Name	Threatened	Type of Presence
		related behaviour likely to occur within area
Thalassarche sp. nov. Pacific Albatross [66511]	Vulnerable*	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thinornis rubricollis rubricollis Hooded Plover (eastern) [66726]	Vulnerable	Species or species habitat may occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area
Xenus cinereus Terek Sandpiper [59300]		Roosting known to occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area

Whales and other Cetaceans		[Resource Information]
Name	Status	Type of Presence
Mammals		
Sousa chinensis Indo-Pacific Humpback Dolphin [50]		Species or species habitat likely to occur within area

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
Hunter Wetlands	NSW
Karuah	NSW
LNE Special Management Zone No1	NSW
Medowie	NSW
Seaham Swamp	NSW
Tilligerry	NSW
Wallaroo	NSW

Regional Forest Agreements	[Resource Information]
Note that all areas with completed RFAs have been included.	
Name	State
North East NSW RFA	New South Wales

Invasive Species

[Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Alauda arvensis Skylark [656]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Lonchura punctulata Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Passer montanus Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
Pycnonotus jocosus Red-whiskered Bulbul [631]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat known to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur

Name	Status	Type of Presence within area
Feral deer		
Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Lepus capensis		
Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus		
House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus		
Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus norvegicus		
Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus		
Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Vulpes vulpes		
Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Alternanthera philoxeroides		
Alligator Weed [11620]		Species or species habitat likely to occur within area
Anredera cordifolia		
Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643]		Species or species habitat likely to occur within area
Asparagus aethiopicus		
Asparagus Fern, Ground Asparagus, Basket Fern, Sprengi's Fern, Bushy Asparagus, Emerald Asparagus [62425]		Species or species habitat likely to occur within area
Asparagus asparagoides		
Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Asparagus plumosus		
Climbing Asparagus-fern [48993]		Species or species habitat likely to occur within area
Cabomba caroliniana		
Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera		
Bitou Bush, Boneseed [18983]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera subsp. rotundata		
Bitou Bush [16332]		Species or species habitat likely to occur within area
Cytisus scoparius		
Broom, English Broom, Scotch Broom, Common Broom, Scottish Broom, Spanish Broom [5934]		Species or species habitat likely to occur within area
Eichhornia crassipes		
Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
Genista monspessulana		
Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom		Species or species habitat likely to occur

Name	Status	Type of Presence
[20126]		within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Sagittaria platyphylla Delta Arrowhead, Arrowhead, Slender Arrowhead [68483]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Senecio madagascariensis Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]		Species or species habitat likely to occur within area
Solanum elaeagnifolium Silver Nightshade, Silver-leaved Nightshade, White Horse Nettle, Silver-leaf Nightshade, Tomato Weed, White Nightshade, Bull-nettle, Prairie-berry, Satansbos, Silver-leaf Bitter-apple, Silverleaf-nettle, Trompillo [12323]		Species or species habitat likely to occur within area

Nationally Important Wetlands [Resource Information]

Name	State
Kooragang Nature Reserve	NSW

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-32.76433 151.74698,-32.72142 151.78626

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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APPENDIX B SPECIES RECORDED

Flora species list

Notes:

* indicates exotic species

HTW = High Weed Threat: Y= Yes

GF = Growth Form: E= Fern, F=Forb, O=Other, T=Tree, S= Shrub, G= Grass & grasslike

Family	Scientific Name	Common name	HTW	GF	Percent cover in each Quadrat									
					PQ02	PQ03	PQ04	PQ05	PQ06	PQ07	PQ08	PQ09	PQ10	PQX
Ferns and allied plants														
Blechnaceae		*Blechnum indicum*	Swamp Water Fern		E			0.5							
Dennstaedtiaceae		*Pteridium esculentum*	Bracken		E			0.5							
Pteridaceae		*Adiantum aethiopicum*	Common Maidenhair		E		5								
Pteridaceae		*Cheilanthes sieberi*	Rock Fern		E			0.1							
Conifers														
Araucariaceae	*	*Araucaria heterophylla*	Norfolk Island Pine				1								

Family	Scientific Name		Common name	HTW	GF	Percent cover in each Quadrat									
						PQ02	PQ03	PQ04	PQ05	PQ06	PQ07	PQ08	PQ09	PQ10	PQX
Pinaceae	*	*Cedrus libani*	Cedar of Lebanon												
Pinaceae	*	*Pinus radiata*	Radiata Pine	Y				40			2				
Angiosperms - dicotyledons															
Acanthaceae		*Brunoniella pumilio*	Dwarf Blue Trumpet		F				0.1				0.1		
Amaranthaceae		*Alternanthera denticulata*	Lesser Joyweed		F								0.1		
Amaranthaceae	*	*Alternanthera pungens*	Khaki Weed	Y							0.1	0.1			
Apiaceae		*Centella asiatica*	Indian Pennywort		F	0.1	0.1	0.2		0.1			0.1	0.2	
Apiaceae	*	*Cyclospermum leptophyllum*	Slender Celery							0.1					
Apiaceae	*	*Foeniculum vulgare*	Fennel							0.1					
Apocynaceae	*	*Gomphocarpus fruticosus*	Narrow-leaved Cotton Bush			0.1				0.5					
Apocynaceae		*Parsonsia straminea*	Common Silkpod		O								0.1	0.1	

Family		Scientific Name	Common name	HTW	GF	Percent cover in each Quadrat									
						PQ02	PQ03	PQ04	PQ05	PQ06	PQ07	PQ08	PQ09	PQ10	PQX
Asteraceae	*	*Bidens pilosa*	Cobbler's Pegs	Y				0.1					0.2	0.1	
Asteraceae	*	*Cirsium vulgare*	Spear Thistle							0.1			0.5		
Asteraceae	*	*Conyza sumatrensis*	Tall fleabane					0.1		0.1			0.2		
Asteraceae		*Euchiton sphaericus*	Star Cudweed		F						0.1				0.1
Asteraceae	*	*Gamochaeta purpurea*	Purple Cudweed			0.1								0.1	
Asteraceae	*	*Hypochaeris radicata*	Catsear			2		0.2			0.1		1	0.1	0.2
Asteraceae		*Lagenophora stipitata*	Common Lagenophora		F							0.1			
Asteraceae	*	*Senecio madagascariensis*	Fireweed			0.1				0.1		0.1	0.5		
Asteraceae	*	*Sonchus oleraceus*	Common Sowthistle							0.2	0.1		0.1		
Bignoniaceae	*	*Jacaranda mimosifolia*	Jacaranda				0.1	0.1							
Campanulaceae		*Pratia purpurascens*	whiteroot		F	0.1		0.1	0.1	0.1		0.1	0.1	1	

Family	Scientific Name		Common name	HTW	GF	Percent cover in each Quadrat									
						PQ02	PQ03	PQ04	PQ05	PQ06	PQ07	PQ08	PQ09	PQ10	PQX
Caryophyllaceae	*	*Cerastium glomeratum*	Mouse-ear Chickweed										0.2		
Casuarinaceae		*Allocasuarina littoralis*	Black She-Oak		T									1	
Casuarinaceae		*Casuarina glauca*	Swamp Oak		T				0.5					2	
Clusiaceae		*Hypericum gramineum*	Small St John's Wort		F	0.2									
Convolvulaceae		*Dichondra repens*	Kidney Weed		F	0.1			0.1	0.1		0.2	0.1		
Ericaceae		*Leucopogon juniperinus*	Prickly Beard-heath		S			5						0.1	
Fabaceae (Faboideae)		*Daviesia ulicifolia*	Gorse Bitter Pea		S				0.1			0.1			
Fabaceae (Faboideae)		*Desmodium spp.*	Tick-trefoil		O	0.1			0.1			0.1			
Fabaceae (Faboideae)		*Glycine clandestina*	Twining glycine		O		X	0.1	0.1			0.1	0.1	0.1	0.1
Fabaceae (Faboideae)		*Glycine spp.*			O					0.1					
Fabaceae (Faboideae)		*Glycine tabacina*	Variable Glycine		O							0.1			

Family		Scientific Name	Common name	HTW	GF	Percent cover in each Quadrat									
						PQ02	PQ03	PQ04	PQ05	PQ06	PQ07	PQ08	PQ09	PQ10	PQX
Fabaceae (Faboideae)		*Hardenbergia violacea*	False Sarsaparilla		O				0.2	0.1					
Fabaceae (Faboideae)		*Pultenaea villosa*	Hairy Bush-pea		S									0.1	
Fabaceae (Faboideae)	*	*Trifolium arvense*	Haresfoot Clover							0.5					
Fabaceae (Mimosoideae)		*Acacia falcata*			S									0.2	
Fabaceae (Mimosoideae)		*Acacia linifolia*	White Wattle		S		25					0.1		1	
Fabaceae (Mimosoideae)		*Acacia longifolia*			S				0.2	0.1				2	
Fabaceae (Mimosoideae)		*Acacia myrtifolia*	Red-stemmed Wattle		S				0.1						
Fabaceae (Mimosoideae)		*Acacia terminalis*	Sunshine Wattle		S				0.1						
Geraniaceae		*Geranium homeanum*			F							0.1	0.2		
Geraniaceae		*Pelargonium spp.*			F						0.1				
Lauraceae		*Cassytha spp.*			O									0.1	

Family	Scientific Name		Common name	HTW	GF	Percent cover in each Quadrat									
						PQ02	PQ03	PQ04	PQ05	PQ06	PQ07	PQ08	PQ09	PQ10	PQX
Lauraceae	*	*Cinnamomum camphora*	Camphor Laurel	Y			5	1			0.1				
Linaceae	*	*Linum trigynum*	French Flax			0.1									
Loranthaceae		*Muellerina eucalyptoides*			O							0.1			
Malvaceae	*	*Sida rhombifolia*	Paddy's Lucerne							0.2		0.5	0.5		
Myoporaceae		*Eremophila debilis*	Amulla		S							0.1			
Myrtaceae		*Angophora costata*	Sydney Red Gum		T									5	
Myrtaceae		*Angophora floribunda*	Rough-barked Apple		T				8						
Myrtaceae		*Callistemon salignus*													1
Myrtaceae		*Corymbia maculata*	Spotted Gum		T							10	2	7	1
Myrtaceae		*Eucalyptus crebra*	Narrow-leaved Ironbark		T				10				3		
Myrtaceae		*Eucalyptus moluccana*	Grey Box		T	3				10			5		20

Family		Scientific Name	Common name	HTW	GF	Percent cover in each Quadrat									
						PQ02	PQ03	PQ04	PQ05	PQ06	PQ07	PQ08	PQ09	PQ10	PQX
Myrtaceae		*Eucalyptus punctata*	Grey Gum		T									1	
Myrtaceae		*Eucalyptus signata*	Scribbly Gum		T				5						
Myrtaceae		*Eucalyptus tereticornis*	Forest Red Gum		T	2					2	2	5	2	
Myrtaceae		*Leptospermum polygalifolium*	Tantoon		S									0.1	
Myrtaceae		*Melaleuca linariifolia*	Flax-leaved Paperbark		S									0.2	
Myrtaceae		*Melaleuca quinquenervia*	Broad-leaved Paperbark		T			0.1							
Myrtaceae		*Melaleuca styphelioides*	Prickly-leaved Tea Tree		S								5		
Ochnaceae	*	*Ochna serrulata*	Mickey Mouse Plant	Y			0.5								
Oleaceae	*	*Ligustrum sinense*	Small-leaved Privet	Y			0.5	0.5							
Oleaceae		*Notelaea longifolia*	Large Mock-olive		T							0.1	0.2		
Oleaceae	*	*Olea europaea subsp. cuspidata*	African Olive	Y					0.2	0		0.1			

