

1 September 2023

Jessica Henderson-Wilson Principal Environmental Consultant Umwelt Level 20/145 Ann St Brisbane QLD 4000

Dear Jessica

Richmond Valley Solar Farm MNES Assessment Project no. 38804

Biosis Pty Ltd was commissioned by Umwelt on behalf of Ark Energy to prepare a Matters of National Environmental Significance (MNES) assessment across multiple land parcels approximately 25 kilometres south of Casino, New South Wales (NSW). Biosis understands that Ark Energy proposes to develop the Richmond Valley Solar Farm within the project area (the project), and that this MNES assessment will assist with informing the *Environmental Protection and Conservation Act 1999* (EPBC) referral being prepared by Umwelt for the project.

The project meets the criteria for State Significant Development (SSD) and therefore the Biodiversity Offset Scheme (BOS) is triggered, and a Biodiversity Development Assessment Report (BDAR) is required. A scoping report has been lodged and Secretary's Environmental Assessment Requirements (SEARs) have been obtained. A constraints and opportunities assessment prepared for the project by Biosis identified 17 MNES entities that have a moderate – higher likelihood of occurrence within the project area and may therefore be impacted by the project. This includes 15 threatened flora and fauna species (Appendix 1), and two threatened ecological communities.

The scope of this assessment is to assess the likelihood of significant impacts to these MNES entities listed under the EPBC Act and to assist in the preparation of the Biodiversity Development Assessment Report (BDAR) and EPBC referral. These entities have been assessed against the EPBC Significance Impact Criteria (SIC) and are outlined in Appendix 2.

Although avoid and minimise principles have been applied thoroughly throughout the early stages of the project planning to date, SIC assessments concluded significant impacts have the potential to occur to three threatened entities, and therefore referral to the minister is required under the EPBC Act, with a controlled action a likely outcome. This is predominantly based on the uncertainty of impacts resulting from potential impacts to habitat present, previous bushfire impacts in the last 5 years, a worse case preliminary design and incomplete seasonal surveys undertaken to date. The three threatened entities are;

- Slaty Red Gum Eucalyptus glaucina (Vulnerable).
- Rupp's Watte Acacia ruppii (Endangered)
- Koala *Phascolarctos cinereus* (Endangered)



It is noted that the project area includes two options for a proposed transmission line and will be further refined during the detailed design stage. However, for the purpose of the below SIC assessments, impacts are tentatively based on the current conservative impact area.

I trust that this advice is of assistance to you however please contact me if you would like to discuss any elements of this ecological advice further.

Yours sincerely,

M

Mitchell Palmer

Manager – Ecology and GIS (NSW)



References

Commonwealth of Australia 2013. Matters of National Environmental Significance: Significant impact guidelines 1.1. Environment Protection and Biodiversity Conservation Act 1999.

DAWE 2016. Approved Conservation Advice for *Petauroides volans* Greater Glider, The Commonwealth Department of Agriculture, Water and the Environment. Canberra.

DAWE 2020. Provisional list of animals requiring urgent management intervention, Australian Government Department of Agriculture, Water, and Environment.

DAWE 2021. Conservation Advice for the Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland, Commonwealth Department of Agriculture Water and The Environment. http://www.environment.gov.au/biodiversity/threatened/communities/pubs/171-conservation-advice.pdf.

DAWE 2022. Conservation Advice for Petaurus australis australis (yellowbellied glider (south-eastern)), accessed 9 January 2022, http://www.environment.gov.au/biodiversity/threatened/species/pubs/87600-conservation-advice-02032022.pdf.

DCCEEW 2021. National Recovery Plan for the Grey-headed Flying-fox *Pteropus poliocephalus*, Australian Government Department of Agriculture, Water and the Environment.

DCCEEW 2022a. Conservation Advice for Petauroides volans (greater glider (southern and central)), accessed 31 August 2022, http://www.environment.gov.au/biodiversity/threatened/species/pubs/254-conservation-advice-05072022.pdf.

DCCEEW 2022b. *National Flying-fox monitoring viewer*, Australian Government Department of Climate Change, Energy, the Environment and Water https://www.environment.gov.au/webgis-framework/apps/ffc-wide/ffc-wide.jsf.

DCCEEW 2022c. Approved Conservation Advice for the Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions.

DCCEEW 2023a. Conservation Advice for Climacteris picumnus victoriae (Brown Treecreeper (south-eastern)), Commonwealth Department of Climate Change, Energy, the Environment and Water. Canberra, ACT. http://www.environment.gov.au/biodiversity/threatened/species/pubs/67062-conservation-advice-31032023.pdf.

DCCEEW 2023b. Conservation Advice for Stagonopleura guttata (diamond firetail).

DEE 2020. Analysis of species listed under the Environment Protection and Biodiversity Conservation Act 1999 which occur in areas affected by bushfires between 1 August 2019 and 13 January 2020 in southern and eastern Australia, Australian Government Department of the Environment and Energy.

Department of Agriculture, Water and the Environment 2021. Conservation Advice for Acacia ruppii (Rupp's Wattle).



Department of Environment, Climate Change and Water 2010. Northern Rivers Regional Biodiversity Management Plan, National Recovery Plan for the Northern Rivers Region.

Department of the Environment, Water, Heritage and the Arts 2008a. Approved Conservation Advice for Paspalidium grandispiculatum.

Department of the Environment, Water, Heritage and the Arts 2008b. Approved Conservation Advice for Angophora robur.

Department of the Environment, Water, Heritage and the Arts 2008c. Conservation Advice for Eucalyptus tetrapleura (Square-fruited Ironbark).

DEWHA 2008. Approved Conservation Advice for *Eucalyptus glaucina* (Slaty Red Gum), https://www.environment.gov.au/biodiversity/threatened/species/pubs/5670-conservation-advice.pdf.

DoE 2014. EPBC Act referral guidelines for the vulnerable koala (combined populations of Queensland, New South Wales and the Australian Capital Territory), Department of the Environment, accessed 29 May 2019, Australian Government Department of the Environment and Energy.

DPE 2019. *Slaty Red Gum - profile, Department of Planning and Environment. Sydney, NSW*, accessed 2 December 2019, https://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=10295.

DPE 2022a. *Glossy Black-Cockatoo - profile*, *NSW Department of Planning and Environment. Sydney*, *NSW*, https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10140.

DPE 2022b. *BioNet the website for the Atlas of NSW Wildlife*, *Department of Planning and Environment. Sydney*, *NSW*, https://www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity/nsw-bionet/web-services.

DPE 2022c. *NSW BioNet Threatened Biodiversity Profile Data Collection*, https://data.nsw.gov.au/data/dataset/9125a0e2-a575-40d4-83b0-45d985420d0e.

DPE 2023. NSW State Vegetation Type Map (SVTM C1.1M1), Department of Planning and Environment. Sydney, NSW. https://datasets.seed.nsw.gov.au/dataset/nsw-state-vegetation-type-map.

Eby P & Law B 2008. *Ranking the feeding habitats of Grey-headed flying foxes for conservation management*, Report prepared for the Department of Environment and Climate Change (NSW) & The Department of Environment, Water, Heritage and the Arts.

Goldingay R & Kavanagh R 1991. 'The yellow-bellied glider: a review of its ecology, and management considerations', *Conservation of Australia's forest fauna*, 1: 365–375.

Higgins P 1999. Handbook of Australian, New Zealand and Antarctic Birds. Volume 4, Parrots to Dollarbird, Oxford University Press.

Threatened Species Scientific Committee 2019. Conservation Advice Botaurus poiciloptilus Australasian Bittern.

Woinarski J, Burbidge A, & Harrison P 2014. *The Action Plan for Australian Mammals*, CSIRO Publishing, Collingwood, Victoria.



Appendices



Appendix 1 Threatened Flora and Fauna

The following tables include a list of the threatened flora and fauna that have potential to occur within the project area. The list of species is sourced from the NSW BioNet Wildlife Atlas and the Protected Matters Search Tool (PMST) (DEE; accessed on 28/04/2023). Examples of criteria for determining the likelihood of occurrence for threatened biota as a guide for writing the rationale for likelihood have been listed below.

Likelihood of occurrence	Potential criteria
High	 Species recorded in project area during current or previous assessment/s. Aquatic species recorded from connected waterbodies in close proximity to the project area during current or previous assessment/s. Sufficient good quality habitat is present in project area or in connected waterbodies in close proximity to the project area (aquatic species). Project area is within species natural distributional range (if known). Species has been recorded within 10 km or from the relevant catchment/basin.
Medium	 Records of terrestrial biota within 10 km of the project area or of aquatic species in the relevant basin/neighbouring basin. Habitat limited in its capacity to support the species due to extent, quality, or isolation.
Low	 No records within 10 km of the project area or for aquatic species, the relevant basin/neighbouring basin. Marginal habitat present (low quality & extent). Substantial loss of habitat since any previous record(s).
Negligible	 Habitat not present in project area Habitat for aquatic species not present in connected waterbodies in close proximity to the project area. Habitat present but sufficient targeted survey has been conducted at an optimal time of year and species was not recorded.

Notes to tables:

Status – EPBC Act:	Status – BC Act:
CE – Critically Endangered	E1 – endangered species (Part 1, Schedule 1)
EN – Endangered	E2 – endangered population (Part 2, Schedule 1)

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VU – Vulnerable

E4 – presumed extinct (Part 4, Schedule 1) E4A – critically endangered V – vulnerable (Part 1, Schedule 2)



Table 1 Threatened Flora

			Conservatio status	'n			
Scientific name	Common name	Source	EPBC	ВС	Type	SAI I	Likely occurrence in project area
Ancistrachne maidenii		BAM-C		VU	Species	Ν	Medium
Angophora robur	Sandstone Rough-barked Apple	PMST, BAM-C	VU	VU	Species	Ν	High
Acacia ruppii		PMST, BAM-C	EN	EN	Species	Ν	Medium
Arthraxon hispidus	Hairy-joint Grass	PMST, Bionet, BAM- C	VU	VU	Species	N	Low
Belvisia mucronata	Needle-leaf Fern	BAM-C		EN	Species	Ν	Low
Callistemon linearifolius	Netted Bottle Brush	BAM-C		VU	Species	Ν	Low
Centranthera cochinchinensis	Swamp Foxglove	BAM-C		EN	Species	N	Low
Coatesia paniculata	Axe-Breaker	BAM-C		EN	Species	Ν	Low
Cryptocarya foetida	Stinking Cryptocarya, Stinking Laurel	Bionet	VU	VU		N	Negligible
Cryptostylis hunteriana	Leafless Tongue-orchid	PMST, Bionet	VU	VU		Ν	Negligible
Cyanchum elegans	White-flowered Wax Plant	PMST	EN			Ν	Low
Cyperus aquatilis	Water Nutgrass	Bionet, BAM-C		EN	Species	Ν	High
Desmodium acanthocladum	Thorny Pea	BAM-C	VU	VU	Species	Ν	Low
Dichanthium setosum	bluegrass	PMST, Bionet	VU	VU		Ν	Negligible
Eleocharis tetraquetra	Square-stemmed Spike-rush	BAM-C		EN	Species	Ν	Medium
Endiandra hayesii	Rusty Rose Walnut	BAM-C	VU	VU	Species	Ν	Low
Eucalyptus glaucina	Slaty Red Gum	PMST, Bionet, BAM- C	VU	VU	Species	N	High
Eucalyptus tetrapleura	Square-fruited Ironbark	PMST, BAM-C	VU	VU	Species	Ν	High

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Geodorum densiflorum	Pink Nodding Orchid	BAM-C		EN	Species	Ν	Medium
Grevillea masonii	Masons Grevillea	PMST, BAM-C	EN	EN	Species	Y	Low
Grevillea banyabba	Banyabba Grevillea	BAM-C	VU	VU	Species	Ν	Low
Gossia fragrantissima	Sweet Myrtle	PMST, BAM-C	EN	EN	Species	Ν	Low
Hibbertia marginata		PMST	VU			Ν	Low
Indigofera baileyi	Bailey's Indigo	Bionet, BAM-C		EN	Species	Ν	High
Lindernia alsinoides	Noah's False Chickweed	Bionet, BAM-C		EN	Species	Ν	Medium
Lindsaea incisa	Slender Screw Fern	Bionet, BAM-C		EN	Species	Ν	Medium
Marsdenia longiloba	Slender Marsdenia	PMST, BAM-C	VU	EN	Species	Ν	Low
Melichrus gibberagee	Narrow-leaf Melichrus	BAM-C	EN	EN	Species	Y	Low
Melichrus hirsutus	Hairy Melichrus	BAM-C	EN	EN	Species	Ν	Low
Macadamia integrifolia	Macadamia Nut	PMST, Bionet	VU			Ν	Low
Macadamia tetraphylla	Rough-shelled Bush Nut	PMST, Bionet	VU	VU		Ν	Low
Maundia triglochinoides		Bionet, BAM-C		VU	Species	Ν	Medium
Myrsine richmondensis	Ripple-leaf Muttonwood	PMST, BAM-C	EN	EN	Species	Y	Low
Melaleuca irbyana	Weeping Paperbark	Bionet, BAM-C		EN	Species	Ν	Medium
Oberonia complenata	Yellow-flowered King of the Fairies	BAM-C		EN	Species	Ν	Medium
Olax angulata	Square-stemmed Olax	PMST, BAM-C	VU	VU	Species	Ν	Low
Oldenlandia galioides	Sweet False Galium	Bionet, BAM-C		EN	Species	Y	Medium
Owenia cepiodora	Onion Cedar	Bionet	VU	VU		Y	Negligible
Paspalidium		PMST, Bionet, BAM-			- ·		
grandispiculatum		C PMST Biopet BAM	VU	VU	Species	N	Medium
Persicaria elatior	Knotweed, Tall Knotweed	C	VU	VU	Species	Ν	Low
		PMST, Bionet, BAM-					
Phaius australis	Lesser Swamp-orchid	С	EN	E1	Species	Ν	Low
Phyllanthus microcladus	Brush Sauropus	Bionet, BAM-C		EN	Species	Ν	Medium



Prostanthera palustris	Swamp Mint-bursh	BAM-C	VU	VU	Species	Y	Low
Prostanthera sejuncta		BAM-C		VU	Species	Y	High
Polygala linariifolia	Native Milkwort	Bionet, BAM-C		EN	Species	Ν	High
Pterostylis spp.	Greenhood	Bionet	VU			Ν	Low
		PMST, Bionet, BAM-					
Rhodamnia rubescens	Scrub Turpentine	С	CE	CR	Species	Y	Low
		PMST, Bionet, BAM-					
Rhodomyrtus psidioides	Native Guava	С	CR	CR	Species	Y	Low
Rotala tripartita		Bionet, BAM-C		EN	Species	Y	High
Thesium australe	Austral Toadflax, Toadflax	PMST, Bionet	VU	VU		Ν	Negligible
Tylophora woollsii		PMST	EN			Ν	Low



Threatened Fauna Table 2

			Conso statu	ervatio s	n			Migrat ory/	
	6	Course	EPB	DC.	F		SA	Nomad ic/ Vagran	Likely occurrence in
Scientific name		Source		вс	IVI	Credit Type		t	project area
Actitis hypoleucos	Common Sandpiper	PMST					N		Low
Anthochaera phrygia	Regent Honeyeater	PMST, Bionet, BAM-C	CE	CR		Species/Ecos ystem	N/ A		Low
Anseranas semipalmata	Magpie Goose	BAM-C		VU		Ecosystem	Ν		Medium
Apus pacificus	Fork-tailed Swift	PMST					Ν		Low
Artamus cyanopterus cyanopterus	Dusky Woodswallow	Bionet, BAM-C		VU		Ecosystem	Ν		High
Botaurus poiciloptilus	Australasian Bittern	PMST, Bionet, BAM-C	EN	EN		Ecosystem	Ν		Medium
Burhinus grallarius	Bush Stone-curlew	Bionet, BAM-C		EN		Ecosystem	Ν		Medium
Calidris acuminata	Sharp-tailed Sandpiper	PMST					Ν	Y	Low
Calidris alba	Sanderling	BAM-C		VU		Species/Ecos ystem	Ν		Low
Calidris ferruginea	Curlew Sandpiper	PMST, Bionet, BAM-C	CR, Mi	E1		Species/Ecos ystem	Y	Y	Low
Calidris canutus	Red Knot	BAM-C	EN			Species/Ecos ystem	N		Low
Calidris melanotos	Pectoral Sandpiper	PMST					Ν		Low
Calidris tenuirostris	Great Knot	BAM-C	CR	VU		Ecosystem	Y	Y	Low
Calyptorhynchus banksii banksii	Red-tailed Black-Cockatoo (coastal subspecies)	Bionet, BAM-C		CR		Species	Y		Medium

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Calyptorhynchus lathami	Glossy Black-Cockatoo	PMST, Bionet, BAM-C	VU	VU	Species/Ecos ystem	Ν		High
Charadrius mongolus	Lesser Sand-plover	BAM-C	EN	VU	Species/Ecos ystem	Ν		Low
Chthonicola sagittata	Speckled Warbler	Bionet, BAM-C		VU	Ecosystem	Ν		Medium
Circus assimilis	Spotted Harrier	Bionet, BAM-C		VU	Ecosystem	Ν		High
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	PMST, Bionet, BAM-C	VU	VU	Ecosystem	N		High
Coracina lineata	Barred Cuckoo-shrike	BAM-C		VU	Ecosystem	Ν		Medium
Cuculus optatus	Oriental Cuckoo	PMST				Ν		Low
Cyclopsitta diophthalma coxeni	Coxen's Fig-Parrot	PMST, Bionet	EN	E4A	Species	Y		Low
Daphoenositta chrysoptera	Varied Sittella	Bionet, BAM-C		VU	Ecosystem	Ν		High
Dromaius novaehollandiae	Emu	Bionet, BAM-C		E2	Species	Ν		High
Ephippiorhynchus asiaticus	Black-necked Stork	Bionet, BAM-C		EN	Ecosystem	Ν		High
Erythrotriorchis radiatus	Red Goshawk	PMST, Bionet	EN	CR	Species	Y		Low
Falco hypoleucos	Grey Falcon	PMST, Bionet	VU	E1	Ecosystem	Ν		Low
Galinago hardwickii	Latham's Snipe					Ν	Y	Low
Glossopsitta pusilla	Little Lorikeet	Bionet, BAM-C		VU	Ecosystem	Ν		High
Grantiella picta	Painted Honeyeater	PMST,Bionet	VU	VU	Ecosystem	Ν		Low
Charadrius leschenaultii	Greater Sand-plover	PMST, BAM-C	VU	VU	Ecosystem	Ν		Low
Grus rubicunda	Brolga	BAM-C		VU	Ecosystem	Ν		Medium
Haliaeetus leucogaster	White-bellied Sea-Eagle	Bionet, BAM-C		VU	Species/Ecos ystem	N/ A		High
Hieraaetus morphnoides	Little Eagle	Bionet, BAM-C		VU	Species/Ecos ystem	N/ A		High
Hirundapus caudacutus	White-throated Needletail	PMST, Bionet, BAM-C	VU, Mi		Ecosystem	Ν	Y	Low
Ixobrychus flavicollis	Black Bittern	Bionet		VU	Ecosystem	Ν		Medium



		PMST, Bionet,			Species/Ecos	N/		
Lathamus discolor	Swift Parrot	BAM-C	CE	EN	ystem	A		Low
Lichenostomus fasciogularis	Mangrove Honeyeater	BAM-C		VU	Species	Ν		Low
					Species/Ecos			
Limosa lapponica baueri	Bar-tailed Godwit (baueri)	BAM-C	VU		ystem	N		Low
Lophoictinia isura	Square-tailed Kite	Bionet, BAM-C		VU	Species/Ecos ystem	N/ A		High
Melanodryas cucullata	Hooded Robin (south-eastern	PMST, Bionet,			, ,			U
cucullata	form)	BAM-C	EN	VU	Ecosystem	Ν		Medium
	Black-chinned Honeyeater							
Melithreptus gularis gularis	(eastern subspecies)	Bionet, BAM-C		VU	Ecosystem	Ν		High
Monarcha melanopsis	Black-faced Monarch	PMST				Ν	Υ	Medium
Monarcha trivirgatus	Spectacled Monarch	PMST				Ν	Y	Medium
Montacilla flava	Yellow Wagtail	PMST				Ν	Y	Medium
Myiagra cyanoleuca	Satin Flycatcher	PMST				Ν	Y	High
					Species/Ecos	N/		
Ninox connivens	Barking Owl	Bionet, BAM-C		VU	ystem	А		High
					Species/Ecos	N/		
Ninox strenua	Powerful Owl	Bionet, BAM-C	CD	VU	ystem	A		High
Numenius madagascariensis	Fastern Curlew	PMST, Bionet, BAM-C	CR, Mi		Species/Ecos	IN/ A	Y	Low
hamemas maaagasea rensis		Bran e			Species/Ecos	N/	•	2011
Pandion cristatus	Eastern Osprey	Bionet, BAM-C		VU	ystem	А		Low
Pandion haliaetus	Osprey	PMST				Ν	Y	Low
Petroica boodang	Scarlet Robin	Bionet, BAM-C		VU	Ecosystem	Ν		Medium
Petroica phoenicea	Flame Robin	Bionet		VU	Ecosystem	Ν		Low
Pomatostomus temporalis	Grey-crowned Babbler (eastern							
temporalis	subspecies)	Bionet, BAM-C		VU	Ecosystem	Ν		High
Ptilinopus magnificus	Wompoo Fruit-Dove	Bionet, BAM-C		VU	Ecosystem	Ν		Low
Ptilinopus regina	Rose-crowned Fruit-Dove	BAM-C		VU	Ecosystem	Ν	Y	Low
Ptilinopus superbus	Superb Fruit-Dove	BAM-C		VU	Ecosystem	Ν	Y	Low



Rhipidura rufifrons	Rufous Fantail	PMST				Ν		Medium	
		PMST, Bionet,							
Rostratula australis	Australian Painted Snipe	BAM-C	EN	E1	Ecosystem	Ν		Low	
Stagonopleura guttata	Diamond Firetail	PMST, Bionet, BAM-C	VU	VU	Ecosystem	N		High	
Tringa nebularia	Common Greenshank	PMST			,	N	Y	Low	
Turnix maculosus	Red-backed Button-quail	BAM-C		VU	Species	Ν		High	
Turnix melanogaster	Black-breasted Button-quail	PMST, Bionet	VU	E4A	Species	Y		Low	
Tyto novaehollandiae	Masked Owl	Bionet, BAM-C		VU	Species/Ecos ystem	N/ A		High	
Tyto tenebricosa	Sooty Owl	Bionet		VU	Species/Ecos ystem	Y		Medium	
Vespadelus troughtoni	Eastern Cave Bat	BAM-C		VU	Species	Υ		Medium	
					Species/Ecos				
Xenus cinereus	Terek Sandpiper	BAM-C		VU	ystem	Ν		Low	
Mammals									
Mammals Aepyprymnus rufescens	Rufous Bettong	Bionet, BAM-C		VU	Species	N		High	
Mammals Aepyprymnus rufescens Cercartetus nanus	Rufous Bettong Eastern Pygmy Possum	Bionet, BAM-C BAM-C		VU VU	Species Species	N N		High High	
Mammals Aepyprymnus rufescens Cercartetus nanus Chalinolobus dwyeri	Rufous Bettong Eastern Pygmy Possum Large-eared Pied Bat, Large Pied Bat	Bionet, BAM-C BAM-C PMST, Bionet, BAM-C	VU	VU VU VU	Species Species Species	N N Y		High High Low	
Mammals Aepyprymnus rufescens Cercartetus nanus Chalinolobus dwyeri Chalinolobus nigrogriseus	Rufous Bettong Eastern Pygmy Possum Large-eared Pied Bat, Large Pied Bat Hoary Wattled Bat	Bionet, BAM-C BAM-C PMST, Bionet, BAM-C Bionet, BAM-C	VU	VU VU VU VU	Species Species Species Ecosystem	N N Y N		High High Low Medium	
MammalsAepyprymnus rufescensCercartetus nanusChalinolobus dwyeriChalinolobus nigrogriseusDasyurus maculatus	Rufous Bettong Eastern Pygmy Possum Large-eared Pied Bat, Large Pied Bat Hoary Wattled Bat Spotted-tailed Quoll	Bionet, BAM-C BAM-C PMST, Bionet, BAM-C Bionet, BAM-C PMST, Bionet, BAM-C	VU EN	VU VU VU VU VU	Species Species Species Ecosystem Ecosystem	N N Y N		High High Low Medium Medium	
MammalsAepyprymnus rufescensCercartetus nanusChalinolobus dwyeriChalinolobus nigrogriseusDasyurus maculatusFalsistrellus tasmaniensis	Rufous Bettong Eastern Pygmy Possum Large-eared Pied Bat, Large Pied Bat Hoary Wattled Bat Spotted-tailed Quoll Eastern False Pipistrelle	Bionet, BAM-C BAM-C PMST, Bionet, BAM-C Bionet, BAM-C PMST, Bionet, BAM-C Bionet, BAM-C	VU EN	VU	Species Species Species Ecosystem Ecosystem Ecosystem	N N Y N N		High High Low Medium Medium Medium	
MammalsAepyprymnus rufescensCercartetus nanusChalinolobus dwyeriChalinolobus nigrogriseusDasyurus maculatusFalsistrellus tasmaniensisMacropus dorsalis	Rufous Bettong Eastern Pygmy Possum Large-eared Pied Bat, Large Pied Bat Hoary Wattled Bat Spotted-tailed Quoll Eastern False Pipistrelle Black-striped Wallaby	Bionet, BAM-C BAM-C PMST, Bionet, BAM-C Bionet, BAM-C PMST, Bionet, BAM-C Bionet, BAM-C Bionet, BAM-C	VU EN	VU VU VU VU VU VU EN	Species Species Species Ecosystem Ecosystem Ecosystem	N N Y N N N		High High Low Medium Medium Medium Medium	
MammalsAepyprymnus rufescensCercartetus nanusChalinolobus dwyeriChalinolobus nigrogriseusDasyurus maculatusFalsistrellus tasmaniensisMacropus dorsalisMicronomus norfolkensis	Rufous Bettong Eastern Pygmy Possum Large-eared Pied Bat, Large Pied Bat Hoary Wattled Bat Spotted-tailed Quoll Eastern False Pipistrelle Black-striped Wallaby Eastern Coastal Free-tailed Bat	Bionet, BAM-C BAM-C PMST, Bionet, BAM-C Bionet, BAM-C PMST, Bionet, BAM-C Bionet, BAM-C Bionet, BAM-C	VU EN	VU	Species Species Species Ecosystem Ecosystem Ecosystem Ecosystem Ecosystem	N N Y N N N N		High High Low Medium Medium Medium Medium Medium	
MammalsAepyprymnus rufescensCercartetus nanusChalinolobus dwyeriChalinolobus nigrogriseusDasyurus maculatusFalsistrellus tasmaniensisMacropus dorsalisMicronomus norfolkensisMiniopterus australis	Rufous BettongEastern Pygmy PossumLarge-eared Pied Bat, Large PiedBatHoary Wattled BatSpotted-tailed QuollEastern False PipistrelleBlack-striped WallabyEastern Coastal Free-tailed BatLittle Bent-winged Bat	Bionet, BAM-C BAM-C PMST, Bionet, BAM-C Bionet, BAM-C PMST, Bionet, BAM-C Bionet, BAM-C Bionet, BAM-C Bionet, BAM-C	VU EN	VU VU	 Species Species Species Ecosystem Ecosystem Ecosystem Ecosystem Ecosystem Species/Ecos ystem 	N N Y N N N N Y		High High Low Medium Medium Medium Medium Medium	



