations/2016/white-bellied-sea-eagle-nsw-scientific-committee-final-determination.pdf

TSSC (2016b) Conservation Advice Paralucia spinifera purple copper butterfly. Threatened Species Scientific Committee. Accessed at: environment.gov.au/biodiversity/threatened/species/pubs/26335-conservation-advice-16122016.pdf

TSSC (2016c) Approved Conservation Advice for the Superb Parrot. Accessed at: environment.gov.au/biodiversity/threatened/species/pubs/738-conservation-advice-05052016.pdf

Appendix F

Biodiversity credit reports

BAM Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00042373/BAAS25007/23/00042374	Mt Piper to Wallerawang	05/08/2025
Assessor Name	**Report Created**	**BAM Data version ***
Mal Weerakoon	18/08/2025	Current classification (live - default) (82)
Assessor Number	**Assessment Type**	**BAM Case Status**
BAAS25007	Major Projects	Finalised
Assessment Revision	**BOS entry trigger**	**Date Finalised**
1		18/08/2025

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Threatened species reliably predicted to utilise the site. No surveys are required for these species. Ecosystem credits apply to these species.

Common Name	Scientific Name	Vegetation Types(s)
Australasian Bittern	Botaurus poiciloptilus	3932-Central and Southern Tableland Swamp Meadow Complex
Australian Painted Snipe	Rostratula australis	3932-Central and Southern Tableland Swamp Meadow Complex
Black Falcon	Falco subniger	3369-Central Tableland Ranges Peppermint-Gum Grassy Forest
		3385-Southern Tableland Creekflat Swamp Woodland
		3735-Central Tableland Peppermint Shrub-Grass Forest
		3747-Southern Tableland Western Hills Scribbly Gum Forest
		3749-Western Blue Mountains Scribbly Gum Forest
Black-breasted Buzzard	Hamirostra melanosternon	3735-Central Tableland Peppermint Shrub-Grass Forest
		3747-Southern Tableland Western Hills Scribbly Gum Forest
		3749-Western Blue Mountains Scribbly Gum Forest
Black-chinned Honeyeater (eastern subspecies)	Melithreptus gularis gularis	3369-Central Tableland Ranges Peppermint-Gum Grassy Forest
		3735-Central Tableland Peppermint Shrub-Grass Forest
		3747-Southern Tableland Western Hills Scribbly Gum Forest
		3749-Western Blue Mountains Scribbly Gum Forest

Black-necked Stork	Ephippiorhynchus asiaticus	3369-Central Tableland Ranges Peppermint-Gum Grassy Forest
		3385-Southern Tableland Creekflat Swamp Woodland
		3735-Central Tableland Peppermint Shrub-Grass Forest
		3747-Southern Tableland Western Hills Scribbly Gum Forest
		3749-Western Blue Mountains Scribbly Gum Forest
		3932-Central and Southern Tableland Swamp Meadow Complex
Blue-billed Duck	Oxyura australis	3932-Central and Southern Tableland Swamp Meadow Complex
Brown Treecreeper (eastern subspecies)	Climacteris picumnus victoriae	3369-Central Tableland Ranges Peppermint-Gum Grassy Forest
		3385-Southern Tableland Creekflat Swamp Woodland
		3735-Central Tableland Peppermint Shrub-Grass Forest
		3747-Southern Tableland Western Hills Scribbly Gum Forest
		3749-Western Blue Mountains Scribbly Gum Forest
Diamond Firetail	Stagonopleura guttata	3369-Central Tableland Ranges Peppermint-Gum Grassy Forest
		3385-Southern Tableland Creekflat Swamp Woodland
		3735-Central Tableland Peppermint Shrub-Grass Forest
		3747-Southern Tableland Western Hills Scribbly Gum Forest
Dusky Woodswallow	Artamus cyanopterus cyanopterus	3369-Central Tableland Ranges Peppermint-Gum Grassy Forest
		3385-Southern Tableland Creekflat Swamp Woodland
		3735-Central Tableland Peppermint Shrub-Grass Forest
		3747-Southern Tableland Western Hills Scribbly Gum Forest
		3749-Western Blue Mountains Scribbly Gum Forest
		3932-Central and Southern Tableland Swamp Meadow Complex
Eastern False Pipistrelle	Falsistrellus tasmaniensis	3369-Central Tableland Ranges Peppermint-Gum Grassy Forest
		3735-Central Tableland Peppermint Shrub-Grass Forest
		3747-Southern Tableland Western Hills Scribbly Gum Forest
		3749-Western Blue Mountains Scribbly Gum Forest
		3932-Central and Southern Tableland Swamp Meadow Complex

Flame Robin	Petroica phoenicea	3369-Central Tableland Ranges Peppermint-Gum Grassy Forest
		3385-Southern Tableland Creekflat Swamp Woodland
		3735-Central Tableland Peppermint Shrub-Grass Forest
		3747-Southern Tableland Western Hills Scribbly Gum Forest
		3749-Western Blue Mountains Scribbly Gum Forest
		3932-Central and Southern Tableland Swamp Meadow Complex
Freckled Duck	Stictonetta naevosa	3932-Central and Southern Tableland Swamp Meadow Complex
Gang-gang Cockatoo	Callocephalon fimbriatum	3369-Central Tableland Ranges Peppermint-Gum Grassy Forest
		3385-Southern Tableland Creekflat Swamp Woodland
		3735-Central Tableland Peppermint Shrub-Grass Forest
		3747-Southern Tableland Western Hills Scribbly Gum Forest
		3749-Western Blue Mountains Scribbly Gum Forest
		3932-Central and Southern Tableland Swamp Meadow Complex
Gilbert's Whistler	Pachycephala inornata	3735-Central Tableland Peppermint Shrub-Grass Forest
		3747-Southern Tableland Western Hills Scribbly Gum Forest
		3749-Western Blue Mountains Scribbly Gum Forest
Grey-headed Flying-fox	Pteropus poliocephalus	3369-Central Tableland Ranges Peppermint-Gum Grassy Forest
		3735-Central Tableland Peppermint Shrub-Grass Forest
		3747-Southern Tableland Western Hills Scribbly Gum Forest
Large Bent-winged Bat	Miniopterus orianae oceanensis	3369-Central Tableland Ranges Peppermint-Gum Grassy Forest
		3385-Southern Tableland Creekflat Swamp Woodland
		3735-Central Tableland Peppermint Shrub-Grass Forest
		3747-Southern Tableland Western Hills Scribbly Gum Forest
		3932-Central and Southern Tableland Swamp Meadow Complex
Little Eagle	Hieraaetus morphnoides	3369-Central Tableland Ranges Peppermint-Gum Grassy Forest
		3385-Southern Tableland Creekflat Swamp Woodland
		3735-Central Tableland Peppermint Shrub-Grass Forest
		3747-Southern Tableland Western Hills Scribbly Gum Forest

Little Eagle	Hieraaetus morphnoides	3749-Western Blue Mountains Scribbly Gum Forest
		3932-Central and Southern Tableland Swamp Meadow Complex
Little Lorikeet	Glossopsitta pusilla	3369-Central Tableland Ranges Peppermint-Gum Grassy Forest
		3735-Central Tableland Peppermint Shrub-Grass Forest
		3747-Southern Tableland Western Hills Scribbly Gum Forest
		3749-Western Blue Mountains Scribbly Gum Forest
Painted Honeyeater	Grantiella picta	3369-Central Tableland Ranges Peppermint-Gum Grassy Forest
		3385-Southern Tableland Creekflat Swamp Woodland
		3735-Central Tableland Peppermint Shrub-Grass Forest
		3747-Southern Tableland Western Hills Scribbly Gum Forest
		3749-Western Blue Mountains Scribbly Gum Forest
Rosenberg's Goanna	Varanus rosenbergi	3369-Central Tableland Ranges Peppermint-Gum Grassy Forest
		3735-Central Tableland Peppermint Shrub-Grass Forest
		3747-Southern Tableland Western Hills Scribbly Gum Forest
		3932-Central and Southern Tableland Swamp Meadow Complex
Scarlet Robin	Petroica boodang	3369-Central Tableland Ranges Peppermint-Gum Grassy Forest
		3385-Southern Tableland Creekflat Swamp Woodland
		3735-Central Tableland Peppermint Shrub-Grass Forest
		3747-Southern Tableland Western Hills Scribbly Gum Forest
		3749-Western Blue Mountains Scribbly Gum Forest
		3932-Central and Southern Tableland Swamp Meadow Complex
South-eastern Glossy Black-Cockatoo	Calyptorhynchus lathami lathami	3369-Central Tableland Ranges Peppermint-Gum Grassy Forest
		3385-Southern Tableland Creekflat Swamp Woodland
		3735-Central Tableland Peppermint Shrub-Grass Forest
		3747-Southern Tableland Western Hills Scribbly Gum Forest
		3749-Western Blue Mountains Scribbly Gum Forest
South-eastern Hooded Robin	Melanodryas cucullata cucullata	3369-Central Tableland Ranges Peppermint-Gum Grassy Forest
		3385-Southern Tableland Creekflat Swamp Woodland