Family	Scientific Name		Common name	HTW	GF	Percent cover in each Quadrat									
						PQ02	PQ03	PQ04	PQ05	PQ06	PQ07	PQ08	PQ09	PQ10	PQX
Onagraceae		*Ludwigia peploides subsp. montevidensis*	Water Primrose		F					0.1					
Oxalidaceae		*Oxalis perennans*			F					0.2					
Phyllanthaceae		*Breynia oblongifolia*	Coffee Bush		S								0.1		
Phyllanthaceae		*Glochidion ferdinandi*	Cheese Tree		T		2	1		0.1				0.2	
Phyllanthaceae		*Glochidion ferdinandi*	Cheese Tree		T								0.1		
Pittosporaceae		*Billardiera scandens*	Hairy Apple Berry		O				0.1			0.1			
Pittosporaceae		*Pittosporum undulatum*	Sweet Pittosporum		S		2	1	2	0.1					
Plantaginaceae	*	*Plantago lanceolata*	Lamb's Tongues			2			0.2	0.2		2	2	0.1	1
Plantaginaceae	*	*Plantago myosuros*				0.1									
Polygonaceae		*Persicaria strigosa*			F										
Primulaceae	*	*Lysimachia arvensis*	Scarlet Pimpernel					0.1							

Family		Scientific Name	Common name	HTW	GF	Percent cover in each Quadrat									
						PQ02	PQ03	PQ04	PQ05	PQ06	PQ07	PQ08	PQ09	PQ10	PQX
Proteaceae		*Grevillea robusta*	Silky Oak		T		2								
Ranunculaceae		*Ranunculus inundatus*	River Buttercup		F								0.2		
Rosaceae	*	*Rosa bracteata*	Macartney Rose			0.2				5					
Rosaceae	*	*Rosa rubiginosa*	Sweet Briar	Y									2		
Rosaceae	*	*Rubus fruticosus sp. agg.*	Blackberry complex	Y		0.1	0.1	5					5	0.1	
Rubiaceae		*Asperula conferta*	Common Woodruff		F	0.1							0.1		
Rubiaceae		*Opercularia diphylla*	Stinkweed		F									0.1	
Rubiaceae	*	*Richardia humistrata*						0.1	0.1						
Sapindaceae		*Dodonaea triquetra*	Large-leaf Hop-bush		S				5						
Solanaceae		*Solanum spp.*			F		XX								
Verbenaceae	*	*Lantana camara*	Lantana	Y			10	5		0.2		0.1	0.2		
Verbenaceae	*	*Verbena bonariensis*	Purpletop			1		0.1	0.2	10		0.5		1	

Family	Scientific Name		Common name	HTW	GF	Percent cover in each Quadrat									
						PQ02	PQ03	PQ04	PQ05	PQ06	PQ07	PQ08	PQ09	PQ10	PQX
Verbenaceae	*	*Verbena rigida var. rigida*	Veined Verbena				1	0.5			0.1				
Angiosperms - monocotyledons															
Alliaceae	*	*Nothoscordum gracile*	Onion Weed							0.2					
Anthericaceae		*Tricoryne elatior*	Yellow Autumn-lily		F			0.1	0.1				0.1		
Asparagaceae	*	*Asparagus aethiopicus*	Asparagus Fern	Y				0.1	0.1			0.1			
Asparagaceae	*	*Asparagus officinalis*	Asparagus											0.1	
Commelinaceae		*Commelina cyanea*	Native Wandering Jew		F								0.2		
Cyperaceae		*Carex appressa*	Tall Sedge		G								40		
Cyperaceae		*Carex inversa*	Knob Sedge		G	0.1						1			
Cyperaceae	*	*Cyperus eragrostis*	Umbrella Sedge	Y							0.1				
Cyperaceae		*Cyperus gracilis*	Slender Flat-sedge		G							1			

Family		Scientific Name	Common name	HTW	GF	Percent cover in each Quadrat									
						PQ02	PQ03	PQ04	PQ05	PQ06	PQ07	PQ08	PQ09	PQ10	PQX
Cyperaceae		*Cyperus spp.*			G					0.1					
Cyperaceae		*Schoenus apogon*	Fluke Bogrush		G	0.5									
Iridaceae	*	*Herbertia lahue subsp. caerulea*				1						10			
Iridaceae	*	*Romulea rosea*	Onion Grass	Y								2			
Juncaceae	*	*Juncus cognatus*				0.2									
Juncaceae		*Juncus usitatus*			G									0.1	
Lomandraceae		*Lomandra filiformis subsp. filiformis*			G							2			
Lomandraceae		*Lomandra longifolia*	Spiny-headed Mat-rush		G				0.5					0.1	
Lomandraceae		*Lomandra multiflora*	Many-flowered Mat-rush		G									0.1	
Lomandraceae		*Lomandra spp.*	Mat-rush		G				0.1						
Luzuriagaceae		*Eustrephus latifolius*	Wombat Berry		O				0.5						
Luzuriagaceae		*Geitonoplesium cymosum*	Scrambling Lily		O								0.1	0.1	

Family		Scientific Name	Common name	HTW	GF	Percent cover in each Quadrat									
						PQ02	PQ03	PQ04	PQ05	PQ06	PQ07	PQ08	PQ09	PQ10	PQX
Phormiaceae		*Dianella longifolia var. longifolia*	A Blue Flax Lily		F				0.1	0.1					
Phormiaceae		*Dianella revoluta*	Blueberry Lily		F								0.1	0.1	
Poaceae	*	*Andropogon virginicus*	Whisky Grass	Y				0.1						5	
Poaceae	*	*Anthoxanthum odoratum*	Sweet Vernal Grass				3	25							
Poaceae		*Aristida vagans*	Threeawn Speargrass		G				0.5			5		0.1	
Poaceae	*	*Axonopus fissifolius*	Narrow-leafed Carpet Grass	Y		40						20	5		40
Poaceae		*Bothriochloa macra*	Red Grass		G	5			0.1				2		
Poaceae	*	*Briza maxima*	Quaking Grass					1	0.1						
Poaceae	*	*Briza minor*	Shivery Grass			0.1									
Poaceae	*	*Briza subaristata*		Y		5		20	1	20	0.1				
Poaceae	*	*Bromus catharticus*	Praire Grass								0.1				

Family	Scientific Name		Common name	HTW	GF	Percent cover in each Quadrat									
						PQ02	PQ03	PQ04	PQ05	PQ06	PQ07	PQ08	PQ09	PQ10	PQX
Poaceae	*	*Cenchrus clandestinus*	Kikuyu Grass	Y			30							2	
Poaceae	*	*Chloris gayana*	Rhodes Grass	Y					2	30				1	
Poaceae		*Cymbopogon refractus*	Barbed Wire Grass		G	0.1						20	0.5	0.1	
Poaceae		*Cynodon dactylon*	Common Couch		G	10	10	10		5	90	5	20	10	15
Poaceae		*Dichelachne micrantha*	Shorthair Plumegrass		G	10									
Poaceae		*Echinopogon ovatus*	Forest Hedgehog Grass		G		1	1				1			
Poaceae		*Entolasia stricta*	Wiry Panic		G				2				2	1	
Poaceae	*	*Eragrostis curvula*	African Lovegrass	Y		0.1							0.2		
Poaceae	*	*Hyparrhenia hirta*	Coolatai Grass	Y				10		2				30	
Poaceae		*Imperata cylindrica*	Blady Grass		G	1							10		
Poaceae		*Microlaena stipoides*	Weeping Grass		G	0.2	10	40	2	0.5	0.1	10	5	2	5

Family		Scientific Name	Common name	HTW	GF	Percent cover in each Quadrat									
						PQ02	PQ03	PQ04	PQ05	PQ06	PQ07	PQ08	PQ09	PQ10	PQX
Poaceae		*Oplismenus aemulus*			G							2			
Poaceae		*Panicum effusum*	Hairy Panic		G							0.5			
Poaceae	*	*Panicum repens*	Torpedo Grass	Y										30	
Poaceae		*Paspalidium distans*			G								2	0.1	
Poaceae	*	*Paspalum dilatatum*	Paspalum	Y		30	1	5	2	40	0.1		2	5	20
Poaceae	*	*Phalaris minor*	Lesser Canary Grass							1					
Poaceae		*Poa spp.*			G							15	2		
Poaceae		*Rytidosperma spp.*			G				2				0.1		
Poaceae	*	*Setaria parviflora*									2			1	
Poaceae	*	*Sporobolus africanus*	Parramatta Grass										1		
Poaceae		*Sporobolus elongatus*	Slender Rat's Tail Grass		G						0.1				
Poaceae		*Themeda triandra*			G	5			5	0.2		0.5			

Family	Scientific Name		Common name	HTW	GF	Percent cover in each Quadrat									
						PQ02	PQ03	PQ04	PQ05	PQ06	PQ07	PQ08	PQ09	PQ10	PQX
Strelitziaceae	*	*Strelitzia spp.*					0.1								

Fauna species list

Legend

V – Vulnerable

E – Endangered

O – observed

W – heard call

P – scat

F – Diggings

* – exotic species

U – ultrasonic recording (Anabat recording) (C – Confident, Pr – Probable, Po – Possible)

Fauna group	Scientific Name	Common name	Status		Observation Type
			BC Act	EPBC Act	
Amphibian	*Crinia signifera*	Common Eastern Froglet			W
Amphibian	*Litoria fallax*	Eastern Dwarf Tree Frog			W
Amphibian	*Litoria peronii*	Peron's Tree Frog			W
Bird	*Acanthiza nana*	Yellow Thornbill			W
Bird	*Acanthiza pusilla*	Brown Thornbill			W
Bird	*Acanthorhynchus tenuirostris*	Eastern Spinebill			W
Bird	*Acridotheres tristis*	Common Myna			W
Bird	*Alisterus scapularis*	Australian King Parrot			W
Bird	*Anthochaera carunculata*	Red Wattlebird			W
Bird	*Aythya australis*	Hardhead			O
Bird	*Cacatua galerita*	Sulphur-crested Cockatoo			O
Bird	*Cacatua roseicapilla*	Galah			O
Bird	*Cacatua sanguinea*	Little Corella			O
Bird	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike			W