Myotis macropus	Southern Myotis	Bionet, BAM-C		VU	Species	Ν	Medium
Nettapus coromandelianus	Cotton Pygmy-Goose	BAM-C		EN	Species	Ν	Medium
Notamacropus parma	Parma Wallaby	PMST	VU	VU		Ν	Low
Nyctophilus bifax	Eastern Long-eared Bat	Bionet, BAM-C		VU	Ecosystem	Ν	Medium
Ozimops lumsdenae	Northern Free-tailed Bat	BAM-C		VU	Species/Ecos ystem	N	Medium
Petauroides volans	Southern Greater Glider	PMST, Bionet, BAM-C	EN	EN	Species	N	High
Petaurus australis	Yellow-bellied Glider	PMST, Bionet, BAM-C	VU	VU	Ecosystem	N	High
Petaurus norfolcensis	Squirrel Glider	Bionet, BAM-C		VU	Species	N	High
Petrogale penicillata	Brush-tailed Rock-wallaby	PMST, Bionet	VU	E1	Species	Y	Low
Phascogale tapoatafa	Brush-tailed Phascogale	Bionet, BAM-C		VU	Species	Y	Medium
Phascolarctos cinereus	Koala	PMST, Bionet, BAM-C	EN	VU, E2	Species	N	High
					Species/Ecos		Ŭ
Phoniscus papuensis	Golden-tipped Bat	BAM-C		VU	ystem	Ν	Low
Planigale maculata	Common Planigale	Bionet, BAM-C		VU	Species	Ν	Medium
Pseudomys gracilicaudatus	Eastern Chestnut Mouse	BAM-C		VU	Species/Ecos ystem	N	Low
Potorous tridactylus	Long-nosed Potoroo (northern)	PMST, Bionet, BAM-C	VU	VU	Species	Ν	Low
Pseudomys novaehollandiae	New Holland Mouse	PMST, Bionet, BAM-C	VU		Ecosystem	N	Low
Pteropus poliocephalus	Grey-headed Flying-fox	PMST, Bionet, BAM-C	VU	VU	Species/Ecos ystem	N/ A	High
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	Bionet, BAM-C		VU	Ecosystem	N	Low
Scoteanax rueppellii	Greater Broad-nosed Bat	BAM-C		VU	Species/Ecos ystem	N	Medium
Syconycteris australis	Common Blossom-bat	BAM-C		VU	Species/Ecos ystem	N	Medium



						Species/Ecos		
Thylogale stigmatica	Red-legged Pademelon	BAM-C		VU		ystem	Ν	Low
Amphibians								
Crinia tinnula	Wallum Froglet	Bionet, BAM-C		VU		Species	Ν	Medium
Litoria aurea	Green and Golden Bell Frog	BAM-C	EN	VU		Species	Ν	Low
Litoria brevipalmata	Green-thighed Frog	Bionet, BAM-C		VU		Species	Ν	Medium
Litoria olongburensis	Olongburra Frog	BAM-C	VU	VU		Species	Ν	Low
Mixophyes balbus	Stuttering Frog	PMST	VU					Low
Mixophyes iteratus	Giant Barred Frog	PMST, Bionet, BAM-C	EN	EN		Species	N	Low
Fish								
	Southern Purple Spotted				Е			
Mogurnda adspersa	Gudgeon	Bionet		EN	N		Ν	Medium
<u> </u>	0							
Reptiles								
Reptiles Cacophis harriettae	White-crowned Snake	BAM-C		VU		Species	N	High
Reptiles Cacophis harriettae Coeranoscincus reticulatus	White-crowned Snake Three-toed Snake-tooth Skink	BAM-C PMST, Bionet, BAM-C	VU	VU VU		Species Species	N	High Low
ReptilesCacophis harriettaeCoeranoscincus reticulatusHoplocephalus bitorquatus	White-crowned Snake Three-toed Snake-tooth Skink Pale-headed Snake	BAM-C PMST, Bionet, BAM-C Bionet, BAM-C	VU	VU VU VU		Species Species Species	N N N	High Low Medium
Reptiles Cacophis harriettae Coeranoscincus reticulatus Hoplocephalus bitorquatus Hoplocephalus stephensii	White-crowned Snake Three-toed Snake-tooth Skink Pale-headed Snake Stephens' Banded Snake	BAM-C PMST, Bionet, BAM-C Bionet, BAM-C Bionet, BAM-C	VU	VU VU VU VU		Species Species Species Species	N N N	High Low Medium Medium
Reptiles Cacophis harriettae Coeranoscincus reticulatus Hoplocephalus bitorquatus Hoplocephalus stephensii Insects	White-crowned Snake Three-toed Snake-tooth Skink Pale-headed Snake Stephens' Banded Snake	BAM-C PMST, Bionet, BAM-C Bionet, BAM-C Bionet, BAM-C	VU	VU VU VU VU		Species Species Species Species	N N N	High Low Medium Medium
ReptilesCacophis harriettaeCoeranoscincus reticulatusHoplocephalus bitorquatusHoplocephalus stephensiiInsectsArgynnis hyperbius	White-crowned Snake Three-toed Snake-tooth Skink Pale-headed Snake Stephens' Banded Snake Laced Fritillary	BAM-C PMST, Bionet, BAM-C Bionet, BAM-C Bionet, BAM-C PMST, Bionet, BAM-C	VU CR	VU VU VU VU EN		Species Species Species Species Species	N N N Y	High Low Medium Medium Low
ReptilesCacophis harriettaeCoeranoscincus reticulatusHoplocephalus bitorquatusHoplocephalus stephensiiInsectsArgynnis hyperbiusPetalura litorea	White-crowned Snake Three-toed Snake-tooth Skink Pale-headed Snake Stephens' Banded Snake Laced Fritillary Coastal petaltail	BAM-C PMST, Bionet, BAM-C Bionet, BAM-C Bionet, BAM-C Bionet, BAM-C PMST, Bionet, BAM-C BAM-C	VU CR	VU VU VU VU EN EN		Species Species Species Species Species Species	N N N Y Y	High Low Medium Medium Low Low
ReptilesCacophis harriettaeCoeranoscincus reticulatusHoplocephalus bitorquatusHoplocephalus stephensiiInsectsArgynnis hyperbiusPetalura litoreaPhyllodes imperialis southernsubspecies	White-crowned Snake Three-toed Snake-tooth Skink Pale-headed Snake Stephens' Banded Snake Laced Fritillary Coastal petaltail Southern Pink Underwing Moth	BAM-C PMST, Bionet, BAM-C Bionet, BAM-C Bionet, BAM-C Bionet, BAM-C BAM-C BAM-C BAM-C	VU CR EN	VU VU VU VU EN EN EN		Species Species Species Species Species Species Species	N N N Y Y	High Low Medium Medium Low Low Low



Appendix 2 Significant Impact Criteria assessments

Subtropical Eucalypt Floodplain Forest and Woodland of the New South Wales North **Coast and South East Queensland bioregions**

Subtropical Eucalypt Floodplain Forest and Woodland is listed as Endangered under the EPBC Act. The structure of the ecological community, in its undisturbed state, varies from tall open forest to woodland, although partial clearing may have reduced the canopy to scattered trees in some areas. Elsewhere, there may be localised areas of denser closed forest and/or low forest, often associated with other disturbance (including flooding). It tends to be shorter and less dense on the wider floodplains, and taller and denser on the more confined floodplains. The tree canopy is dominated by eucalypts and/or other myrtaceous trees (specifically from the Angophora, Corymbia, Lophostemon and Syncarpia genera), often as a mixture of species. A mid-layer or sub-canopy of small trees may be present - with scattered to dense shrubs. For example, Melaleuca, Leptospermum and related genera may form dense thickets beneath the main canopy, or in gaps between canopy trees. Its groundcover typically includes grasses, forbs, ferns, sedges and scramblers (DCCEEW 2022c).

The main threats to subtropical eucalypt floodplain forest and woodland include; clearing and the selective harvesting of the dominant canopy tree species; altered fire and hydrological regimes; livestock grazing; weeds; invasive fauna (pests); climate change; disease, pathogens and dieback (e.g., bell miner associated dieback (BMAD)); and human disturbance.

This endangered ecological community (EEC) is consistent with PCT 4046 and 3428. Up to 17.51 ha of the community consistent with PCT 3428 may be removed as a result of the project, however this area includes two potential options for the transmission line. As only one option will be selected, this area will be further reduced during the detailed design stage, therefore total impacts have a degree of uncertainty. As a precautionary approach, an assessment against the Significant Impact Criteria detailed in the Matters of National Environmental Significance: Significant impact guidelines version 1.1 (Commonwealth of Australia 2013) has been undertaken below.

Table 3 SIC assessment for Subtropical eucalypt floodplain forest and woodland

SIC assessment for critically endangered and endangered ecological community

Reduce the extent of an ecological community.

The project will directly impact up to 18.49 ha of PCT 3428 within the project area, of which up to 17.51 ha of vegetation will likely meet the minimum condition threshold for the EPBC Subtropical Eucalypt Floodplain Forest and Woodland EEC. The remaining 126.98 ha of the EEC has been avoided within the remainder of the project area.

The region was subject to intense bushfire impacts in 2019/2020, to which impacts, and recovery, is clearly evident. Both unburnt and burnt areas for this TEC occur in the project area, with several patches of unburnt areas avoided and retained. The total extent of the EEC within the project area is approximately 144.49 ha, which includes up to 17.51 ha within the impact area. The removal of up to 17.51 ha constitutes a reduction of <1% of Subtropical eucalypt floodplain EEC within the project area and broader locality, and is therefore not considered to be a substantial reduction.

This community is located in the north-western section of the project area through well connected native vegetation, along and adjacent to periodically inundated riparian areas, bordered by good quality PCT 3420 and regenerating PCT

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SIC assessment for critically endangered and endangered ecological community

3428. However, it should be noted this area is currently subjected to a Private Native Forestry Plan (PNFP) so regular disturbance currently exists. Additionally, fragmented patches of this community occur throughout the eastern portions of the project area. The good and moderate condition vegetation accommodate a better structure and floristic diversity, and a reduced occupancy of weeds. The regenerating vegetation is likely acting as a buffer between this EEC and the transmission line utilised within the project area, such that the good and moderate patches of the EEC have not been significantly modified by weed invasion or edge effects.

Given the small reduction (<1%) of the EEC within the project area, and considering the majority of the community will be retained, including unburnt patches, the project is considered unlikely to lead to a significant reduction in the extent of the ecological community.

Fragment or increase fragmentation of an ecological community.

The project will result in the removal of up to 17.51 ha of the EEC. While this vegetation removal will result in the creation of some localised fragmentation, resulting in the creation of smaller patches, approximately 126.98 ha will be retained within the remainder of the project area. Mitigation measures will be implemented through a CEMP to reduce indirect impacts arising from the project including weed ingress, pollutants, and sedimentation and erosion to the remaining areas surrounding the transmission line.

Given the broadscale retention of the EEC within the project area, and that localised disturbance adjacent to the EEC resulting in indirect impacts that will be mitigated it is unlikely that the project will lead to increased fragmentation of the community to the degree that it places the local occurrence or community as a whole at risk of decline.

Adversely affect habitat critical to the survival of an ecological community.

Within the project area, this vegetation occupies an area surrounding periodically inundated areas and riparian corridors surrounding tributaries, which are characteristic of the preferred landscape for this community. In addition, the patch occurs within a larger area of good quality vegetation, which likely constitutes habitat critical to the survival of the community.

The project requires removal of up to 17.51 ha of EEC vegetation, with 126.98 to be retained within the project area. This constitutes a reduction of <1 % of habitat considered critical to the survival of the community, which is not considered to be a substantial amount, when considered in relation to the size of the patch to be impacted, and that it is currently subject to a low level of edge effects from the existing easement. While indirect impacts such as weed ingress, sedimentation and erosion and pollutants have the potential to arise as a result of the project, these impacts will be mitigated, and will not adversely affect critical habitat for the EEC in a manner that would cause it to significantly decline in the locality or as a whole.

Modify or destroy abiotic factors necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns.

The project may result in localised disturbance to soil and hydrology, with an increase of edge effects (such as increased light, weed ingress or changes to hydrology), however this is not expected to result in the modification of abiotic factors. Implementation of measures such as erosion and sedimentation will be implemented to ensure indirect impacts resulting from the project will be mitigated. The project is not expected to result in impacts that modify or destroy abiotic factors necessary for the survival of the EEC.

Cause a substantial change in the species composition of an occurrence of an ecological community, including a decline or loss of functionally important species, for example through regular burning or flora and fauna harvesting.

The 17.51 ha of the EEC proposed for removal occurs in various condition states, with regenerating and planted areas



SIC assessment for critically endangered and endangered ecological community

lacking floristic diversity within the understorey, and with a higher percentage of exotic species, having been recently burnt. Good and moderate condition patches are comprised of key species such as Forest Red Gum, *Eucalyptus seeana*, Pink Bloodwood *Corymbia intermedia*, Grey Ironbark *Eucalyptus siderophloia* and Swamp Mahogany *Lophostemon suaveolens* and midstorey species *Melaleuca alternifolia* and *Acacia concurrens* well represented, with a higher level of floristic diversity, and a lower number of exotic species.

The project will not result in regular burning or flora and fauna harvesting of the EEC. While the project may result in the removal of up to 17.51 ha of the EEC, it is not anticipated that this will result in the removal of functionally important species such as canopy *Eucalypts* or *Corymbias* as this area constitutes <1% of the total occurrence within the project area, and intact patches containing key species will remain and continue the dispersal of genetic material through the project area and broader landscape. Therefore, the project is unlikely to cause a substantial change in the species composition of an occurrence of an ecological community, including a decline or loss of functionally important species.

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

Assisting invasive species establishment

Causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community.

While the project may result in the removal of up to 17.51 ha of the EEC, invasive species are currently present in lowmoderate densities within the community, particularly in planted and regenerating conditional zones that have been recently subject to disturbance from 2019/2020 fires or the PNFP. Their prevalence, along with other exotic species, is indicative of increased disturbance and nutrient levels associated with pasture improvement and livestock grazing in surrounding areas. While the project will result in soil disturbance which may lead to the establishment of new plants via stimulation the weed seed bank, it is unlikely to result in the introduction of new species or exacerbate existing pressures in a manner that is likely to cause the EEC to decline in the locality or as a whole. Mitigation measures including good hygiene practices will be implemented to further reduce impacts to the retained areas of the EEC.

Interfere with the recovery of an ecological community.

There is currently no recovery plan for subtropical eucalypt floodplain forest and woodland, however the Conservation Advice (DCCEEW 2022c) identifies four priority conservation actions in order to support the recovery of this EEC, they are:

- Protect the ecological community;
- Conserve remaining patches;
- Manage actions to minimise impacts;
- Apply buffer zones.

While the project may result in the removal of up to 17.51 ha of the EEC, 126.98 ha has been actively avoided through the design, and will be retained. The project will implement actions to minimise impacts such as weed ingress through vehicle hygiene and biosecurity protocols, protecting against the spread of weeds and pathogens into and from the site (given the abundance of weed propagules and potential presence of waterborne contaminants and pathogens within the surrounding landscape).

Given the project will result in the removal of a small area (<1%) of the EEC within the project area, and that management actions will be employed to reduce indirect impacts to retained patches, it is considered unlikely to significantly interfere with the recovery of the ecological community in the locality or as a whole.

Conclusion.

Based on the above assessment, the project is not likely to have a significant impact Subtropical Eucalypt Floodplain Forest and Woodland EEC, due to:



SIC assessment for critically endangered and endangered ecological community

- A small amount (<1%) of the EEC will be removed as part of the works, which will be further reduced during the detailed design stage. The remainder of the EEC (126.98) has been avoided in the design, and will be retained.
- Unlikely to contribute to substantial fragmentation of the community in the locality.
- Unlikely to result in impacts that modify or destroy abiotic factors necessary for the survival of the EEC.
- Unlikely to cause a substantial reduction in the quality or integrity of an occurrence of the EEC.
- Unlikely to increase invasive species establishment and mobilise chemicals such as fertilisers or herbicides.

Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland

Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland (Coastal Swamp Sclerophyll Forest) is listed as an EEC under the EPBC Act and is a swamp community that commonly occurs in low-lying coastal alluvial areas. The EEC structure varies from open woodland to closed forest with a canopy that is dominated by Swamp Paperbark (or other *Melaleuca* spp.) and/or Swamp Mahogany. It is associated with hydric soils that are characterized by alluvial deposits and that are either waterlogged or intermittently seasonally inundated. The ecological community occurs between the Great Dividing Range and the coastline from near Gladstone in Queensland, through to the south coast of New South Wales (DAWE 2021).

The main threats to the EEC include clearing and drainage for agriculture, forestry, and urban development, which have detrimentally affected the extent, patch size and condition of the ecological community.

Coastal Swamp Sclerophyll Forest aligns with PCT 4001, 15.66 hectares of which is present within the project area, however no vegetation will be directly removed as a result of the project. Indirect impacts downstream such as weed ingress, impacts to hydrology, and pollutants, may occur as a result of the works and as such, an assessment against the Significant Impact Criteria detailed in the *Matters of National Environmental Significance: Significant impact guidelines version 1.1* (Commonwealth of Australia 2013) has been undertaken below.

Table 4SIC assessment for Coastal Swamp Sclerophyll Forest of New South Wales and South East
Queensland

SIC assessment for endangered and critically endangered community

Reduce the extent of an ecological community.

The total extent of Coastal Swamp Sclerophyll Forest is estimated to be 114,358 ha (DAWE 2021). The project area occurs immediately adjacent to a patch of connected vegetation \geq 100 ha of similar habitat, being low-lying flats in proximity to drainage lines subject to periodic inundation. Approximately 50 ha of this vegetation is likely to be consistent with PCT 4001 and of Coastal Swamp Sclerophyll Forest EEC.

The project will not result in the direct removal of the EEC, however, may result in indirect impacts through construction activities and development of solar infrastructure in adjacent areas, such as pollutants travelling downstream into areas of the EEC, as well as weed ingress and sedimentation and erosion. Mitigation measures outlined within the CEMP for the project including good soil transportation and hygiene practices during construction will reduce these indirect impacts and therefore the project is considered unlikely to lead to a significant reduction in the extent of the ecological community.

Fragment or increase fragmentation of an ecological community.



SIC assessment for endangered and critically endangered community

All areas of the EEC have been avoided through the initial detailed design, and therefore no vegetation will be directly removed as a result of the project. Mitigation measures will be implemented through a CEMP to reduce indirect impacts arising from the project including weed ingress, pollutants, and sedimentation and erosion.

Therefore, it is unlikely that disturbance adjacent to the EEC resulting in indirect impacts that will be mitigated will lead to increased fragmentation of the community to the degree that it places the local occurrence or community as a whole at risk of decline.

Adversely affect habitat critical to the survival of an ecological community.

The approved conservation advice for Coastal Swamp Sclerophyll Forest states: 'the areas (including habitat) most critical to the survival of the ecological community are those where the hydrological regime remains reasonably intact such that the vegetative diagnostic features are maintained' (DAWE 2021). Within the project area, the EEC is related to the drainage lines and tributaries of Physics Creek, which is currently subject to some disturbance from surrounding land use and is unlikely to constitute habitat critical to the survival of the community. The project will not result in changes to the existing landscape drainage or hydrology, and so will not adversely affect habitat critical to the survival of the ecological community, as no vegetation will be removed as a result of the works. Additionally, the community is located within a matrix of agricultural land that has been historically disturbed due to clearing and livestock grazing. Therefore, while indirect impacts such as weed ingress, sedimentation and erosion and pollutants have the potential to arise as a result of the project, these impacts will be mitigated, and will not adversely affect critical habitat for the EEC in a manner that would cause it to significantly decline in the locality or as a whole.

Modify or destroy abiotic factors necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns.

As outlined, abiotic factors necessary for Coastal Swamp Sclerophyll Forest survival relate to hydrology to create suitable habitat to support the suite of species associated with the community. Habitat for the community within the project area relates to the localised drainage which moves through Physics Creek and will not be altered by the project.

Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including but not limited to: Assisting invasive species establishment, Causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community.

Invasive species are currently present in high densities within the community, particularly surrounding Physics Creek. Their prevalence, along with other exotic species, is indicative of increased disturbance and nutrient levels associated with pasture improvement and livestock grazing. While the project will result in soil disturbance which may lead to the establishment of new plants via stimulation the weed seed bank, it is unlikely to result in the introduction of new species or exacerbate existing pressures in a manner that is likely to cause the Coastal Swamp Sclerophyll Forest to decline in the locality or as a whole. These indirect impacts will be mitigated through the implementation of a CEMP.

Interfere with the recovery of an ecological community.

A National Recovery Plan for Coastal Swamp Sclerophyll Forest has not been produced; however the approved conservation advice sufficiently outlines the priority actions needed for this ecological community (DAWE 2021). Some of the key threatening processes significant to the project is:

- Clearing of native vegetation.
- Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants.
- Novel biota and their impact on biodiversity (including the effects of Myrtle Rust Austropuccinia psidii and feral deer).
- Dieback caused by the root-rot fungus *Phytophthora cinnamomi*.



SIC assessment for endangered and critically endangered community

The project will implement vehicle hygiene and biosecurity protocols to protect against the spread of weeds and pathogens into and from the site (given the abundance of weed propagules and potential presence of waterborne contaminants and pathogens).

Given the project will not result in the removal of the EEC, it is considered unlikely to significantly interfere with the recovery of the ecological community in the locality or as a whole.

Conclusion.

Based on the assessment provided above, it is concluded that Coastal Swamp Sclerophyll Forest is unlikely to be significantly impacted by the project. This conclusion was made on the basis that the project is:

- All areas of the EEC have been avoided and therefore no direct clearing of the community will occur.
- Unlikely to contribute to substantial fragmentation of the community in the locality.
- Unlikely to result in impacts that modify or destroy abiotic factors necessary for the survival of the EEC.
- Unlikely to cause a substantial reduction in the quality or integrity of an occurrence of the EEC.
- Unlikely to increase invasive species establishment and mobilise chemicals such as fertilisers or herbicides.