South-eastern Hooded Robin	Melanodryas cucullata cucullata	3735-Central Tableland Peppermint Shrub-Grass Forest
		3747-Southern Tableland Western Hills Scribbly Gum Forest
		3749-Western Blue Mountains Scribbly Gum Forest
Speckled Warbler	Chthonicola sagittata	3369-Central Tableland Ranges Peppermint-Gum Grassy Forest
		3385-Southern Tableland Creekflat Swamp Woodland
		3735-Central Tableland Peppermint Shrub-Grass Forest
		3747-Southern Tableland Western Hills Scribbly Gum Forest
		3749-Western Blue Mountains Scribbly Gum Forest
		3932-Central and Southern Tableland Swamp Meadow Complex
Spotted Harrier	Circus assimilis	3369-Central Tableland Ranges Peppermint-Gum Grassy Forest
		3385-Southern Tableland Creekflat Swamp Woodland
		3932-Central and Southern Tableland Swamp Meadow Complex
Spotted-tailed Quoll	Dasyurus maculatus	3369-Central Tableland Ranges Peppermint-Gum Grassy Forest
		3385-Southern Tableland Creekflat Swamp Woodland
		3735-Central Tableland Peppermint Shrub-Grass Forest
		3747-Southern Tableland Western Hills Scribbly Gum Forest
		3932-Central and Southern Tableland Swamp Meadow Complex
Square-tailed Kite	Lophoictinia isura	3369-Central Tableland Ranges Peppermint-Gum Grassy Forest
		3385-Southern Tableland Creekflat Swamp Woodland
		3735-Central Tableland Peppermint Shrub-Grass Forest
		3747-Southern Tableland Western Hills Scribbly Gum Forest
		3749-Western Blue Mountains Scribbly Gum Forest
		3932-Central and Southern Tableland Swamp Meadow Complex
Swift Parrot	Lathamus discolor	3369-Central Tableland Ranges Peppermint-Gum Grassy Forest
		3735-Central Tableland Peppermint Shrub-Grass Forest
		3747-Southern Tableland Western Hills Scribbly Gum Forest
		3749-Western Blue Mountains Scribbly Gum Forest

Varied Sittella	Daphoenositta chrysoptera	3369-Central Tableland Ranges Peppermint-Gum Grassy Forest
		3385-Southern Tableland Creekflat Swamp Woodland
		3735-Central Tableland Peppermint Shrub-Grass Forest
		3747-Southern Tableland Western Hills Scribbly Gum Forest
		3749-Western Blue Mountains Scribbly Gum Forest
		3932-Central and Southern Tableland Swamp Meadow Complex
White-bellied Sea-Eagle	Haliaeetus leucogaster	3369-Central Tableland Ranges Peppermint-Gum Grassy Forest
		3385-Southern Tableland Creekflat Swamp Woodland
		3735-Central Tableland Peppermint Shrub-Grass Forest
		3747-Southern Tableland Western Hills Scribbly Gum Forest
		3749-Western Blue Mountains Scribbly Gum Forest
		3932-Central and Southern Tableland Swamp Meadow Complex
White-fronted Chat	Epthianura albifrons	3932-Central and Southern Tableland Swamp Meadow Complex
White-throated Needletail	Hirundapus caudacutus	3369-Central Tableland Ranges Peppermint-Gum Grassy Forest
		3385-Southern Tableland Creekflat Swamp Woodland
		3735-Central Tableland Peppermint Shrub-Grass Forest
		3747-Southern Tableland Western Hills Scribbly Gum Forest
		3749-Western Blue Mountains Scribbly Gum Forest
		3932-Central and Southern Tableland Swamp Meadow Complex
Yellow-bellied Glider	Petaurus australis	3735-Central Tableland Peppermint Shrub-Grass Forest
		3932-Central and Southern Tableland Swamp Meadow Complex
Yellow-bellied Sheathtail-bat	Saccolaimus flaviventris	3747-Southern Tableland Western Hills Scribbly Gum Forest

Threatened species Manually Added

None added

Threatened species assessed as not within the vegetation zone(s) for the PCT(s)

Refer to BAR for detailed justification

BAM Predicted Species Report

Common Name	Scientific Name	Justification in the BAM-C

BAM Candidate Species Report

Proposal Details

Assessment Id 00042373/BAAS25007/23/00042374	Proposal Name Mt Piper to Wallerawang	BAM data last updated * 05/08/2025
Assessor Name Mal Weerakoon	Report Created 18/08/2025	BAM Data version * Current classification (live - default) (82)
Assessor Number BAAS25007	Assessment Type Major Projects	BAM Case Status Finalised
Assessment Revision 1	BOS entry trigger	Date Finalised 18/08/2025

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

List of Species Requiring Survey

Name	Presence	Survey Months
Acacia bynoeana Bynoe's Wattle	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☑ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?
Acacia meiantha Acacia meiantha	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☑ Oct ☑ Nov ☐ Dec ☑ Survey month outside the specified months?
Burhinus grallarius Bush Stone-curlew	No (surveyed)	☐ Jan ☐ Feb ☑ Mar ☐ Apr ☐ May ☑ Jun ☑ Jul ☑ Aug ☐ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Callocephalon fimbriatum Gang-gang Cockatoo	Yes (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?
Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☑ Jul ☑ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Cercartetus nanus Eastern Pygmy-possum	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☑ Feb ☑ Mar ☑ Apr ☐ May ☑ Jun ☑ Jul ☑ Aug ☐ Sep ☑ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Chalinolobus dwyeri Large-eared Pied Bat	Yes (surveyed) *Survey months are outside of the months specified in Bionet.	☑ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Eucalyptus aggregata Black Gum	Yes (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☑ Aug ☑ Sep ☑ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?
Eucalyptus cannonii Capertee Stringybark	Yes (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☑ Aug ☑ Sep ☑ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?

Haliaeetus leucogaster White-bellied Sea-Eagle	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☐ Feb ☑ Mar ☐ Apr ☐ May ☑ Jun ☑ Jul ☑ Aug ☑ Sep ☑ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Hamirostra melanosternon Black-breasted Buzzard	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☐ Feb ☑ Mar ☐ Apr ☐ May ☑ Jun ☑ Jul ☑ Aug ☑ Sep ☑ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Hieraaetus morphnoides Little Eagle	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☐ Feb ☑ Mar ☐ Apr ☐ May ☑ Jun ☑ Jul ☑ Aug ☑ Sep ☑ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Leucochrysum albicans subsp. tricolor Hoary Sunray	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☑ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?
Litoria aurea Green and Golden Bell Frog	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Lophoictinia isura Square-tailed Kite	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☐ Feb ☑ Mar ☐ Apr ☐ May ☑ Jun ☑ Jul ☑ Aug ☑ Sep ☑ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?

Miniopterus orianae oceanensis Large Bent-winged Bat	No (surveyed) *Survey months are outside of the months specified in Bionet.	☑ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Myotis macropus Southern Myotis	Yes (surveyed)	☑ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Ninox connivens Barking Owl	Yes (surveyed)	☐ Jan ☑ Feb ☑ Mar ☐ Apr ☐ May ☑ Jun ☑ Jul ☑ Aug ☑ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Ninox strenua Powerful Owl	Yes (surveyed)	☐ Jan ☑ Feb ☑ Mar ☐ Apr ☐ May ☑ Jun ☑ Jul ☑ Aug ☑ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Paralucia spinifera Purple Copper Butterfly, Bathurst Copper Butterfly	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Persoonia marginata Clandulla Geebung	No (surveyed)	☑ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Petauroides volans Southern Greater Glider	No (surveyed)	☐ Jan ☑ Feb ☑ Mar ☑ Apr ☐ May ☑ Jun ☑ Jul ☑ Aug ☐ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Petaurus norfolcensis Squirrel Glider	Yes (surveyed)	☐ Jan ☑ Feb ☑ Mar ☑ Apr ☐ May ☑ Jun ☑ Jul ☑ Aug ☐ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Phascogale tapoatafa Brush-tailed Phascogale	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☑ Feb ☑ Mar ☑ Apr ☐ May ☑ Jun ☑ Jul ☑ Aug ☐ Sep ☑ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Phascolarctos cinereus Koala	No (surveyed)	☐ Jan ☐ Feb ☑ Mar ☐ Apr ☐ May ☑ Jun ☑ Jul ☑ Aug ☐ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Pteropus poliocephalus Grey-headed Flying-fox	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☐ Feb ☑ Mar ☐ Apr ☐ May ☑ Jun ☑ Jul ☑ Aug ☑ Sep ☑ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Tyto novaehollandiae Masked Owl	No (surveyed)	☐ Jan ☑ Feb ☑ Mar ☐ Apr ☐ May ☑ Jun ☑ Jul ☑ Aug ☑ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Veronica blakelyi Veronica blakelyi	No (surveyed)	☑ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Threatened species Manually Added

None added

Threatened species assessed as not on site

Refer to BAR for detailed justification

Common name	Scientific name	Justification in the BAM-C
Booroolong Frog	Litoria booroolongensis	Habitat degraded
Brush-tailed Rock-wallaby	Petrogale penicillata	Habitat degraded
Giant Burrowing Frog	Heleioporus australiacus	Habitat degraded
Littlejohn's Tree Frog	Litoria littlejohni	Habitat degraded
Red-crowned Toadlet	Pseudophryne australis	Habitat degraded
Stuttering Frog	Mixophyes balbus	Habitat degraded
Swift Parrot	Lathamus discolor	Habitat constraints

BAM Credit Summary Report

Proposal Details

Assessment Id
00042373/BAAS25007/23/00042374

Proposal Name
Mt Piper to Wallerawang

BAM data last updated *
05/08/2025

Assessor Name
Mal Weerakoon

Report Created
18/08/2025

BAM Data version *
Current classification (live - default) (82)