Fauna group	Scientific Name	Common name	Status		Observation Type
			BC Act	EPBC Act	
Bird	*Corvus coronoides*	Australian Raven			O/W
Bird	*Cracticus tibicen*	Australian Magpie			W
Bird	*Cracticus torquatus*	Grey Butcherbird			W
Bird	*Dacelo novaeguineae*	Laughing Kookaburra			W
Bird	*Dicaeum hirundinaceum*	Mistletoebird			O
Bird	*Eudynamys orientalis*	Eastern Koel			W
Bird	*Gerygone olivacea*	White-throated Gerygone			W
Bird	*Gallinula tenebrosa*	Dusky Moorhen			O
Bird	*Glossopsitta concinna*	Musk Lorikeet			W
Bird	*Glossopsitta pusilla*	Little Lorikeet	V		W
Bird	*Grallina cyanoleuca*	Magpie-lark			W
Bird	*Hirundo neoxena*	Welcome Swallow			O
Bird	*Lichenostomus chrysops*	Yellow-faced Honeyeater			W
Bird	*Malurus cyaneus*	Superb Fairy-wren			O/W
Bird	*Manorina melanocephala*	Noisy Miner			W
Bird	*Meliphaga lewinii*	Lewin's Honeyeater			O
Bird	*Myzomela sanguinolenta*	Scarlet Honeyeater			W
Bird	*Neochmia temporalis*	Red-browed Finch			O
Bird	*Ocyphaps lophotes*	Crested Pigeon			O
Bird	*Oriolus sagittatus*	Olive-backed Oriole			W

Fauna group	Scientific Name	Common name	Status		Observation Type
			BC Act	EPBC Act	
Bird	*Pardalotus striatus*	Striated Pardalote			W
Bird	*Platycercus eximius*	Eastern Rosella			O
Bird	*Pomatostomus temporalis*	Grey-crowned Babbler	V		O
Bird	*Porphyrio porphyrio*	Purple Swamphen			O
Bird	*Psophodes olivaceus*	Eastern Whipbird			W
Bird	*Rhipidura fuliginosa*	Grey Fantail			W
Bird	*Rhipidura leucophrys*	Willie Wagtail			W
Bird	*Scythrops novaehollandiae*	Channel-billed Cuckoo			W
Bird	*Sericornis frontalis*	White-browed Scrubwren			O
Bird	*Sphecotheres vieilloti*	Australasian Figbird			W
Bird	**Streptopelia chinensis*	Spotted Turtle-Dove			O
Bird	*Threskiornis molucca*	Australian White Ibis			O
Bird	*Todiramphus sanctus*	Sacred Kingfisher			O
Bird	*Trichoglossus haematodus*	Rainbow Lorikeet			W
Bird	*Vanellus miles*	Masked Lapwing			O
Bird	*Zosterops lateralis*	Silvereye			W
Mammal	**Goat*	Feral Goat			O
Mammal	*Chalinolobus gouldii*	Gould's Wattled Bat			U C
Mammal	*Chalinolobus morio*	Chocolate Wattled Bat			U Po
Mammal	*Falsistrellus tasmaniensis*	Eastern False Pipistrelle	V		U Po

Fauna group	Scientific Name	Common name	Status		Observation Type
			BC Act	EPBC Act	
Mammal	*Miniopterus australis*	Little Bent-wing Bat	V		U
Mammal	*Miniopterus orianae oceanensis*	Large Bent-wing Bat	V		U
Mammal	*Micronomus norfolkensis*	Eastern Freetail-bat	V		U C
Mammal	*Mormopterus ridei*	Little Freetail Bat, Eastern Free-tailed Bat			U C
Mammal	*Myotis macropus*	Southern Myotis	V		U Po
Mammal	*Nyctophilus sp.*	Unidentified Nyctophilus sp.			U Po
Mammal	**Oryctolagus cuniculus*	Rabbit			F
Mammal	*Pteropus poliocephalus*	Grey-headed Flying-fox	V	V	O
Mammal	*Scoteanax rueppellii*	Greater Broad-nosed Bat	V		U Pr
Mammal	*Scotorepens orion*	Eastern Broad-nosed Bat			U Po
Mammal	*Austronomus australis*	White-striped Freetail-bat			U
Mammal	*Trichosurus vulpecula*	Common Brushtail Possum			O (spotlight)
Mammal	**Unknown species*	Deer species (unknown)			O
Mammal	*Vespadelus vulturnus*	Little Forest Bat			U Po

APPENDIX C BAM DATA

Composition and structure data

Plot	Number of native species						Percent cover					
	Tree	Shrub	Grass	Forb	Fern	Other	Tree	Shrub	Grass	Forb	Fern	Other
PQ02	2	0	9	5	0	1	5	0	31.9	0.6	0	0.1
PQ03	2	2	3	1	1	0	4	27	21	0.1	5	0
PQ04	2	2	3	3	3	1	1.1	6	51	0.4	1.1	0.1
PQ05	4	6	8	5	0	5	23.5	7.5	12.2	0.5	0	1
PQ06	2	2	4	6	0	2	10.1	0.2	5.8	0.7	0	0.2
PQ07	1	0	3	2	0	0	2	0	90.2	0.2	0	0
PQ08	3	3	12	4	0	5	12.1	0.3	63	0.5	0	0.5
PQ09	6	2	10	11	0	3	15.3	5.1	83.6	1.4	0	0.3
PQ10	7	7	9	4	0	4	18.2	3.7	13.6	1.4	0	0.4
PQX	3	0	2	3	0	0	5	0	40	0.5	0	0

Function data

Plot	Large trees	Hollow trees	Litter cover	Fallen logs	Tree stem size (diameter in centimetres)					Tree regeneration	High threat exotic percent cover
					5-9	10-19	20-29	30-49	50-79		
PQ02	0	0	15	1	0	1	1	1	0	0	75.2
PQ03	0	0	36	25	1	1	0	0	0	1	47.1
PQ04	0	0	71	7	1	1	1	0	0	1	86.9
PQ05	2	0	87	11	1	1	1	1	1	1	5.3
PQ06	0	0	38	4	1	1	1	0	0	1	92.2
PQ07	1	0	8	0	0	1	1	1	1	0	2.5
PQ08	1	1	48	0	1	1	1	1	0	1	22.4
PQ09	2	2	53	18	1	1	1	1	1	1	14.6
PQ10	0	0	72	3	1	1	1	0	0	1	73.2
PQX	0	0	5	0	0	1	0	1	0	0	50

APPENDIX D LIKELIHOOD OF OCCURRENCE TABLES

Threatened Ecological Communities

TECs listed under the BC Act	BC Act Status*	TECs listed under the EPBC Act	EPBC Act status*	Habitat requirements	Likelihood of occurrence
Central Hunter Grey Box-Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions	CE	Central Hunter Valley eucalypt forest and woodland	CE	Occurs on Permian sediments in the Hunter Valley in Cessnock, Singleton and Muswellbrook LGAs. Occurs on slopes and undulating hills. Typically forms a woodland dominated by *Eucalyptus crebra* (Narrow-leaved Ironbark), *Brachychiton populneus* subsp. *populneus* (Kurrajong) and *Eucalyptus moluccana* Grey Box).	Low to moderate The development site is outside the range of this TEC, however the TEC is listed as associated with PCT 1600, which occurs in the development site. TEC was not identified in the development site.
Central Hunter Ironbark-Spotted Gum-Grey Box Forest in the New South Wales North Coast and Sydney Basin Bioregions	E	Central Hunter Valley eucalypt forest and woodland	CE	Occurs on Permian sediments in the Hunter Valley, in Cessnock, Singleton and Muswellbrook LGAs. Typically forms an open forest to woodland dominated by *Eucalyptus crebra* (Narrow-leaved Ironbark), *Corymbia maculata* (Spotted Gum) and *Eucalyptus moluccana* (Grey Box).	Low. There is no potential habitat for the TEC in the development site. TEC was not identified in the development site
Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E	Subtropical and Temperate Coastal Saltmarsh	V	Occurs in the intertidal zone on the shores of estuaries and lagoons. Frequently found as a zone landward of mangrove stands.	Low. There is no potential habitat for the TEC in the development site. TEC was not identified in the development site
Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E			Associated with periodic or semi-permanent inundation by freshwater, although there may be minor saline influence in some wetlands. They typically occur on silts, muds or humic loams in depressions, flats, drainage lines, backswamps, lagoons and lakes associated with coastal floodplains. Generally occur below 20 m	Low. There is no potential habitat for the TEC in the development site.

TECs listed under the BC Act	BC Act Status*	TECs listed under the EPBC Act	EPBC Act status*	Habitat requirements	Likelihood of occurrence
				elevation. The structure of the community may vary from sedgelands and reedlands to herb fields, and woody species of plants are generally scarce.	TEC was not identified in the development site
Hunter Floodplain Red Gum Woodland in the NSW North Coast and Sydney Basin Bioregions	E			Generally occurs on floodplains and associated floodplain rises along the Hunter River and tributaries. Typically forms a tall to very tall (18-35 m) woodland. Stands on major floodplains are generally dominated by *Eucalyptus camaldulensis* (River Red Gum) in combination with *E. tereticornis* (Forest Red Gum), *E. melliodora* (Yellow Box) and *Angophora floribunda* (Rough-barked Apple).	Low. There is no potential habitat for the TEC in the development site. TEC was not identified in the development site
Hunter Lowland Redgum Forest in the Sydney Basin and New South Wales North Coast Bioregions	E			Found on gentle slopes arising from depressions and drainage flats on permian sediments of the Hunter Valley floor. Generally an open forest with most common canopy trees species being *Eucalyptus tereticornis* and *E. punctata*	Low. There is no potential habitat for the TEC in the development site. TEC was not identified in the development site
Hunter Valley Footslopes Slaty Gum Woodland in the Sydney Basin Bioregion	V	Central Hunter Valley eucalypt forest and woodland	CE	Occurs at the interface of Narrabeen Sandstone and Permian sediments in the Hunter Valley. Typically forms a woodland, or occasionally forest, comprising a sparse to moderately dense tree stratum, occasional low tree stratum, and moderately dense to dense shrub stratum. The tree canopy is typically dominated by *Eucalyptus dawsonii* (Slaty Gum) and/or *E. moluccana* (Grey Box).	Low. There is no potential habitat for the TEC in the development site. TEC was not identified in the development site
Hunter Valley Vine Thicket in the NSW North Coast and Sydney Basin Bioregions	E			Typically forms a low forest, usually less than 10 m tall, with a closed canopy dominated by small trees. The canopy may include *Elaeodendron australe* (Red Olive Plum), *Geijera parviflora* (Wilga), *Notelaea microcarpa* var. *microcarpa* (Native Olive), *Alectryon oleifolius* subsp. *elongatus* (Western Rosewood), *Melia azedarach* (White Cedar) and *Brachychiton populneus* subsp. *populneus* (Kurrajong). Has a highly restricted geographic distribution in the central Hunter Valley.	Low. There is no potential habitat for the TEC in the development site. TEC was not identified in the development site