Rupp's Wattle Acacia ruppii

Rupp's wattle is listed as Endangered under the EPBC Act. Rupp's Wattle is an erect, open shrub, 1–3 m in height and spread, with spindly arching branches. It has smooth grey bark and densely hairy branchlets. The leaves are crowded, about 0.8–2 cm long and 1–2 mm wide, with fine hairs especially on margins and near base and an acute mucro at the apex. The round flower heads are golden yellow and are followed by flat seed pods 4–11 cm long. Rupp's Wattle occurs in an area from Grafton north to Mount Neville Nature Reserve and inland of the Great Dividing Range between Glen Innes and Stanthorpe (Department of Agriculture, Water and the Environment 2021).

The main threats to Rupp's Wattle include high frequency fire, road maintenance activities, clearing of habitat for agriculture and browsing by stock or introduced herbivores (Department of Agriculture, Water and the Environment 2021).

No records of Rupp's Wattle have been detected within the project area to date, however targeted surveys are yet to be undertaken, and will be completed in Spring 2023. In addition, no records of Rupp's Wattle occur within 10 kilometres of the project area, with the closest record occurring approximately 24 kilometres to the south-east in vegetation comprising Mount Neville Nature Reserve. Habitat for the species is represented by PCT 3428 and 4046 within the project area. Up to 18.49 ha of these PCT's may be removed as a result of the proposed works, however this area includes two potential options for the transmission line. As only one option will be selected, this area will be further reduced during the detailed design stage, therefore impacts are currently uncertain. Therefore, an assessment against the Significant Impact Criteria detailed in the *Matters of National Environmental Significance: Significant impact guidelines version 1.1* (Commonwealth of Australia 2013) has been undertaken below.



Table 5Significant Impact Criteria for Rupp's Wattle

Significant Impact Criteria (Critically endangered and endangered species)

Lead to a long-term decrease in the size of a population.

No populations of Rupp's Wattle are known to occur within a 10-kilometre radius of the project area. The closest population occurs approximately 24 kilometres to the south-east in intact bushland comprising Mount Neville Nature Reserve. No individuals were encountered during the initial field investigation, however targeted surveys are yet to be undertaken for the species in Spring, and due to the size of the project area, all areas of potential habitat for this species were not able to be surveyed and isolated occurrences of the species may remain undetected.

Given the species is broadly associated with dry open forests and fringing drainage lines, the project area may provide marginal habitat, represented by PCT 3428 and 4046. Potential impacts to the local population of the species, associated with the project, are considered localised in nature. Although there is potential for the species to occur in up to 18.49 hectares of PCT 3428 and PCT 4046, this potential habitat is subject to a low degree of edge effects such as a weed ingress, from the existing easement and transmission line in the far eastern corner of the project area, and occurs in a contiguous manner with vast tracts of intact bushland to the north and west. In addition, this area will be further reduced during the detailed design stage. With this in consideration, it is unlikely that there will be a long-term decrease in the size of a population of a species able to re-colonise the area after disturbance, if present within or adjacent to the project area.

Reduce the area of occupancy of the species.

The removal of up to 18.49 hectares of potential habitat for Rupp's Wattle has the potential to reduce the area of habitat available. The closest known population occurs over 20 kilometres to the south-east, however, is unlikely to reduce the available habitat for the species as a whole. In addition, large patches of similar and better-quality habitat are present within and adjacent to the project area, and across the broader landscape. An area of 136.81 ha will be retained within the project area, subject to further decreases during the detailed design stage when a final option is selected for the transmission line. As such, while final impacts are uncertain, the removal of up to 18.49 ha of potential habitat as a result of the project is not considered substantial enough to result in a significant reduction to the area of occupancy of the species.

Fragment an existing population into two or more populations.

Rupp's Wattle is not known to occur within a 10-kilometre radius of the project area, and was not recorded within the project area during the initial field surveys, however, due to the size of the project area, all areas of potential habitat for this species were not able to be surveyed and isolated occurrences of the species may remain undetected. Targeted surveys will be undertaken in Spring 2023 to confirm the presence/absence of the species within the project area. The project requires the removal of up to 18.49 hectares of potential habitat for Rupp's Wattle within the project area, represented by PCT 3428 and PCT 4046, which will be further reduced. Potential habitat for the species in the project area occurs in various conditions, with the majority of vegetation (12.63 ha) to be removed occurring in good condition. However, the remaining vegetation is subject to some level of fragmentation and edge effects from existing easements and transmission lines, as well as adjacent agricultural land use. Although this removal will decrease the amount of native vegetation within the project area and result in some localised fragmentation, the project area to the north and west, which will be retained. While final impacts are uncertain, the localised fragmentation will be expected to significantly reduce connectivity as the impacts occur within an already fragmented landscape, and it is unlikely that the local population, and/or any undetected individuals of Rupp's Wattle will be exposed to any substantial fragmentation, given large areas of habitat will be avoided.

Adversely affect habitat critical to the survival of a species.

Due to the highly restricted range and small population size of the species, all habitat for Rupp's Wattle is considered critical



Significant Impact Criteria (Critically endangered and endangered species)

habitat under the approved conservation advice (Department of Agriculture, Water and the Environment 2021). Therefore, up to 18.49 ha of potential habitat represented by PCT 3428 and PCT 4046 to be removed by the project meets the criteria for critical habitat for the species.

While the works will result in the removal of up to 18.49 ha of critical habitat for the species, 4.35 ha of the habitat to be removed is subject to edge effects and weed ingress resulting from previous clearing and agricultural land uses. The remainder of habitat to be removed occurs in a contiguous manner with a large area of vegetation which will be retained within the project area, as well as large tracts of vegetation immediately adjacent to the north and west of the project area (>9000 ha). In addition, the total area of 18.49 ha will be reduced further during selection of the transmission line option. However, as final impacts are uncertain, noting that no known populations of the species occur within a 10-kilometre radius of the project area, as targeted surveys is yet to be undertaken for this species, the removal of up to 18.49 ha of potential habitat may be considered likely to adversely affect habitat critical to the survival of the species.

Disrupt the breeding cycle of a population.

The flowering period of Rupp's Wattle is from July to September. Wattle species are mostly pollinated by insects, particularly bees, and offer only pollen as a reward. Little is known about longevity or generation length of Rupp's Wattle, although like many Wattles, Rupp's Wattle plants probably have relatively short lifespans of around 20-40 years (Department of Agriculture, Water and the Environment 2021).

The project will result in the removal of up to 18.49 ha of PCT 3428 and 4046 representing potential habitat for Rupp's Wattle, subject to decreases during the detailed design, however the project is not expected to impact on the availability of suitable pollinators. Further, given there is a large proportion of native vegetation within the project area that will be retained under the project (approximately 98 %), any unknown populations of Rupp's Wattle within the broader project area may continue to persist and genetic material will continue to be dispersed. Therefore, the project is unlikely to disrupt the breeding cycle of the population.

Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

The species was not recorded in the project area, and is not known to occur within a 10-kilometre radius, however targeted surveys will be undertaken in Spring 2023 to detect any unknown populations of the species. The project will remove up to 18.49 ha of potential habitat for the species, subject to further decrease, which constitutes approximately 11.9% of potential habitat for Rupp's Wattle within the project area, however, constitutes a far smaller area (less than 1 %) in the context of available habitat within the broader locality (>9000 ha within 10 km of the project area). While impacts are yet to be finalised, and are therefore uncertain, this local scale loss of habitat within the project area is not considered to cause the species to decline considering there is an abundance of similar higher quality patches of habitat available in the region that comprise a local string of reserves.

Result in invasive species that are harmful to critically endangered or endangered species becoming established in the critically endangered or endangered species' habitat.

The project will not increase invasive fauna species. Invasive weeds are not known to directly impact Rupp's Wattle, however they do have potential to reduce quality of habitat in the adjoining bushland and therefore increase potential to harm the population of the species through habitat modification. The project area and vegetation to be removed is currently subject to a low-moderate level of weed invasion, including from priority species such as Lantana. The risk of introduction and spread of weed species will be mitigated through the implementation of good soil transportation and hygiene practices. The project is therefore unlikely to exacerbate the current level of invasive species threats operating within the project areas, or introduce new invasive species to the area.

Introduce disease that may cause the species to decline.



Significant Impact Criteria (Critically endangered and endangered species)

The project is unlikely to introduce a disease that causes the Rupp's Wattle to decline. Appropriate vehicle hygiene methods should be implemented to reduce the potential spread of pathogens and disease into, or out from the project area as a result of the project.

Interfere substantially with the recovery of the species.

A recovery plan has been prepared for Rupp's Wattle (Department of Environment, Climate Change and Water 2010). The plan lists objectives to aid in the recovery of several species within the Northern Rivers Region. Those objectives that relate to the project include:

- Protect species and their habitats from the effects of clearing and fragmentation.
- To protect vegetation communities, ecosystems and habitats from inappropriate fire regimes.
- Protect the Region from the impact of weeds.
- Protect the Region from the impact of pests.
- Protect the Region from the impact of disease and pathogens.

The project will result in the removal of up to 18.49 ha of PCT 3428 and PCT 4046, representing potential habitat for Rupp's Wattle. While this will result in some localised habitat loss for the species, it is not anticipated to adversely reduce or fragment the habitat available for a local population or the species as a whole. In addition this area will be further reduced during detailed design stages when one option of the two currently considered for the project is selected. The project will not increase inappropriate fire regimes, and the risk of introduction and spread of weeds will be mitigated through hygiene measures implemented during the works, such as good wash-down and soil transportation methods, and it is therefore unlikely to interfere substantially with the listed recovery actions for the species.

Conclusion

Considering the above factors, particularly uncertainty of impacts upon habitat considered critical to this species, it is possible that the proposed work will impose a significant impact on Rupp's Wattle or their habitat. It is therefore concluded that the project is may to lead to a significant impact on the Rupp's Wattle. As such, referral to the Federal Minister for the Department of Climate Change, Energy, the Environment and Water is required and controlled action considered a likely outcome.

Paspalidium grandispiculatum

Paspalidium grandispiculatum is listed as vulnerable under the EPBC Act. It is a tufted grass that can be distinguished from other Australian Paspalidium by its large spikelets, 3.5–4.8 mm long and characteristic woody culms arising from robust woody rhizomes. *Paspalidium grandispiculatum* occurs in south-east Queensland in a band from Canungra to Kingaroy, over a range of approximately 100 km. It occurs in mixed Eucalyptus forest, mixed open forest, and native pasture occurring as a result of land clearing for agriculture. One population occurs in the Crows Nest Falls National Park, the remaining known populations occur in either state forest or on private land. Most populations occur in areas of remnant vegetation as defined under the Vegetation Management Act 1999 (Queensland) and are therefore protected from broad-scale clearing (Department of the Environment, Water, Heritage and the Arts 2008a).

The main identified threats to *Paspalidium grandispiculatum* include destruction of habitat by clearing; habitat disturbance by timber harvesting; inappropriate grazing regimes; and inappropriate fire regimes. Most known populations are on private land and those within state forests are threatened by illegal grazing, which is difficult to exclude because of insufficient fencing. The above ground parts are killed by fire but the species is capable of regenerating from the rhizome.



No individuals of *Paspalidium grandispiculatum* have been recorded within the project area, however targeted surveys are yet to be undertaken in Summer 2023/2024. Two records of *Paspalidium grandispiculatum* occur within 10 kilometres of the project area, with the closest record occurring approximately 9 kilometres to the south-east in vegetation comprising Doubleduke State Forest. Habitat for the species is represented by PCT 3420. Up to 44.68 ha of these PCT's will be removed as a result of the proposed works, however this area includes two potential options for the transmission line. As only one option will be selected, this area will be further reduced during the detailed design stage, therefore impacts are currently uncertain. Therefore, an assessment against the Significant Impact Criteria detailed in the *Matters of National Environmental Significance: Significant impact guidelines version 1.1* (Commonwealth of Australia 2013) has been undertaken below.

Table 6 SIC assessment for Paspalidium grandispiculatum

SIC assessment for vulnerable species

Lead to the long-term decrease in the size of an important population of a species.

No important populations have been declared for *Paspalidium grandispiculatum* within the Approved Conservation listing (Department of the Environment, Water, Heritage and the Arts 2008a).

No records have been detected within the project area however targeted surveys are yet to be undertaken in Summer 2023/2024. Two records are located approximately 9 kilometres south-east of the project area within intact vegetation comprising Doubleduke National Park. Within the project area, potential habitat is present in the form of 331.72 ha of PCT 3420. The project may result in the removal of up to 44.68 ha of these PCT's for the transmission line and associated solar infrastructure, however impacts are yet to be finalised, with further reductions to be made to this area following selection of one of the two transmission line options.

Vegetation to be impacted occurs in a contiguous manner with similar and higher quality habitat in adjoining areas immediately north and north-west of the project area (>9000ha), that will continue to support the movement of genetic material and dispersal. As such, while impacts are yet to be finalise, the removal of up to 44.68 ha associated with the project is not considered significant in the context of available habitat within the project area and broader locality. It is therefore considered unlikely that there will be a long-term decrease in the size of the local population of *Paspalidium grandispiculatum*.

Reduce the area of occupancy of an important population.

Two records of *Paspalidium grandispiculatum* are known within a 10-kilometre radius of the project area. The closest record of the species occurs approximately 9 kilometres to the south-east of the project area, with a large number of records condensed further to the east. No important populations for the species have been declared within the approved conservation advice (Department of the Environment, Water, Heritage and the Arts 2008a).

The project will remove up to 44.68 ha of vegetation comprising PCT 3420 that represents potential habitat for the species, however this area will be reduced further during the detailed design phase. Approximately 6.05 ha of vegetation to be removed is currently subject to some edge effects and disturbance from previous clearing for an existing easement. Vegetation to be removed exists in a contiguous manner with similar and higher quality vegetation within the project area and in areas immediately adjacent to the project area that are >9000 ha in size.

While impacts are yet to be finalised and are therefore uncertain, given the amount of habitat to be removed in relation to contiguous vegetation to be retained both within the project area and in the immediate vicinity, it is considered unlikely that there will be a long-term decrease in the local population of *Paspalidium grandispiculatum*.



Fragment an existing important population into two or more populations.

Two records of *Paspalidium grandispiculatum* occur within the locality, however no important populations have been declared for the species. As the species is broadly associated with PCT 3420, patches of this community within the northern portion of the project area, designated for removal may provide broad dispersal habitat for the species. Broadly, the project area is currently subject to a moderate level of fragmentation from previous land clearing for agricultural purposes and historical grazing practices. However, patches of PCT 3420 to be removed occur in a contiguous manner with larger patches of similar and higher quality vegetation within and adjacent to the project area, which will be retained.

The project to impact upon up to 44.68 ha of native vegetation (subject to further reduction) for the installation of a transmission line and associated solar infrastructure will not result in any new barrier to the movement of genetic material for the local occurrence of species, or fragment an existing population into two or more populations.

Adversely affect habitat critical to the survival of a species.

Critical habitat has not yet been declared for *Paspalidium grandispiculatum* (Department of the Environment, Water, Heritage and the Arts 2008a). However, 38.63 ha of PCT 3420 in good and moderate condition to be impacted likely constitutes good-quality habitat that is likely to provide important resources for recovery of the species. However, it is noted that a portion (6.05 ha) of habitat to be removed is subject to some edge effects within the far eastern section of the project area, and is contiguous to larger areas of similar and better quality habitat that will be retained, both within and adjacent to the project area. In addition, this area will be significantly reduced during the detailed design stage. While impacts are uncertain at this stage, considering the above factors, it is unlikely that the removal of 44.68 ha of PCT 3420 will adversely affect habitat critical to the survival of the species.

Disrupt the breeding cycle of an important population.

No important populations have been declared for the species. Little information exists on the reproductive biology of the species, however the species is known to flower and fruit from January–May. Activities likely to threaten its reproductive cycle include clearing, trampling and grazing, illegal grazing and altered fire regimes.

The project will include vegetation removal (up to 44.68 ha) for the proposed transmission line. However, given this area will be further reduced and the availability of resources within the immediate locality, including large tracts of intact vegetation that form a matrix of State Forests, areas of habitat to be removed are currently subject to edge effects, and that mitigation measures to minimise further soil erosion or disturbance will be implemented for the duration of works, it is unlikely disturbance to potential habitat for the local occurrence for the species will disrupt the breeding cycle of the local population. The project is not expected to increase grazing pressure or increase the frequency of fire regimes.

Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

Up to 44.68 ha of potential habitat comprising PCT 3420 and PCT 3428 for this species will be removed as a result of the project, subject to further reduction.

Approximately 6.05 ha of the habitat is currently subject to some level of disturbance and modification from edge effects and weed disturbance within the understorey surrounding the existing easement and in the eastern most portion of the project area. In addition, vegetation to be impacted occurs in a contiguous nature with a larger patch of similar and higher quality habitat both within the project area, and directly adjacent to it, that will continue to support the movement of genetic material and dispersal for the species. While impacts are yet to be finalised, and are therefore uncertain, given the



above factors, it is considered unlikely that the project will modify, destroy, isolate or decrease the availability or quality of habitat to the extent that the local population or species is likely to decline. In addition, mitigation measures outlined within the report will ensure further weed invasion is minimised.

Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat.

The project will not increase invasive fauna species. Invasive weeds are not known to directly impact *Paspalidium grandispiculatum*, however they do have potential to reduce quality of habitat in the adjoining bushland and therefore increase potential to harm the population of *Paspalidium grandispiculatum*, through habitat modification. The risk of introduction and spread of weed species will be mitigated through the implementation of good soil transportation and hygiene practices. The project is therefore unlikely to exacerbate the current level of invasive species threats operating within the project areas, or introduce new invasive species to the area.

Introduce disease that may cause the species to decline.

The project is unlikely to introduce a disease that causes the *Paspalidium grandispiculatum* to decline. Appropriate vehicle hygiene methods should be implemented to reduce the potential spread of pathogens and disease into, or out from the project area as a result of the project.

Interfere substantially with the recovery of the species.

A recovery plan has not been prepared for *Paspalidium grandispiculatum*. However, the approved conservation advice lists several actions to aid in the recovery of the species:

Habitat Loss, Disturbance and Modification

- Monitor known populations to identify key threats.
- Monitor the progress of recovery, including the effectiveness of management actions and the need to adapt them if necessary.
- Identify populations of high conservation priority.
- Ensure road widening and maintenance activities or other infrastructure or development activities involving substrate or vegetation disturbance in areas where *P. grandispiculatum* occurs do not adversely impact on known populations.
- Minimise adverse impacts from land use at known sites.
- Investigate formal conservation arrangements, management agreements and covenants on private land, and for crown and private land investigate inclusion in reserve tenure if possible.

Trampling, Browsing or Grazing

- Develop and implement a stock management plan for roadside verges and travelling stock routes.
- Manage known sites to ensure appropriate grazing regimes occur.
- Prevent grazing pressure at known sites through exclusion fencing or other barriers.

<u>Fire</u>

- Develop and implement a suitable fire management strategy for *P. grandispiculatum*.
- Provide maps of known occurrences to local and state Rural Fire Services and land managers and seek inclusion of mitigative measures in bush fire risk management plans, risk register and/or operation maps.

Conservation Information



• Raise awareness of P. grandispiculatum within the local community.

Enable Recovery of Additional Sites and/or Populations

- Undertake appropriate seed collection and storage.
- Investigate options for linking, enhancing or establishing additional populations.
- Implement national translocation protocols if establishing additional populations is considered necessary and feasible.

The project may result in the removal of up to 44.68 ha of PCT 3420, representing potential habitat for *Paspalidium grandispiculatum*, however this area will be further reduced during the detailed design stage. While this will result in some localised habitat loss for the species, it is not considered to adversely reduce or fragment the habitat available for an important population, the local population or the species as a whole. The project will not increase trampling, grazing and browsing by livestock, or inappropriate fire regimes, and the risk of introduction and spread of weeds will be mitigated through hygiene measures implemented during the works, such as good wash-down and soil transportation methods, and it is therefore unlikely to interfere substantially with the listed recovery actions for the species.

Conclusion.

Based on the assessment above, it is concluded that *Paspalidium grandispiculatum* is unlikely to be significantly impacted by the project. This conclusion was made on the basis that the project:

- Will not lead to the long term decrease of an important population, reduce the areas of occupancy or fragment an existing important population.
- Will not disrupt the breeding cycle of an important population, the local population or species as a whole.
- Will not adversely modify the species habitat or introduce invasive species/diseases project mitigation measures are to be implemented to mitigate any potential weed incursion/disease spread.
- Will not interfere will the recovery of the species.

Sandstone Rough-barked Apple Angophora robur

Sandstone Rough-barked Apple *Angophora robur* is listed as Vulnerable under the EPBC Act. It is a small straggly tree growing to 10 m tall. It has persistent rough grey bark on the trunk and branches. Leaves are opposite to one another along stems, and unusually large, up to 18 cm long and 7.5 cm wide. The petioles (leaf stalks) are absent or up to 1 mm long. Flowers are white or cream coloured. Fruits are large, up to 1.6 cm long and wide, and cup-shaped with longitudinal ribs. Sandstone Rough-barked Apple is locally frequent, but restricted to the sandstone belt running from northwest of Coffs Harbour, near Glenreagh, to the Coaldale district, north-west of Grafton, NSW. Sandstone Rough-barked Apple is restricted to dry sclerophyll woodland on sandy or skeletal soils on sandstone, or occasionally granite (Department of the Environment, Water, Heritage and the Arts 2008b).

The main identified threats to Sandstone Rough-barked Apple are clearing of habitat for development or agriculture; too frequent fires, which may suppress regeneration; widening of roads; and timber harvesting.

No individuals of Sandstone Rough-barked Apple have been recorded within the project area, however targeted surveys are yet to be undertaken in Spring 2023. No records of Rough-barked Apple occur within 10 kilometres of the project area, with the closest record occurring approximately 40 kilometres to the southwest in vegetation comprising Fortis Creek National Park. Potential habitat for the species is represented by PCT 3420 and 3428, which comprise dry sclerophyll woodland. Up to 62.81 ha of these PCT's may be removed as a result of the proposed works, however this area includes two potential options for the transmission line.



As only one option will be selected, this area will be further reduced during the detailed design stage, therefore impacts are currently uncertain. Therefore, an assessment against the Significant Impact Criteria detailed in the *Matters of National Environmental Significance: Significant impact guidelines version 1.1* (Commonwealth of Australia 2013) has been undertaken below.

Table 7SIC assessment for Sandstone Rough-barked Apple

SIC assessment for vulnerable species

Lead to the long-term decrease in the size of an important population of a species.

No important populations have been declared for Sandstone Rough-barked Apple within the approved conservation listing (Department of the Environment, Water, Heritage and the Arts 2008c).

No populations occur within the project area or locality, however targeted surveys for the species are yet to be undertaken. Within the project area, potential habitat is present in the form of 331.72 ha of PCT 3420 and 55.43 ha of PCT 3428. The project will result in the removal of a total of up to 62.81 ha of these PCT's for the transmission line and associated solar infrastructure, subject to further reduction during detailed design stages.

Approximately 324.34 ha of potential habitat will be retained within the project area, which will increase once the transmission line option is selected. In addition, vegetation to be impacted occurs in a contiguous manner with similar and higher quality habitat in adjoining areas immediately north and north-west of the project area, which will continue to support the movement of genetic material and dispersal. As such, while impacts are yet to be finalised, the removal of up to 62.81 ha is not considered to be significant in the context of available habitat within the locality (>9000 ha) and the absence of local records of the species. It is therefore considered unlikely that there will be a long-term decrease in the size of the local population of Square-fruited Ironbark.

Reduce the area of occupancy of an important population.

No local populations of Sandstone Rough-barked Apple are known within a 10 kilometre radius of the project area. The closest record of the species occurs approximately 40 kilometres to the south-west of the project area, within Fortis Creek National Park. No important populations for the species have been declared within the approved conservation advice (Department of the Environment, Water, Heritage and the Arts 2008c).

The project will remove up to 62.81 ha of vegetation comprising PCT 3420 and PCT 3428 that represents potential habitat for Sandstone Rough-barked Apple, subject to reductions in the detailed design stage. Vegetation to be removed is currently subject to some edge effects and disturbance from previous clearing for an existing easement, and exists in a contiguous manner with similar and higher quality vegetation within the project area and in areas immediately adjacent to the project area that are >9000 ha. The removal of up to 62.81 ha would constitute a reduction of approximately 16% of the available habitat within the project area, however this area will be further reduced during the detailed design stage, and less and 1 % available within the surrounding locality.

Despite there being no known local populations within a 10-kilometre radius of the project area, and no important population for this species in the area, given the amount of habitat to be removed in relation to contiguous vegetation to be retained both within the project area and in the immediate vicinity, it is considered unlikely that there will be a long-term decrease in a population of Sandstone Rough-barked Apple.

Fragment an existing important population into two or more populations.

No known populations of Sandstone Rough-barked Apple occur within the locality, and no important populations have been declared for the species. As the species is broadly associated with PCT 3420 and 3428, patches of these communities within the northern portion of the project area may provide broad dispersal habitat for the species. Broadly, the project area is currently subject to a moderate level of fragmentation from previous land clearing for



agricultural purposes and historical grazing practices. However, patches of PCT 3420 and PCT 3428 to be removed occur in a contiguous manner with larger patches of similar and higher quality vegetation within and adjacent to the project area, which will be retained.