Assessor Number
BAAS25007

BAM Case Status
Finalised

Date Finalised
18/08/2025

Assessment Revision
1

BOS entry trigger

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
Central and Southern Tableland Swamp Meadow Complex												
14	3932_moderate	Not a TEC	48.9	48.9	2.4	PCT Cleared - 68%	High Sensitivity to Gain			1.75		51
											Subtotal	**51**

Central Tableland Peppermint Shrub-Grass Forest												
7	3735_good	Not a TEC	91.5	91.5	1.7	PCT Cleared - 69%	High Sensitivity to Gain			1.75		68
8	3735_shrubland	Not a TEC	38.3	38.3	7.5	PCT Cleared - 69%	High Sensitivity to Gain			1.75		126
											Subtotal	**194**
Central Tableland Ranges Peppermint-Gum Grassy Forest												
1	3369_good	Not a TEC	75.3	75.3	1.5	PCT Cleared - 62%	High Sensitivity to Gain			1.75		48
2	3369_shrubland	Not a TEC	30	30.0	5.5	PCT Cleared - 62%	High Sensitivity to Gain			1.75		72
											Subtotal	**120**
Southern Tableland Creekflat Swamp Woodland												
3	3385_good	Not a TEC	81.9	81.9	2.6	PCT Cleared - 75%	High Sensitivity to Gain			2.00		106
4	3385_moderate	Not a TEC	46.8	46.8	0.83	PCT Cleared - 75%	High Sensitivity to Gain			2.00		19
5	3385_paddock_trees	Not a TEC	34.8	34.8	0.61	PCT Cleared - 75%	High Sensitivity to Gain			2.00		11

6	3385_poor	Not a TEC	14.8	14.8	6.9	PCT Cleared - 75%	High Sensitivity to Gain			2.00		0
15	3385_non-native	Not a TEC	1.6	1.6	30	PCT Cleared - 75%	High Sensitivity to Gain			2.00		0
16	3385_Good_MZ3I	Not a TEC	81.9	7.1	1	PCT Cleared - 75%	High Sensitivity to Gain			2.00		4
17	3385_Moderate_MZ4I	Not a TEC	46.8	4.7	0.05	PCT Cleared - 75%	High Sensitivity to Gain			2.00		1
											Subtotal	**141**
Southern Tableland Western Hills Scribbly Gum Forest												
9	3747_good	Not a TEC	79.9	79.9	4.6	PCT Cleared - 65%	High Sensitivity to Gain			1.75		163
10	3747_poor	Not a TEC	18.4	18.4	6	PCT Cleared - 65%	High Sensitivity to Gain			1.75		48
11	3747_shrubland	Not a TEC	43.6	43.6	12.3	PCT Cleared - 65%	High Sensitivity to Gain			1.75		235
											Subtotal	**446**

Western Blue Mountains Scribbly Gum Forest											
12	3749_good	Not a TEC	75.1	75.1	1.6	PCT Cleared - 36%	High Sensitivity to Gain			1.50	46
13	3749_shrubland	Not a TEC	38.8	38.8	1.4	PCT Cleared - 36%	High Sensitivity to Gain			1.50	20
										Subtotal	**66**
										Total	**1018**

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
Callocephalon fimbriatum / Gang-gang Cockatoo (Fauna)									
3369_good	75.3	75.3	1.5	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	55
3385_good	81.9	81.9	0.94	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	38

3735_good	91.5	91.5	1.7	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	77
3747_good	79.9	79.9	4.6	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	186
3749_good	75.1	75.1	1.6	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	62
3385_Good_MZ 3I	7.1	7.1	0.52	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	False	2
								Subtotal	**420**
Chalinolobus dwyeri / Large-eared Pied Bat (Fauna)									
3369_good	75.3	75.3	1.5	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	True	83
3369_shrubland	30.0	30.0	5.5	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	True	123

3385_good	81.9	81.9	2.6	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	True	159
3385_poor	14.8	14.8	6.9	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	True	77
3385_paddock_trees	34.8	34.8	0.61	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	True	16
3735_good	91.5	91.5	1.7	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	True	116
3735_shrubland	38.3	38.3	7.5	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	True	216
3747_good	79.9	79.9	4.6	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	True	279
3747_shrubland	43.6	43.6	12.3	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	True	402

3747_poor	18.4	18.4	6	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	True	82
3749_good	75.1	75.1	1.6	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	True	92
3749_shrubland	38.8	38.8	1.4	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	True	39
3385_moderate	46.8	46.8	0.83	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	True	29
3932_moderate	48.9	48.9	2.4	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	True	87
3385_Good_MZ 3I	7.1	7.1	1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	True	5
3385_Moderate _MZ4I	4.7	4.7	0.05	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	True	1
								Subtotal	**1806**

Eucalyptus aggregata / Black Gum (Flora)									
3385_good	N/A	N/A	155	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	310
3385_poor	N/A	N/A	54	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	108
3385_paddock_trees	N/A	N/A	54	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	108
3932_moderate	N/A	N/A	1	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	2
3385_non-native	N/A	N/A	10	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	20
								Subtotal	**548**

Eucalyptus cannonii / Capertee Stringybark (Flora)									
3369_good	N/A	N/A	19	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	29
3369_shrubland	N/A	N/A	2	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	3
3385_poor	N/A	N/A	2	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	3
3735_good	N/A	N/A	4	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	6
3735_shrubland	N/A	N/A	2	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	3

3747_good	N/A	N/A	105	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	158
3749_good	N/A	N/A	8	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	12
								Subtotal	**214**
Myotis macropus / Southern Myotis (Fauna)									
3369_good	75.3	75.3	0.47	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	18
3369_shrubland	30.0	30.0	4.1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	61
3385_good	81.9	81.9	2.2	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	90
3385_moderate	46.8	46.8	0.83	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	19

3385_paddock_trees	34.8	34.8	0.61	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	11
3385_poor	14.8	14.8	4.3	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	32
3735_good	91.5	91.5	0.76	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	35
3735_shrubland	38.3	38.3	0.92	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	18
3747_good	79.9	79.9	1.4	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	54
3747_poor	18.4	18.4	4	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	37
3747_shrubland	43.6	43.6	4.8	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	104

3932_moderate	48.9	48.9	2.4	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	58
3385_Good_MZ 3I	7.1	7.1	0.9	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	3
3385_Moderate _MZ4I	4.7	4.7	0.05	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1
								Subtotal	**541**
Ninox connivens / Barking Owl (Fauna)									
3369_good	75.3	75.3	1.5	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	55
3385_good	81.9	81.9	0.94	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	38
3735_good	91.5	91.5	1.7	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	77

3747_good	79.9	79.9	4.6	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	186
3749_good	75.1	75.1	1.6	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	62
3385_Good_MZ 3I	7.1	7.1	0.52	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	2
								Subtotal	**420**
Ninox strenua / Powerful Owl (Fauna)									
3369_good	75.3	75.3	1.5	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	55
3385_good	81.9	81.9	0.94	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	38
3735_good	91.5	91.5	1.7	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	77

3747_good	79.9	79.9	4.6	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	186
3749_good	75.1	75.1	1.6	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	62
3385_Good_MZ 3I	7.1	7.1	0.52	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	2
								Subtotal	**420**
Petaurus norfolcensis / Squirrel Glider (Fauna)									
3369_good	75.3	75.3	1.5	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	55
3385_good	81.9	81.9	0.94	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	38
3735_good	91.5	91.5	1.7	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	77

3747_good	79.9	79.9	4.6	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	186
3747_shrubland	43.6	43.6	12.3	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	268
3749_good	75.1	75.1	1.6	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	62
3385_Good_MZ 3I	7.1	7.1	0.52	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	2
								Subtotal	**688**

Appendix G

Anabat call analysis results

G-1 Analysis method

Bat calls were recorded during field surveys using Anabat Express Zero Crossing detectors (Titley Scientific).

The zero-crossing analysis file (zca file) recorded using the detector was converted to zc sequence files using Anabat Insight (version 2.0.6-3) for analysis and in order to add metadata (e.g. species label etc). During the conversion process general bat call and species-specific filters were applied to identify bat sequences and remove noise files. Noise files were moved to a separate folder for later checking.

The *Bat calls of NSW: Region based guide to the echolocation calls of microchiropteran bats* (Pennay et al. 2004) was used to assist call analysis. Call identification was also assisted by consulting distribution information for potential species (Pennay et al 2011; Churchill 2008; Van Dyck et al. 2013) and records from BioNet (December 2023) and BatMap (December 2023). No reference calls were collected during the survey.

A call (pass) was defined as a sequence of three or more consecutive pulses of similar frequency and shape. Calls with less than three defined consecutive pulses of similar frequency and shape were not unambiguously identified to a species but were used as part of the activity count for the survey area. Due to variability in the quality of calls and the difficulty in distinguishing some species the identification of each call was assigned a confidence rating (see Mills *et al.* 1996 & Duffy *et al.* 2000 for similar process) as summarised in Table G.1. Due to the absence of reference calls from the study area, high level of variability within a bat call and overlap in call characteristics between some species, a conservative approach was taken when analysing calls. Species nomenclature follows Armstrong et al 2022.