TECs listed under the BC Act	BC Act Status*	TECs listed under the EPBC Act	EPBC Act status*	Habitat requirements	Likelihood of occurrence
Hunter Valley Weeping Myall Woodland in the Sydney Basin Bioregion	E	Hunter Valley Weeping Myall (Acacia pendula) Woodland	CE	Associated with heavy clay soils on depositional landforms in the south-western part of the Hunter River valley floor.	Low. There is no potential habitat for the TEC in the development site. TEC was not identified in the development site
Kurri Sand Swamp Woodland in the Sydney Basin Bioregion	E			A low woodland or heathland, generally with a low open canopy rarely exceeding 15 m in height and a shrubby understorey. The overstorey is usually dominated by *Eucalyptus parramattensis* subsp. *decadens* (Parramatta Red Gum) and *Angophora bakeri* (Narrow-leaved Apple)	Low. There is no potential habitat for the TEC in the development site. TEC was not identified in the development site
Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E	Littoral Rainforest and Coastal Vine Thickets of Eastern Australia	CE	Generally a closed forest, the structure and composition of which is strongly influenced by proximity to the ocean. The plant species in this ecological community are predominantly rainforest species with evergreen mesic or coriaceous leaves	Low. There is no potential habitat for the TEC in the development site. TEC was not identified in the development site
Lower Hunter Spotted Gum-Ironbark Forest in the Sydney Basin Bioregion	E			Occurs principally on Permian geology in the central to lower Hunter Valley. The community is strongly associated with, though not restricted to, the yellow podsolic and solodic soils of the Lower Hunter soil landscapes of Aberdare, Branxton and Neath. Restricted to a range of approximately 65 km by 35 km centred on the Cessnock - Beresfield area in the Central and Lower Hunter Valley. Dominated by *Corymbia maculata* (Spotted Gum), Eucalyptus fibrosa (Broad-leaved Ironbark) while *E. punctata* (Grey Gum) and *E. crebra* (Grey Ironbark) occur occasionally.	Moderate. There may be potential habitat for the TEC in the development site. TEC was not identified in the development site
Lower Hunter Valley Dry Rainforest in the Sydney	V			Occurs on the Barrington footslopes along the northern rim of the Hunter Valley Floor, where it occupies gullies and steep hillslopes with south facing aspects. Typically	Low.

TECs listed under the BC Act	BC Act Status*	TECs listed under the EPBC Act	EPBC Act status*	Habitat requirements	Likelihood of occurrence
Basin and NSW North Coast Bioregions				has a canopy of 15-25m high with 40-80% cover. The most common canopy trees include *Elaeocarpus obovatus* (Hard Quandong), *Baloghia inophylla* (Brush Bloodwood), *Streblus brunonianus* (Whalebone Tree), *Mallotus philippensis* (Red Kamala), *Capparis arborea* (Brush Caper Berry), *Olea paniculata* (Native Olive) and *Dendrocnide excelsa* (Giant Stinging Tree).	There is no potential habitat for the TEC in the development site. TEC was not identified in the development site
Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions	E	Lowland Rainforest of Subtropical Australia	CE	Associated with a range of high-nutrient geological substrates, notably basalts and fine-grained sedimentary rocks, on coastal plains and plateaux, footslopes and foothills. A range of plant growth forms are present in Lowland Rainforest, including palms, vines and vascular epiphytes. Scattered eucalypt emergents (e.g. *Eucalyptus grandis, E. saligna*) may occasionally be present	Low. There is no potential habitat for the TEC in the development site. TEC was not identified in the development site
Lowland Rainforest on Floodplain in the New South Wales North Coast Bioregion	E	Lowland Rainforest of Subtropical Australia	CE	Occupies riverine corridors and alluvial flats with rich, moist silts often in sub catchments dominated by basic volcanic substrates. Typical tree species in the community include figs (*Ficus macrophylla, F. obliqua* and *F. watkinsiana*), palms (*Archontophoenix cunninghamiana* and *Livistona australis*), Silky Oak (*Grevillea robusta*), Black Bean (*Castanospermum australe*) and Brush Cherry (*Syzygium australe*).	Low. There is no potential habitat for the TEC in the development site. TEC was not identified in the development site
River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E			Found on the river flats of the coastal floodplains. It has a tall open tree layer of eucalypts, which may exceed 40 m in height. The most widespread and abundant dominant trees include *Eucalyptus tereticornis* (forest red gum), *E. amplifolia* (cabbage gum), *Angophora floribunda* (rough-barked apple) and *A. subvelutina* (broad-leaved apple)	Low. There is no potential habitat for the TEC in the development site. TEC was not identified in the development site
Subtropical Coastal Floodplain Forest of the New South Wales North Coast Bioregion	E			Associated with clay-loams and sandy loams, on periodically inundated alluvial flats, drainage lines and river terraces associated with coastal floodplains. The most widespread and abundant dominant trees include *Eucalyptus tereticornis* (Forest Red Gum), *E. siderophloia* (Grey Ironbark), *Corymbia intermedia* (Pink Bloodwood)	Low. There is no potential habitat for the TEC in the development site.

TECs listed under the BC Act	BC Act Status*	TECs listed under the EPBC Act	EPBC Act status*	Habitat requirements	Likelihood of occurrence
				and, north of the Macleay floodplain, *Lophostemon suaveolens* (Swamp Turpentine).	TEC was not identified in the development site
Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E	Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community	E	Associated with grey-black clay-loams and sandy loams, where the groundwater is saline or sub-saline, on waterlogged or periodically inundated flats, drainage lines, lake margins and estuarine fringes associated with coastal floodplains. Has a dense to sparse tree layer in which *Casuarina glauca* (Swamp Oak) is the dominant species northwards from Bermagui.	Low. There is no potential habitat for the TEC in the development site. TEC was not identified in the development site
Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E			Associated with humic clay loams and sandy loams, on waterlogged or periodically inundated alluvial flats and drainage lines associated with coastal floodplains. Has an open to dense tree layer of eucalypts and paperbarks, which may exceed 25 m in height, but can be considerably shorter in regrowth stands or under conditions of lower site quality.	Low. There is no potential habitat for the TEC in the development site. TEC was not identified in the development site
Sydney Freshwater Wetlands in the Sydney Basin Bioregion	E			Occurs on sand dunes and low-nutrient sandplains along coastal areas in the Sydney Basin bioregion. Largely restricted to freshwater swamps in swales and depressions on sand dunes and low nutrient sandplains such as those of the Warriewood and Tuggerah soil landscapes. Characterised by sedges and aquatic plants.	Low. There is no potential habitat for the TEC in the development site. TEC was not identified in the development site
Themeda grassland on sea cliffs and coastal headlands in the NSW North Coast, Sydney Basin and South East Corner Bioregions	E			Found on sea cliffs and coastal headlands. The structure of the community is typically closed tussock grassland, but may be open shrub land or open heath with a grassy matrix between the shrubs. *Themeda australis* is the dominant species in the community.	Low. There is no potential habitat for the TEC in the development site. TEC was not identified in the development site
Warkworth Sands Woodland in the Sydney Basin Bioregion	E	Warkworth Sands Woodland of the Hunter Valley	CE	Occurs on aeolian sand deposits south east of Singleton in the Hunter Valley. Generally a woodland to low	Low.

TECs listed under the BC Act	BC Act Status*	TECs listed under the EPBC Act	EPBC Act status*	Habitat requirements	Likelihood of occurrence
				woodland structure with trees of *Angophora floribunda* and *Banksia integrifolia.*	There is no potential habitat for the TEC in the development site. TEC was not identified in the development site
White Box Yellow Box Blakely's Red Gum Woodland	E	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	CE	Occurs in the tablelands and western slopes of NSW. Characterised by the presence or prior occurrence of White Box, Yellow Box and/or Blakely's Red Gum.	Low. There is no potential habitat for the TEC in the development site. TEC was not identified in the development site

Threatened flora

1 – denotes species identified in candidate species credit report (species credit species)

2 – denotes species identified in EPBC protected matters search

Name	BC Act	EPBC Act	Distribution and habitat requirements	No. of records (Bionet 10km buffer)	Likelihood of occurrence	Ecosystem and/or species credit species?	IBRA subregion
Acacia bynoeana (Bynoe's Wattle)	V	E	Occurs from Morisset south to the Southern Highlands and west to the Blue Mountains. It grows mainly in heath or dry sclerophyll forest on sandy soils and seems to prefer open, sometimes disturbed sites such as trail margins and recently burnt areas.	0	Low. The development site is outside the known distribution of the species. The development site does not support preferred habitat for the species.	Species[1]	Hunter
Angophora inopina (Charmhaven Apple)	V	V	Occurs in the Hunter/Central Rivers Catchment, endemic to the Central Coast region of NSW, in open woodland with a dense shrub understorey on deep white sandy soils over sandstone. Occurs in vegetation communities of Eucalypt and Angophora.	1	Low. The development site does not support preferred habitat for the species.	Species[1,2]	Hunter and Karuah Manning
Asperula asthenes (Trailing Woodruff)	V	V	Found in scattered locations from Bulahdelah north to near Kempsey, with several records from the Port Stephens / Wallis Lakes area / Forster. The species generally occurs in damp sites along river banks.	1	Low. The development site does not support preferred habitat for the species.	Species[1,2]	Hunter
Caladenia tessellata (Thick Lip Spider Orchid)	E	V	Known from the Sydney area (old records), Wyong, Ulladulla and Braidwood in NSW. Generally found in grassy sclerophyll woodland on clay loam or sandy soils, though the population near Braidwood is in low woodland with stony soil.	0	Low. The development site does not support preferred habitat for the species.	Species[2]	

Name	BC Act	EPBC Act	Distribution and habitat requirements	No. of records (Bionet 10km buffer)	Likelihood of occurrence	Ecosystem and/or species credit species?	IBRA subregion
Callistemon linearifolius (Netted Bottle Brush)	V	-	Occurs from Georges River to the Hawkesbury River in Sydney, north to the Nelson Bay area. Grows in dry sclerophyll forest.	4	Moderate. There are records of the species in the locality and the development site supports marginal preferred habitat for the species.	Species[1]	Hunter and Karuah Manning
Commersonia prostrata (Dwarf Kerrawang)	E	E	Occurs in Southern Highlands, Southern Tablelands, Thirlmere Lakes and the North Coast. Grows on sandy, peaty soils in a variety of habitats; Snow Gum Woodland and Ephemeral Wetland floor, Blue Leaved Stringybark Open Forest, Brittle Gum Low Open Woodland, Scribbly Gum/Swamp Mahogany Ecotonal Forest.	12	Low. The development site does not support preferred habitat for the species.	Species[2]	
Cryptostylis hunteriana (Leafless Tongue Orchid)	V	V	Recorded from the Gibraltar Range south to Victoria, chiefly in coastal districts but also extends on to tablelands. Does not appear to have well defined habitat preferences and is known from a range of communities, including swamp-heath and woodland.	0	Low. The development site does not support preferred habitat for the species.	Species[1,2]	Hunter and Karuah Manning
Cynanchum elegans (White-flowered Wax Plant)	E	E	Restricted to the east coast of NSW, inland to Merriwa. Occurs on margins of dry rainforest, also littoral rainforest, open forest and woodland, and scrub.	1	Low. The development site does not support preferred habitat for the species.	Species[1,2]	Hunter and Karuah Manning
Dichanthium setosum (Bluegrass)	V	V	Occurs in the New England Tablelands, North West Slopes and Plains, and Central Western Slopes of NSW, mainly on private property. Associated with heavy basaltic black soils and red-brown loams with clay subsoil.	0	Low. The development site does not support preferred habitat for the species.	Species[2]	
Diuris arenaria	E	-	Known from the Tomaree Peninsula near Newcastle. Occurs in coastal heath and dry grassy	1	Low.	Species	