Currently, the project will impact up to 62.81 ha of native vegetation for the installation of a transmission line and associated solar infrastructure, however this area will be further reduced once an option is selected for the transmission line. While impacts are currently uncertain, these works are unlikely to result in any new barrier to the movement of genetic material for the local occurrence of species, or fragment an existing population into two or more populations.

Adversely affect habitat critical to the survival of a species.

Critical habitat has not yet been declared for Sandstone Rough-barked Apple (Department of the Environment, Water, Heritage and the Arts 2008c). Up to 62.81 ha of PCT 3420 and PCT 3428 in good and moderate condition to be impacted likely constitutes potential critical habitat that is likely to provide important resources for recovery of the species. However, this area will be further reduced, and habitat to be removed is currently subject to some edge effects within the far western section of the project area, as well as scattered trees, from surrounding agricultural land uses, existing easements and transmission lines. In addition, the habitat to be removed is contiguous to larger areas of similar and better quality habitat.

While impacts are yet to be finalised, considering these factors, it is unlikely that the removal of up to 62.81 ha of PCT 3420 and PCT 3428 will adversely affect habitat critical to the survival of the species.

Disrupt the breeding cycle of an important population.

No important populations have been declared for the species, and therefore the closest population approximately 40 kilometres away is not considered to constitute an important population.

Little information exists on the reproductive biology of the species, however the species is known to flower in December. Activities likely to threaten its reproductive cycle include clearing, timber harvesting, road construction and maintenance and altered fire regimes which inhibit regeneration.

The project will include vegetation removal for the proposed transmission line. However, given the availability of resources within the immediate locality, including 324.34 ha of available habitat to be avoided within the project area, and large tracts of intact vegetation that form a matrix of State Forests adjacent to the project area, the removal of up to 62.81 ha is not considered significant in the context of locally available habitat. Areas of habitat to be removed are currently subject to some edge effects, and mitigation measures to minimise further soil erosion or disturbance will be implemented for the duration of works. While impacts are yet to be finalised, it is unlikely disturbance resulting from the project to potential habitat for the local occurrence for the species will disrupt the breeding cycle of the local population.

Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

Up to 62.81ha of potential habitat comprising PCT 3420 and PCT 3428 for this species will be removed as a result of the project, subject to further reduction during the detailed design stage.

The habitat to be removed consists of good, moderate, low and scattered tree conditional states, with some areas currently subject to a low-moderate level of disturbance and modification from edge effects, previous clearing and weed disturbance within the understorey surrounding the existing easement and in the western most portion of the project area adjacent to existing transmission lines. In addition, vegetation to be impacted occurs in a contiguous nature with larger patches of similar and higher quality habitat both within the project area, and directly adjacent to the north, east and west, that will continue to support the movement of genetic material and dispersal for the species. While impacts are



yet to be finalised, it is considered unlikely that the project will modify, destroy, isolate or decrease the availability or quality of habitat to the extent that the local population or species is likely to decline. In addition, mitigation measures outlined within the report will ensure further weed invasion is minimised.

Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat.

The project will not increase invasive fauna species. Invasive weeds are not known to directly impact Sandstone Roughbarked Apple, however they do have potential to reduce quality of habitat in the adjoining bushland and therefore increase potential to harm the population of Sandstone Rough-barked Apple through habitat modification. The risk of introduction of weed species will be mitigated by the implementation of good soil transportation and hygiene practices. The project is therefore unlikely to exacerbate the current level of invasive species threats operating within the project areas, or introduce new invasive species to the area.

Introduce disease that may cause the species to decline.

The project is unlikely to introduce a disease that causes the Sandstone Rough-barked Apple to decline. Appropriate vehicle hygiene methods should be implemented to reduce the potential spread of pathogens and disease into, or out from the project area as a result of the project.

Interfere substantially with the recovery of the species.

A recovery plan has been prepared for Sandstone Rough-barked Apple (Department of Environment, Climate Change and Water 2010). The plan lists objectives to aid in the recovery of several species within the Northern Rivers Region. Those objectives that relate to the project include:

- Protect species and their habitats from the effects of clearing and fragmentation.
- To protect vegetation communities, ecosystems and habitats from inappropriate fire regimes.
- Protect the Region from the impact of weeds.
- Protect the Region from the impact of pests.
- Protect the Region from the impact of disease and pathogens.

The project will result in the removal of up to 62.81 ha of PCT 3420 and PCT 3428, representing potential habitat for Sandstone Rough-barked Apple, subject to further reduction. While this will result in some localised habitat loss for the species, it is not considered to adversely reduce or fragment the habitat available for an important population, the local population or the species as a whole, considering at least 324.34 ha will be retained within the project area, and a further area of >9000 ha of potential habitat occurs in the immediate vicinity. The project will not increase inappropriate fire regimes, and the risk of introduction and spread of weeds will be mitigated through hygiene measures implemented during the works, such as good wash-down and soil transportation methods, and it is therefore unlikely to interfere substantially with the listed recovery actions for the species.

Conclusion.

Based on the assessment above, it is concluded that Sandstone Rough-barked Apple is unlikely to be significantly impacted by the project. This conclusion was made on the basis that the project:

• Will not lead to the long term decrease of an important population, reduce the areas of occupancy or fragment an existing important population.



- Will not disrupt the breeding cycle of an important population, the local population or species as a whole.
- Will not adversely modify the species habitat or introduce invasive species/diseases project mitigation measures are to be implemented to mitigate any potential weed incursion/disease spread.
- Will not interfere will the recovery of the species.

Slaty Red Gum Eucalyptus glaucina

Slaty Red Gum is listed as vulnerable under the EPBC Act. It is a small to medium-sized woodland tree, often to 18 m and sometimes to 30 m high The bark sheds over the whole trunk in large plates or flakes to leave a smooth or granular, mottled surface of white or various shades of grey. Slaty Red Gum was originally known from the Rappville district, south of Casino, and in a number of localities in the Taree, Stroud, Dungog and Paterson districts, NSW. Slaty Red Gum grows in a range of situations, from shallow soils or stony hillsides, but not on poor sandstones, to grassy woodland on deep, moderately fertile and well-watered soil, to gentle slopes near drainage lines in alluvial and clayey soils (DEWHA 2008).

The main threats to Slaty Red gum include clearing and fragmentation of habitat for agriculture and development, timber harvesting activities, and lack of regeneration through grazing pressure.

No individuals of Slaty Red Gum have been recorded within the project area; however targeted surveys are yet to be undertaken in Spring 2023. A large population, approximately 238 records of Slaty Red Gum occur within 10 kilometres of the project area, with the closest record recorded approximately 74 m from the project area, and the most recent record being from 2022. Habitat for the species is represented by PCT 3420 and PCT 4046. Up to 45.04 ha of these PCT's will be removed as a result of the proposed works, however this area includes two potential options for the transmission line. As only one option will be selected, this area will be further reduced during the detailed design stage, therefore impacts are currently uncertain. Therefore, an assessment against the Significant Impact Criteria detailed in the *Matters of National Environmental Significance: Significant impact guidelines version 1.1* (Commonwealth of Australia 2013) has been undertaken below.

Table 8 SIC assessment for Slaty Red Gum

SIC assessment for Slaty vulnerable species

Lead to the long-term decrease in the size of an important population of a species.

No important populations have been declared for Slaty Red Gum within the approved conservation listing (DEWHA 2008). However, the local population is relatively large, consisting of approximately 200 individuals, and is therefore considered to be important in the movement of genetic material and dispersal for the species within the locality. It is highly likely this species will be present in the project area.

More than 200 records of Slaty Red Gum occur within 100 m of the project area, with the majority of records condensed to the north of the project area in bushland comprising land designated for forestry. The species was not recorded during the field investigation to date, however targeted surveys are yet to be conducted.

Within the project area, potential habitat is present in the form of 331.72 ha of PCT 3420 and 99.87 ha of PCT 4046



(431.59 ha total) of PCT 4046. The project will result in the removal of up to 45.04 ha of these communities for the proposed transmission line and associated solar infrastructure, however this area will be further reduced. While vegetation to be impacted occurs in a contiguous manner with similar and higher quality habitat in adjoining areas within and immediately north and north-west of the project area, this species has a very high likelihood of occurrence within the project area, given the proximity of records, availability of suitable habitat and similar resemblance to other species present within the site. The removal of up to 45.04 ha of potential habitat would result in a reduction of approximately 10.44% of available habitat for the species within the project area. Given the proximity of known records, paired with the reduction in habitat, if the species is found to occur on the site, it is possible the project could lead to the long-term decrease in the size of an important population of the species.

Reduce the area of occupancy of an important population.

The local population of Slaty Red Gum is not considered to comprise an important population, however a large number of records occur to the north of the site that are likely to be important in maintaining genetic diversity and dispersal for the species. The project will remove up to 45.04 ha of vegetation comprising PCT 3420 and PCT 4046 that represents potential habitat for Slaty Red Gum, which will be further reduced.

Vegetation to be removed is currently subject to a low-moderate level of edge effects and disturbance from previous clearing for existing easements and transmission lines, however, overall exists in a moderate – good condition. Vegetation to be removed also exists in a contiguous manner with similar and higher quality vegetation within the project area and in areas immediately adjacent to the project area that are >9000 ha. An area of approximately 386.55 ha will be retained for the species within the project area, however given the proximity of records and reduction of up to 10.44% of the available habitat, if the species is found during targeted surveys, this is considered to comprise a significant area and is considered possible to reduce the area of occupancy for the local population.

Fragment an existing important population into two or more populations.

A large number of records of Slaty Red Gum exist to the north of the project area, however no important populations have been declared for the species. As the species is broadly associated with PCT 3420 and 4046, patches of this community within the northern portion of the project area may provide broad dispersal habitat for the species. Broadly, the project area is currently subject to a low - moderate level of fragmentation from previous land clearing for existing easements, and historical grazing practices. Patches of PCT 3420 to be removed occur in a contiguous manner with larger patches of similar and higher quality vegetation within and adjacent to the project area, which will be retained, and will remain connected to the local population of Slaty Red Gum to the north. However, given up to 45.04 ha will be cleared from the west to the east of the site, if the species is located during targeted surveys, this may result in the fragmentation of the unknown population and known population north of the project area into two separate populations, and potentially reduce the movement of genetic material through the creation a large cleared area (approximately 190 m in width) within intact vegetation.

Adversely affect habitat critical to the survival of a species.

Critical habitat has not yet been declared for Slaty Red Gum (DEWHA 2008). Up to 45.04 ha of PCT 3420 and PCT 4046 in good and moderate condition will be impacted (to be further reduced) likely constitutes potential high-quality habitat that is likely to provide important resources for recovery of the species. While some of the habitat to be removed is subject to a low level of edge effects within the far western section of the project area, and is contiguous to larger areas of similar and better quality habitat, which will remain connected to the local population of Slaty Red Gum, a reduction of up to 10.44% of the available habitat is likely to adversely affect habitat critically to the survival of the species if the species is located during targeted surveys.



Disrupt the breeding cycle of an important population.

The local population of Slaty Red Gum is not considered to comprise an important population, however, is considered important in the local context of dispersal and movement of genetic material.

Little information exists on the reproductive biology of the species, however it is known to flower between August and December and is known to hybridise with other Red Gum species, which poses a threat to the long term viability of the species (DPE 2019).

The project will include vegetation removal for the proposed transmission line (up to 45.04 ha). While there are similar resources available within the locality, if the species is located during targeted surveys, a reduction of up to 10.44% of habitat within the project area including disturbance to potential habitat for the local population of the species may potentially disrupt the breeding cycle of the local population. This could occur through the creation of a large area of cleared land for the transmission line (approximately 190 metres wide), resulting in less movement of genetic material.

Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

Up to 45.04 ha of potential habitat comprising PCT 3420 and 4046 for this species will be removed as a result of the project, which will be further reduced during the detailed design.

The habitat to be removed is currently subject to a low-moderate level of disturbance and modification from edge effects and weed disturbance within the understorey, surrounding the existing easement and in the western most portion of the project area. Vegetation to be impacted occurs in a contiguous nature with a larger patch of similar and higher quality habitat both within the project area. However, the creation of a large, cleared area approximately 190 wide, including the removal of up to 10.44% of available habitat for the species within the project area. Given these factors, if Slaty Red Gum is detected during targeted surveys, it is considered possible that the project will modify, destroy, isolate or decrease the availability or quality of habitat to the extent that the local population or species is likely to decline.

Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat.

The project will not increase invasive fauna species. Invasive weeds are not known to directly impact Slaty Red Gum, however they do have potential to reduce quality of habitat in the adjoining bushland and therefore increase potential to harm the population of Slaty Red Gum through habitat modification. The risk of introduction of weed species will be mitigated by the implementation of good soil transportation and hygiene practices. The project is therefore unlikely to exacerbate the current level of invasive species threats operating within the project areas, or introduce new invasive species to the area.

Introduce disease that may cause the species to decline.

The project is unlikely to introduce a disease that causes the Slaty Red Gum to decline. Appropriate vehicle hygiene methods should be implemented to reduce the potential spread of pathogens and disease into, or out from the project area as a result of the project.

Interfere substantially with the recovery of the species.

There is no adopted/made recovery plan for Slaty Red Gum (DEWHA 2008). However, the approved conservation advice



for the species lists the following regional recovery actions, including: <u>Habitat Loss, Disturbance and Modification</u>

- Monitor known populations to identify key threats.
- Monitor the progress of recovery, including the effectiveness of management actions and the need to adapt them if necessary.
- Identify populations of high conservation priority.
- Control the removal of Slaty Red Gum for firewood or fencing material (DECC, 2005).
- Ensure agriculture and timber harvesting activities (or other infrastructure or development activities involving substrate or vegetation disturbance) in areas where Slaty Red Gum occurs do not adversely impact on known populations.
- Investigate formal conservation arrangements such as the use of covenants, conservation agreements or inclusion in reserve tenure.

Trampling, Browsing or Grazing

- Develop and implement a stock management plan for roadside verges and travelling stock routes.
- Modify grazing in known stands of Slaty Red Gum to enhance regeneration. Fencing may be required (DECC, 2005).

<u>Fire</u>

- Develop and implement a suitable fire management strategy for Slaty Red Gum that includes avoiding frequent fires that may suppress regeneration (DECC, 2005).
- Identify appropriate intensity and interval of fire to promote vegetation regeneration.
- Provide maps of known occurrences to local and state rural fire services and seek inclusion of mitigative measures in bush fire risk management plans, risk register and/or operation maps.

Conservation Information

• Raise awareness of Slaty Red Gum within the local community, especially among landholders.

Enable Recovery of Additional Sites and/or Populations

- Undertake appropriate seed collection and storage.
- Investigate options for linking, enhancing or establishing additional populations.
- Implement national translocation protocols (Vallee

The project is not likely to increase trampling and grazing pressures from livestock, or inappropriate fire regimes. However, the project will result in the removal of up to 45.04 ha of PCT 3420 and 4046, representing potential habitat for Slaty Red Gum. This equates to a 10.44% loss of available habitat for the species within the project area, and if the species is found during targeted surveys, would be considered likely to adversely reduce or fragment the habitat available for the local population. Therefore, the current project impact area and associated works are considered likely to interfere substantially with the listed recovery actions for the species.

Conclusion.

Based on the assessment above, it is concluded that Slaty Red Gum is likely to be significantly impacted by the project. This conclusion was made on the basis that the project:

- Will potentially to the long term decrease of an important population, reduce the areas of occupancy or fragment an existing important population.
- Will potentially disrupt the breeding cycle of an important population, the local population or species as a whole.
- Will potentially adversely modify the species habitat or introduce invasive species/diseases project mitigation measures are to be implemented to mitigate any potential weed incursion/disease spread.


• Will likely interfere will the recovery of the species.

It is therefore concluded that the project is may to lead to a significant impact on the Slaty Red Gum. As such, referral to the Federal Minister for the Department of Climate Change, Energy, the Environment and Water is required and controlled action considered a likely outcome.

Square-fruited Ironbark Eucalyptus tetrapleura

Square-fruited Ironbark is listed as Vulnerable under the EPBC Act. It is a medium tree growing to 30 m, usually with a straight trunk. The bark is very thick and furrowed, and moderately hard or somewhat flaky. The Square-fruited Ironbark is endemic to areas of coastal lowlands and coastal foothills in northern NSW, from near Glenreagh in the south to Casino in the north. Distribution is patchy but occurs over an area measuring approximately 100 km in length and 40 km in width. The Square-fruited Ironbark occurs in both dry and moist eucalypt forests, on soils of low to moderate fertility, but often with heavy clay substrate and poor drainage.

The main identified threats to Square-fruited Ironbark include loss of habitat through clearing for agriculture, timber harvesting activities, road construction and maintenance; grazing of young plants by domestic stock; and too-frequent fires that inhibit regeneration. The Square-fruited Ironbark is also under threat from Lantana (Lantana camara).

No individuals of Square-fruited Ironbark have been recorded within the project area, however targeted surveys are yet to be undertaken in Spring 2023. No records of Square-fruited Ironbark occur within 10 kilometres of the project area, with the closest record occurring approximately 12 kilometres to the south. Habitat for the species is represented by PCT 3420 and 3428. Up to 62.81 ha of these PCT's will be removed as a result of the proposed works, however this area includes two potential options for the transmission line. As only one option will be selected, this area will be further reduced during the detailed design stage, therefore impacts are currently uncertain. Therefore, an assessment against the Significant Impact Criteria detailed in the *Matters of National Environmental Significance: Significant impact guidelines version 1.1* (Commonwealth of Australia 2013) has been undertaken below.

Table 9 SIC assessment for Square-fruited Ironbark

SIC assessment for vulnerable species

Lead to the long-term decrease in the size of an important population of a species.

No important populations have been declared for Square-fruited Ironbark within the approved conservation listing (Department of the Environment, Water, Heritage and the Arts 2008c).

No populations occur the project area or locality, with targeted surveys yet to be undertaken. Within the project area, potential habitat is present in the form of 387.15 ha of PCT 3420 and PCT 3428. The project will result in the removal of up to 62.81 ha of these PCT's for the transmission line and associated solar infrastructure, with further reductions to the impact area during the detailed design stage planned.

Vegetation to be impacted occurs in a contiguous manner with similar and higher quality habitat in adjoining areas immediately north and north-west of the project area, which will continue to support the movement of genetic material and dispersal. In addition, approximately 324.34 ha of habitat will be retained through avoidance within the project area. As such, impacts associated with the project are not considerable in the context of available habitat within the locality and



the absence of local records of the species. While impacts are yet to be finalised, it is considered unlikely that there will be a long-term decrease in the size of the local population of Square-fruited Ironbark.

Reduce the area of occupancy of an important population.

No local populations of Square-fruited Ironbark are known within a 10 kilometre radius of the project area. The closest record of the species occurs approximately 12 kilometres to the south of the project area, within vegetation comprising Whiporie State Forest. A small number of records occur at the site, and no important populations for the species have been declared within the approved conservation advice (Department of the Environment, Water, Heritage and the Arts 2008c).

The project will remove up to 62.81 ha of vegetation comprising PCT 3420 and PCT 3428 that represents potential habitat for Square-fruited Ironbark, subject to further reductions. Vegetation to be removed is currently subject to some edge effects and disturbance from previous clearing for an existing easement and exists in a contiguous manner with similar and higher quality vegetation within the project area and in areas immediately adjacent to the project area that are >9000 ha.

Despite there being no known local populations within a 10-kilometre radius of the project area, and no important population for this species in the area, given the amount of habitat to be removed in relation to contiguous vegetation to be retained both within the project area and in the immediate vicinity, it is considered unlikely that there will be a long-term decrease in a population of Square-fruited Ironbark.

Fragment an existing important population into two or more populations.

No known populations of Square-fruited Ironbark occur within the locality, and no important populations have been declared for the species. As the species is broadly associated with PCT 3420 and 3428, patches of these communities within the project area may provide broad dispersal habitat for the species.

Broadly, the project area is currently subject to a moderate level of fragmentation from previous land clearing for agricultural purposes and historical grazing practices. However, patches of PCT 3420 and PCT 3428 to be removed occur in a contiguous manner with larger patches of similar and higher quality vegetation within and adjacent to the project area, which will be retained.

The project will impact upon up to 62.81 ha of native vegetation for the installation of a transmission line and associated solar infrastructure, however this area will be further reduced during the detailed design. While impacts are to be finalised, the creation of this transmission line is not expected to result in any new barrier to the movement of genetic material for the local occurrence of species, or fragment an existing population into two or more populations.

Adversely affect habitat critical to the survival of a species.

Critical habitat has not yet been declared for Square-fruited Ironbark (Department of the Environment, Water, Heritage and the Arts 2008c). Up to 62.81 ha of PCT 3420 and PCT 3428 in good and moderate condition to be impacted likely constitutes potential high-quality habitat that is likely to provide important resources for recovery of the species. The remainder of habitat to be removed occurs in a contiguous manner with a large area of vegetation which will be retained within the project area, as well as large tracts of vegetation immediately adjacent to the north and west of the project area (>9000 ha). In addition, the total area of 62.81 ha will be reduced further during selection of the transmission line option. While final impacts are uncertain, considering no known populations of the species occur within a 10kilometre radius of the project area, and the availability of resources within the immediate locality, the removal of up to 62.81 ha of potential habitat is not considered likely to adversely affect habitat critical to the survival of the species.



Disrupt the breeding cycle of an important population.

No important populations are known to occur within the locality for the species. Little information exists on the reproductive biology of the species, however activities likely to threaten its reproductive cycle include clearing, timber harvesting, road construction and maintenance and altered fire regimes which inhibit regeneration. The project will result in the removal of up to 62.81 ha of PCT 3420 and 3428 representing potential habitat for Square-fruited Ironbark, subject to decreases in impact area during the detailed design, however the project is not expected to increase timber harvesting, or altered fire regimes. Further, given there is a large proportion of native vegetation within the project area that will be retained under the project (approximately 84 %), any unknown populations of Square-fruited Ironbark within the broader project area may continue to persist and genetic material will continue to be dispersed. Therefore, the project is unlikely to disrupt the breeding cycle of the 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 species was not recorded in the project area, and is not known to occur within a 10-kilometre radius, however targeted surveys will be undertaken in Spring to detect any unknown populations of the species. The project will remove up to 62.17 ha of potential habitat for the species, subject to further decrease, which constitutes approximately 16 % of potential habitat for Square-fruited Ironbark within the project area, however, constitutes a far smaller area (less than 1%) in the context of available habitat within the broader locality (>9000 ha within 10 km of the project area). While impacts are yet to be finalised, and are therefore uncertain, this local scale loss of habitat within the project area is not considered to cause the species to decline considering there is an abundance of similar higher quality patches of habitat available in the region that comprise a local string of reserves.

Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat.

Square-fruited Ironbark is known to be threatened from invasion by priority weed species Lantana *Lantana camara* (Department of the Environment, Water, Heritage and the Arts 2008c).

The project is not likely to increase invasive fauna species. The project will include vegetation clearing and soil disturbance which has the potential increase the spread or introduction of weed species such as Lantana which negatively impact the species through competition and habitat modification. Some level of invasion by Lantana amongst other weed species currently exists within the project area. The risk of weed introduction and spread will be mitigated by the implementation of good soil transportation and hygiene practices throughout the works. The project is therefore unlikely to exacerbate the current level of invasive species threats operating within the project areas, or introduce new invasive species to the area.

Introduce disease that may cause the species to decline.

The project is unlikely to introduce a disease that causes the Square-fruited Ironbark to decline. Appropriate vehicle hygiene methods should be implemented to reduce the potential spread of pathogens and disease into, or out from the project area as a result of the project.

Interfere substantially with the recovery of the species.

A recovery plan has been prepared for Square-fruited Ironbark (Department of Environment, Climate Change and Water



2010). The plan lists objectives to aid in the recovery of several species within the Northern Rivers Region. Those objectives that relate to the project include:

- Protect species and their habitats from the effects of clearing and fragmentation.
- To protect vegetation communities, ecosystems and habitats from inappropriate fire regimes.
- Protect the Region from the impact of weeds.
- Protect the Region from the impact of pests.
- Protect the Region from the impact of disease and pathogens.

The project will result in the removal of up to 62.81 ha of PCT 3420 and PCT 3428, representing potential habitat for Square-fruited Ironbark. While this will result in some localised habitat loss for the species, it is not considered to adversely reduce or fragment the habitat available for an important population, the local population or the species as a whole. Refinement of the impact area will result in further reductions to the amount of vegetation to be cleared during the detailed design stage. The project will not increase inappropriate fire regimes, and the risk of introduction and spread of weeds will be mitigated through hygiene measures implemented during the works, such as good wash-down and soil transportation methods, and it is therefore unlikely to interfere substantially with the listed recovery actions for the species.

Conclusion.