Table G.1 Confidence ratings applied to calls

Identification	Description
D – Definite	Species identification not in doubt.
PR – Probable	Call most likely to represent a particular species, but there exists a low probability of confusion with species of similar call type or call lacks sufficient detail.
SG – Species Group	Call made by one of two or more species. Call characteristics overlap making it too difficult to distinguish between species for e.g. *Chalinolobus gouldii /Ozimops sp.*

G-2 Analysis results

These analysis results cover three rounds of Anabat surveys completed between:

– 23-27 October 2023 (8 survey nights)
– 19-23 February 2024 (16 survey nights)
– 29 January-2 February 2024 (14 survey nights).

October 2023 survey results

Table G.2 presents a summary of the species recorded for each site for the October 2023 survey period as a result of the bat call analysis. Eight species were positively (Definite) identified of the 18 or so species that are known to occur from the locality of the study area over eight survey nights.

Of the 2,376 files recorded approximately 75 per cent contained bat files of some description. Remaining files contained anthropogenic and/or insect noise. As many as four other species may also have been recorded, including the NSW Biodiversity Conservation Act 2016 listed *Saccolaimus flaviventris* and *Miniopterus orianae oceanensis* but short sequences, poor data quality and/or interspecific call similarities precluded reliable identification of additional species.

Table G.2 Summary of bat call analysis results for each night and site October 2023

Species	Dracula/SN434272 2023-10-24	Dracula/SN434272 2023-10-25	Nosferatu/SN507312 2023-10-24	Nosferatu/SN507312 2023-10-25	Wagga/SN409366 2023-10-23	Wagga/SN409366 2023-10-24	Wagga/SN409366 2023-10-25	Wagga/SN409366 2023-10-26
	Targeting flyway within firetrail in SCA. Collected 10pm 25/10/23 due to forecast rain		Targeting flyway within firetrail south of easement in SCA near Coal Reject Emplacement Area		Targeting caves and rock outcrop on privately leased farmland			
Austronomus australis		D			D	D	D	D
Saccolaimus flaviventris, v		**PR**				**PR**	**PR**	
Chalinolobus gouldii		D	D		D	D	D	
Chalinolobus morio		D	D		D	D		
Miniopterus orianae oceanensis, v			**PR**			**PR**		
Nyctophilus spp			D	D		D	D	
Ozimops ridei/ O. planiceps						D	D	
Rhinolophus megaphyllus			D					
Vespadelus darlingtoni					D	D		
Vespadelus regulus						D		
Vespadelus vulturnus			D	D				
C. gouldii/ S. rueppellii/ S. orion			SG		SG	SG		
C.gouldii/ Ozimops sp.		SG		SG	SG	SG	SG	

Species	Dracula/SN434272 2023-10-24	Dracula/SN434272 2023-10-25	Nosferatu/SN507312 2023-10-24	Nosferatu/SN507312 2023-10-25	Wagga/SN409366 2023-10-23	Wagga/SN409366 2023-10-24	Wagga/SN409366 2023-10-25	Wagga/SN409366 2023-10-26
	Targeting flyway within firetrail in SCA. Collected 10pm 25/10/23 due to forecast rain		Targeting flyway within firetrail south of easement in SCA near Coal Reject Emplacement Area		Targeting caves and rock outcrop on privately leased farmland			
M.macropus/ Nyctophilus sp.			SG	SG	SG	SG		
M.o.oceanensis/ V.vulturnus						SG		
M.o.oceanensis/ Vespadelus sp			SG		SG	SG	SG	
S.rueppellii/S. orion/F.tasmaniensis						SG		
S.rueppellii/S.orion						SG		
V. vulturnus/ V. troughtoni			SG	SG		SG		
V.darlingtoni/ V.regulus		SG	SG	SG	SG	SG	SG	
Vespadelus sp./ C.morio.			SG	SG	SG	SG		
Other bat calls	Y	Y	Y	Y	Y	Y	Y	Y
Number of files	7	64	1008	39	206	867	129	56
Number of species per night	-	4	5	2	4	7	4	1
Survey effort (hrs:mins)	10	10	10	10	10	10	10	10

Notes:

Total number of species recorded for each night/site is based on definite (D) identification only. Total number of D species for each night includes one *Nyctophilus* species where recorded.

See Table 1 for confidence rating e.g. D or Pr

Other bat calls – incomplete single pulses, call sequences consisting of incomplete, fragmented pulses lacking key diagnostic features

ce, e, v - species listed under the *NSW Biodiversity Conservation Act 2016*.

CE, E, VU – species listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Survey effort: estimate of time between sunset and sunrise for a successful night of Anabat detection. Other bat calls – files with one or more non-consecutive pulses from possibly one or more species

January 2024 survey results

Tables G.3 and G.4 presents a summary of the species recorded for each site for the January 2024 survey period as a result of the bat call analysis. Twelve species were positively (Definite) identified of the 18 or so species that are known to occur from the locality of the study area over 16 survey nights. Approximately 65 per cent of the 27,677 .zc files were reviewed. Of the files reviewed the majority were bat calls of some description. A high proportion of the bat calls contained solid echoes (e.g. a second pulse immediately following the first pulse of same shape and frequency), possibly resulting from the detector microphone being located close to a solid object (e.g. cliff face), however some echoes were also diffuse, probably resulting from dense foliage of trees. Remaining files contained anthropogenic and/or insect noise. See Attachment 1 for example spectrogram for each threatened bat species positively (definite) identified. Bat species positively (Definitively/D) identified included:

– White-striped Freetail Bat (*Austronomus australis*)
– Large-eared Pied Bat (*Chalinolobus dwyeri*) – vulnerable EPBC Act and vulnerable BC Act
– Gould's Wattled Bat (*Chalinolobus gouldii*)
– Chocolate Wattled Bat (*Chalinolobus morio*)
– Eastern False Pipistrelle (*Falsistrellus tasmaniensis*) – vulnerable BC Act
– Large Bent-winged Bat (*Miniopterus orianae oceanensis*) – vulnerable BC Act
– Southern Myotis (*Myotis macropus*) – vulnerable BC Act
– Long-eared bat (*Nyctophilus*) species (*gouldi* or *geoffroyi*)
– South-eastern Freet-tailed Bat (*Ozimops planiceps*)
– Eastern Free-tailed Bat (*Ozimops ridei*)
– Eastern Horseshoe Bat (*Rhinolophus megaphyllus*)
– Large Forest Bat (Vespadelus darlingtoni)
– Little Forest Bat (*Vespadelus vulturnus*).

Table G.3 Summary of bat call analysis results for each night and sites SN409366 and SN507312 January-February 2024

Species/ Species Group	SN409366 2024-01-29	SN409366 2024-01-30	SN409366 2024-01-31	SN409366 2024-02-01	SN507312 2024-01-29	SN507312 2024-01-30	SN507312 2024-01-31	SN507312 2024-02-01
	Targeting Coxes River from internal (former Wallerawang Power Station)				Targeting Coxes River at the intersection of Main Street (Former Wallerawang Power Station)			
Austronomus australis	D	D	D	D	0	0	0	0
Chalinolobus dwyeri	**0**	**D**	**0**	**D**	**0**	**0**	**0**	**0**
Chalinolobus gouldii	D	D	D	D	D	PR	D	D
Chalinolobus morio	D	D	D	0	D	D	0	D
Falsistrellus tasmaniensis	**PR**	**D**	**D**	**PR**	**PR**	**PR**	**0**	**D**
Miniopterus orianae oceanensis	**0**	**0**	**0**	**0**	**PR**	**PR**	**PR**	**PR**
Myotis macropus	**D**	**0**	**0**	**D**	**0**	**0**	**PR**	**PR**
Nyctophilus spp	0	0	0	0	D	0	0	0
Ozimops planiceps	D	0	D	D	0	0	0	0
Ozimops ridei	D	0	0	0	0	0	0	0
Rhinolophus megaphyllus	0	0	0	0	0	0	0	0
Scotorepens orion	0	0	0	0	0	0	PR	0
Vespadelus darlingtoni	D	D	D	D	0	D	D	D
Vespadelus regulus	0	D	0	D	D	D	D	0
Vespadelus vulturnus	D	0	0	0	0	0	D	D
C. gouldii/S. rueppellii/S.orion	SG	0	0	0	0	SG	0	0
C.gouldii/Ozimops sp.	SG	SG	SG	SG	SG	0	0	SG
M.macropus/Nyctophilus sp.	SG	SG	SG	SG	SG	SG	S	SG
M.o.oceanensis/V.vulturnus	0	SG	SG	SG	0	SG	S	0
M.o.oceanensis/V.vulturnus,M.o.oceanensis/Vespadelus sp.	SG	0	0	0	0	0	0	0
M.o.oceanensis/Vespadelus sp.	SG	SG	SG	SG	SG	SG	S	SG
S. orion/ F. tasmaniensis	0	0	0	0	SG	SG	0	SG
S.rueppellii/S. orion/F.tasmaniensis	SG	SG	SG	SG	SG	SG	SG	SG
V. vulturnus/V. troughtoni	0	0	0	0	SG	SG	S	0
V.darlingtoni/V.regulus	SG	SG	SG	SG	SG	SG	S	SG

Species/ Species Group	SN409366 2024-01-29	SN409366 2024-01-30	SN409366 2024-01-31	SN409366 2024-02-01	SN507312 2024-01-29	SN507312 2024-01-30	SN507312 2024-01-31	SN507312 2024-02-01
V.troughtoni/V. pumilus	0	0	0	0	0	0	0	0
Vespadelus sp./C.morio	0	SG	0	SG	0	SG	S	0
Number of files	494	550	532	561	1757	2504	2035	1980
Number of species per night	8	7	6	7	4	3	4	5
Survey effort (hrs:mins)	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5

Table Notes:

Total number of species recorded for each night/site is based on definite (D) identification only. Total number of D species for each night includes one *Nyctophilus* species where recorded.