Name	BC Act	EPBC Act	Distribution and habitat requirements	No. of records (Bionet 10km buffer)	Likelihood of occurrence	Ecosystem and/or species credit species?	IBRA subregion
(Sand Doubletail)			eucalypt forest on sandy flats. Grows in gently undulating country in eucalypt forest with a grassy understorey on clay soil.		The development site does not support preferred habitat for the species.		
Diuris flavescens (Pale Yellow Doubletail)	CE	CE	Grows in grassy tall eucalypt forest with Kangaroo Grass and Blady Grass on brown clay soil. Known only from the Wingham-Tinonee area.	0	Low. The development site is well outside the known distribution of the species. The development site does not support preferred habitat for the species.	Species[1]	Karuah Manning
Diuris praecox (Rough Double Tail)	V	V	Occurs between Bateau Bay and Smiths Lake. Grows on hills and slopes of near-coastal districts in open forests with a grassy/dense understory. May not be visible throughout the year as it only produces leaves and flowering stems in Winter.	0	Low. The development site does not support preferred habitat for the species.	Species[1]	Hunter and Karuah Manning
Eucalyptus camfieldii (Heart-leaved Stringybark)	V	V	Populations occur in scattered distributions from Raymond Terrace to south Waterfall. Grows in shallow sandy soils overlying Hawkesbury sandstone and coastal heath on exposed sandy ridges. Associated with Brown Stringybark, Scribbly Gum and Narrow-Leaved Scribbly Bark.	2268	Low. The development site does not support preferred habitat for the species.	Species[2]	
Eucalyptus glaucina (Slaty Red Gum)	V	V	Found on north coast of NSW and Casino as well as from Taree to Broke and west of Maitland. Grows in grassy woodland and dry eucalypt forest in deep, moderately fertile and well-watered soils.	0	Low. The development site does not support preferred habitat for the species.	Species[1]	Hunter and Karuah Manning
Eucalyptus parramattensis subsp. decadens	V	V	One population occurs in Kurri Kurri and Mulbring-Abedare in 'Kurri Sand Swamp Woodlands' whilst the second population occurs in the Tomago Sandbeds in 'Tomago Swamp Woodland'. Populations occur in dry sclerophyll woodland with	1391	Low. The development site does not support preferred habitat for the species.	Species[1,2]	Karuah Manning

Name	BC Act	EPBC Act	Distribution and habitat requirements	No. of records (Bionet 10km buffer)	Likelihood of occurrence	Ecosystem and/or species credit species?	IBRA subregion
			dry heath understorey and as an emergent in dry or wet heathland. Flowers November-January.				
Euphrasia arguta	CE	CE	Present in the Nundle area of NSW north western slopes and tablelands, Hastings River and Barrington Tops. Grows in eucalypt forest with a mixed grass and a shrub understorey. Dies off over Winter months and actively grows from January to April.	1	Low. The development site does not support preferred habitat for the species.	Species	
Grevillea guthrieana (Guthrie's Grevillea)	E	E	Grows along creeks and cliff lines in eucalypt forest, on granitic or sedimentary soil. Known from the north coast of NSW, at Booral near Bulahdelah and on the Carrai Plateau, south-west of Kempsey.	0	Low. The development site does not support preferred habitat for the species.	Species[1]	Karuah Manning
Grevillea parviflora subsp. parviflora (Small-flower Grevillea)	V	V	Distributed through Sydney Basin with populations in Picton, Appin, Bargo and the Cessnock-Kurri Kurri area of the Hunter. Grows in sandy or light clay soils over thin shales, with lateritic ironstone gravels and nodules. Occurs in heath and shrubby woodland or open forest and often in open, slightly disturbed sites such as along tracks.	10	Low. The development site does not support preferred habitat for the species.	Species[1,2]	Hunter and Karuah Manning
Lindernia alsinoides (Noah's False Chickweed)	E	-	Occurs north from Bulahdelah. Currently known from Shannon Creek (near Grafton) with pre-1925 records from Bulahdelah and Coopernook. Grows in swampy sites in sclerophyll forest and coastal heath. At Shannon Creek, the species occurs in damp paperbark swamp with *Melaleuca alternifolia.*	1	Low. The development site does not support preferred habitat for the species.	Species	
Maundia triglochinoides	V	-	Species restricted to coastal NSW from QLD to Wyong. Grows in swamps, lagoons, dams, channels, creeks or shallow freshwater 30-60cm deep on heavy clay with low nutrients. Flowers	11	Low. The development site does not support preferred habitat for the species.	Species	

Name	BC Act	EPBC Act	Distribution and habitat requirements	No. of records (Bionet 10km buffer)	Likelihood of occurrence	Ecosystem and/or species credit species?	IBRA subregion
			during warmer months (November to January) and associated with wetland species.				
Melaleuca biconvexa (Biconvex Paperbark)	V	V	Only found in NSW with scattered and dispersed populations in the Jervis Bay area and Gosford-Wyong. Generally, the species grows in damp places, often near streams or low-lying areas on alluvial soils of low slopes or sheltered aspects.	0	Low. The development site does not support preferred habitat for the species.	Species[2]	
Melaleuca groveana (Grove's Paperbark)	V	-	Widespread, scattered populations in coastal districts north of Yengo NP to south-east QLD. Also found near Torrington. Grows in heath and shrubland, often in exposed sites in low coastal hills, escarpment ranges and tablelands on outcropping granite, rhyolite and sandstone on rocky outcrops and cliffs. Can also occur in dry shrubby open forest and woodlands.	0	Low. The development site does not support preferred habitat for the species.	Species[1]	Hunter
Monotaxis macrophylla (Large-leafed Monotaxis)	E	-	Recorded from several highly disjunct populations in NSW: west of Moruya, Bemboka portion of South East Forests National Park, Cobar area, the Tenterfield area, and Woodenbong. There is a great diversity in associated vegetation types, encompassing coastal heath, arid shrubland, forests and montane heath. Grows on rocky ridges and hillsides.	0	Low. The development site does not support preferred habitat for the species.	Species	
Ozothamnus tesselatus	V	V	Restricted to a few locations in an east-west zone south of Bunnan and between west Bylong and east Ravensworth. Grows in eucalypt woodland.	0	Low. The development site is well outside the known distribution of the species.	Species[1]	Hunter
Persicaria elatior (Tall Knotweed)	V	V	Recorded at Mt Dromedary, Moruya State Forest, Upper Avon River, Raymond Terrace and Grafton. Normally grows in damp places, especially beside	4	Low. The development site does not support preferred habitat for the species.	Species[2]	

Name	BC Act	EPBC Act	Distribution and habitat requirements	No. of records (Bionet 10km buffer)	Likelihood of occurrence	Ecosystem and/or species credit species?	IBRA subregion
			streams and lakes, occasionally growing in swamp forest or associated with disturbance.				
Persoonia pauciflora (North Rothbury Persoonia)	CE	CE	The species has an extremely restricted distribution, with all but one of the plants in the only known population occurring within a 2.5 km radius at North Rothbury in the Cessnock local government area. Found in dry open forest or woodland dominated by *Corymbia maculata, Eucalyptus fibrosa* and/or *E. crebra* and supporting a moderate to sparse shrub layer and grassy groundcover. The majority of the population is known to occur on silty sandstone soils derived from the Farley Formation.	0	Low. The development site is well outside the known distribution of the species.	Species[1]	Hunter
Phaius australis (Southern Swamp Orchid)	E	E	Occurs in Queensland and north-east NSW as far south as Coffs Harbour. Historically, it extended farther south, to Port Macquarie. Found in swampy grassland or swampy forest including rainforest, eucalypt or paperbark forest, mostly in coastal areas.	0	Low. The development site does not support preferred habitat for the species.	Species[2]	
Pomaderris queenslandica (Scant Pomaderris)	E	-	Widely scattered but not common in north-east NSW and Queensland. Known from several locations on the NSW north coast and a few locations on the New England Tablelands and North West Slopes, including near Torrington and Coolata. Found in moist eucalypt forest or sheltered woodlands with a shrubby understorey, and occasionally along creeks.	0	Low. The development site does not support preferred habitat for the species.	Species[1]	Karuah Manning
Prasophyllum sp. Wybong (C.Phelps ORG 5269)		CE	Endemic to NSW, it is known from near Ilford, Premer, Muswellbrook, Wybong, Yeoval, Inverell, Tenterfield, Currabubula and the Pilliga area. Most populations are small, although the Wybong	0	Low. The development site does not support preferred habitat for the species.	Species[2]	

Name	BC Act	EPBC Act	Distribution and habitat requirements	No. of records (Bionet 10km buffer)	Likelihood of occurrence	Ecosystem and/or species credit species?	IBRA subregion
			population contains by far the largest number of individuals.				
Prostanthera cineolifera Singleton Mint Bush	V	V	Restricted to only a few localities near Scone, Cessnock and St Albans. Grows in open woodlands on exposed sandstone ridges; usually found in association with shallow or skeletal sands.	0	Low. The development site does not support preferred habitat for the species.	Species[1]	Hunter
Pterostylis chaetophora	V	-	In NSW the species is known from 18 sites between Taree and Kurri Kurri, extending towards Tea Gardens and the Upper Hunter. The species also occurs in Columbey NP and Wingen Maid NP. Preferred habitat is seasonally moist, dry sclerophyll forest with a grass and shrub understorey.	5	Low. The development site does not support preferred habitat for the species.	Species[1]	Hunter and Karuah Manning
Rhizanthella slateri (Eastern Australian Underground Orchid)	V	E	Habitat requirements are poorly understood and no particular vegetation type has been associated with the species, although it is known to occur in sclerophyll forest. In NSW, currently known from fewer than 10 locations, including near Bulahdelah, the Watagan Mountains, the Blue Mountains, Wiseman's Ferry area, Agnes Banks and near Nowra.	0	Low. Although habitats for the species are poorly understood, due to the low flora habitat values of the development site the species is unlikely to occur.	Species[1]	Karuah Manning
Rhodamnia rubescens (Scrub Turpentine)	CE	-	Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils. Occurs in coastal districts north from Batemans Bay (NSW) to areas inland of Bundaberg (Qld).	2	Low. The development site does not support preferred habitat for the species.	Species	
Rhodomyrtus psidioides (Native Guava)	CE	-	Pioneer species found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest often near creeks and drainage lines. Occurs from Broken Bay (NSW) north to Maryborough (Qld). Populations typically restricted to coastal and sub-coastal areas of low elevation	1	Low. The development site does not support preferred habitat for the species.	Species	