Based on the assessment above, it is concluded that Square-fruited Ironbark is unlikely to be significantly impacted by the project. This conclusion was made on the basis that the project:

- Will not lead to the long term decrease of an important population, reduce the areas of occupancy or fragment an existing important population.
- Will not disrupt the breeding cycle of an important population, the local population or species as a whole.
- Will not adversely modify the species habitat or introduce invasive species/diseases project mitigation measures are to be implemented to mitigate any potential weed incursion/disease spread.
- Will not interfere will the recovery of the species.

Australasian Bittern Botaurus poiciloptilus

The Australasian Bittern is listed as Endangered under the EPBC Act. It is a large, stocky, thick-necked, heronlike bird and has a prominent black-brown stripe running down the side of the neck, the eyebrow is pale, and the chin and upper throat are white. In Australia, the Australasian Bittern occurs from south-east Queensland to south-east South Australia as far as the Adelaide Region, southern Eyre Peninsula, Tasmania and in the southwest of Western Australia (Threatened Species Scientific Committee 2019).

The Australasian Bittern has primarily been impacted by the loss of wetland habitat through the diversion of water away from wetlands; drainage of swamps; and clearing for urban and agricultural development. Habitat degradation due to factors such as reduced water quality, invasion by weeds, impacts from grazing animals and reduced water flows due to a changing climate are also impacting on Australasian Bittern survival and breeding success. Predation by introduced species may also be limiting survival but more research is required to determine the relative importance of this threat.

No records of Australian Bittern have been found within the project area, however no targeted surveys have been undertaken. One record of Australasian Bittern occurs within 10 kilometres of the project area, with the



closest record recorded approximately 150 metres away from 2018. There is potential for the project area to be used occasionally by this species for foraging, as well as breeding, given the presence of associated PCTs (PCT 4046 and 4001). Up to 0.35 ha of PCT 4046 will be removed as a result of the proposed works, however this area includes two potential options for the transmission line. As only one option will be selected, this area will be further reduced during the detailed design stage, therefore impacts are currently uncertain. An assessment against the Significant Impact Criteria detailed in the *Matters of National Environmental Significance: Significant impact guidelines version 1.1* (Commonwealth of Australia 2013) has been undertaken below.

Table 10 SIC assessment for Australasian Bittern

SIC assessment for Endangered species

Lead to the long-term decrease in the size of a population.

No Australasian Bittern populations were detected or are known to occur within the project area, however no targeted surveys have been undertaken. One record occurs within close proximity to the project area approximately 150 metres to the north. Targeted surveys are yet to be undertaken. Approximately 0.35 ha of potential habitat will be removed as a result of the project, however this area is subject to further reduction during the detailed design.

The majority of vegetation to be removed for the species is impacted by edge effects such as a weed ingress through previous clearing and ongoing agricultural land use, and includes scattered trees which are unlikely to be utilised by the species, when considered in relation to good-quality wetland habitat which occurs adjacent to vegetation to be removed, and will be retained. It is therefore unlikely the project would lead to a long-term decrease in the size of the population of the mobile Australasian Bittern due to the removal of marginal habitat. Mitigation measures to protect trees to be retained adjacent to the impact area, which will ensure any further impacts to Australasian Bittern are also minimised.

Reduce the area of occupancy of the species.

The 0.35 ha of PCT 4046 to be removed occurs in a highly modified state, having been heavily cleared and subjected to edge effects including a moderate level of ingress from exotic species due to pasture improvement. In addition, the 0.35 ha to be removed will be further reduced during the detailed design, and is not considered to be a large reduction when considered in relation to the amount of better quality habitat to be retained within the project area (116.36 ha), which constitutes < 1% of both PCT 4046 and PCT 4001.

Based on the above, the project will not result in a further reduction of the area of occupancy for the Australasian Bittern, with consideration to the small area 0.35 ha to be impacted relative to the larger tracts of remnant native vegetation within the vicinity. The species will continue to be able to forage and breed in retained habitat within and outside of the project area and the project will not represent a barrier to the movement of individuals.

Fragment an existing population into two or more populations.

Overall, the vegetation to be removed by the project occurs in a modified state, including moderate, low and scattered trees conditional states. While the project will result in some level of fragmentation for the development of a transmission line and associated solar infrastructure, the majority of intact vegetation will be retained in the immediate vicinity, which and continue to provide better-quality habitat for Australasian Bittern. Therefore, impacts to 0.35 ha of PCT 4046, (subject to further reduction) is unlikely to result in habitat becoming significantly fragmented or isolate the population more than the existing barriers such as the existing paddocks, easements and transmission line already provide.

Adversely affect habitat critical to the survival of a species.



Given that the Australasian Bittern is presumed to have undergone a severe reduction in numbers, based on historic habitat loss and degradation across the core part of its range, all natural habitat (including constructed wetlands with suitable habitat) in which the Australasian Bittern is known or likely to occur should be considered critical to the survival of the species (Threatened Species Scientific Committee 2019).

The project will impact 0.35 ha of PCT 4046, which, given the above factors, is considered to form critical habitat for the species. This area will be further reduced during the detailed design stage.

In the context of available, and better-quality resources within the project area, including wetland areas which have been avoided through the projects design, the project will remove a relatively small area (up to 0.35 ha) of vegetation, which constitutes < 1% of the total area of habitat available within the project area. In addition, the vegetation to be removed is predominantly comprised of low and scattered tree conditional states, which have been subject to modification through clearing and ingress by exotic species. It is likely these areas would provide sub-optimal habitat for Australasian Bittern only. Vegetation comprising PCT 4001 occurring across vegetated wetland areas in the far south-eastern section of the project area is likely to constitute preferred habitat for the species, and these areas have been avoided and will be retained. Considering these factors, it is unlikely the project will adversely affect habitat critical to the survival of the Australasian Bittern.

Disrupt the breeding cycle of a population.

The Australasian Bittern breeds from October to February in solitary pairs. However, sometimes several nests may be placed in close proximity to each other (Marchant & Higgins 1990). The species nests adjacent to relatively deep, densely vegetated freshwater swamps and pools, building its nests under dense cover over shallow water (Marchant & Higgins 1990). The species prefers to nest in vegetation that is up to 2.5 m tall and the nests are placed about 30 cm above the water level (Marchant & Higgins 1990). The nest is a shallow structure of dry or green reeds, within a clump of reeds in water or a swamp and is built on a platform of bent-over reeds.

The removal of 0.35 ha of PCT 4046 for the project is considered small-scale in relation to high quality wetland habitat occurring within the south-east of the project area and contiguously further east. Given the species favours permanent and seasonal freshwater habitats, particularly those with dense tall vegetation dominated by sedges, rushes and reed, sand requires shallow water for which to forage and nest in, and areas of PCT 4046 do not contain these aquatic elements, it is likely the 0.35 ha of PCT 4046 to be removed constitutes marginal habitat only.

While the project would result in the removal of a small area of marginal habitat for this species within the locality, this is unlikely to reduce the local availability of resources such that the breeding cycle of a population would be disrupted. Similarly, it is unlikely that short-term disturbance from noise or lighting associated with the construction of the transmission line and solar farm will substantially interfere with the species' ability to reproduce successfully. Australasian Bittern populations will continue to breed in areas unaffected by vegetation loss and as a result the breeding cycle of an Australasian Bittern population will not be disrupted.

Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

Impacts to 0.35 ha of Australasian Bittern habitat including PCT 4046, will reduce the availability of marginal resources within the immediate locality. However, given the vegetation to be removed within this community is relatively disturbed, being subject to edge effects and weed ingress, and the availability of better-quality habitat represented by adjacent vegetated wetlands, the impact is not considered significant. The project area, including vegetation to be removed is currently subject to a low-moderate degree of weed ingress, including from priority weed species such as Lantana. Mitigation measures such as good soil transportation and wash-down protocols implemented throughout the works will reduce the risk of weed introduction and spread. The project is also not likely to isolate populations as the development



will not substantially impact on the movement corridor and thus is not likely to constitute a barrier to movement and unlikely to result in the decline of the species as a whole.

Result in invasive species that are harmful to an endangered species becoming established in the endangered species' habitat.

The project is unlikely to exacerbate the current level of invasive species populations utilising the area, such as Foxes and Cats which are known to have a negative impact on populations of Australasian Bittern. Invasive weeds species are not known to directly harm populations of Australasian Bittern, but do have potential to reduce quality of habitat in the adjoining bushland and therefore increase potential to harm the population of Hooded Robin. The risk of introduction of weed species will be mitigated by the implementation of good soil transportation practices throughout works.

Introduce disease that may cause the species to decline.

The project is unlikely to result in the introduction of a disease that could reduce the reproductive output of Australasian Bittern populations in or near the project isa.

Interfere substantially with the recovery of the species.

A national recovery plan currently exists for Australasian Bittern. Actions outlined within the plan to aid in the recovery of the species relating to the project include:

- Identify subpopulations of high conservation priority.
- Identify key locations that require habitat protection and improvement.
- Protect areas of 'habitat critical for survival' that are not currently managed for nature conservation.
- Develop and implement a range of voluntary incentives for protecting Australasian Bittern habitat on private land.
- Undertake wetland restoration activities, to create suitable habitats for Australasian Bittern.
- Monitor habitat subject to restoration and enhancement.

The project will result in the removal of up to 0.35 ha of PCT 4046, pending further reduction, representing marginal habitat for Australasian Bittern. While all potential habitat for the species is considered critical habitat, vegetation to be removed is small in relation to the available habitat and resources that have been actively avoided by the projects design and will be retained. In addition, the habitat to be removed has been modified through previous clearing and agricultural practices, and in its current state provides marginal habitat, when considered in relation to good quality wetland habitat that occurs within the southeast of the project area. The project is not anticipated to interfere with restoration activities or modify habitat that is currently subject to restoration/enhancement measures. Measures to mitigate the risk of weed ingress will be implemented throughout the works, including wash-down procedures and good soil transportation, to eliminate indirect impacts to retained vegetation. Therefore, it is unlikely the project will result in substantial interference with the recovery actions listed for the species.

Conclusion.

In consideration of the above significant impact criteria, the project is not likely to significantly impact Australasian Bittern within the project area or wider locality, as:

• The project will result in impacts to 0.35 ha of marginal foraging and dispersal habitat which is to be further reduced during the detailed design. Given the availability of similar and better-quality resources within the project area and broader locality, impacts to this vegetation is not considered to constitute a significant impact.



- The project is unlikely to result in the introduction of a disease that could reduce the reproductive output of the Hooded Robin populations in or near the project isa.
- The project does not substantially interfere with recovery actions listed for Australasian Bittern.

This assessment has determined that a referral to the minister is not recommended.

Glossy Black Cockatoo Calyptorhynchus lathami

Glossy Black-Cockatoo is listed as Vulnerable under the EPBC Act. It is a medium-sized cockatoo with a diagnostic combination of black-brown head, neck and underbody, red or orange-red panel in tail, and otherwise black plumage. Adult females also exhibit extensive patches of yellow feathering on head and neck.

The species is closely associated with *Allocasuarina* spp. and *Casuarina* spp. dominated woodlands, or open sclerophyll forest where the middle stratum is *Allocasuarina* spp. They feed almost exclusively on the seed of *Allocasuarina* spp. but occasionally also take wood-boring insect larvae. The species is dependent on hollow-bearing trees for breeding habitat as they nest in the hollows formed in the trunk, stump, spout or limbs of eucalypt trees, living or dead (Higgins 1999, DPE 2022a).

The main threat causing the decline of south-eastern glossy black cockatoo is a result of habitat loss, degradation, and fragmentation. Historic land clearance was the main cause of decline in the past, leading to the loss of both feeding and breeding habitats. Wildfires cause further habitat loss and degradation. The subspecies was severely affected by the 2019/2020 bushfires, with a significant portion of their known range burnt.

No individuals of Glossy Black Cockatoo were recorded within the project area during targeted surveys undertaken in Winter 2023. Approximately 65 records of Glossy Black Cockatoo occur within 10 kilometres of the project area, with the closest record recorded from within the project area, and the most recent record being from 2019 (DPE 2022b). There is potential for the project area to be used occasionally by this species for foraging, as well as breeding, given the presence of associated PCTs (3428 and 3420), as well as suitably sized hollows. No evidence has been found to date that breeding is occurring within the project area. Up to 62.81 ha of these PCT's will be removed as a result of the proposed works, however this area includes two potential options for the transmission line. As only one option will be selected, this area will be further reduced during the detailed design stage, therefore impacts are currently uncertain. An assessment against the Significant Impact Criteria detailed in the *Matters of National Environmental Significance: Significant impact guidelines version 1.1* (Commonwealth of Australia 2013) has been undertaken below.

Table 11 SIC assessment for Glossy Black Cockatoo

SIC assessment for vulnerable species

Lead to the long-term decrease in the size of an important population of a species.

No important populations have been identified for Glossy Black Cockatoo within the approved conservation advice for the species. No individuals were recorded during targeted surveys conducted in August 2023.

The project will result in the clearing of up to 62.81 ha of PCT 3420 and 3428 including sparse patches of *Casuarina* and *Allocasuarina* species and hollow-bearing trees with suitably sized hollows, representing potential foraging and breeding resources for the Glossy Black-Cockatoo. While the project will result in the removal of potential foraging habitat, the total area of habitat to be retained both within and adjacent to the project area is considerable (387.15 ha), and foraging habitat to be impacted is sparse and subject to edge effects from adjacent cleared areas. Given the expanse of native

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vegetation to be retained within the project area and within the broader landscape, up to 62.81 ha, subject to further reduction is not expected to significantly reduce habitat for the highly mobile species. Given the scale of the impact in the context of available habitat in the region, it is unlikely that the proposed impacts will lead to a long-term decrease in the size of the highly mobile Glossy Black-Cockatoo important populations.

Reduce the area of occupancy of an important population.

It is considered that vegetation within the project area constitutes known habitat to the foraging and breeding practices of the Glossy Black-Cockatoo. However, the overall context of the region and the extent of the vegetation connected to these areas, up to 62.81 ha expected to be cleared is unlikely to have a significant impact to the occupancy of an important population for this species. This area constitutes a reduction of approximately 15 %, however this will be further reduced during the detailed design.

Given the size and connectivity available in the greater landscape, and the highly mobile nature of the species, it is unlikely that an important population would be negatively impacted by the project. The species will continue to forage in retained habitat within the project area and immediate surrounding landscape. As such, it is unlikely that project will reduce the area of occupancy of the species' population.

Fragment an existing important population into two or more populations.

In the scope of the greater context of the surrounding land, the 62.81 ha of potential Glossy Black-Cockatoo habitat to be removed as a result of the proposed work represents less than 1 % of the native vegetation within 10 km of the locality (>9000 ha), a relatively small portion of land for the highly mobile species. While the works will result in some level of fragmentation within the immediate locality through the clearing of vegetation for the proposed transmission line, the works are not expected to reduce connectivity throughout the landscape which would fracture multiple populations and vegetated corridors containing key Glossy Black-Cockatoo habitat. In addition, the area to be impacted will be further reduced during the detailed design stage. As such the project will not fragment an existing population into two or more populations.

Adversely affect habitat critical to the survival of a species.

Given the project area contains both habitat necessary for foraging, roosting and breeding it is considered likely that the project area comprises habitat critical to the survival of the species. However, large areas of habitat will be retained within the project area (324.34) and surrounding locality (>9000 ha), which constitute approximately 85% and 99% of available habitat for the species respectively. Therefore, while the works will result in localised impacts to foraging, breeding and dispersal habitat, these are not expected to be significant in the context of available resources. Vegetation connectivity will be maintained throughout the landscape, and the impact area will be further reduced during detailed design stages. Although native vegetation will be removed, the project will not substantially impact upon any of the required Glossy Black-Cockatoo habitat, and thus will not adversely affect habitat critical for the species' survival.

Disrupt the breeding cycle of an important population.

Glossy black cockatoos are hollow nesters, utilising large hollows in both living and dead eucalypt trees (Higgins 1999). They have a clutch size of one, and females are entirely responsible for incubation and brooding. Males are present throughout the incubation and nestling period to feed the females. Fledglings becomes independent after around three months (Higgins 1999).

The project area contains both foraging and breeding habitat represented by PCT 3420 and 3428 and suitably sized hollow-bearing trees. While the project is likely to result in the loss of suitable hollow-bearing trees within the project area and therefore reduce the local availability of breeding resources, it is not anticipated that this will reduce the availability within the locality such that the breeding cycle of a population would be disrupted as a whole, given the amount of vegetation to be retained both within and adjacent to the project area that contains similar and better quality resources including suitably sized hollow-bearing trees. It is unlikely that indirect disturbance from noise or lighting associated with the construction for the project will substantially interfere with the species' ability to reproduce successfully. The highly



mobile Glossy Black-Cockatoo will continue to breed in areas unaffected by vegetation loss and as a result the breeding cycle of the population will not be disrupted.

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 includes the removal of up to 62.81 ha hectares of PCT 3420 and 3428, and suitable hollow-bearing trees, however this area will be further reduced during the detailed design stage. The removal of this vegetation will reduce the availability of foraging resources within the immediate area. However, patches surrounding the existing easement and transmission line, smaller patches within paddocks and scattered trees are currently subject to a low-moderate level of modification through previous clearing and weed ingress. The majority of good condition vegetation to be removed is highly connected to larger areas of similar/good quality habitat that will be retained. The project area will remain contiguous to vast areas of intact vegetation comprising multiple reserves and national parks. Given that the project will not constitute a new barrier to the movement of individuals of the highly mobile species, and the contiguous nature of the vegetation with a large tract of good quality bushland with hollow-bearing trees to the west and south of the project area, the removal of vegetation for the works is considered unlikely to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline. In addition, mitigation methods outlined within the recommendations section of this report will be implemented to ensure that indirect impacts including weed establishment are minimised for the duration of the works.

Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat.

The project will not increase invasive fauna species. Invasive weeds species are not known to directly harm populations of Glossy Black Cockatoo, but do have potential to reduce quality of habitat in the adjoining bushland and therefore increase potential to harm the population of Glossy Black Cockatoo. The risk of introduction of weed species will be mitigated by the implementation of good soil transportation practices. The project is therefore unlikely to exacerbate the current level of invasive species threats operating within the project areas, or introduce new invasive species to the area.

Introduce disease that may cause the species to decline.

The project is unlikely to introduce a disease that causes the Glossy Black-Cockatoo to decline.

Interfere substantially with the recovery of the species.

There is no National Recovery Plan for the Glossy Black-Cockatoo, however, Saving our Species (SoS) has developed a strategy to secure the species from extinction. Key management sites are being identified, located in various sites across NSW. The project area is located outside the priority management sites. The project will not impact on the recovery of the Glossy Black-Cockatoo or any areas mapped as priority management sites.

Habitat critical to survival for the species includes all foraging habitat during both the breeding and non-breeding season. Therefore, any habitat utilised by Glossy Black-Cockatoo is considered habitat critical to survival of the species and impacts to habitat may interfere with the recovery of the species. The area of habitat to be removed by the project is surrounded by contiguous areas of suitable foraging habitat, both within the northern section of the project area, and in adjacent areas to the north, east and west. Given these factors it is considered unlikely that the removal of 62.81 ha, which constitutes approximately 15% of the available of foraging habitat within the project area, will interfere with the recovery of the species.

Conclusion.

Considering the above factors, it is unlikely that the proposed work will impose a significant impact on Glossy Black-Cockatoo or their habitats as:

• The species was not recorded during targeted surveys.

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- The project will not introduce any diseases or invasive species of the Glossy Black-Cockatoo.
- The project will not interfere with the recovery of the species or areas established by SoS as a priority management site.
- The removal of native vegetation is considered to be a threat to the recovery and ongoing survival of the species however as the project will impact on only a very small area of potential habitat, surrounded by large swathes of habitat, it is not likely to significantly impact the species.

Based on the factors above, it is concluded that the project is unlikely to lead to a significant impact on the Glossy Black-Cockatoo.

Greater Glider Petauroides Volans

Greater Glider (Southern and Central) is listed as endangered under the EPBC Act. It is the largest gliding possum in Australia, with a head and body length of 35 – 46 centimetres, and a tail measuring 45 – 60 centimetres (Menkhorst & Knight 2011). The species is arboreal and nocturnal and is mostly restricted to eucalypt forests and woodlands. It is typically found in highest abundance in tall, montane and moist eucalypt forests with old trees and abundant hollows. The species favours forests with a diversity of eucalypt species, due to the seasonal variation in its preferred tree species. During the day Southern Greater Glider shelters in tree hollows, particularly those that are in large, old trees (McKay 2008).

The Greater Glider is found throughout eastern Australia, from the Windsor Tableland in north Queensland through to central Victoria. The broad extent of occurrence is unlikely to have changed substantially since European settlement, however the area of occupancy has decreased substantially, mostly due to land clearing (Threatened Species Scientific Committee 2016). This decline is most likely continuing due to further land clearing, fragmentation, fire and forestry activities. The species is considered to be particularly sensitive to forest clearance, logging and fire, and is slow to recover following major disturbance. The species is also considered to be sensitive to fragmentation due to a low dispersal ability, previously showing low persistence in small forest fragments (Threatened Species Scientific Committee 2016).

Greater Glider is threatened by a number of processes including loss and fragmentation of habitat through land-clearing, mortality on roads through habitat and movement areas, predation from cats, dogs and foxes. The Greater Glider is slow to respond to disturbance and therefore is at a higher susceptibility of population decline.

Southern Greater Glider populations throughout Australia are currently under increased pressure due to the 2019-2020 summer bushfires that occurred across the southern and eastern states of Australia. DCCEEW have provided several resources in response to these fires including analyses of listed species habitat within fire affected areas (DAWE 2020a), as well as provisional lists of fauna that require urgent management intervention (DAWE 2020b). Approximately 29 % of the known distribution for Southern Greater Glider has been identified as occurring within fire affected areas, and the species has been identified as requiring urgent management intervention. Given this context, any remaining areas of high quality Southern Greater Glider habitat are now of key importance in the conservation of the species. Southern Greater Glider is sensitive to wildfire, and it is slow to recover following major bushfire disturbances. (Lunney 1987, Threatened Species Scientific Committee 2016). Home ranges for the species are typically small, ranging from 1-4 hectares (Pope, Lindenmayer, & Cunningham 2004), and thus reoccupation of burnt sites in subsequent years is likely to be slow as a result of the species' limited dispersal capabilities (Threatened Species Scientific Committee 2016).



No individuals of Greater Glider were recorded within the project area during targeted surveys. However, 80 records of Greater Glider occur within 10 kilometres of the project area, with the closest record being approximately 88 metres from the project area, and the most recent record being from 2018 (DPE 2022b). There is potential for the project area to be used occasionally by this species for foraging, as well as breeding, given the presence of associated PCTs (PCT 3428, 3420, 4046 and 4001) and suitably sized hollows. Up to 63.17 ha of these PCT's will be removed as a result of the proposed works, however this area includes two potential options for the transmission line. As only one option will be selected, this area will be further reduced during the detailed design stage, therefore impacts are currently uncertain. An assessment against the Significant Impact Criteria detailed in the *Matters of National Environmental Significance: Significant impact guidelines version 1.1* (Commonwealth of Australia 2013) has been undertaken below.

Table 12 SIC assessment for Greater Glider

Significant impact criteria (Critically endangered and endangered species)

Lead to a long-term decrease in the size of a population

No Greater Glider populations were detected during targeted surveys or are known to occur within the project area, however, known records occur within close proximity to the project area approximately 88 metres to the east within Bungwalbin State Forest. It is therefore presumed that these records form part of the local population of greater glider.

The project will result in the removal of up to 63.17 hectares of native vegetation within the project area, including the removal of PCT 3420, 3428, and 4046 which are all associated with the species. However, this area will be further reduced during the detailed design stages. The vegetation within the project area includes flowering perennial species and suitable hollow-bearing trees, which represent potential foraging breeding habitat for Greater Glider. Whilst works will reduce the availability of potential foraging and breeding resources within the immediate locality, approximately 440.69 ha of habitat will be retained within the project area, much of which is contiguous with large areas of highly connected, good-quality vegetation in the adjacent areas surrounding the project area, which comprises >9000 ha within a 10-kilometre radius. It is therefore unlikely the project would lead to a long-term decrease in the size of an important population of Greater Glider. Further surveys to determine potential for species presence and mitigation measures to protect trees to be retained adjacent to the impact area, which will ensure any further impacts to Greater Glider are also minimised.

Reduce the area of occupancy of the species

The project occurs on pre-disturbed, cleared areas that are currently utilised for cattle grazing, with areas of intact vegetation primarily occurring within the northern section of the project area. The clearing of up to 63.17 ha of native vegetation will include patches of good and moderate condition vegetation, and scattered trees within these pre-disturbed areas.

The project will result in the removal of up to 63.17 ha of potential habitat for Greater Glider, which includes foraging and breeding resources represented by flowering Eucalypts and suitably sized hollows.

Whilst the removal of native vegetation within the impact area will result in localised reductions in species habitat, it is unlikely to result in a significant decrease in the area of occupancy over which the species ranges within the locality, constituting approximately a 14 % reduction within the project area. Furthermore, given the local population does not occur at the edge of the species range, with a high occurrence of the species across the locality as represented by records in the Bungwalbin National Park and State Forest, as well as Ellangowan and Carwong State forests, it is not considered that the local population meets the criteria of an important population. Given the quality and extent of the vegetation to be retained both within and contiguous to the project area, which includes foraging and breeding habitat represented by the same vegetation community, the 63.17 ha to be cleared is unlikely to reduce the area of occupancy of the species.