See Table 1 for confidence rating e.g. D or Pr

Other bat calls – incomplete single pulses, call sequences consisting of incomplete, fragmented pulses lacking key diagnostic features

ce, e, v - species listed under the *NSW Biodiversity Conservation Act 2016*.

CE, E, VU – species listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Survey effort: estimate of time between sunset and sunrise for a successful night of Anabat detection. Other bat calls – files with one or more non-consecutive pulses from possibly one or more species

Table G.4 Summary of bat call analysis results for each night and sites SN528637 and SN542859 January – February 2024

Species/ Species Group	SN528637 2024-01-29	SN528637 2024-01-30	SN528637 2024-01-31	SN542859 2024-01-29	SN542859 2024-01-30	SN542859 2024-01-31	SN542859 2024-02-01
	Targeting small farm dam adjacent to conveyer in privately leased land			Targeting sedimentation dam next to substation and (EA land)	Targeting sedimentation dam in Centennial/Springvale land	Targeting dam on private leased property north of easement	Targeting pools under conveyer off Brays Lane
Austronomus australis	D	D	D	D	D	D	D
Chalinolobus dwyeri	**D**	**PR**	**D**	**D**	**D**	**D**	**D**
Chalinolobus gouldii	D	D	D	D	D	D	D
Chalinolobus morio	D	D	D	D	0	0	0
Falsistrellus tasmaniensis	**D**	**0**	**PR**	**D**	**0**	**0**	**PR**
Miniopterus orianae oceanensis	**PR**	**PR**	**D**	**0**	**0**	**0**	**PR**
Myotis macropus	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Nyctophilus spp	0	0	0	0	0	0	0
Ozimops planiceps	D	0	D	D	D	0	0
Ozimops ridei	0	0	0	0	0	0	0
Rhinolophus megaphyllus	0	0	0	D	D	0	0
Scotorepens orion	0	0	0	0	0	0	0
Vespadelus darlingtoni	D	D	D	D	D	D	D
Vespadelus regulus	D	D	D	0	0	0	0
Vespadelus vulturnus	D	0	0	D	D	D	0
C. gouldii/S. rueppellii/S.orion	0	0	0	0	0	0	0
C.gouldii/Ozimops sp.	SG	SG	SG	SG	SG	SG	SG
M.macropus/Nyctophilus sp.	SG	0	SG	0	SG	SG	0
M.o.oceanensis/V.vulturnus	0	0	0	0	0	0	0
M.o.oceanensis/V.vulturnus,M.o.oceanensis/ Vespadelus sp.	0	0	0	0	0	0	0
M.o.oceanensis/Vespadelus sp.	SG	SG	SG	SG	SG	SG	SG
S. orion/ F. tasmaniensis	0	0	0	0	0	SG	0
S.rueppellii/S. orion/F.tasmaniensis	SG	0	SG	SG	0	SG	0

Species/ Species Group	SN528637 2024-01-29	SN528637 2024-01-30	SN528637 2024-01-31	SN542859 2024-01-29	SN542859 2024-01-30	SN542859 2024-01-31	SN542859 2024-02-01
	Targeting small farm dam adjacent to conveyer in privately leased land			Targeting sedimentation dam next to substation and (EA land)	Targeting sedimentation dam in Centennial/Springvale land	Targeting dam on private leased property north of easement	Targeting pools under conveyer off Brays Lane
V. vulturnus/V. troughtoni	SG	0	SG	SG	SG	SG	SG
V.darlingtoni/V.regulus	SG	SG	SG	SG	SG	SG	SG
V.troughtoni/V. pumilus	0	0	0	0	0	0	SG
Vespadelus sp./C.morio	SG	SG	SG	SG	SG	SG	SG
Number of files	2075	2964	2168	3336	1757	2273	2681
Number of species per night	9	5	8	9	7	5	4
Survey effort (hrs:mins)	10.5	10.5	10.5	10.5	10.5	10.5	10.5

Notes:

Total number of species recorded for each night/site is based on definite (D) identification only. Total number of D species for each night includes one *Nyctophilus* species where recorded.

See Table 1 for confidence rating e.g. D or Pr

Other bat calls – incomplete single pulses, call sequences consisting of incomplete, fragmented pulses lacking key diagnostic features

ce, e, v - species listed under the *NSW Biodiversity Conservation Act 2016*.

CE, E, VU – species listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Survey effort: estimate of time between sunset and sunrise for a successful night of Anabat detection. Other bat calls – files with one or more non-consecutive pulses from possibly one or more species

February 2024 survey results

Table 5 presents a summary of the species recorded for each site for the February 2024 survey period as a result of the bat call analysis. Eight species were positively (Definite) identified of the 18 or so species that are known to occur from the locality of the study area over 14 survey nights. Approximately 70 per cent of the 18,009 .zc files were reviewed. Of the files reviewed the majority were bat calls of some description. Remaining files contained anthropogenic and/or insect noise. See Attachment 1 for example spectrogram for each threatened bat species positively (definite) identified. Bat species positively (Definitively/D) identified included:

– White-striped Freetail Bat (*Austronomus australis*)
– Gould's Wattled Bat (*Chalinolobus gouldii*)
– Chocolate Wattled Bat (*Chalinolobus morio*)
– Long-eared bat (*Nyctophilus*) species (*gouldi* or *geoffroyi*)
– South-eastern Freet-tailed Bat (*Ozimops planiceps*)
– Eastern Free-tailed Bat (*Ozimops ridei*)
– Eastern Horseshoe Bat (*Rhinolophus megaphyllus*)
– Large Forest Bat (Vespadelus darlingtoni)
– Little Forest Bat (*Vespadelus vulturnus*).

In addition three threatened species were probably identified, as insufficient information was available to provide a definitive identification.

– Large-eared Pied Bat (*Chalinolobus dwyeri*) – vulnerable EPBC Act and vulnerable BC Act (1 call)
– Eastern False Pipistrelle (*Falsistrellus tasmaniensis*) – vulnerable BC Act (3 calls)
– Large Bent-winged Bat (*Miniopterus orianae oceanensis*) – vulnerable BC Act (20 + calls. It is more than likely that some of these calls originate form this species given recent records.

Table G.5 Summary of bat call analysis results for each night – February 2024

Species/ Species Group	SN409366 2024-02-19	SN409366 2024-02-20	SN409366 2024-02-21	SN409366 2024-02-22	SN507312 2024-02-19	SN507312 2024-02-20	SN507312 2024-02-21	SN507312 2024-02-22	SN528637 2024-02-20	SN528637 2024-02-21	SN528637 2024-02-22	SN542859 2024-02-20	SN542859 2024-02-21	SN542859 2024-02-22
	Targeting drainage line within NPWS land				Targeting drainage line in EA land	Targeting firetrail in NPWS land			Targeting drainage line within NPWS land			Targeting Coxs River from internal bridge at Former Wallerawang Power Station land		
Austronomus australis	D	D	D	0	0	0	0	0	D	D	D	0	D	0
Chalinolobus dwyeri	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**PR**	**0**	**0**	**0**
Chalinolobus gouldii	0	0	D	0	D	0	D	D	D	D	D	0	PR	0
Chalinolobus morio	0	0	D	0	0	D	D	D	0	0	D	0	0	0
Falsistrellus tasmaniensis	**0**	**0**	**0**	**0**	**0**	**PR**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Miniopterus orianae oceanensis	**0**	**0**	**0**	**0**	**PR**	**PR**	**PR**	**PR**	**PR**	**PR**	**PR**	**0**	**0**	**0**
Nyctophilus spp	0	0	0	0	0	D	D	0	0	0	0	0	0	0
Ozimops planiceps	0	0	0	0	0	0	0	0	0	0	0	0	0	D
Rhinolophus megaphyllus	0	D	D	0	D	D	D	D	0	D	0	D	D	0
Scotorepens orion	0	0	0	0	0	0	PR	0	0	0	0	0	0	0
Vespadelus darlingtoni	D	D	D	0	D	0	0	D	0	0	0	0	0	0
Vespadelus vulturnus	D	0	D	0	D	D	D	D	0	0	0	0	0	0
C. gouldii/S. rueppellii/S.orion	SG	0	0	0	SG	0	0	SG	0	SG	SG	0	0	0
C.gouldii/Ozimops sp.	SG	0	0	0	SG	SG	SG	0	SG	SG	SG	0	SG	0
M.macropus/ Nyctophilus sp.	SG	SG	0	0	SG	SG	0	SG	SG	SG	SG	SG	0	0
M.o.oceanensis/ V.vulturnus	SG	SG	SG	SG	0	SG	SG	0	0	SG	SG	0	SG	SG
M.o.oceanensis/ Vespadelus sp.	SG	SG	SG	SG	SG	SG	SG	SG	SG	SG	SG	SG	SG	SG