Name	BC Act	EPBC Act	Distribution and habitat requirements	No. of records (Bionet 10km buffer)	Likelihood of occurrence	Ecosystem and/or species credit species?	IBRA subregion
			however the species occurs up to 120 km inland in the Hunter River catchment.				
Rutidosis heterogama (Heath Wrinklewort)	V	V	Recorded from Cessnock to Kurri Kurri with outlying occurrences at Howes Valley. On the Central Coast it is located from Wyong to Newcastle with north coast populations between Wooli and Evans Head. It also occurs on the New England Tablelands. Grows in heath on sandy soils and moist areas in open forest and possibly along disturbed roadsides.		Low. The development site does not support preferred habitat for the species.	Species[1,2]	Karuah Manning
Syzygium paniculatum (Magenta Lilly Pilly)	E	V	Found only in NSW, in a narrow, linear coastal strip from Upper Lansdowne to Conjola State Forest. On the south coast populations occur on grey soils over sandstone, restricted mainly to remnant stands of littoral rainforest. On the central coast, populations occur on gravels, sands, silts and clays in rainforest communities.	0	Low. The development site does not support preferred habitat for the species.	Species[2]	
Tetratheca juncea (Black-eyed Susan)	V	V	Confined to the local government areas of Wyong, Lake Macquarie, Newcastle, Port Stephens, Great Lakes and Cessnock. Usually found in low open forest/woodland with a mixed shrub understorey and grassy groundcover but has also been recorded in heathland and moist forest.	0	Low. The development site does not support preferred habitat for the species.	Species[1,2]	Hunter and Karuah Manning
Thesium australe (Austral Toadflax)	V	V	Found in small populations scattered across eastern NSW, the coast, and the Northern and Southern Tablelands. Populations occur in grassland on coastal headlands or grassland and grassy woodland away from the coast. Grows with Kangaroo Grass.	0	Low. The development site does not support preferred habitat for the species.	Species[1,2]	Karuah Manning
Zannichellia palustris	E	-	Submerged aquatic plant known from the lower Hunter and in Sydney Olympic Park. Grows in	2	Low.	Species	

Name	BC Act	EPBC Act	Distribution and habitat requirements	No. of records (Bionet 10km buffer)	Likelihood of occurrence	Ecosystem and/or species credit species?	IBRA subregion
			fresh or slightly saline stationary or slowly flowing water. Flowers during warmer months.		The development site does not support preferred habitat for the species.		

Threatened fauna

1 – denotes species identified in candidate species credit report (species credit species)

2 – denotes species identified in predicted species credit report (ecosystem credit species)

3 – denotes species identified in EPBC protected matters search

Name	BC Act	EPBC Act	Habitat requirements	No. of records (Bionet 10km buffer)	Likelihood of occurrence	Ecosystem or species credit species?	IBRA subregion
Frogs							
Wallum Froglet (*Crinia tinnula*)	V	-	Occurs from the Queensland border south to Kurnell. The species is found only in acid paperbark swamps and sedge swamps of the coastal 'wallum' country.	63	Low. The development site does not support preferred habitat for the species.	Species[1]	Hunter
Giant Burrowing Frog (*Heleioporus australiacus*)	V	V	Found in heath, woodland and open dry sclerophyll forest on a variety of soil types except those that are clay based. Breeding habitat of this species is generally soaks or pools within first or second order streams.	0	Low. The development site does not support preferred habitat for the species.	Species[3]	
Green and Golden Bell Frog (*Litoria aurea*)	E	V	This species occurs in fragment patches near coastal locations from Vic to south of the NSW-QLD border. For breeding it uses a wide range of waterbodies, including both natural and man-made structures, such as marshes, dams, and stream sides, and ephemeral wetlands.	21	Low. Small areas of ephemeral drainage/seeps are overrun with weeds such as Blackberry and have low diversity of vegetation. Limited shelter sites nearby. Habitat is suboptimal. No individuals have been recorded in the	Species[1,3]	Hunter and Karuah Manning

Name	BC Act	EPBC Act	Habitat requirements	No. of records (Bionet 10km buffer)	Likelihood of occurrence	Ecosystem or species credit species?	IBRA subregion
					adjacent Irrawang Swamp. Closest known population is in Newcastle 8.5 km from the development site.		
Green-thighed Frog (*Litoria brevipalmata*)	V	-	Green-thighed Frogs occur in a range of habitats from rainforest and moist eucalypt forest to dry eucalypt forest and heath, typically in areas where surface water gathers after rain. It prefers wetter forests in the south of its range, but extends into drier forests in northern NSW and southern Queensland.	0	Low. The development site does not support preferred habitat for the species.	Species[1]	Hunter and Karuah Manning
Stuttering Frog (*Mixophyes balbus*)	E	V	Terrestrial species, found in rainforest, Antarctic beech forest or wet sclerophyll forest.	0	Low. The development site does not support preferred habitat for the species.	Species[3]	
Mahony's Toadlet (*Uperoleia mahonyi*)	E	-	Current observations indicate Mahony's Toadlet inhabits ephemeral and semi-permanent swamps and swales on the coastal fringe of its range. Known records occur in heath or wallum habitats almost exclusively associated with leached (highly nutrient impoverished) white sand. Commonly associated with acid paperbark swamps, Mahony's Toadlet also is known to occur in wallum heath, swamp mahogany-paperbark swamp forest, heath shrubland and	15	Low. The development site does not support preferred habitat for the species.	Species[1]	Hunter

Name	BC Act	EPBC Act	Habitat requirements	No. of records (Bionet 10km buffer)	Likelihood of occurrence	Ecosystem or species credit species?	IBRA subregion
			Sydney red gum woodland. Recent studies suggest intact vegetation adjacent to and within water bodies is an important habitat feature for this species.				
Birds							
Common Sandpiper (*Actitis hypoleucos*)	-	M	Found along all coastlines of Australia and in many areas inland. Occurs in a wide range of coastal wetlands and some inland wetlands, with varying levels of salinity. It is mostly encountered along muddy margins or rocky shores and rarely on mudflats. It has been recorded in estuaries and deltas of streams, banks farther upstream; around lakes, pools, billabongs, reservoirs, dams and claypans, and occasionally piers and jetties (DoEE, 2019c).	8	Low. The development site does not support preferred habitat.	- [3]	
Magpie Goose (*Anseranas semipalmata*)	V	-	Occurs in shallow wetlands such as large swamps and dams, especially with dense growth of rushes or sedges, and with permanent lagoons and grassland nearby.	18	Moderate. Species found in terrestrial habitats (near wetlands).	Ecosystem	
Regent Honeyeater (*Anthochaera phrygia*)	CE	CE	Occurs mostly in box-ironbark forests and woodland and prefers wet, fertile sites such as along creek flats, broad river valleys and foothills.	2	Moderate. Preferred feed trees present in scattered areas. The development site does not support	Species/ Ecosystem[1,2,3]	Hunter and Karuah Manning

Name	BC Act	EPBC Act	Habitat requirements	No. of records (Bionet 10km buffer)	Likelihood of occurrence	Ecosystem or species credit species?	IBRA subregion
					breeding habitat (species credits do not apply).		
Ruddy Turnstone (*Arenaria interpres*)	-	M	In Australasia, the Ruddy Turnstone is mainly found on coastal regions with exposed rock coast lines or coral reefs. It also lives near platforms and shelves, often with shallow tidal pools and rocky, shingle or gravel beaches. Sometimes in estuaries, harbours, bays and coastal lagoons, among low saltmarsh or on exposed beds of seagrass, around sewage ponds and on mudflats (DoEE, 2019).	0	Low. The development site does not support preferred habitat.	- [3]	
Dusky Woodswallow (*Artamus cyanopterus cyanopterus*)	V	-	The Dusky Woodswallow occurs throughout most of New South Wales. Primarily inhabits dry, open eucalypt forests and woodlands, including mallee associations, with an open or sparse understorey of eucalypt saplings, acacias and other shrubs, and ground-cover of grasses or sedges and fallen woody debris. It has also been recorded in shrublands, heathlands and very occasionally in moist forest or rainforest.	1	Moderate. Marginal habitat available in development site.	Ecosystem	Hunter
Bush Stone-curlew (*Burhinus grallarius*)	E	-	Found throughout most of Australia. Inhabits open forests and woodlands with a sparse grassy groundlayer and fallen timber.	0	Low. Marginal habitat present. Species not recorded in 10km of development site.	Species[1]	Hunter and Karuah Manning

Name	BC Act	EPBC Act	Habitat requirements	No. of records (Bionet 10km buffer)	Likelihood of occurrence	Ecosystem or species credit species?	IBRA subregion
Australasian Bittern (*Botaurus poiciloptilus*)	E	E	Requires permanent wetlands with tall dense vegetation, particularly bulrushes and spikerushes.	4	Low. The development site does not support preferred habitat.	Ecosystem[3]	
Sharp-tailed Sandpiper (*Calidris acuminata*)	-	M	In Australia, mostly found in the south-east. Prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. They use intertidal mudflats in sheltered bays, inlets, estuaries or seashores, and also swamps and creeks lined with mangroves (DoEE, 2019c).	18	Low. The development site does not support preferred habitat.	- [3]	
Red Knot (*Calidris canutus*)	-	E, M	In Australasia, they mainly inhabit intertidal mudflats, sandflats and sandy beaches of sheltered coasts, in estuaries, bays, inlets, lagoons and harbours; sometimes on sandy ocean beaches or shallow pools on exposed wave-cut rock platforms or coral reefs. Sometimes seen in terrestrial saline wetlands near the coast. They rarely use inland lakes or swamps (DoEE, 2019c)	3	Low. The development site does not support preferred habitat.	Species/Ecosystem[3]	
Curlew Sandpiper (*Calidris ferruginea*)	-	CE, M	Occurs along the entire coast of NSW. In NSW is mainly found in intertidal mudflats of sheltered coasts, but also in non-tidal swamps, lakes and lagoons.	15	Low. The development site does not support preferred habitat.	Species/Ecosystem[3]	

Name	BC Act	EPBC Act	Habitat requirements	No. of records (Bionet 10km buffer)	Likelihood of occurrence	Ecosystem or species credit species?	IBRA subregion
Pectoral Sandpiper (*Calidris melanotos*)	-	M	Prefers shallow fresh to saline wetlands. The species is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands (DoEE, 2019c)	10	Low. The development site does not support preferred habitat.	- [3]	
Red-necked Stint (*Calidris ruficollis*)	-	M	In Australasia, the Red-necked Stint is mostly found in coastal areas, including in sheltered inlets, bays, lagoons and estuaries with intertidal mudflats, often near spits, islets and banks and, sometimes, on protected sandy or coralline shores (DoEE, 2019c).	6	Low. The development site does not support preferred habitat.	- [3]	
Great Knot (*Calidris tenuirostris*)	-	CE, M	In NSW, the species has been recorded at scattered sites along the coast down to about Narooma. Found within sheltered, coastal habitats containing large, intertidal mudflats or sandflats, including inlets, bays, harbours, estuaries and lagoons, sandy beaches with mudflats nearby, sandy spits and islets and sometimes on exposed reefs or rock platforms (DoEE, 2019c).	2	Low. The development site does not support preferred habitat.	Species/Ecosystem[3]	
Gang-gang Cockatoo (*Callocephalon fimbriatum*)	V	-	In spring and summer, generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In autumn and winter, the species often moves to lower altitudes in drier, more open	0	Low. Marginal habitat present. No suitable breeding habitat. Species not	Species/ Ecosystem[1,2]	Hunter and Karuah Manning