Fragment an existing population into two or more populations

The project area is located within a matrix of agricultural land that currently separates two strings of state forests and reserves, Bungwalbin National Park, State Conservation Area and State Forest to the east and Ellangowan, Braemar and Carwong State Forests to the west. This area also currently separates populations of Greater Glider which reside in the above reserves. The project area itself is currently subject to a moderate level of fragmentation and edge effects through clearing of native vegetation and existing agricultural practices. While the project will result in fragmentation of vegetation within the immediate locality for the proposed transmission line, the removal of 63.17 ha of vegetation will not create a barrier to the movement of these populations or further fragment vegetation within the project area to the extent that it will fragment an existing population into two or more populations. Vegetation within the project area to both the south and west of the project area, including protected land comprising Bungwalbin State Forest and National Park, and Carwong State forest. This vegetation exists in a contiguous manner to the vegetation to be removed and is considered to provide high quality habitat for Greater Glider.

The works to remove up to 63.17 ha are not expected to reduce connectivity at a landscape level, considering the high level of fragmentation that already exists and currently acts as a barrier to populations of Greater Glider, and as such, the project will not fragment an existing population into two or more populations.

Adversely affect habitat critical to the survival of a species

Habitat critical to the survival of Southern Greater Glider includes large, mature trees with hollows (for sheltering and breeding), and large remnant vegetation patches. Southern Greater Glider are highly sensitive to fragmentation and are generally unable to persist in small vegetation patches.

Using the factors listed to broadly define critical habitat within the *Conservation Advice for Petauroides volans (greater glider (southern and central))* (DCCEEW 2022a) it is likely critical habitat occurs within the project area as the vegetation consist of large contiguous areas of Eucalypt Forest, which contains hollow-bearing trees that may facilitate the dispersal of the species. It is noted that no Critical Habitat as defined under section 207A of the EPBC Act has been identified or included in the Register of Critical Habitat.

The current project proposes the removal of up to 63.17 ha hectares of Southern Greater Glider habitat, encompassing eucalypt woodland that contains potential foraging and breeding habitat for the species, represented by PCT 3420 and 3428, and suitable hollow-bearing trees, however this area will be further reduced. It is not considered likely that the removal of up to 63.17 ha of potential habitat for the species would adversely affect habitat critical to the survival of this species, given approximately 440.69 ha of vegetation including 417.63 ha of moderate and good quality vegetation will be retained within the project area, which contains similar and higher-quality vegetation. Additionally, this species has not been recorded using the vegetation within the project area to date. The project footprint avoids and will retain larger contiguous areas of higher quality, intact and large patch size vegetation with abundant hollows, which is important habitat for this species.

Disrupt the breeding cycle of a population

The Greater Glider shelters in hollows during the day, with a particular preference for large hollows. Females give birth to a single young from March to June, with individuals living up to 15 years (DCCEEW 2022a) and the species have relatively small home ranges (1-19 hectares ((DAWE 2016). Impacts likely to have an adverse effect on the life cycle of this species include loss and fragmentation of habitat, loss of hollow bearing trees, too frequent or high severity fires (DPE 2022b).



There are a number of records of the species approximately 88 metres south and south-east of the project area, however no Greater Glider populations were recorded during targeted surveys or are known to occur within the project area. The project is not expected to increase fire regimes. In addition, the removal of up to 63.17 ha of vegetation (to be further reduced) for the project is not considered to be significant in relation to the 440.69 ha of vegetation to be retained within the project area, and high quality bushland occurring in a contagious manner to the project area, providing similar/better quality foraging and breeding habitat including hollow-bearing trees.

Given this, it is unlikely the works will reduce the local availability of resources such that the breeding cycle of a population would be disrupted. Similarly, it is unlikely that short-term indirect disturbance from noise or lighting associated with the construction will substantially interfere with the species' ability to reproduce successfully. Greater Glider will be able to continue to breed in areas to be retained within the project area, and as a result the breeding cycle of a Greater Glider population will not be disrupted.

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

The current project proposes the removal of up to 63.17 ha of potential Greater Glider habitat, encompassing eucalypt woodland, and suitably sized hollow-bearing trees. Due to the large number of Greater Glider recorded in close proximity to the project area, this habitat appears to be highly suitable for the species. A portion of the vegetation to be removed consist of low condition and regenerating vegetation as well as scattered trees, which occur in a modified state due to previous fires and clearing activities which have resulted in the presence of a high cover of exotic pasture species within the understorey. Good condition PCT 3420 and 3428 to be removed is also subject to a low level of edge effects from the existing cleared easements and transmission line. However, majority of this vegetation will be retained within the project area and in the immediate vicinity.

Additionally, large tracts of intact vegetation occur directly adjacent to the impact area, and are likely to provide better quality habitat for the species. As Greater Glider require relatively small home ranges (1-19 hectares), it is considered that there is adequate habitat within the nearby reserves and within retained habitat within the impact area to support the local population of Greater Gliders, and that the project would not modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that it would cause the species to decline.

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

The project will not increase invasive fauna species. Invasive weeds species are not known to directly harm populations of Greater Glider, but do have potential to reduce quality of habitat in the adjoining bushland and therefore increase potential to harm the population of Greater Glider. The project area is currently subject to a low-moderate level of weed ingress, including by priority species such as Lantana. The risk of introduction and spread of weed species will be mitigated by:

- Implementation of appropriate weed control and weed disposal in accordance with Biosecurity protocols.
- Any soil or other materials imported to the site for use in restoration or rehabilitation would be certified free from weeds and pathogens or obtained from sources that demonstrate best practice management to minimise weed and pathogen risks.

The project is therefore unlikely to exacerbate the current level of invasive species threats operating within the project areas.



Introduce disease that may cause the species to decline

The project is unlikely to result in the introduction of a disease that could reduce the reproductive output of Greater Glider populations within or near the project area.

Interfere with the recovery of the species

There is no adopted or made recovery plan for this species. However, the *Conservation Advice for* Petauroides volans (*greater glider* (*southern and central*)) lists several actions to assist with the recovery of the species, including:

- In the aftermath of bushfires, protect any unburnt habitat.
- Protect and maintain sufficient areas of suitable habitat, including denning and foraging resources and habitat connectivity, to sustain viable subpopulations throughout the species' range.
- Undertake habitat restoration to improve micro-climate conditions in areas at high risk of extreme temperatures and drought.
- Protect and maintain sufficient areas of suitable habitat, including denning and foraging resources and habitat connectivity, to sustain viable subpopulations throughout the species' range.

While the proposed removal of 63.17 ha of Greater Glider habitat will not contribute to the recovery of the species, it is not considered likely to substantially interfere with the recovery of the species for the following reasons:

- Approximately 86% of the species potential habitat has been avoided and will be retained within the project area, subject to further increase during the detailed design stage as the impact area will be reduced.
- Large tracts of intact native vegetation including Carwong, Ellangowan and Bungwalbin State Forest and Bungwalbin State Conservation Area and National Park, occur directly adjacent to the impact area, and are likely contains higher quality and preferable habitat for the species, given records are condensed in these reserves. This habitat is considered adequate such that the loss of 63.17 ha of habitat within the impact area would not reduce the local population size or decrease the viability of the local population. These reserves alone comprise >9000 ha, and are surrounded by greater areas of contiguous intact bushland.
- As part of the project, preclearance assessments would be undertaken and clearing of hollow-bearing trees would be supervised by an ecologist, and any unknown populations or individuals of Greater Gliders utilising the habitat would be removed from the impact area would be captured and relocated. Due to the large areas of suitable habitat nearby (i.e. within the reserve system), it is likely that displaced individuals would be successfully relocated, assuring that the local population would not decrease in numbers as a result of the project.

Conclusion

Considering the above factors, it is unlikely that the proposed work will impose a significant impact on Greater Glider or their habitat as:

- The species was not recorded during targeted surveys undertaken to date.
- The project will not introduce any diseases or invasive species of the Greater Glider.
- The project will not result in the modification or fragmentation of habitat such that any new barrier to connectivity for the dispersal movements of the species will be created.
- The project will result in the removal of 63.17 ha of PCT 3420 and 3428, which will be further reduced during detailed design stages. Given the availability of similar resources to be retained within the project area and immediate locality, including areas contiguous to the project area, the removal of this vegetation is unlikely to constitute a significant impact.



• The project does not significantly interfere with any of the conservation actions for the species.

Based on the factors above, it is concluded that the project is unlikely to lead to a significant impact on the Greater Glider. As such, referral to the Federal Minister for the Department of Climate Change, Energy, the Environment and Water is not recommended.

Yellow-bellied Glider Petaurus australis australis (South-Eastern)

Yellow-bellied Glider (South-Eastern) subspecies is listed as Vulnerable under the EPBC Act. It is a mediumsized arboreal marsupial, and the second largest Australian glider. The body is a greyish-brown colour with a black stripe running down the back and extending to the tail. There are two subspecies, which are similar in appearance, though the yellow-bellied glider (Wet Tropics) is typically smaller than the yellow-bellied glider (south-eastern). This subspecies occurs in eucalypt-dominated woodlands and forests, including both wet and dry sclerophyll forests, and shows a preference for large patches of mature old growth forest that provide suitable trees for foraging and shelter, and also have a clear preference for forests with a high proportion of winter-flowering and smooth-barked eucalypts. During the day, the yellow-bellied glider shelters in hollows found in large, old trees, usually more than one metre in diameter, which are a critical habitat feature for the yellow-bellied glider as they use them for dens for sheltering and breeding. The species is active throughout the night and feeds on the sap of Eucalyptus species, insects, pollen and nectar. The yellow-bellied glider (south-eastern) is found from south-eastern Queensland to far south-eastern South Australia. In NSW, it predominantly occurs in forests along the eastern coast, from the NSW-Qld border to the NSW-Vic border. However, the distribution also extends inland to the western slopes of the Great Dividing Range in parts of NSW and Qld (DAWE 2022).

The yellow-bellied glider (south-eastern) is primarily threatened by climate change, altered fire regimes, clearing, fragmentation and timber harvesting.

No Yellow-bellied Gliders were recorded during the targeted surveys undertaken to date, however 75 records of Yellow-bellied glider occur within 10 kilometres of the project area, with the closest record approximately 400 metres away and the most recent record from 2019 (DPE 2022b). Vegetation to be impacted within the project area including PCT 3420, 3428 and 4046, including suitably sized hollow-bearing trees may provide potential foraging and breeding habitat for the species. Up to 63.17 ha of these PCT's will be removed as a result of the proposed works, however this area includes two potential options for the transmission line. As only one option will be selected, this area will be further reduced during the detailed design stage, therefore impacts are currently uncertain. Therefore, an assessment against the Significant Impact Criteria detailed in the *Matters of National Environmental Significance: Significant impact guidelines version 1.1* (Commonwealth of Australia 2013) has been undertaken below.

Table 13 SIC assessment for Yellow-bellied Glider

Significant impact criteria (Vulnerable species)

Lead to a long-term decrease in the size of an important population of a species.

Important populations of Yellow-bellied Glider (South East) include stronghold populations, ecologically or genetically distinct populations (e.g., those at the limits of the subspecies' range, outlying populations), research populations, and other populations where recovery actions are being implemented. Several populations are listed as important within the



approved conservation advice for the subspecies; however the list is not exhaustive and notes that all known populations should be considered important.

No Yellow-bellied Glider populations were detected during targeted surveys undertaken to date or are known to occur within the project area, however, a number of records of the species are concentrated approximately 400 metres to the east and west of the project area in protected vegetation comprising Bungwalbin National Park, State Conservation Area and State Forest to the east and Ellangowan, Braemar and Carwong State Forests.

The project will include the removal up to 63.17 hectares of native vegetation within the project area (to be further reduced), including the removal of PCT 3420, 3428, and 4046 which are associated with the species, in addition to the removal of suitable hollow-bearing trees for the species. The vegetation within the project area includes flowering perennial species and suitable hollow-bearing trees, which represent potential foraging breeding habitat for Yellow-bellied Glider. Whilst works will reduce the availability of potential foraging and breeding resources within the immediate locality, the amount of a large area of highly connected, high-quality vegetation will be retained within the northern section of the project area (approximately 400.97 ha), in addition to high-quality resources within the immediate locality (>9000 ha). It is therefore unlikely the project would lead to a long-term decrease in the size of an important population of Yellow-bellied Glider. Mitigation measures to protect trees to be retained adjacent to the impact area, and pre-clearance of hollow-bearing trees will also be undertaken to ensure any further impacts to Yellow-bellied Glider are also minimised.

Reduce the area of occupancy of an important population.

The subspecies is social and lives in family groups of two to six individuals (though usually three to four) of varying age and sex composition, throughout an exclusive home range of approximately 50–65 ha (DAWE 2022). Records of an existing important population are concentrated to the south-west of the project area in >9000 hectares of protected vegetation comprising a string of state forests, national parks and reserves, which exists in a contiguous manner without substantial breaks in connectivity to vegetation within the project area.

Given the quality and extent of vegetation to be retained both within and contiguous to the project area, which includes foraging and breeding habitat represented by flowering Eucalypt and other perennial species, and hollow-bearing trees, up to 63.17 ha expected to be cleared is unlikely to reduce the area of occupancy of an important population of the species both within the project area and broader Richmond Valley area.

Given the size and connectivity available in the broader landscape to the north, east, west and south of the project area, it is unlikely that the area of occupancy for the important population will be reduced. Foraging and breeding habitat will be retained both within and surrounding the project area immediately adjacent to the impact area.

Fragment an existing important population into two or more populations.

The project area is located within a matrix of agricultural land that currently separates two strings of state forests and reserves, Bungwalbin National Park, State Conservation Area and State Forest to the east and Ellangowan, Braemar and Carwong State Forests to the west. This area also currently separates populations of Yellow-bellied Glider which reside in the above reserves.

The vegetation within the impact area itself is also currently subject to edge effects from previous fragmentation through the existing easements, and ongoing agricultural practices. The project to clear up to 63.17 ha of vegetation for the development of a transmission line and solar photovoltaic units, including removal of potential foraging and breeding habitat will result in fragmentation within the immediate locality, but is unlikely to create a new barrier to the movement of the local important population or further fragment vegetation within the project area to the extent that it will fragment an existing important population into two or more populations. Vegetation within the project area will remain highly connected to similar and higher quality vegetation both within and adjacent to the project area to both to the north and west. This vegetation exists in a contiguous manner to the vegetation to be removed, and in the context of the



surrounding vegetation the (up to) 63.17 ha of potential foraging and breeding habitat to be removed as a result of the proposed work represents a small proportion of the native vegetation within 10km of the locality which comprises >9000 ha.

The works to remove up to 63.17 ha are therefore not expected to reduce connectivity throughout the landscape, and as such, the project will not fragment an existing important population into two or more populations.

Adversely affect habitat critical to the survival of a species.

Using the factors listed to broadly define critical habitat within the *Conservation Advice for Petaurus australis australis* (*Yellow-bellied glider (south-eastern)*) (DAWE 2022) it is likely critical habitat occurs within the project area as the vegetation consists of:

• Large contiguous areas of floristically diverse eucalypt forest, which are dominated by winter-flowering and smooth-barked eucalypts, including mature living hollow-bearing trees and sap trees (including winter flowering species Forest Red Gum *Eucalyptus tereticornis* and Spotted Gum *Corymbia maculata*).

It is noted that no Critical Habitat as defined under section 207A of the EPBC Act has been identified or included in the Register of Critical Habitat.

The project will remove up to 63.17 ha of PCT 3420, 3428 and 4046 which contain both Forest Red Gum and Spotted Gum. The impact area comprises good and moderate condition vegetation that is subject to a low level of edge effects from existing easements and transmission lines and previous burning, as well as scattered trees that is subject to a higher level of edge effects such as weed ingress from surrounding exotic grassland. Similar and higher quality vegetation including hollow-bearing trees will remain available for these species both within the project area and surrounding the project area within the reserve system, which is contiguous with vegetation within the project area. Considering these factors, it is unlikely the project will adversely affect habitat critical to the survival of the species.

Disrupt the breeding cycle of an important population.

The subspecies reproduces seasonally, with timing varying across its broad range (Woinarski, Burbidge, & Harrison 2014). Litter size is usually one, and individuals reach sexual maturity at around two years of age range (Woinarski, Burbidge, & Harrison 2014). Once sexual maturity is reached, individuals will pair up with each other, usually in a monogamous relationship. The subspecies' lifespan is a minimum of six years in the wild. Generation length is four to five years (Goldingay & Kavanagh 1991, Woinarski, Burbidge, & Harrison 2014). Actions likely to impact the breeding cycle of the species include altered fire regimes, clearing, fragmentation and timber harvesting (DAWE 2022).

There are a number of records of the species approximately 400 metres south-east of the project area, however no Yellow-bellied Glider populations were recorded during the targeted surveys or are known to occur within the project area. Scattered trees to be removed within the project area currently exist in a highly modified and fragmented state from previous clearing and weed ingress. Good condition PCT 3420 AND 3428 to be removed is highly connected to surrounding intact vegetation, providing similar/better quality foraging and breeding habitat.

The project is not likely to increase fire regimes or timber harvesting, however, will result in localised clearing and fragmentation through the removal of up to 63.17 ha of potential habitat including suitable hollow-bearing trees. However, while this will reduce the local availability of resources, it is not anticipated that this will reduce the availability within the broader project area or broader landscape such that the breeding cycle of a population would be disrupted. The species will continue to breed within >9000 ha of habitat within the adjacent reserve system, and if unknown populations of the species occasionally utilise the project area, they will remain able to do so in approximately 400.97 ha

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of retained vegetation. Similarly, it is unlikely that short-term disturbance from indirect impacts such as noise or lighting associated with the construction will substantially interfere with the species' ability to reproduce successfully. Yellowbellied Glider will be able to continue to breed in areas to be retained within the project area, and as a result the breeding cycle of a Yellow-bellied Glider important populations will not be disrupted.

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 includes the removal of up to 63.17 ha of PCT 3420 and 3428, including suitable hollow-bearing trees. The removal of this vegetation will reduce the availability of foraging and breeding resources within the immediate area. A portion of the vegetation to be removed consist of low condition and regenerating vegetation as well as scattered trees, which occur in a modified state due to previous fires and clearing activities which have resulted in the presence of a high cover of exotic pasture species within the understorey. Good condition PCT 3420 and 3428 to be removed is also subject to a low level of edge effects from the existing cleared easements and transmission line. However, majority of this vegetation occur directly adjacent to the impact area, and are likely to provide better quality habitat for the species. Given that the project will not constitute a new barrier to the movement of individuals of the subspecies, and the contiguous nature of the vegetation with a large tract of good quality bushland with hollow-bearing trees to the west and south of the project area, the removal of vegetation for the works is considered unlikely to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline. In addition, mitigation methods outlined within the recommendations section of this report will be implemented to ensure that indirect impacts including weed establishment are minimised for the duration of the works.

Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat.

The project will not increase invasive fauna species such as cats or foxes. Invasive weeds species are not known to directly harm populations of Yellow-bellied Glider, but do have potential to reduce quality of habitat in the adjoining bushland and therefore increase potential to harm the population of Yellow-bellied Glider. Dieback caused by *Phytophthora cinnamomi* may also be impacting the subspecies through habitat degradation (DAWE 2022). The risk of introduction of weed species will be mitigated by the implementation of good soil transportation practices. The project is therefore unlikely to exacerbate the current level of invasive species threats operating within the project areas, or introduce new invasive species to the area.

Introduce disease that may cause the species to decline.

The project is unlikely to result in the introduction of a disease that could reduce the reproductive output of Yellow-bellied Glider populations within or near the project area.

Interfere substantially with the recovery of the species.

There is no adopted or made recovery plan for this species. However, the *Conservation Advice for Petaurus australis australis (Yellow-bellied glider (south-eastern))* lists several conservation and recovery actions to assist with the recovery of the species, including:



- Ensure suitable habitat is maintained and protected from known threats (such as high severity bushfires) around important subpopulations, as well as in areas where subpopulations have already declined through loss of habitat. When protecting an area, retain sufficient suitable habitat for subpopulation viability.
- If required, implement control measures for introduced predators, including the European red fox and feral cat, in areas burnt by bushfires. The control of introduced herbivores (e.g., feral deer) may also aid habitat recovery.
- Avoid planned burns, clearing, timber harvesting or other disturbance in a 65 ha zone around habitat which has been burnt in the past 10 years.
- Restore connectivity in subpopulations fragmented by major roads, including the use of artificial structures such as rope bridges and glide poles.

While the project will include the removal of up to 63.17 ha of native vegetation providing potential foraging and breeding habitat for the subspecies, the area to be cleared is not considered to be significant in relation to the available similar and higher quality habitat (400.97 ha), and therefore a sufficient area of suitable habitat will be retained within the project area and broader locality (>9000 ha). Works are not expected to increase the presence of introduced predators or increase the likelihood of fire. The project is therefore not expected to interfere substantially with the recovery of the species.

Conclusion

Considering the above factors, it is unlikely that the proposed work will impose a significant impact on Yellow-bellied Glider (south east) or their habitat as:

- The species was not recorded during targeted surveys.
- The project will not introduce any diseases or invasive species of the Yellow-bellied Glider.
- The project will not result in the modification or fragmentation of habitat such that any new barrier to connectivity for the dispersal movements of the subspecies will be created.
- The project will result in the removal of 63.17 ha of PCT 3420, 3428 and 4046, which will be further reduced during the detailed design stage. Given the availability of similar resources within the project area and wider locality that are contiguous with the impact area, the removal of this vegetation is unlikely to constitute a significant impact to the subspecies.
- The project does not significantly interfere with any of the conservation actions for the species.

Based on the factors above, it is concluded that the project is unlikely to lead to a significant impact on the Yellow-bellied Glider (south east). As such, referral to the Federal Minister for the Department of Climate Change, Energy, the Environment and Water is not recommended.

Grey-headed Flying Fox Pteropus poliocephalus

Grey-headed Flying-fox *Pteropus poliocephalus* is listed as Vulnerable under the Commonwealth EPBC Act. The population trends with the distribution of plants with similar flowering and fruiting times which support regular annual cycles of migration and can be associated with flowering eucalyptus dependant on seasonality (Eby & Law 2008). Key threats to the Grey-headed Flying-fox include habitat fragmentation, degradation and loss, heat stress, conflict with humans and entanglement (DCCEEW 2021).

No individuals have been recorded within the project area, however targeted surveys are yet to be undertaken. Previous records of the Grey-headed flying fox exist in the surrounding locality (84 records within



10 kilometres of the project area), with the most recent collected in 2021 and one recorded within the project area (DPE 2022b). Given the species is known to occur within the project area, nearby resources, surrounding intact vegetation and Flying-fox camp at Woodburn, approximately 26 kilometres east of the project area, the species is at risk from potential impacts to foraging habitat, including the disturbance and degradation of foraging habitat from the project. No camp sites occur within the project area. Up to 63.17 ha of PCT's associated with the species (3428, 3420, 4046 and 4001) will be removed as a result of the proposed works, however this area includes two potential options for the transmission line. As only one option will be selected, this area will be further reduced during the detailed design stage, therefore impacts are currently uncertain. An assessment against the Significant Impact Criteria detailed in the *Matters of National Environmental Significance: Significant impact guidelines version 1.1* (Commonwealth of Australia 2013) has been undertaken below.

Table 14 SIC assessment for Grey-headed Flying Fox

SIC assessment for Vulnerable species

Lead to the long-term decrease in the size of an important population of a species.

Grey-headed Flying-fox is considered to be a single, mobile, national population ranging from Ingham in Queensland, to Adelaide in South Australia. They are usually found on the coastal lowlands and slopes of eastern Australia below altitudes of 200m. While the species is generally present intermittently and irregularly when assessed at a local scale, a small number of local areas do support a continuous presence while others are associated with regular, annual patterns of use (DCCEEW 2021). These are mapped as nationally important Grey-headed Flying-fox camps, the closest of these are located approximately 26 km to the east near Woodburn.

Locally recorded individuals are therefore considered to be part of the national population, which is important but not geographically restricted. The project will impact upon 63.17 ha of potential foraging resources for Grey-headed Flying-fox in the local context. However, when considered in relation to the amount of vegetation to be retained within the project area (440.69), and in the context of widely available resources for this mobile species in the 10km-locality (>9000 ha) it is unlikely that the project will lead to the long-term decrease in size of the highly mobile national Grey-headed Flying-fox population.

Reduce the area of occupancy of an important population.