Species/ Species Group	SN409366 2024-02-19	SN409366 2024-02-20	SN409366 2024-02-21	SN409366 2024-02-22	SN507312 2024-02-19	SN507312 2024-02-20	SN507312 2024-02-21	SN507312 2024-02-22	SN528637 2024-02-20	SN528637 2024-02-21	SN528637 2024-02-22	SN542859 2024-02-20	SN542859 2024-02-21	SN542859 2024-02-22
	Targeting drainage line within NPWS land				Targeting drainage line in EA land	Targeting firetrail in NPWS land			Targeting drainage line within NPWS land			Targeting Coxs River from internal bridge at Former Wallerawang Power Station land		
O. ridei/ M. norfolkensis	0	0	0	0	0	0	0	0	0	0	SG	0	0	0
S. orion/ F. tasmaniensis	SG	0	0	0	SG	SG	SG	SG	0	SG	0	0	0	0
S.rueppellii/ S. orion/ F.tasmaniensis	0	0	0	0	0	0	SG	SG	SG	0	0	0	0	0
V. vulturnus/ V. troughtoni	0	0	0	0	0	SG	SG	SG	0	0	0	SG	SG	SG
V.darlingtoni/ V.regulus	SG	SG	SG	0	SG	SG	SG	SG	SG	SG	SG	SG	SG	SG
Vespadelus sp./ C.morio	SG	SG	SG	SG	SG	SG	SG	SG	0	SG	SG	SG	SG	SG
	178	1005	1032	355	576	1619	1173	1262	2693	1492	1690	1460	1582	1892
Number of species per night	3	3	6	0	4	4	5	5	2	3	3	1	2	1
Survey effort (hrs:mins)	10.5	10.5	10.5	1.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5

Notes:

Total number of species recorded for each night/site is based on definite (D) identification only. Total number of D species for each night includes one *Nyctophilus* species where recorded.

See Table 1 for confidence rating e.g. D or Pr

Other bat calls – incomplete single pulses, call sequences consisting of incomplete, fragmented pulses lacking key diagnostic features

ce, e, v - species listed under the *NSW Biodiversity Conservation Act 2016*.

CE, E, VU – species listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Survey effort: estimate of time between sunset and sunrise for a successful night of Anabat detection. Other bat calls – files with one or more non-consecutive pulses from possibly one or more species

G-3 References

Australasian Bat Society - BatMap. ausbats.org.au/batmap. Accessed December 2023

Armstrong, K.N., Reardon, T.B., and Jackson, S.M. (2022). A current taxonomic list of Australian Chiroptera. Australasian Bat Society. Last updated 15 May 2022

BioNet- NSW Government, Department of Environment and Heritage (2020) BioNet – the website for the Atlas of NSW wildlife. bionet.nsw.gov.au/

Churchill, S 2008. Australian Bats, Allen and Unwin, Australia.

Duffy, AM, Lumsden, LF, Caddle, CR, Chick, RR & Newell, GR (2000). The efficacy of Anabat ultrasonic detectors and harp traps for surveying microchiropterans in southeastern Australia, *Acta Chiropterologica* 2: 127-144.

Mills, DJ, Norton, TW, Parnaby, HE, Cunningham, RB & Nix, HA (1996), Designing surveys for microchiropteran bats in complex forest landscapes – a pilot study from south-east Australia. *Forest Ecology and management* 85 (1-3):149-161.

Pennay, M., Law, B., and Lunney, D. (2011). Review of the Distribution and status of the bat fauna of NSW and the ACT. Pp. 226-256 in The Biology and Conservation of Australian Bats, edited by Law., B, Eby., P, and Lunney., D.

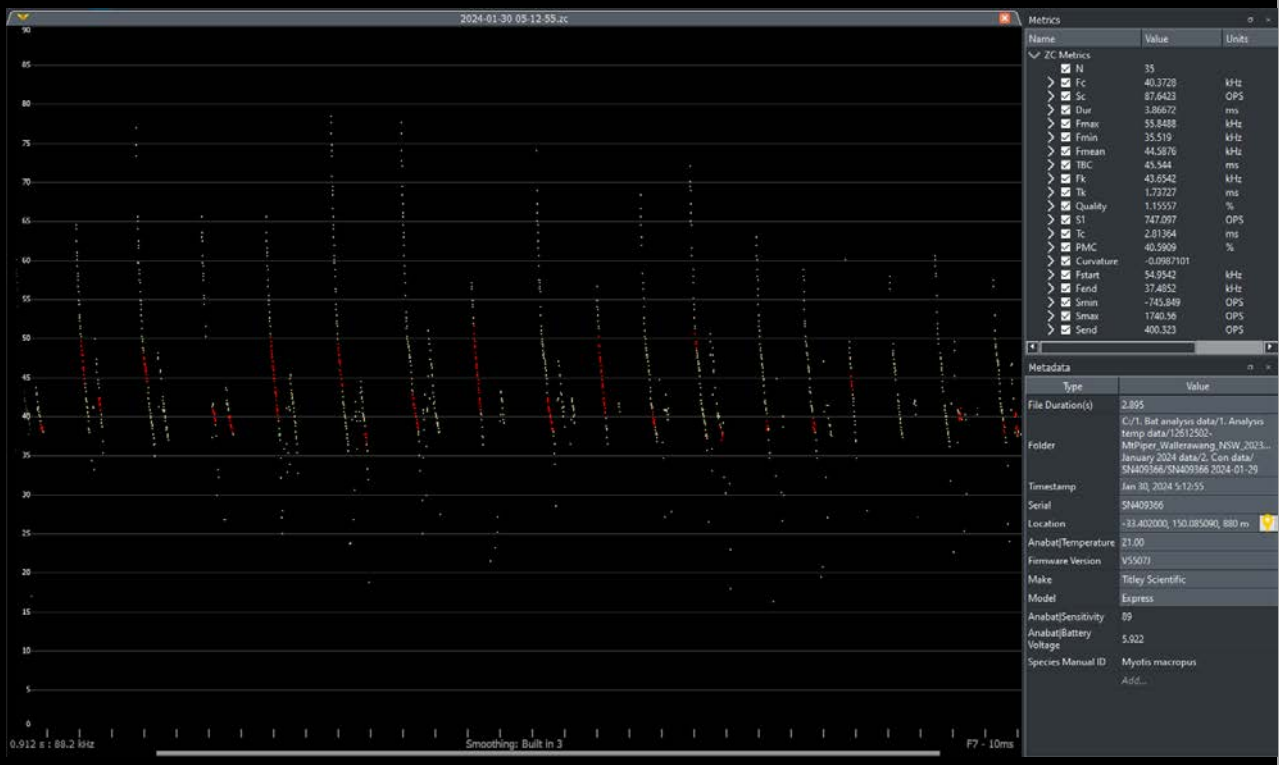
Pennay, M, Law, B, Reinhold, L (2004). Bat calls of New South Wales: Region based guide to the echolocation calls of Microchiropteran bats, NSW Department of Environment and Climate Change, Hurstville.

Reardon, T. B., McKenzie, N. L., Cooper, S. J. B., Appleton., B., Carthew, S. and Adams, M (2014) A molecular and morphological investigation of species boundaries and phylogenetic relationships in Australian free-tailed bats Mormopterus (Chiroptera : Molossidae). *Australian Journal of Zoology* 62: 109-136.

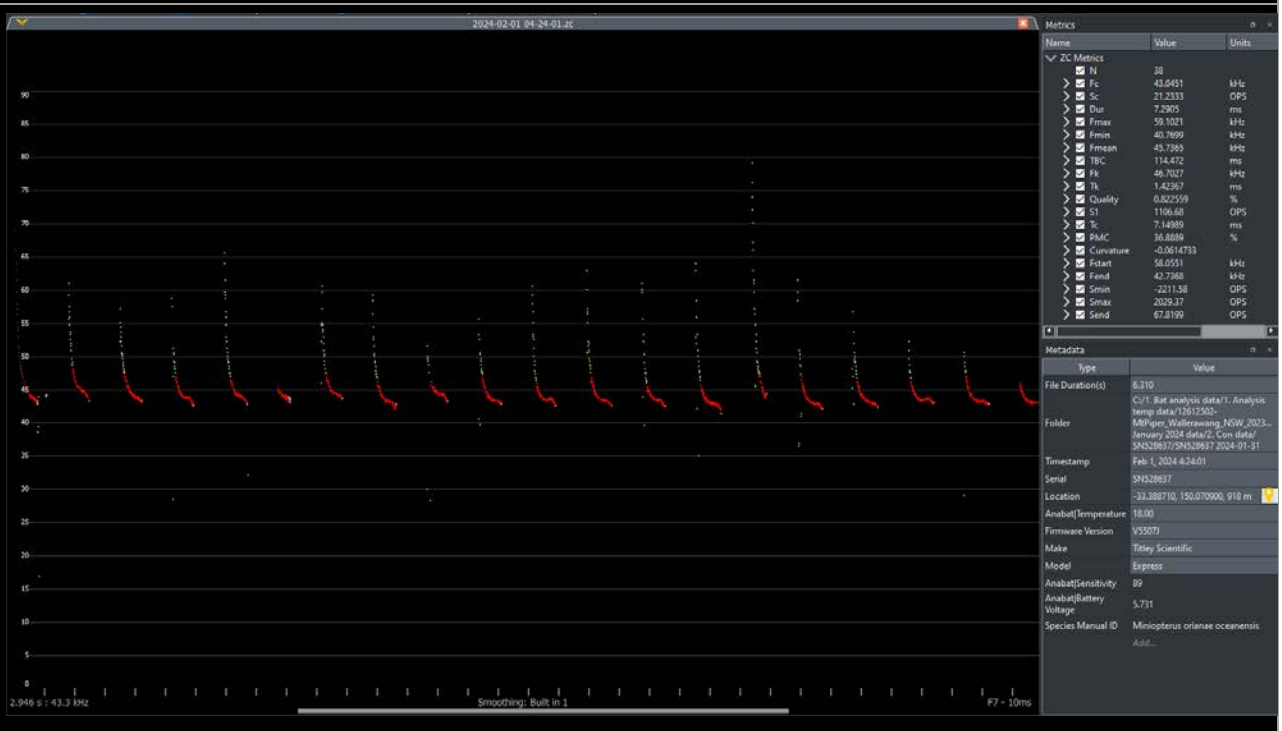
Van Dyke. S, Gynther. I, and Baker. A. (2013). Field Companion To The Mammals of Australia. New Holland Publishers.