Name	BC Act	EPBC Act	Habitat requirements	No. of records (Bionet 10km buffer)	Likelihood of occurrence	Ecosystem or species credit species?	IBRA subregion
			eucalypt forests and woodlands, particularly box-gum and box-ironbark assemblages, or in dry forest in coastal areas and often found in urban areas. Favours old growth forest and woodland attributes for nesting and roosting.		recorded in 10km of development site.		
Glossy Black-Cockatoo (*Calyptorhynchus lathami*)	V	-	Occurs in eucalypt woodland and forest with Allocasuarinas. Nests in tree hollows.	19	High. Preferred foraging trees species (*Allocasuarina* species) are present in some areas of the development site. No suitable breeding habitat in the development site – though could be in adjacent areas (species credits do not apply).	Species/ Ecosystem[1,2]	Hunter and Karuah Manning
Double-banded Plover (*Charadrius bicinctus*)	-	M	The Double-banded Plover is found on littoral, estuarine and fresh or saline terrestrial wetlands and also saltmarsh, grasslands and pasture. It occurs on muddy, sandy, shingled or sometimes rocky beaches, bays and inlets, harbours and margins of fresh or saline terrestrial wetlands such as lakes, lagoons and swamps, shallow estuaries and rivers (DoEE, 2019ca).	0	Low. The development site does not support preferred habitat.	- [3]	
Greater Sand Plover (*Charadrius leschenaultii*)	-	M	Almost entirely restricted to coastal areas in NSW, occurring mainly on sheltered sandy, shelly or muddy beaches or estuaries	2	Low.	Species/Ecosystem[3]	

Name	BC Act	EPBC Act	Habitat requirements	No. of records (Bionet 10km buffer)	Likelihood of occurrence	Ecosystem or species credit species?	IBRA subregion
			with large intertidal mudflats or sandbanks.		The development site does not support preferred habitat.		
Lesser Sand Plover (*Charadrius mongolus*)	-	M	Almost entirely coastal in NSW, favouring the beaches of sheltered bays, harbours and estuaries with large intertidal sandflats or mudflats; occasionally occurs on sandy beaches, coral reefs and rock platforms.	3	Low. The development site does not support preferred habitat.	Species/Ecosystem[3]	
White-winged Tern (*Chlidonias leucopterus*)	-	M	Mostly inhabits fresh, brackish or saline, and coastal or subcoastal wetlands. Frequently occurs on tidal wetlands and their associated tidal sandflats and mudflats. Terrestrial wetlands such as swamps, lakes, billabongs, rivers, floodplains, reservoirs, saltworks, sewage ponds and outfalls are also inhabited (DoEE, 2019c).	9	Low. The development site does not support preferred habitat.	-	
Speckled Warbler (*Chthonicola sagittata*)	V	-	In NSW, occurs throughout the hills and tablelands of the Great Dividing Range, rarely from the coast. Inhabits Eucalyptus dominated communities that have a grassy understorey, often on rocky ridges or in gullies where it forages for insects and seeds. Nests in a depression in the ground or the base of a low dense plant, often among fallen branches and other litter.	0	Low. The development site does not support preferred habitat.	Ecosystem[2]	Hunter and Karuah Manning

Name	BC Act	EPBC Act	Habitat requirements	No. of records (Bionet 10km buffer)	Likelihood of occurrence	Ecosystem or species credit species?	IBRA subregion
Spotted Harrier (*Circus assimilis*)	V	-	Occurs throughout the Australian mainland, except in densely forested or wooded habitats of the coast, escarpment and ranges, and rarely in Tasmania. Found most commonly in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands.	5	Moderate. Marginal habitat present on the development site.	Ecosystem	
Brown Treecreeper (*Climacteris picumnus victoriae*)	V	-	Found in eucalypt woodlands (including Box-Gum Woodland) and dry open forest of the inland slopes and plains inland of the Great Dividing Range; mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey, sometimes with one or more shrub species; also found in mallee and River Red Gum (*Eucalyptus camaldulensis*) Forest bordering wetlands with an open understorey of acacias, saltbush, lignum, cumbungi and grasses; usually not found in woodlands with a dense shrub layer; fallen timber is an important habitat component for foraging; also recorded, though less commonly, in similar woodland habitats on the coastal ranges and plains. Hollows in standing dead or live trees and tree stumps are essential for nesting.	3	Moderate. Marginal habitat present on the development site.	Ecosystem[2]	Hunter and Karuah manning

Name	BC Act	EPBC Act	Habitat requirements	No. of records (Bionet 10km buffer)	Likelihood of occurrence	Ecosystem or species credit species?	IBRA subregion
Oriental Cuckoo (*Cuculus optatus*)	-	M	The Oriental Cuckoo in eastern New South Wales, eastern Queensland and Cape York Peninsula, and top end of Northern Territory. Habitat includes forest, woodland, riverside trees.	0	Low. Marginal habitat present. Species not recorded in 10km of development site.	- [3]	
Varied Sittella (*Daphoenositta chrysoptera*)	V	-	The Varied Sittella inhabits most of mainland Australia except the treeless deserts and open grasslands. It inhabits eucalypt forests and woodlands, especially rough-barked species and mature smooth-barked gum with dead branches, mallee and Acacia woodland.	17	Moderate. Marginal habitat present on development site.	Ecosystem[2]	Hunter and Karuah Manning
Eastern Bristlebird (*Dasyornis brachypterus*)	E	E	Confined to NW/Queensland border region, Illawarra region and NSW/Victorian border region. Habitat for central and southern populations is characterised by dense, low vegetation including heath and open woodland with a heathy understorey.	0	Low. The development site does not support preferred habitat.	Species[3]	
Emu population in the New South Wales North Coast Bioregion and Port Stephens LGA (*Dromaius novaehollandiae*)	E	-	This population is isolated and largely restricted to coastal and near-coastal areas from Ballina to Evans Head and Red Rock and west to the Bungawalbin area. Occur in a range of open lowland habitats including grasslands, heathland, shrubland, open and shrubby woodlands, forest, and swamp and sedgeland communities. Forages for seeds,	3	Low. The development site does not support preferred habitat. Species is only associated with PCT 1619 which is in a poor and highly modified condition with no connectivity.	Species[1]	Hunter and Karuah Manning

Name	BC Act	EPBC Act	Habitat requirements	No. of records (Bionet 10km buffer)	Likelihood of occurrence	Ecosystem or species credit species?	IBRA subregion
			fruits and invertebrates. Nest comprises a platform of grass, twigs, leaves and bark on the ground.				
Black-necked Stork (*Ephippiorhynchus asiaticus*)	E	-	Widespread in coastal and subcoastal northern and eastern Australia; in NSW, the species becomes increasingly uncommon south of the Northern Rivers region. Rarely occurs south of Sydney. Found in association with wetlands, swamps, billabongs, estuaries and surrounding vegetation.	74	Low. The development site does not support preferred habitat.	Ecosystem	
White-fronted Chat (*Epthianura albifrons*)	V	-	In NSW, occurs in association with damp, open habitats below 1000 metres elevation along the coast (such as wetlands and saltmarsh), and in association with waterways in the west. Forages for insects on the ground. Nests in low vegetation elevated from the ground.	8	Low. The development site does not support preferred habitat.	Ecosystem	
Red Goshawk (*Erythrotriorchis radiatus*)	CE	V	The species is very rare in NSW. In NSW, preferred habitats include mixed subtropical rainforest, Melaleuca swamp forest and riparian Eucalyptus forest of coastal rivers.	0	Low. Marginal habitat present. Species not recorded in 10km of development site.	Species[3]	
Black Falcon (*Falco subniger*)	V	-	The Black Falcon inhabits woodland, shrubland and grassland in the arid and semi-arid zones, especially wooded watercourses and agricultural	2	Moderate. Marginal habitat present.	Ecosystem	Hunter

Name	BC Act	EPBC Act	Habitat requirements	No. of records (Bionet 10km buffer)	Likelihood of occurrence	Ecosystem or species credit species?	IBRA subregion
			land with scattered remnant trees. The Black Falcon is usually associated with streams or wetlands, visiting them in search of prey and often using standing dead trees as lookout posts. Habitat selection is generally influenced more by prey densities than by specific aspects of habitat floristics or condition, although in agricultural landscapes the Black Falcon tends to nest in healthy, riparian woodland remnants with a diverse avifauna.				
Latham's Snipe (*Gallinago hardwickii*)	-	M	In Australia, the range extends inland over the eastern tablelands in south-eastern Queensland and to west of the Great Dividing Range in NSW. Usually inhabit open, freshwater wetlands with low, dense vegetation. Can also inhabit areas with saline or brackish water, in modified or artificial habitats, and in habitats located close to humans or human activity (DoEE, 2019c).	58	Low. The development site does not support preferred habitat.	-	3
Swinhoe's Snipe (*Gallinago megala*)	-	M	During the non-breeding season Swinhoe's Snipe occurs at the edges of wetlands, such as wet paddy fields, swamps and freshwater streams. The species is also known to occur in grasslands, drier cultivated areas (including crops of rapeseed and wheat) and market gardens (DoEE, 2019c).	0	Low. The development site does not support preferred habitat.	-	3

Name	BC Act	EPBC Act	Habitat requirements	No. of records (Bionet 10km buffer)	Likelihood of occurrence	Ecosystem or species credit species?	IBRA subregion
Pin-tailed Snipe (*Gallinago stenura*)	-	M	During non-breeding period, the Pin-tailed Snipe occurs most often in or at the edges of shallow freshwater swamps, ponds and lakes with emergent, sparse to dense cover of grass/sedge or other vegetation. The species is also found in drier, more open wetlands such as claypans in more arid parts of species' range. It is also commonly seen at sewage ponds; not normally in saline or inter-tidal wetlands (DoEE, 2019c)	0	Low. The development site does not support preferred habitat.	- [3]	
Gull-billed Tern (*Gelochelidon nilotica*)	-	M	Inhabits shallow wetlands, including coastal or inland lakes, swamps and lagoons, as well as sheltered bays and estuaries (Birdlife Australia 2019).	5	Low. The development site does not support preferred habitat.	-	
Painted Honeyeater (*Grantiella picta*)	V	V	The species is nomadic and occurs at low densities throughout its range with the greatest concentrations being on the inland slopes of the Great Dividing Range in NSW, Victoria and southern Queensland. Inhabits Boree/ Weeping Myall (*Acacia pendula*), Brigalow (*A. harpophylla*) and Box-Gum Woodlands and Box-Ironbark forests.	0	Low. The development site does not support preferred habitat.	Ecosystem[3]	
Little Lorikeet (*Glossopsitta pusilla*)	V	-	Found in forests, woodland, treed areas along watercourses and roads. Forages mainly on flowers,	18	Recorded.	Ecosystem[2]	Hunter and Karuah Manning