Grey-headed Flying-fox is highly mobile and widespread ranging from Ingham in Queensland to Adelaide in South Australia, a length of approximately 3,000,000 km. The project will impact upon up to 63.17 ha of foraging habitat, which will be further reduced during detailed design. This habitat includes important winter and spring flowering species such as Forest Red Gum, Spotted Gum, Swamp Mahogany and Melaleuca species. While one record of Grey-headed Flying Fox has been previously observed within the project area, no Grey-headed Flying-fox camps and their associated roosting breeding habitat are present in proximity (within 10km) to the project area or be impacted upon, with the closest camp approximately 26 km to the east. Approximately 440.69 ha of foraging habitat will be retained within the project area and a further >9000 ha is available immediately adjacent to the project area, which will remain contiguous to the northern and southern portions of the project area. Therefore, it is unlikely that the project will reduce the area of occupation for the highly mobile Grey-headed Flying-fox.

Fragment an existing important population into two or more populations.

The project area is located within a matrix of agricultural land that currently separates two strings of state forests and reserves, including Bungwalbin National Park, State Conservation Area and State Forest to the east and Ellangowan, Braemar and Carwong State Forests to the west. The project area itself is currently subject to a moderate level of fragmentation and edge effects through clearing of native vegetation and existing agricultural practices. While the project will result in fragmentation of vegetation within the immediate locality for the proposed transmission line, the removal of



63.17 ha of vegetation including winter and spring flowering nectar resources will not create a barrier to the movement of these populations or further fragment vegetation within the project area to the extent that it will fragment an existing population into two or more populations. The loss or degradation of this area of foraging habitat will not result in fragmentation of habitat at a local scale for this highly mobile species and are not sufficient to fragment the national population into two or more populations. Areas of similar/better quality condition vegetation will be retained both within the project area, and within the broader landscape immediately adjacent to the impact area.

Adversely affect habitat critical to the survival of a species.

Habitat critical to the survival of the Grey-headed Flying-fox includes important breeding and foraging resources, including winter and spring flowering nectar sources. The closest breeding camp is located approximately 26 km east of the project area near Woodburn. The camp is not listed as nationally important (DCCEEW 2022b)

Critical habitat for the species being defined as habitat which:

- contain native species that are known to be productive as foraging habitat during the final weeks of gestation.
- contain native species used for foraging and occur within 20 km of a nationally important camp.
- contain native and or exotic species used for roosting at the site of a nationally important Grey-Headed Flying-Fox camp (DCCEEW 2021).

Up to 63.17 ha of foraging habitat in the form of PCT 3420, PCT 3428 and pct 4046 will be removed by the project, including native species that are known to be productive as foraging habitat during the final weeks of gestation. While foraging habitat is consistent with that listed as critical for Grey-headed Flying Fox, it is unlikely that impacts to 63.17 ha will be of sufficient severity so as to place the survival of the species at risk, given approximately 440.69 ha of foraging habitat comprising open woodland and forest, *Melaleuca* swamps and other winter and spring foraging trees will be avoided and therefore retained within the project area. In addition, large tracts of vegetation adjacent to the project area will remain available for the foraging behaviours of the species (>9000 ha).

Disrupt the breeding cycle of an important population.

Mating occurs in early autumn, after which time the larger camps begin to break up, reforming in late spring/early summer, as food resources become more abundant (Hall & Richards 2000). Males and females segregate in October when females usually give birth. Following six months of gestation, females bear single young each year. For a period of four to five weeks after giving birth, the mother carries her single young with her to feeding sites. Young are carried on the ventral surface of their foraging mothers (Tidemann 1998). Once the young are completely furred, they are left in maternal camps and continue to be nursed until they are independent after around 12 weeks (Hall & Richards 2000). During this nursery phase, males re-join the females for courting with pair bonds being formed (Hall & Richards 2000). Therefore, actions likely to disrupt the breeding cycle of a population include disturbance to maternity camps, and clearing and fragmentation of foraging vegetation.

The project will impact upon up to 63.17 ha of foraging habitat in the form of PCT 3420, PCT 3428 and PCT 4046, which will be further reduced during the detailed design stage. These communities contain Forest Red Gum, Spotted Gum, Swamp Mahogany and other species which provide important nectar resources during the final weeks of gestation. The project area does not contain any camps of Grey-headed Flying-fox, with the closest camp approximately 26km to the east. It is unlikely that the loss or degradation of up to 63.17 of these resources in the context of locally available foraging habitat within both the project area and broader locality (10-kilometre radius) would significantly impact upon locally breeding individuals, nor the wider 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 current project proposes the removal of up to 63.17 ha of foraging habitat for Grey-headed Flying-fox, encompassing



winter and spring foraging resources. A portion of the vegetation to be removed consist of low condition and regenerating vegetation as well as scattered trees, which occur in a modified state due to previous fires and clearing activities which have resulted in the presence of a high cover of exotic pasture species within the understorey. Good condition PCT 3420 and 3428 to be removed is also subject to a low level of edge effects from the existing cleared easements and transmission line. However, majority of this vegetation will be retained within the project area and in the immediate vicinity.

Additionally, large tracts of intact vegetation occur directly adjacent to the development footprint, and are likely to provide better quality habitat for the species. Given the highly mobile nature of the species it is considered that there is adequate habitat within the nearby reserves and within retained habitat within the impact area to support the local population of Grey-headed Flying-fox, and that the project would not modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that it would cause the species to decline.

Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat.

Due to the project area being well-connected to native vegetation, cleared paddocks and forestry, there are a number of feral animals and predators likely to be well established in the locality. Some of these are known to negatively impact Grey-headed Flying-fox including dogs and foxes. However, it is unlikely that the project would result in the establishment of new invasive fauna species. Invasive weeds species are not known to directly harm populations of Grey-headed Flying-fox, but do have potential to reduce quality of habitat in the adjoining bushland and therefore increase potential to harm the local population. The project area is currently subject to a low-moderate level of weed ingress, including by priority species such as Lantana. The risk of introduction and spread of weed species will be mitigated by:

- Implementation of appropriate weed control and weed disposal in accordance with Biosecurity protocols.
- Any soil or other materials imported to the site for use in restoration or rehabilitation would be certified free from weeds and pathogens or obtained from sources that demonstrate best practice management to minimise weed and pathogen risks.

The project is unlikely to exacerbate the current level of invasive species populations utilising the project area.

Introduce disease that may cause the species to decline.

The project is unlikely to result in the introduction of a disease that could cause Grey-headed Flying-fox to decline.

Interfere substantially with the recovery of the species.

Actions considered likely to substantially interfere with the recovery of the Grey-headed Flying-fox as determined by key threats (DCCEEW 2021) to the species are as follows:

- Habitat loss and fragmentation including important foraging species such as Forest Red Gum.
- Winter foraging resources are limited to a narrow coastal strip in QLD and northern NSW.
- Spring foraging resources are considered critical to the survival of the species.
- Exploitation shooting of Grey-Headed Flying-foxes to protect fruit crops involves death of the individual and indirect death as a result of shooting of pregnant and lactating females.
- Competition and hybridisation indirect competition by Black Flying-fox which has had a range expansion in the past.
- Pollutants, electrocution and pathogens. A disproportionately higher number of lactating females are killed by electrocution on power lines.

The project will incrementally contribute to habitat loss and degradation of foraging resources within important coastal lowlands for the species. However, it is unlikely that impacts to 63.17 ha will substantially interfere with the recovery of the species when compared to the amount of vegetation to be retained within the project area (440.69 ha) and 10 km locality (>9000 ha).



Conclusion.

In consideration of the above significant impact criteria, the proposed activity is not likely to significantly impact Greyheaded Flying-fox within the project area or wider locality, as:

- The project will result in the clearing of 63.17 ha of PCT 3420, PCT 3428 and 4046 providing foraging habitat for the species, however this area will be reduced during the detailed design stage. Given the high availability of similar resources within the locality, the removal of this habitat is not considered to constitute a significant impact.
- The vegetation removal associated with the project represents foraging habitat and will not fragment or isolate this highly mobile population.
- The project does not substantially contribute to a key threatening process for Grey-headed Flying-fox or impact upon priority conservation actions for the species.

This assessment has determined that a referral to the minister is not recommended.

Koala Phascolarctos cinereus

Koala populations in Queensland, NSW and ACT are listed as Endangered under the EPBC Act. Koalas occupy a range of eucalypt-dominated forest and woodland types throughout their range, but favour habitats that support key forage species in more mesic microhabitats. Altitude (< 800 metres above sea level) and temperature restrict the Koalas distribution, as does leaf moisture at the western and northern ends of the range.

Key threats to Koala include habitat fragmentation, predation by dogs, vehicle strikes and disease. Climate change may also be affecting Koala populations through increased temperatures causing heat stress and a reduction in the level of moisture within the leaves of browse trees.

Koala populations throughout Australia are currently under increased pressure due to the 2019-2020 summer bushfires that occurred across the southern and eastern states of Australia. DAWE has provided several resources in response to these fires including analyses of listed species habitat within fire affected areas (DEE 2020), as well as provisional lists of fauna that require urgent management intervention (DAWE 2020). Twelve percent of the likely and known distribution of the combined Koala populations across Australia have been identified as occurring within fire affected areas, and Koala has been identified as one of the species requiring urgent management intervention. Given this context, any remaining areas of high-quality Koala habitat are now critical to the conservation of the species.

No Koala individuals were detected during targeted surveys conducted in Winter 2023. Previous records of Koalas exist in the surrounding locality (over 800 records with the closest approximately 3 metres from the project area), and the most recent record recorded in 2022. Given vegetation surrounding the project area provides connectivity to the surrounding habitat, the species is considered highly likely to utilise the project area on occasion. The project will result in the clearing of PCTs 3420, 3428 and 4046 containing feed tree species forming habitat for Koala. Up to 63.17 ha of these PCT's will be removed as a result of the proposed works, however this area includes two potential options for the transmission line. As only one option will be selected, this area will be further reduced during the detailed design stage, therefore impacts are currently uncertain. An assessment against the Significant Impact Criteria detailed in the *Matters of National*



Environmental Significance: Significant impact guidelines version 1.1 (Commonwealth of Australia 2013) has been undertaken below.

Table 15 SIC assessment for Koala

SIC assessment for Endangered species

Lead to the long-term decrease in the size of a population.

Important populations for Koala have not been defined, due to lack of sufficient information to adequately identify and separate the nature of important populations throughout the range of the species (DoE 2014).

Nocturnal surveys and Spot Assessment Techniques (SAT) surveys did not detect evidence of Koala within the project area to date. However, potential habitat does occur and impacts to up to 63.17 ha of Koala foraging and dispersal habitat represented by PCT 3420, 3428 and 4046 within the project area is unlikely to lead to the long-term decrease in the size of a population, based on the following:

- The vegetation to be impacted is unlikely to be important to the life cycle of the species given it is located within a larger patch of vegetation.
- The majority of similar and/or higher condition vegetation will be retained within the project area and is contiguous with large tracts of vegetation within the broader locality.

Reduce the area of occupancy of the species.

PCT 3420, 3428 ad 4046 within the project area occur in various conditions within the project area, with the project requiring the removal of up to 63.17 ha of a mixture of good, regenerating, scattered and planted condition vegetation. Vegetation to be removed in the far west of the project area occurs on the fringe of an existing easement, and is therefore subject to edge effects. The region was subject to intense bushfire impacts in 2019/2020, to which impacts, and recovery, is clearly evident. Both unburnt and burnt areas for this TEC occur in the project area, with several patches of unburnt areas avoided and retained.

Impacts to up to 63.17 ha providing dispersal and foraging Koala habitat will reduce the occupancy of Koala populations in the project area. Large areas of similar and higher quality habitat will be retained within the project area and immediate locality, however perimeter fencing and solar array design may impact the ability for the Koala to move into retained areas of vegetation and act as a barrier to the movement of individuals.

Based on the above, the project will result in a small reduction of the area of occupancy for a Koala population, with up to 63.17 ha may requiring removal. The species will continue to forage and breed in retained habitat outside of the project area with mitigation measure implemented to minimise connectivity and movement impacts.

Fragment an existing population into two or more populations.

The project area is located within a matrix of agricultural land that currently separates two strings of state forests and reserves, Bungwalbin National Park, State Conservation Area and State Forest to the east and Ellangowan, Braemar and Carwong State Forests to the west. While the project will result in some level of fragmentation for the development of the transmission line, the majority of intact vegetation will be retained in the immediate vicinity, which will remain contiguous with large tracts of intact vegetation within the locality (>9000 ha). The installation of perimeter fencing and solar array design may impact the ability for the Koala to move into retained areas of vegetation and act as a barrier to the movement of individuals. Overall however, connectivity around the project area and impacts to up to 63.17 ha of potential Koala habitat is unlikely to become significantly fragmented or isolate the population more than the existing barriers such as the matrix of agricultural land already provide.

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Adversely affect habitat critical to the survival of a species.

The project may impact up to up to 63.17 ha of PCT 3420, 3428 and 4046 which contain one primary feed tree species (Forest Red Gum) and multiple secondary and supplementary Koala species.

Using the factors listed to define critical habitat within the *EPBC Act Referral Conservation Advice for Phascolarctos cinereus* (Koala) combined populations of Queensland, New South Wales and the Australian Capital Territory (DAWE, 2022) it is likely critical habitat occurs within the project area as it is considered likely that vegetation within the project area would constitute foraging habitat used to meet life-cycle requirements of the Koala under (b) whether the habitat is used to meet essential life cycle requirements (examples: foraging, breeding, nesting, roosting, social behaviour patterns or seed dispersal processes).

The project may remove up to 63.17 ha of vegetation, however given the broader region is still recovering from the effects of 2019/2020 bushfires, it is considered to be significant. Preliminary designs as avoided areas of habitat, including unburnt areas, with vegetation to be retained within the project area (400.97) connected to large patches within the broader locality. The remainder of vegetation to be impacted that comprises good, regenerating vegetation, and planted vegetation will remain connected to large tracts of contiguous vegetation to the north and west. These areas contains similar foraging and dispersal habitat including feed and use trees. Considering these factors, it is possible that the project will adversely affect habitat critical to the survival of the species.

Disrupt the breeding cycle of a population.

There are recent records of the species within 10m north-west of the project area, however no Koala occurrences were recorded during the targeted surveys undertaken to date. The removal of up to 63.17 ha of vegetation for the project constitutes a reduction of approximately 16 % ha within the project area.

While the project would result in the removal of up to 63.17 ha of habitat for this species, this is unlikely to reduce the local availability of resources such that the breeding cycle of a population would be disrupted. Similarly, it is unlikely that short-term indirect disturbance from noise or lighting associated with the construction of the transmission line and solar farm will substantially interfere with the species' ability to reproduce successfully. Koalas will continue to breed in areas unaffected by vegetation loss and as a result the breeding cycle of a Koala population will not be disrupted.

Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

The current project proposes the removal of up to 63.17 ha of potential Koala habitat, encompassing eucalypt woodland, including primary and secondary feed trees. Although Koala has not been observed within the project area during targeted surveys undertaken to date, they are known to occur frequently in the broader locality.

A portion of the vegetation to be removed consist of low condition and regenerating vegetation as well as scattered trees, which occur in a modified state due to previous fires and clearing activities which have resulted in the presence of a high cover of exotic pasture species within the understorey. Good condition PCT 3420 and 3428 to be removed is also subject to a low level of edge effects from the existing cleared easements and transmission line. However, majority of this vegetation will be retained within the project area and in the immediate vicinity.

No Koala individuals were recorded within the project area during targeted surveys. Impacts to up to 63.17 ha of Koala habitat including known Koala feed trees will reduce the availability of resources within the immediate locality. However, given the contiguous nature of adjacent native vegetation with a large tract of good quality bushland containing Koala feed and use trees, the impact is not considered significant. The project is not likely to isolate populations as the development will not substantially impact on the movement corridor and thus is not likely to constitute a barrier to movement and unlikely to result in the decline of the species as a whole.



Result in invasive species that are harmful to an endangered species becoming established in the endangered species' habitat.

The project area is connected to native vegetation, cleared paddocks and forestry vegetation, where a number of feral animals and predators are likely to be established. Some of these are known to negatively impact Koalas including dogs and foxes. However, it is unlikely that the project would result in the establishment of new invasive species. The project is unlikely to exacerbate the current level of invasive species populations utilising the area. Invasive weeds species are not known to directly harm populations of Koala but do have potential to reduce quality of habitat in the adjoining bushland and therefore increase potential to harm the population of Koala. The risk of introduction of weed species will be mitigated by the implementation of good soil transportation practices throughout works.

Introduce disease that may cause the species to decline.

The project is unlikely to result in the introduction of a disease (e.g., Chlamydia) that could reduce the reproductive output of Koala populations in or near the project area.

Interfere substantially with the recovery of the species.

Actions considered likely to substantially interfere with the recovery of Koala are defined in *EPBC Act Referral Conservation Advice for Phascolarctos cinereus (Koala) combined populations of Queensland, New South Wales and the Australian Capital Territory (DAWE, 2022)* as follows:

- Increasing Koala fatalities in habitat critical to the survival of the koala due to dog attacks to a level that is likely to result in multiple, ongoing mortalities.
- Increasing Koala fatalities in habitat critical to the survival of the Koala due to vehicle-strikes to a level that is likely to result in multiple, ongoing mortalities.
- Facilitating the introduction or spread of disease or pathogens for example Chlamydia or *Phytophthora cinnamomi* to habitat critical to the survival of the Koala, which are likely to reduce the carrying capacity of the habitat.
- Creating a barrier to movement to, between or within habitat critical to the survival of the Koala that is likely to result in a long-term reduction in genetic fitness or access to habitat critical to the survival of the Koala.
- Changing hydrology which degrades habitat critical to the survival of the Koala to the extent that the carrying capacity of the habitat is reduced in the long-term.

The project will not result in increased dog attacks, which are primarily an issue where new urban development encroaches upon Koala habitat. While the project can be expected to result in an increase in traffic in some areas during the construction phase, this will be temporary and will not result in sustained increases in Koala road mortalities, given existing roads will be utilised. The project is unlikely to result in the introduction of a disease (e.g. Chlamydia) that could reduce the reproductive output of Koala populations in or near the project isa. Similarly, the project is unlikely to exacerbate the current level of invasive species threat operating within the project isa. Mitigation measures will further reduce the risk of facilitating invasive species. The development will not create a barrier to the movement of Koalas between habitat patches, and therefore will not restrict the species' ability to disperse or carry out normal demographic processes. The project is not expected to result in substantial changes to hydrology which would result in degradation of any critical habitat to the extent that the carrying capacity of that habitat is reduced.

Conclusion.

In consideration of the above significant impact criteria, there is considered potential to significantly impact Koalas within the project area or wider locality.



Although not detected in any targeted surveys undertaken to date, it is therefore concluded that the project may to lead to a significant impact on the Koala due to a known population more broadly, a reduction to an area of occupancy and will affect areas considered critical habitat, noting the impacts of past bushfires in the region in the last 5 years. As such, referral to the Federal Minister for the Department of Climate Change, Energy, the Environment and Water is required and controlled action considered a likely outcome.

Hooded Robin Melanodryas cucullata cucullata

The Hooded Robin is listed as Endangered under the EPBC Act. It is widespread, found across Australia, except for the driest deserts and the wetter coastal areas and rarely found on the coast. The south-eastern form (subspecies cucullata) is found from Brisbane to Adelaide and throughout much of inland NSW, with the exception of the extreme north-west, where it is replaced by subspecies picata. The species prefers lightly wooded country, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas. It requires structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses.

The main threat to Hooded Robin include habitat clearance, fragmentation and degradation. Other threats include altered fire regimes that promote greater density in understorey shrubs or weeds, firewood collection and tidying of farmland, over-grazing by stock, rabbits *Oryctolagus cuniculus* and overabundant kangaroos *Macropus spp.*, increased predation cats *Felis catus* and foxes *Vulpes*, and invasive weeds.

No records of hooded robin have been recorded within the project area, however targeted surveys are yet to be conducted for this species. Nine records of Hooded Robin occur within 10 kilometres of the project area, with the closest record recorded approximately 4 kilometres from the project area, and the most recent record being from 2003 (DPE 2022b). There is potential for the project area to be used occasionally by this species for foraging, as well as breeding, given the presence of associated PCTs (3420, 3428 and 4001) comprising dry Eucalypt woodland, and open grassy areas. Up to 62.81 ha of these PCT's will be removed as a result of the proposed works, however this area includes two potential options for the transmission line. As only one option will be selected, this area will be further reduced during the detailed design stage, therefore impacts are currently uncertain. An assessment against the Significant Impact Criteria detailed in the *Matters of National Environmental Significance: Significant impact guidelines version 1.1* (Commonwealth of Australia 2013) has been undertaken below.

Table 16 SIC assessment for Hooded Robin

SIC assessment for Endangered species

Lead to the long-term decrease in the size of a population.

Impacts to up to 62.81 ha of Hooded Robin foraging and dispersal habitat represented by PCT 3420 and 3428, as well as inclusive open grassy areas within the project area is unlikely to lead to the long-term decrease in the size of a population, based on the following:

• The vegetation to be impacted is unlikely to be important to the life cycle of the species given it is located within a larger patch of vegetation.



• The majority of similar and/or higher condition vegetation will be retained within the project area and is contiguous with large tracts of vegetation within the broader locality.

Reduce the area of occupancy of the species.

PCT 3420 and PCT 3428 within the project area occur in various conditions within the project area, with the project requiring the removal of up to 62.81 ha of a mixture of good, regenerating, scattered and planted condition vegetation. Vegetation to be removed in the far west of the project area occurs on the fringe of an existing easement, and is therefore subject to edge effects.

Impacts to 62.81 ha providing dispersal and foraging Hooded-robin habitat is unlikely to reduce the occupancy of Hooded-robin populations as large areas of similar and higher quality habitat will be retained within the project area and immediate locality.

Based on the above, the project will not result in a further reduction of the area of occupancy for a Hooded-robin population, with consideration to the small area (up to 62.81 ha) to be impacted relative to the larger tracts of remnant native vegetation within the vicinity. The species will continue to forage and breed in retained habitat outside of the project area and the project will not represent a barrier to the movement of individuals.

Fragment an existing population into two or more populations.

The project area is located within a matrix of agricultural land that currently separates two strings of state forests and reserves, Bungwalbin National Park, State Conservation Area and State Forest to the east and Ellangowan, Braemar and Carwong State Forests to the west. While the project will result in some level of fragmentation for the development of the transmission line, the majority of intact vegetation will be retained in the immediate vicinity, which will remain contiguous with large tracts of intact vegetation within the locality. Therefore, impacts to up to 62.81 ha of Hooded-robin habitat is unlikely to become significantly fragmented or to isolate the population more than the existing barriers such as the existing easement already provide.

Adversely affect habitat critical to the survival of a species.

The project will impact up to 62.81 ha of PCT 3420 and PCT 3428 forming potential Hooded-robin foraging and dispersal habitat.

Habitat critical to the survival of the hooded robin (south-eastern) include areas of:

- Dry eucalypt and acacia woodlands and shrublands remnants with an open understorey, some grassy areas and a complex ground layer, often in or near clearings or open areas;
- Structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses;
- Standing dead or live trees and tree stumps are also essential for nesting, roosting and foraging;
- Moderately deep to deep soils, rocks and fallen timber which provides essential foraging habitat

Using the factors listed above, it is likely critical habitat occurs within the project area as it is considered likely that vegetation within the project area would constitute dry eucalypt and acacia woodlands with open and/or grassy understorey in some areas, as well as standing suitable trees for nesting, roosting and foraging.

The project will remove a small area (up to 62.81 ha) of vegetation in relation to vegetation to be retained both within the project area and broader locality. Scattered trees within the impact area constitute heavily modified habitat that would provide sub-optimal habitat for Hooded Robin only. The remainder of vegetation to be impacted that comprises good,



regenerating vegetation, and planted vegetation will remain connected to large tracts of contiguous vegetation to the north and west. These areas contains similar foraging and dispersal habitat including feed and use trees. Considering these factors, it is unlikely the project will adversely affect habitat critical to the survival of the species.

Disrupt the breeding cycle of a population.

Hooded robins generally form monogamous pairs and occupy territories during the breeding season (between July and November) and non-breeding season. Birds usually return to the same breeding site where they typically rear several broods each season. Nests comprise small, neat cups of bark and grasses bound with webs and are situated in a tree fork or crevice, from less than 1 m to 5 m above the ground.

There are records of the species within 4 kilometres of the project area, however no Hooded Robin individuals were recorded during the field investigation or are known to occur within the project area (targeted surveys are yet to be undertaken). The removal of up to 62.81 ha of vegetation for the project is not considered substantial in relation to the amount of vegetation to be retained within the project area (324.34 ha) and high quality bushland occurring contiguously to the north, east and west of the project area.

While the project would result in the removal of a small area of habitat for this species within the locality, this is unlikely to reduce the local availability of resources such that the breeding cycle of a population would be disrupted. Similarly, it is unlikely that short-term disturbance from noise or lighting associated with the construction of the transmission line and solar farm will substantially interfere with the species' ability to reproduce successfully. Hooded Robin populations will continue to breed in areas unaffected by vegetation loss and as a result the breeding cycle of a Hooded Robin population will not be disrupted.

Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

Impacts to up to 62.81 ha of Hooded Robin habitat including PCT 3420 and 3428, including open grassy areas will reduce the availability of resources within the immediate locality. However, given the contiguous nature of adjacent native vegetation with a large tract of good quality bushland, the impact is not considered significant. The project is not likely to isolate populations as the development will not substantially impact on the movement corridor and thus is not likely to constitute a barrier to movement and unlikely to result in the decline of the species as a whole.

Result in invasive species that are harmful to an endangered species becoming established in the endangered species' habitat.

The project is unlikely to exacerbate the current level of invasive species populations utilising the area, such as Foxes, Noisy Minor which are known to have a negative impact on populations of Hooded Robin. Invasive weeds species are not known to directly harm populations of Hooded Robin, but do have potential to reduce quality of habitat in the adjoining bushland and therefore increase potential to harm the population of Hooded Robin. The risk of introduction of weed species will be mitigated by the implementation of good soil transportation practices throughout works.

Introduce disease that may cause the species to decline.

The project is unlikely to result in the introduction of a disease that could reduce the reproductive output of Hooded Robin populations in or near the project isa.

Interfere substantially with the recovery of the species.



No recovery plan currently exists for Hooded Robin. However, a decision has been made to have a Recovery Plan due to the complex jurisdictional situation and the conservation planning resources required to develop the plan. A Recovery Plan is considered likely to provide additional conservation benefits and is therefore required for this subspecies. The project is unlikely to exacerbate the current level of invasive species such as Foxes, Cats or Noisy Minor threat operating within the project area. Mitigation measures will further reduce the risk of facilitating invasive plant species such as good hygiene procedures. The development will not create a barrier to the movement of Hooded Robin between habitat patches and therefore will not restrict the species' ability to disperse or carry out normal demographic processes. The project is not expected to result in changes to fire regimes or increase the removal of dead wood. While the project will result in the removal of up to 62.81 ha of PCT 3420 and 3428, vegetation to be removed is not considered significant in relation to large contiguous patches of intact vegetation surrounding the project area (324.34 ha), which has been avoided and will be retained.

Conclusion.

In consideration of the above significant impact criteria, the project is not likely to significantly impact Hooded Robin within the project area or wider locality, as:

- The project will result in impacts to up to 62.81 ha of Hooded Robin foraging and dispersal habitat, which will be further reduced during the detailed design. Given the availability of similar resources within the locality, impacts to this vegetation is not considered to constitute a significant impact.
- The project is unlikely to result in the introduction of a disease that could reduce the reproductive output of the Hooded Robin populations in or near the project isa.
- The project does not significantly interfere with any of the conservation actions for the species.

This assessment has determined that a referral to the minister is not recommended.

Spotted-tailed Quoll Dasyurus maculatus

The Spotted-tailed Quoll is listed as Endangered under the EPBC Act. The Spotted-tailed Quoll is a nocturnal, cat-sized, carnivorous marsupial with reddish-brown fur and distinctive white spots over its back and tail (OEH 2019).

The species was previously widely distributed from south-east Queensland, eastern NSW, Victoria, south-east South Australia and Tasmania (Jones 2001). The subspecies' mainland range is now considered to have reduced by 50–90% (Jones 2001). However, detailed distribution records and abundance estimates are generally lacking due to the scale and intensity of surveying that is required to detect the species across its entire range (DAWE 2016).

The Spotted-tailed Quoll has a preference for mature wet forest habitat, especially in areas with rainfall 600 mm/year (McKay 2008). Unlogged forest or forest that has been less disturbed by timber harvesting is also preferable. The Spot-tailed Quoll is predominantly nocturnal and rests during the day in dens (Jones 2001). Habitat requirements include suitable den sites such as hollow logs, tree hollows, rock outcrops or caves (OEH 2019). Individuals also require an abundance of food, such as birds and small mammals, and large areas of relatively intact vegetation through which to forage (DAWE 2020c). This subspecies is moderately arboreal and approximately 11% of travelling is done in trees (Jones 2001). The Spotted-tailed Quoll occupy



large home ranges, with females occupying 200 – 500 hectares, while males can occupy from 500 to over 4000 hectares (OEH 2019).

No records of Spotted-tailed Quoll have been recorded within the project area and none were observed during the field investigation. One record of Spotted-tailed Quoll exist in the surrounding locality (approximately 7 kilometres from to project area), with the most recent collected in 2009 (DPE 2022b). Vegetation comprising PCT's 3420, 3428 and 4046 to be removed for the project may provide potential foraging habitat for the species. Up to 63.17 ha of these PCT's will be removed as a result of the proposed works, however this area includes two potential options for the transmission line. As only one option will be selected, this area will be further reduced during the detailed design stage, therefore impacts are currently uncertain. An assessment against the Significant Impact Criteria detailed in the *Matters of National Environmental Significance: Significant impact guidelines version 1.1* (Commonwealth of Australia 2013) has been undertaken below.

Table 17 SIC assessment for Spotted-tailed Quoll

SIC assessment for endangered species

Lead to the long-term decrease in the size of a population.

Habitat within the impact area may be used by Spotted-tailed Quoll, although no records occur within the project area, with the closest record occurring approximately 7 kilometres away. The removal of up to 63.17 hectares of potential Spotted-tailed Quoll habitat from the impact area is unlikely to limit the habitat available to the local population. The species requires large home ranges, with females occupying non-overlapping ranges of approximately 200-500 hectares, and males occupying very large, overlapping home ranges from 500 to over 4,000 hectares, depending on foraging resources (EES 2020).

As the impacts associated with the project generally occur on the edges of larger areas of higher quality habitats (with large tracts of intact vegetation occurring immediately adjacent to the impact area), it is considered unlikely that the project will result in long-term decrease in the size of the local population, which will remain supported by the higher quality habitats not impacted by the project.

Removal of 63.17 ha of potential Spotted-tailed Quoll habitat from the impact area, including highly modified scattered trees and good condition vegetation that is subject to some edge effects is unlikely to reduce the area of occupancy of the species, as they will still be able to move through and around the impact area.

Reduce the area of occupancy of the species

The removal of up to 63.17 hectares of potential Spotted-tailed Quoll habitat from the impact area will reduce the area of occupancy of the species,. Perimeter fencing and solar array design may impact the ability for the Spotted-tailed Quoll to move into retained areas of vegetation and act as a barrier to the movement of individuals.

PCT 3420 and PCT 3428 within the project area occur in various conditions within the project area, with the project requiring the removal of up to 63.17 ha of a mixture of good, regenerating, scattered and planted condition vegetation. Vegetation to be removed in the far west of the project area occurs on the fringe of an existing easement, and is therefore subject to edge effects.

Based on the above, although the project will result reduction of the area of occupancy for the Spotted-tailed Quoll population, it is not considered to be substantial with consideration to the area (up to 63.17 ha) to be impacted relative to the larger tracts of remnant native vegetation comprising >9000 ha within the vicinity. The species will continue to forage and breed in retained habitat within outside of the project area.

Fragment an existing population into two or more populations.

The project area is located within a matrix of agricultural land that currently separates two strings of state forests and reserves, Bungwalbin National Park, State Conservation Area and State Forest to the east and Ellangowan, Braemar and Carwong State Forests to the west. While the project will result in some level of fragmentation for the development of



the transmission line, the majority of intact vegetation will be retained in the immediate vicinity, which will remain contiguous with large tracts of intact vegetation within the locality. Perimeter fencing and solar array design may impact the ability for the Spotted-tailed Quoll to move into retained areas of vegetation and act as a barrier to the movement of individuals.

However, impacts to up to 63.17 ha of Spotted-tailed Quoll habitat is unlikely to become significantly fragmented or to isolate the population more than the existing barriers such as the existing easement and farmland already provides.

Adversely affect habitat critical to the survival of a species.

Habitat that is critical to the survival of the Spotted-tailed Quoll includes large patches of forest with adequate denning resources and relatively high densities of medium-sized mammalian prey (DELWP 2016). However, the threshold densities of these critical components required to support quoll populations are unknown. Consequently, it is currently not possible to define (or map) habitat critical to the survival of the Spotted-tailed Quoll. The Recovery Plan states that given the Endangered threat status of the Spotted-tailed Quoll, all habitats within its current distribution that are known to be occupied are considered important (DELWP 2016).

Furthermore, due to the large bushfires that occurred across southern and eastern Australia in the summer of 2019-2020, approximately 29 % of the available habitat across Spotted-tailed Quoll's known range was lost, and the species was identified as requiring urgent management intervention following those fires (DAWE 2020d). Given this context, any remaining areas of Spotted-tailed Quoll habitat are now of increased importance in the conservation of the species.

The species requires large home ranges, with females occupying non-overlapping ranges of approximately 200-500 hectares, and males occupying very large, overlapping home ranges from 500 to over 4,000 hectares, depending on foraging resources (EES 2020). In the Marengo State Forest in north-eastern NSW, females were reported to have non-overlapping range of up to 175 hectares, and males have an overlapping range of up to 757 hectares (Glen & Dickman 2006). A 20 kilometre buffer around the wind farm impact area is likely to include the home ranges of all those individuals most likely to utilise the habitat within and directly adjacent to the impact area.

The removal of approximately 63.17 hectares of Spotted-tailed Quoll habitat as part of the project, is not expected to be of a magnitude substantial enough to adversely affect habitat critical to the survival of a species as a whole, when considered in relation to the amount of vegetation to be retained within the project area (487.1). In addition, given the small amount of Spotted-tailed Quoll records within the locality, impacts to the local population not considered to be significant.

Due to the large home ranges required by the species, with female home ranges generally not overlapping, and the loss the removal of up to 63.17 hectares of habitat is considered a moderate loss in relation to adjacent habitat >9000 ha.

Disrupt the breeding cycle of a population.

Potential Spotted-tailed Quoll breeding habitat may be removed from the impact area as part of the project, including understorey vegetation, tree hollows and logs. Due to the large areas of intact vegetation comprising several reserves encompassing Bangwalbin State Forest and National Park, Ellangowan and Cowan State Forests, it is likely that adequate den sites are located within the locality such that the breeding cycle of the local population will not be interrupted by the project. Spotted-tailed Quoll will continue to forage and breed in areas unaffected by vegetation loss and as a result the breeding cycle of a Spotted-tailed Quoll population will not be disrupted.

Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

Up to 63.17 ha of Spotted-tailed Quoll habitat is proposed to be removed from the impact area as part of the project, including PCT 3420 and 3428. However, only one record of Spotted-tailed Quoll has been recorded within the locality, approximately 7 km from the project area within intact vegetation comprising the adjacent reserve system, including the adjacent Bungwalbin National Park, nature reserve and state forest. The project would result in a reduction of habitat available to the local population, and the available habitat within 10 kilometres, however large intact areas will be retained both within the project area and directly adjacent to the impact area that provide similar/better quality habitat. It is therefore considered that there is adequate habitat available in surrounding vegetation and nature reserves that the species as a whole is not likely to decline.



Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat.

There is potential for the introduction of weeds, pests or pathogens as a result of the project, via movement of vehicles and plant, and increase in foot traffic. However, management measures would be prepared, implemented and audited to avoid and minimise the environmental risks associated with weeds, pests and pathogens. As a minimum, these would include:

- Implementation of appropriate weed control and weed disposal in accordance with Biosecurity protocols.
- Any soil or other materials imported to the site for use in restoration or rehabilitation would be certified free from weeds and pathogens or obtained from sources that demonstrate best practice management to minimise weed and pathogen risks.
- Implementation of appropriate hygiene protocols where there are potential or known pathogen risks.

Appropriate disposal of any weed material.

Introduce disease that may cause the species to decline.

The project will result in removal of potential habitat for Spotted-tailed Quoll within the impact area. This impact is not likely to results in the introduction of diseases that may cause the species to decline.

Interfere substantially with the recovery of the species.

The main threats to Spotted-tailed Quoll include habitat loss and fragmentation, poison baiting, predation by invasive species, deliberate killing, road mortality, poor burning regimes and climate change, among others. The National Recovery Plan for the Spotted-tailed Quoll lists the following management objectives:

- Determine the distribution and status of Spotted-tailed Quoll populations throughout the range and identify key threats and implement threat abatement management practices.
- Investigate key aspects of the biology and ecology of the Spotted-tailed Quoll to acquire targeted information to aid recovery.
- Reduce the rate of habitat loss and fragmentation on private land.
- Evaluate and manage the risk posed by silvicultural practices.
- Determine and manage the threat posed by introduced predators (foxes, cats, wild dogs) and of predator control practices on Spotted-tailed Quoll populations.
- Determine and manage the impact of fire regimes on Spotted-tailed Quoll populations.
- Reduce the frequency of Spotted-tailed Quoll road mortality.
- Assess the threat Cane Toads pose to Spotted-tailed Quolls and develop threat abatement actions if necessary.
- Determine the likely impact of climate change on Spotted-tailed Quoll populations.
- Increase community awareness of the Spotted-tailed Quoll and involvement in the Recovery Program.

The project would involve the removal of up to 63.17 ha of potential Spotted-tailed Quoll habitat, which would contribute to the above listed threat of habitat loss for the species and is somewhat averse to the management objective 'reduce the rate of habitat loss and fragmentation on private land.' However very few records are known from the broader locality, and the condition of the majority of habitat impacted is sub-optimal due to its occurrence along vegetated edges between intact vegetation and cleared farmland. Furthermore no important den or latrine sites were recorded during the field instigations, and well vegetation riparian zones, used commonly for movement through an individual's range are not well represented in the impact area. As impacted habitats are largely considered sub-optimal, and large areas will be retained both within the project area and immediately adjacent to the site, the project cannot be said to be likely to interfere substantially with the recovery of the species.

Conclusion

In consideration of the above significant impact criteria, the project is not likely to significantly impact Spotted-tailed Quoll within the project area or wider locality, as:



- The project will result in impacts to up to 63.17 ha of Spotted-tailed Quoll foraging and breeding habitat, which will be further reduced during the detailed design stage. Given the availability of similar resources within the locality, impacts to this vegetation is not considered to constitute a significant impact.
- The project is unlikely to result in the introduction of a disease or invasive species that could reduce the reproductive output of the Spotted-tailed Quoll populations in or near the project isa.
- The project does not significantly interfere with any of the conservation actions for the species.

This assessment has determined that a referral to the minister is not recommended.

Woodland Birds

- Diamond Firetail Stagonopleura guttata
- Brown Treecreeper Climacteris picumnus victoriae

The Brown Treecreeper is Australia's largest Treecreeper and is listed as Vulnerable under the EPBC Act. The Brown Treecreeper is endemic to eastern Australia and occurs in eucalypt forests and woodlands of inland plains and slopes of the Great Dividing Range. It is less commonly found on coastal plains and ranges. It is found in eucalypt woodlands (including Box-Gum Woodland) and dry open forest of the inland slopes and plains inland of the Great Dividing Range. This species is usually observed in pairs or small groups, and forages in trees and on the ground, probing for insects, mostly ants as well as other invertebrates. The Brown Treecreeper nests in hollows in standing dead or live trees and tree stumps (DPE 2022g).

The main threats to Brown treecreeper include clearing for agriculture, fragmentation, habitat degradation, and lack of regenerating eucalypts in overstorey.

The Diamond Firetail is listed as vulnerable under the EPBC Act. It is a large, striking finch with a bright red bill, and red eyes and rump. Diamond firetails occur on the south-east mainland of Australia from south-east Queensland to Eyre Peninsula, South Australia, and about 300 km inland from the sea. Diamond firetails occur in eucalypt, acacia or casuarina woodlands, open forests and other lightly timbered habitats, including farmland and grassland with scattered trees. They prefer areas with relatively low tree density, few large logs, and little litter cover but high grass cover. Diamond firetails usually occur in flocks of between 5 to 40, and occasionally more. The species appears to be sedentary, though some populations move locally. Their flight is described as low and direct in long lines with slight undulations. Birds roost in dense shrubs or in smaller nests built especially for roosting (DCCEEW 2023b).

The main threats to Diamond Firetail include historical and ongoing clearing of native vegetation, habitat degradation leading to food shortage, overgrazing.

No Diamond Firetail or Brown Treecreeper individuals were recorded within the project area during the field investigation. However, 136 records of Brown Treecreeper occur within a 10-kilometre radius, with the closest recorded approximately 100 m from the project area in 2022. Ten records of Diamond Firetail occur within a 10-kilometre radius, with the closest recorded within the project area, on the fringe of Ellangowan State Forest. Vegetation to be removed comprising PCTs 3420, 3428 and 4046 represent potential habitat for the species, and therefore an assessment against the Significant Impact Criteria detailed in the *Matters of National Environmental Significance: Significant impact guidelines version 1.1* (Commonwealth of Australia 2013) has been undertaken below.



Table 18SIC assessment for woodland birds

SIC assessment for vulnerable species

Lead to the long-term decrease in the size of an important population of a species.

No important populations have been identified for Brown Treecreeper or Diamond Firetail within the approved conservation advice for these species.

The project will result in the clearing of up to 63.17 ha of PCT 3420, 3428 and 4046 representing potential foraging and breeding resources for these woodland birds. While the project will result in the removal of potential foraging habitat, the total area of habitat being removed is not considered substantial in relation to the amount of retained, and non-impacted habitat available in the broader landscape. Given the expanse of native vegetation in the broader landscape, and the large patches of suitable habitat within the project area to be retained, the 63.17 ha is not expected to significantly reduce habitat for these species. Given the scale of the impact in the context of available habitat in the region, it is unlikely that the proposed impacts will lead to a long-term decrease in the size of these mobile woodland bird populations.

Reduce the area of occupancy of an important population.

No important populations have been identified for these woodland bird species.

It is considered that vegetation within the project area constitutes known habitat to the foraging and breeding practices of the Diamond Firetail. However, given the overall context of the region and the extent of the vegetation connected to these areas, the 63.17 ha expected to be cleared is unlikely to have a significant impact to the occupancy of the local population.

Given the size and connectivity available in the greater landscape, it is unlikely that an important population or local population would be negatively impacted by the project. These mobile species will continue to forage in retained habitat within the surrounding landscape. As such, it is unlikely that project will reduce the area of occupancy of these species' population.

Fragment an existing important population into two or more populations.

No important populations have been identified for these woodland bird species.

The project area is located within a matrix of agricultural land that currently separates two strings of state forests and reserves, Bungwalbin National Park, State Conservation Area and State Forest to the east and Ellangowan, Braemar and Carwong State Forests to the west.

In the scope of the greater context of the surrounding land, up to 63.17 ha of potential habitat for Brown Treecreeper, and known habitat for Diamond Firetail to be removed as a result of the proposed work represents a reduction of approximately 16% within the project area, and less than 1% of the native vegetation within 10 km of the locality, which comprises >9000 ha, a relatively small portion of land. While the works will result in some level of fragmentation within the immediate locality through the clearing of vegetation for the proposed transmission line, the works are not expected to reduce connectivity throughout the landscape which would fracture multiple populations and vegetated corridors containing habitat for mobile woodland birds. As such the project will not fragment an existing population into two or more populations.

Adversely affect habitat critical to the survival of a species.

Under the respective approved conservation advice for Brown treecreeper and Diamond Firetail, critical habitat is defined below.

Habitat critical to the survival of the brown treecreeper (south-eastern) includes areas that have:

• Relatively undisturbed grassy woodland with native understorey. – Habitat structure should be quite open at ground level so that birds are able to feed on or near the ground and maintain vigilance against predators. – The required degree of openness is mostly likely to be created by moderate levels of disturbance by fire and/or grazing.


SIC assessment for vulnerable species

- Large living and dead trees which are essential for roosting and nesting sites and for foraging;
- Fallen timber which provides essential foraging habitat and;
- Hollows in standing dead or live trees and tree stumps are also essential for nesting.

Habitat critical to the survival of the diamond firetail includes areas of:

- Eucalypt, acacia or casuarina woodlands, open forests and other lightly timbered habitats;
- Low tree density, few large logs, and little litter cover but high grass cover for foraging, roosting and breeding;
- Drooping she-oak (Allocasuarina verticillata) within the Mt Lofty Ranges.

Given the project area contains open Eucalypt Forest and hollow-bearing trees, it is considered likely that the project area comprises habitat critical to the survival of both species. However, large areas of habitat will be retained within the project area and surrounding locality. Therefore, impacts to foraging, breeding and dispersal habitat are not expected to be significant. Vegetation connectivity will be maintained throughout the landscape. Although some native vegetation will be removed, the project will not substantially impact upon any of the required habitat for the two woodland birds, and thus will not adversely affect habitat critical for the species' survival.

Disrupt the breeding cycle of an important population.

No important populations have been identified for these woodland bird species.

Brown treecreepers (south-eastern) nest and roost in naturally occurring tree cavities in a variety of eucalypt species. Hollows in standing dead or live trees and tree stumps are essential for nesting. Typically, birds breed cooperatively with the breeding group consisting of a breeding pair and a few subordinate males. Nests comprise cups of grass and bark lined with fur and feathers, built in a hollow limb or trunk (DCCEEW 2023a).

Between August and January, groups of Diamond Firetail separate into small colonies to breed. Nests are bottle shaped and are made of green grass blades and stems lined with fine grasses and feathers. To safeguard their eggs and nestlings, diamond firetails often build their nests into the base of the large stick-nest of a bird of prey (DCCEEW 2023b).

The project area contains both foraging and breeding habitat represented by PCT 3420 and 3428 and suitably sized hollow-bearing trees required by Brown Treecreeper. While the project is likely to result in the loss of suitable hollow-bearing trees within the project area and therefore reduce the local availability of breeding resources, it is not anticipated that this will reduce the availability within the locality such that the breeding cycle of a population of Brown Treecreeper would be disrupted as a whole, given the amount of vegetation to be retained both within and adjacent to the project area. It is unlikely that disturbance from noise or lighting associated with the construction will substantially interfere with these species' ability to reproduce successfully. These mobile woodland birds will continue to breed in areas unaffected by vegetation loss and as a result the breeding cycle of the population will not be disrupted.

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 includes the removal of up to 63.17 ha of PCT 3420, 3428 and 4046, and suitable hollow-bearing trees for Brown Treecreeper. The removal of this vegetation will reduce the availability of foraging and breeding resources within the immediate area. However, scattered trees are currently subject to a moderate level of modification through previous clearing and weed ingress, while good condition vegetation is highly connected to larger areas of similar/good quality habitat that will be retained. The project area will remain contiguous to vast areas of intact vegetation comprising multiple reserves and national parks. Given that the project will not constitute a new barrier to the movement of individuals of the highly mobile species, and the contiguous nature of the vegetation with a large tract of good quality bushland with hollow-bearing trees to the west and south of the project area, the removal of vegetation for the works is considered unlikely to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline. In addition, mitigation methods outlined within the recommendations section of this report will be implemented to ensure that indirect impacts including weed establishment are minimised for the duration of the works.

Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable



SIC assessment for vulnerable species

species' habitat.

The project will not increase invasive fauna species. Invasive weeds species are not known to directly harm populations of either woodland bird species, but do have potential to reduce quality of habitat in the adjoining bushland and therefore increase potential to harm the local population of these species. The risk of introduction of weed species will be mitigated by the implementation of good soil transportation practices. The project is therefore unlikely to exacerbate the current level of invasive species threats operating within the project areas, or introduce new invasive species to the area.

Introduce disease that may cause the species to decline.

The project is unlikely to introduce a disease that causes the woodland bird species to decline.

Interfere substantially with the recovery of the species.

There is currently no National Recovery Plan for either Brown Treecreeper or Diamond Firetail. However recovery actions are outlined within the approved conservation advice for each species. Those relating to the project include:

- Retain and protect woodland, open forest, grassland and mallee habitat from clearing, fragmentation and disturbance (areas of 200 ha or greater within woody vegetation are particularly significant).
- Protect and maintain areas of high-quality habitat, which includes open forest, woodland, mallee and grasslands with a diverse ground layer dominated by a mixture of grass species which seed at different times of year (providing a year-round food supply) and provides scattered shrubs for shelter.
- Cease all land clearing of habitat critical of the survival of brown treecreeper (southeastern).

While the project will result in the removal of woodland and open forest habitat, including areas considered habitat critical to the survival of these species, the area of habitat to be removed by the project is surrounded by contiguous areas of suitable foraging and breeding habitat, with similar or higher quality resources. The works will result in localised fragmentation of the patch, however this is unlikely to pose a barrier to movement of these mobile species within the broader locality. Given these factors it is considered unlikely that the removal of up to 63.17 ha of vegetation will interfere with the recovery of these species.

Conclusion.

Considering the above factors, it is unlikely that the proposed work will impose a significant impact on woodland birds or their habitats as:

- The project will not introduce any diseases or invasive species of Brown Treecreeper or Diamond Firetail.
- The project will not interfere significantly with the recovery actions for the species.
- The removal of native vegetation is considered to be a threat to the recovery and ongoing survival of the species however the project will impact up to 63.17 ha of potential habitat, surrounded by large swathes of habitat that will be retained both within and adjacent to the project area, it is not likely to significantly impact the species.

Based on the factors above, it is concluded that the project is unlikely to lead to a significant impact on woodland birds species.