Attachment 1 – Example spectrogram calls from site for threatened species. Calls presented in F7, compressed mode

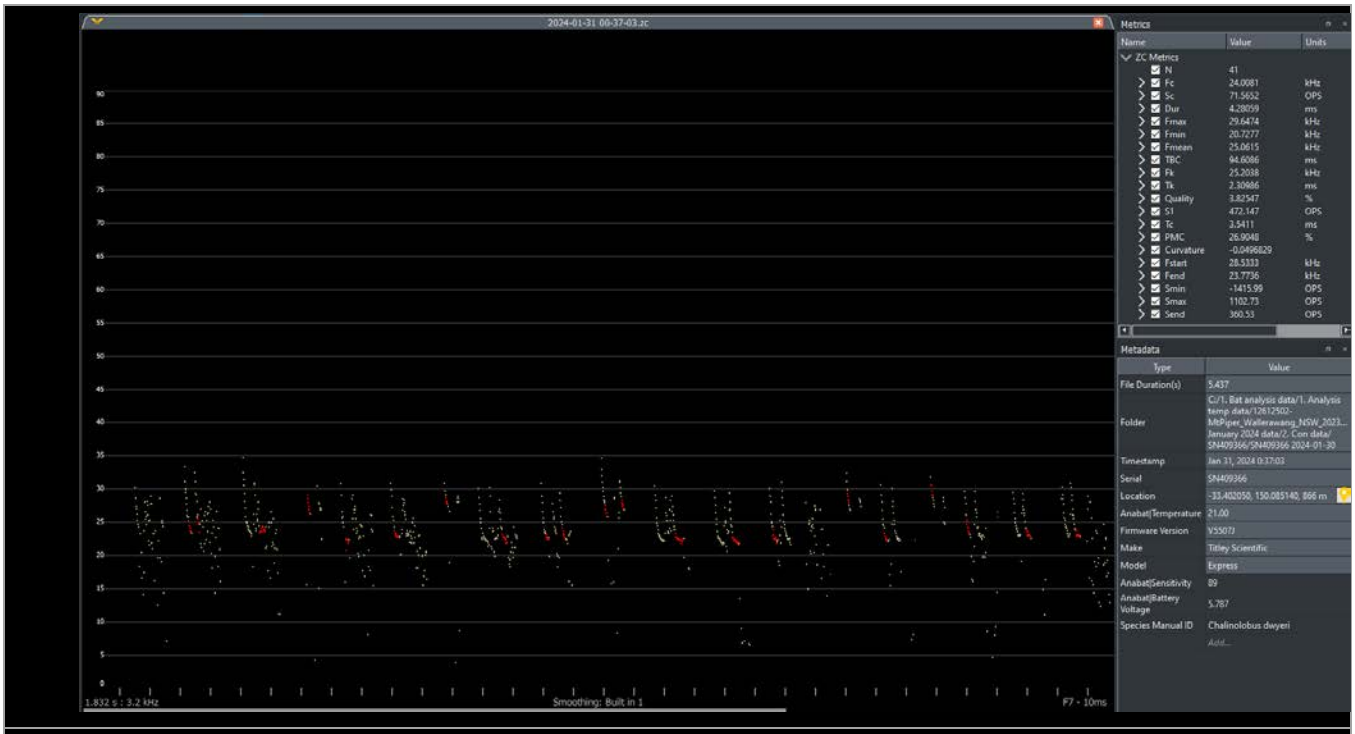
Myotis macropus - Definite



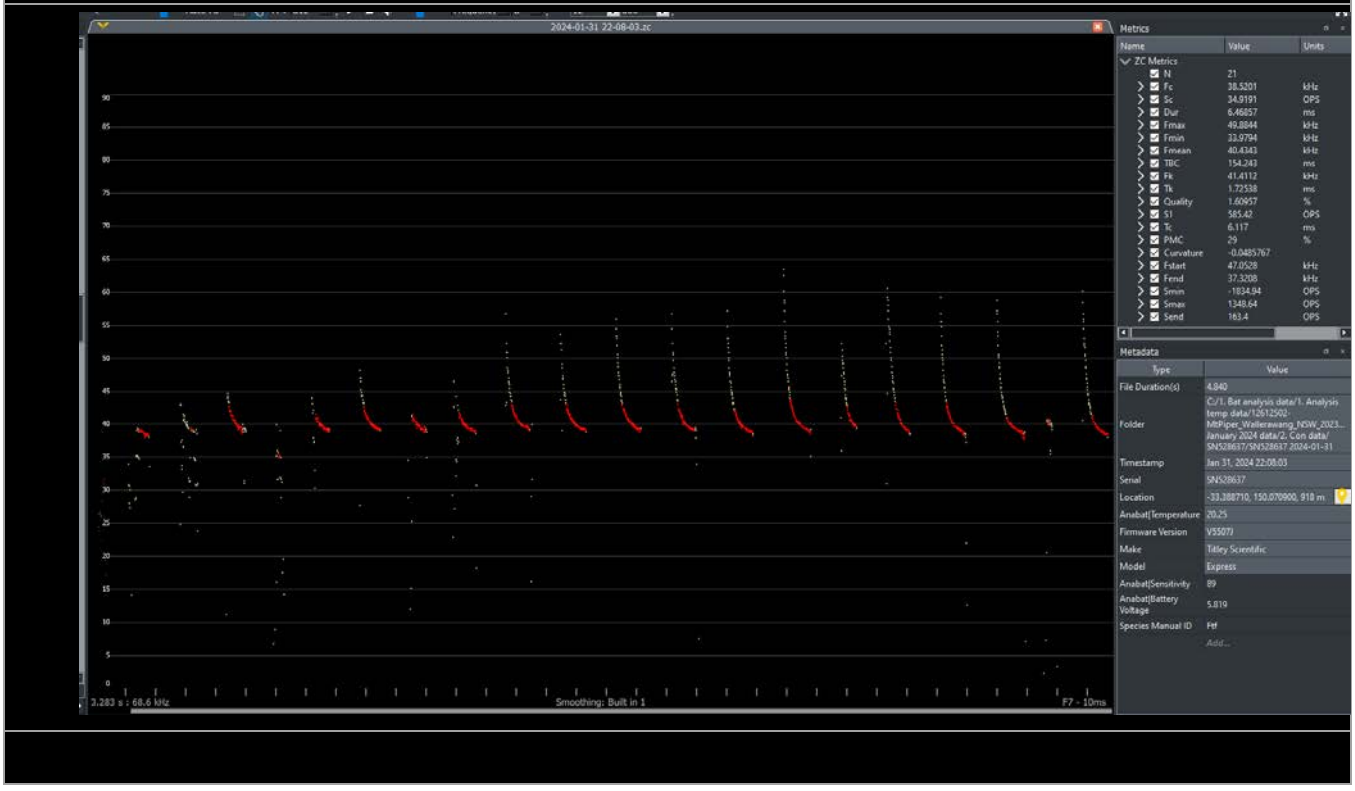
]Miniopterus orianae oceanensis - Definite



Chalinolobus dwyeri - Definite



Falsistrellus tasmaniensis - Definite



G-4 Qualifications of bat call analysis specialist

Craig Grabham

Senior Ecologist



Qualifications B. App. Science (Parks, Recreation and Heritage) 1998 (Honours) 2004 Anabat system training course (Titley Scientific, December 2012) Wildlife Accoustic's Song Meter/SongScope training (Faunatech, July 2015), Anabat Insight and bat call analysis workshop (Titley Scientific and Balance Environmental June 2019)

Relevance to project. Craig was previously a Project Manager and Senior Ecologist with GHD's Natural Resource Team in Victoria. He has over 22 years' experience in conducting ecological survey and assessment within Australia. He is currently undertaking targeted surveys for the threatened Pilbara Leaf-nosed Bat (*Rhinonicteris aurantia* (Pilbara form) and Ghost Bat (*Macroderma gigas*).

Key experience areas

Bat survey and assessment experience

Craig has completed microchiropteran bat surveys and assessments in various states and territories of Australia including the NT (WA, NSW, QLD, Vic, Tasmania) using a variety of methods including: radio-tracking, harp trapping; light tagging; cave occupancy sheeting; habitat surveys (e.g. cave assessments); roost surveillance/roost counts (using infrared and thermal video cameras); bat call (echolocation) survey (using SongMeter and Anabat detectors); and bat call analysis. Craig has also completed bat inventory surveys for National Parks, Nature Reserves, catchment management areas and private land conservation projects.

Bat call analysis and reporting

To date Craig has completed echolocation (ultrasonic) analysis and reporting for over 160 GHD projects from WA, NSW, NT, QLD and Vic. Calls collected during field surveys from Anabat or Song Meter devices are analysed primarily using Anabat Insight or Kaleidoscope software. Craig has experience with a variety of analysis methods/programs including manual identification (comparison of sonograms and call characteristics with reference material) and automated analysis (e.g. using recognisers/classifiers in Songscope/ Kaleidoscope or filters within Anabat Insight).

Bat Management Plans

Craig has designed and implement management plans for a variety of bridge removal and refurbishment projects with roosting bats in Victoria and NSW. He has also assisted with the peer review of bat management plans for bridges, wind farms, mines and building demolition. The key aim of most plans is to help proponents design and implement a humane program of management, usually by a process of gradual exclusion and/or the retention and monitoring of bat roosts. Plans use strategies from guidelines produced by the Australasian Bat Society and Bat Conservation International.

BHP Jimblebar | WA (Pilbara).

Ghost Bat surveys, proposed mine expansion (2019 - 2020). Craig has undertaken targeted surveys for the Ghost Bat and assisted with the survey design, analysis and reporting of other surveys for BHP including full spectrum (FS) ultrasonic call survey and analysis (ongoing).

FMG/FMG Iron Bridge | WA (Pilbara). *Pilbara Leaf-nosed Bat, North Star Mine (2014-2020)*. Craig has been undertaking targeted surveys since 2014 to inform the EPA conditions for approval for its North Star Mine Operations. The scope of works currently includes:

- Full spectrum (FS) ultrasonic call survey and analysis at over 60 locations
- Development of a Survey Plan and standard operating procedures for the methods and techniques to survey the Pilbara Leaf-nosed Bat including handling trapping and release protocols; roost surveillance; cave occupation determination and radio tracking methods and procedures
- Structural and habitat assessments of a known roosts to determine 1. geological characteristics and stability of roost habitat 2. characterisation of the internal architecture of the roosting habitat (e.g. internal dimensions and microhabitat characteristics) 3. classification of roost habitats according to conservation guidelines
- Regional surveys to assist with the location additional roost locations and habitat extent
- Roost occupancy determination surveys using the non-invasive sheeting method described (Survey guidelines for Australia's threatened bats DEWHA 2010) in conjunction with ultrasonic surveys and infrared camera surveillance
- Radio-tracking of Pilbara Leaf-nosed Bat using digitally encoded nanotags, automated receiver base-station array and handheld receiver units (2017 and 2019).

FMG/FMG Iron Bridge | WA (Pilbara). *Pilbara Leaf-nosed Bat and Ghost Bat surveys, Proposed Glacier Valley/South Star area (2018-2019)*. Craig has been undertaking baseline and targeted surveys for both species to inform the proposed North Star Mine expansion processions including:

- FS ultrasonic call survey and analysis for both species
- Habitat assessment and modelling including cave habitat searches to assist with determining habitat suitability and occupations, and classification of roost habitats according to conservation guidelines

- Regional surveys to assist with the location of other habitat/ roost sites using helicopter
- Roost occupancy determination surveys using the non-invasive sheeting method.

Targeted bat surveys Balickera Tunnel | Hunter Water, NSW (Newcastle region). Craig assisted with ultrasonic activity and emergence surveys (using Infrared cameras) for the three threatened bat species that occupy the tunnel (*Myotis macropus, Miniopterus schreibersii* and *Miniopterus australis*). Craig has also assisted with the surveys using an innovative drone watercraft capable of recording video imagery of the tunnel ceiling to identify the roosting locations for various bat species.

Parks Victoria | Cumberland River, Vic.
Use of an existing cave – Bent-wing Bat. Craig completed a survey of a foreshore cave using infrared camera and ultrasonic recorders to determine the presence of threatened bent-wing bats (*Miniopterus orianae bassanii / Miniopterus schreibersii oceanensis*). Methods include roost exit counts using infrared camera and handheld ultrasonic detectors and nightly surveys using FS ultrasonic detectors (2018).

Volunteer position | King Lake NP, Vic.
Use of an abandoned mine adits – Eastern Bent-wing Bat. Craig assisted with the study of this species use of several abandoned mines in the King Lake area. Methods include roost exit counts, harp trapping and bat call survey and analysis (2011 - 2012).

Murray Wildlife | Hay, NSW
Bat survey and analysis of tank sites (dams). Bat surveys were completed to determine the usage of tank sites within grazing land by micro bats for the Hay Landcare Group. The overall aim of the project was to determine how important these artificial water sources are for native wildlife within this agricultural landscape (2012).

NSW RTA | Murray River, NSW/Vic
Cobram-Barooga historic bridge partial demolition. Targeted surveys (harp trapping, bat call survey and analysis, roost searches) was completed for the threatened Large-footed Myotis and other micro bat species to determine the impacts of the partial bridge demolition. A Bat Management Plan was developed to avoid or minimise impacts upon the bat species within the bridge. Monitoring of bats was undertaken during demolition and post demolition phases (2009 – 2010).

Lower Murray Darling CMA | Lower Murray-Darling, NSW
Survey of ground-dwelling vertebrate fauna and microchiropteran bats at pre-determined sites. Harp trapping, Anabat and reference call collection were completed at six sites. Anabat analysis was completed for 25 locations within the study area (2008).

QLD Rail | Byerwen, QLD
Targeted survey - threatened Little Pied Bat Including harp trapping, bat call surveys, roost search and cave habitat assessments to determine the impacts of the proposed 450 ha quarry (2008).

DMR | Hermidale region, NSW
Anabat surveys and analysis of 12 derelict mine shafts.. Craig assisted with the development of the management plan and provided recommendations regarding the closure of shafts (2006).

NSW RTA | Gundagai, NSW
Prince Alfred Bridge, (initial assessment and post refurbishment monitoring). Targeted surveys (harp trapping, bat call survey and analysis, roost searches) were completed to determine the impacts of the bridge refurbishment to micro bats. A Bat Management Plan was developed to minimise impacts upon the bat species within the bridge. Monitoring of bats was undertaken during refurbishment and post refurbishment phases (2005 - 2006).

NPWS | Kosciusko National Park, NSW
Micro bat use of abandoned mine adits. Anabat surveys and analysis was completed of Kings Mine, Ravine River Adit, and Ravine Mine Adit for the South West Slopes Division of the NSW National Parks and Wildlife Service. Craig provided recommendations regarding the ongoing use of the mine adits by bats (2004).

Other relevant experience
Honours (2003 - 2004) Title: '*Bats in fragmented rural landscapes - the use of remnant and revegetated habitats*'. Craig investigated the use of six main habitat types (30 sites) by microchiropteran bats across a fragmented rural landscape including the value of native revegetation to bats.

Contact details:
Otway Ecology
M: 0428884821
E: **otwayecology@gmail.com**

Appendix H

Audiomoth call analysis results

H-1 Introduction

Fifteen audiomoths were successfully deployed between 12 to 13 June 2024 and 2 July 2024 comprising 216 survey nights. Two additional audiomoths were deployed but failed to record.

H-2 Analysis method

Recordings were then analysed using AviaNZ and Python to confirm presence of targeted threatened species. These programs provided an excel spreadsheet listing all possible recordings, with confidence levels (ranging between 0-1) to indicate the likelihood of a positively identified species. The confidence level of recordings of targeted species ranged between 0.300 and 0.851. Recordings highlighted were then confirmed by a GHD ecologist to eliminate false positives. Note that only recordings attributed to threatened species were reviewed.

H-3 Analysis results

Table H.1 outlines the results, with Table H.2 detailing the confirmed presence recordings.

Table H.1 Summary of bioacoustic analysis from Audiomoths deployed in June 2024

Species name	Common name	Number of recordings	Confidence range	Presence confirmed
Phascolarctos cinereus	Koala	995	0.500	No
Callocephalon fimbriatum	Gang-gang Cockatoo	29	0.302-0.851	Yes
Calyptorhynchus lathami lathami	South-eastern Glossy Black-cockatoo	3	0.300-0.415	No
Ninox connivens	Barking Owl	1	0.475	No
Tyto novaehollandiae	Australian Masked Owl	1	0.324	No
Ninox Strenua	Powerful Owl	6	0.305-0.543	No
Haliaeetus leucogaster	White-bellied Sea-eagle	19	0.302-0.480	No

From the analyses, Gang-gang Cockatoos were positively identified on three occasions from two devices (see Table H.2).

Collecting no recordings for Barking Owl, Powerful Owl and Masked Owl on the night of 1 July was unexpected, as three replicates of owl call-playback broadcasts were performed within the recordable range of active devices between 17:30 and 22:00. Owl call playback location 1 (-33.364886, 150.024998) was approximately 400 m, and Owl call playback location 3 (-33.378131, 150.053089) was 150 m from the nearest active Audiomoth (K4 and G26, respectively), but these devices stopped recording on the 26 and 30 June, respectively and so did not pick up any broadcasts made by ecologists. Owl call playback location 2 (-33.371365, 150.039139) was approximately 80 m from an Audiomoth (G30), but this device failed to make any recordings throughout its deployment.

Table H.2 Threatened species recorded

Scientific name	Common name	Device ID	Device location (lat/lon)	Time and date of record
Callocephalon fimbriatum	Gang-gang Cockatoo	K1	-33.383759, 150.062139	16/06/2024 7:12
Callocephalon fimbriatum	Gang-gang Cockatoo	K1	-33.383759, 150.062139	25/06/2024 7:03
Callocephalon fimbriatum	Gang-gang Cockatoo	K5	-33.373199, 150.041882	28/06/2024 7:00

ghd.com

The Power of Commitment