Name	BC Act	EPBC Act	Habitat requirements	No. of records (Bionet 10km buffer)	Likelihood of occurrence	Ecosystem or species credit species?	IBRA subregion
			nectar and fruit. Found along coastal east Australia from Cape York in Queensland down east coast and round to South Australia. Uncommon in southern Victoria.				
Pied Oystercatcher (*Haematopus longirostris*)	E	-	In NSW the species is thinly scattered along the entire coast. Favours intertidal flats of inlets and bays, open beaches and sandbanks.	1	Low. The development site does not support preferred habitat.	Species	
White-bellied Sea-Eagle (*Haliaeetus leucogaster*)	V	-	In NSW it is widespread along the east coast, and along all major inland rivers and waterways. Occurs in coastal areas such as bays and inlets, beaches, reefs, lagoons, estuaries and mangroves; and at, or in the vicinity of freshwater swamps, lakes, reservoirs, billabongs and saltmarsh.	184	High. Recent records from the locality and potential foraging habitat present. No nests identified during field surveys (species credits do not apply).	Species/ Ecosystem[1,2]	Hunter and Karuah Manning
Grey-tailed Tattler (*Heteroscelus brevipes*)	-	M	Grey-tailed Tattlers breed in Siberia. In Australia, more commonly found in the north. Usually seen in small flocks on sheltered coasts with reefs and rock platforms or with intertidal mudflats. They are also found in intertidal rocky, coral or stony reefs, platforms and islets that are exposed at high tide, also shores of rock, shingle, gravel and shells and on intertidal mudflats in embayments, estuaries and coastal lagoons, especially those	0	Low. The development site does not support preferred habitat.	-	

Name	BC Act	EPBC Act	Habitat requirements	No. of records (Bionet 10km buffer)	Likelihood of occurrence	Ecosystem or species credit species?	IBRA subregion
			fringed with mangroves. (DoEE, 2019c).				
Little Eagle (*Hieraaetus morphnoides*)	V	-	The Little Eagle is distributed throughout the Australian mainland occupying habitats rich in prey within open eucalypt forest, woodland or open woodland. Sheoak or acacia woodlands and riparian woodlands of interior NSW are also used.	2	High. Potential foraging habitat present. No nests identified during field surveys (species credits do not apply).	Species/ Ecosystem[1,2]	Hunter and Karuah Manning
White-throated needletail (*Hirundapus caudacutus*)	-	M	In Australia the species is widespread in eastern and south-eastern Australia, from the islands in Torres Strait and the tip of Cape York south to Tasmania. It does not breed in Australia. Occurs in airspace over open forest, rainforest, heathland, farmlands, sandy beaches, mudflats and islands (DoEE, 2019c).	3	Low. The species is mostly aerial and the development site does not support the preferred habitat types that this species is typically found recorded above.	- [3]	
Caspian Tern (*Hydroprogne caspia*)	-	M	Mostly found in sheltered coastal embayments, those with sandy or muddy margins preferred. Also occurs on near-coastal or inland terrestrial wetlands, either fresh or saline, particularly lakes, waterholes, reservoirs, rivers and creeks. Also utilises artificial wetlands.	2	Low. The development site does not support preferred habitat.	-	
Comb-crested Jacana (*Irediparra gallinacea*)	V	-	Occurs on freshwater wetlands, either still or slow-flowing, with a good surface cover of floating	2	Low.	Ecosystem	

Name	BC Act	EPBC Act	Habitat requirements	No. of records (Bionet 10km buffer)	Likelihood of occurrence	Ecosystem or species credit species?	IBRA subregion
			vegetation or fringing and aquatic vegetation.		The development site does not support preferred habitat.		
Black Bittern (*Ixobrychus flavicollis*)	V	-	The Black Bittern has a wide distribution, from southern NSW north to Cape York and along the north coast to the Kimberley region. Inhabits both terrestrial and estuarine wetlands, generally in areas of permanent water and dense vegetation. Where permanent water is present, the species may occur in flooded grassland, forest, woodland, rainforest and mangroves.	2	Low. The development site does not support preferred habitat for the species.	Ecosystem	
Swift Parrot (*Lathamus discolor*)	E	CE	The Black Bittern has a wide distribution, from southern NSW north to Cape York and along the north coast to the Kimberley region. Inhabits both terrestrial and estuarine wetlands, generally in areas of permanent water and dense vegetation. Where permanent water is present, the species may occur in flooded grassland, forest, woodland, rainforest and mangroves.	8	Moderate. Nectivorous trees within woodland offer a small amount of foraging habitat for the species. The species breeds in Tasmania, and as such, the development site does not support nesting habitat for the species (species credits do not apply).	Species/ Ecosystem[1,2,3]	Hunter and Karuah Manning
Broad-billed Sandpiper (*Limicola falcinellus*)	V	M	The Broad Billed Sandpiper breeds in northern Siberia before migrating southwards in winter to Australia. During winter, the species inhabits sheltered parts of the coast such as estuarine sandflats and mudflats, harbours, embayments, lagoons,	10	Low. The development site does not support preferred habitat.	Species/Ecosystem[3]	

Name	BC Act	EPBC Act	Habitat requirements	No. of records (Bionet 10km buffer)	Likelihood of occurrence	Ecosystem or species credit species?	IBRA subregion
			saltmarshes and reefs as feeding and roosting habitat.				
Bar-tailed Godwit (*Limosa lapponica*)	-	M	The species has been recorded in the coastal areas of all Australian states. Found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays (DoEE, 2019c).	5	Low. The development site does not support preferred habitat.	Species/Ecosystem[3]	
Bar-tailed Godwit (baueri) (*Limosa lapponica baueri*)	-	V	The Bar-tailed Godwit (western Alaskan) occurs mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It has also been recorded in coastal sewage farms and saltworks, salt lakes and brackish wetlands near coasts, sandy ocean beaches, rock platforms, and coral reef-flats (DoEE, 2019c)	0	Low. The development site does not support preferred habitat.	Species/Ecosystem[3]	
Northern Siberian Bar-tailed Godwit (*Limosa lapponica menzbieri*)	-	CE	The Bar-tailed Godwit (northern Siberian) occurs mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It has also been recorded in coastal sewage farms and saltworks, salt lakes and brackish wetlands near coasts, sandy ocean beaches, rock platforms, and coral reef-flats (DoEE, 2019c)	0	Low. The development site does not support preferred habitat.	- [3]	

Name	BC Act	EPBC Act	Habitat requirements	No. of records (Bionet 10km buffer)	Likelihood of occurrence	Ecosystem or species credit species?	IBRA subregion
Black-tailed Godwit (*Limosa limosa*)	V	M	Breeds in Mongolia and Eastern Siberia (Palaearctic). In NSW, it is most frequently recorded at Kooragang Island, with occasional records elsewhere along the north and south coast, and inland. Primarily a coastal species. Usually found in sheltered bays, estuaries and lagoons with large intertidal mudflats and/or sandflats. Roosts and loafs on low banks of mud, sand and shell bars.	10	Low. The development site does not support preferred habitat.	Species/Ecosystem[3]	
Square-tailed Kite (*Lophoictinia isura*)	V	-	Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses. Breeding is from July to February, with nest sites generally located along or near watercourses, in a fork or on large horizontal limbs.	7	High. Foraging habitat present. No raptor nests identified in development site (species credits do not apply).	Species/ Ecosystem[1,2]	Hunter and Karuah Manning
Hooded Robin (south-eastern form) (*Melanodryas cucullata cucullata*)	V	-	The species prefers lightly wooded country, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas. The Hooded Robin requires structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses.	0	Low. The development site does not support preferred habitat for the species.	Ecosystem[2]	Hunter and Karuah Manning

Name	BC Act	EPBC Act	Habitat requirements	No. of records (Bionet 10km buffer)	Likelihood of occurrence	Ecosystem or species credit species?	IBRA subregion
Black-chinned Honeyeater (eastern subspecies) (*Melithreptus gularis gularis*)	V	-	Inhabit mostly upper levels of drier open forests or woodlands dominated by box and ironbark eucalypts, as well as open forest of smooth-barked gums, stringybarks, ironbarks, river sheoaks (nesting habitat) and tea-trees. This species forage over large home ranges of at least five hectares.	0	Low. Marginal habitat present. Species not recorded in 10km of development site.	Ecosystem[2]	Hunter and Karuah Manning
Black-faced Monarch *(Monarcha melanopsis)*	-	M	The Black-faced Monarch mainly occurs in rainforest ecosystems, including semi-deciduous vine-thickets, complex notophyll vine-forest, tropical (mesophyll) rainforest, subtropical (notophyll) rainforest, mesophyll (broadleaf) thicket/shrubland, warm temperate rainforest, dry (monsoon) rainforest and (occasionally) cool temperate rainforest (DoEE, 2019c)	0	Low. The development site does not support preferred habitat for the species.	- [3]	
Yellow Wagtail (*Motacilla flava*)		-	This species occupies a range of damp or wet habitats with low vegetation, from damp meadows, marshes, waterside pastures, sewage farms and bogs to damp steppe and grassy tundra. In the north of its range, it is also found in large forest clearings (DoEE, 2019c).	0	Low. The development site does not support preferred habitat for the species.	- [3]	
Satin Flycatcher (*Myiagra cyanoleuca*)	-	M	Satin Flycatchers inhabit heavily vegetated gullies in eucalypt-dominated forests and taller	0	Low.	- [3]	

Name	BC Act	EPBC Act	Habitat requirements	No. of records (Bionet 10km buffer)	Likelihood of occurrence	Ecosystem or species credit species?	IBRA subregion
			woodlands, and on migration, occur in coastal forests, woodlands, mangroves and drier woodlands and open forests (DoEE, 2019c).		The development site does not support preferred habitat for the species.		
Turquoise Parrot (*Neophema pulchella*)	V	-	In NSW, occurs from the coastal plains to the western slopes of the Great Diving Range. Found along the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland. Forages on the ground for seeds and grasses. Nests in a tree hollow, log or post.	2	Moderate. Marginal habitat present.	Ecosystem[2]	Hunter and Karuah Manning
Barking Owl (*Ninox connivens*)	V	-	Inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. Sometimes able to successfully breed along timbered watercourses in heavily cleared habitats (eg western NSW) due to the higher density of prey on these fertile riparian soils. Roosts in shaded portions of tree canopies, including tall midstorey trees with dense foliage such as Acacia and Casuarina species. Requires very large permanent territories in most habitats due to sparse prey densities.	0	Low. Marginal habitat present. Species not recorded in 10km of development site.	Species/Ecosystem[1,2]	Hunter and Karuah Manning
Powerful Owl (*Ninox strenua*)	V	-	In NSW, the Powerful Owl is widely distributed throughout the eastern forests from the coast inland to tablelands. It inhabits a	17	High Potential foraging habitat present. No suitable hollows for breeding	Species/ Ecosystem[1,2]	Hunter and Karuah Manning

Name	BC Act	EPBC Act	Habitat requirements	No. of records (Bionet 10km buffer)	Likelihood of occurrence	Ecosystem or species credit species?	IBRA subregion
			range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest requiring large tracts of forest or woodland habitat but can occur in fragmented landscapes as well. Powerful Owls nest in large tree hollows (at least 0.5 m deep), in large eucalypts (diameter at breast height of 80-240 cm) that are at least 150 years old.		identified in development site (species credits do not apply).		
Eastern Curlew (*Numenius madagascariensis*)	-	CE	Within Australia, the Eastern Curlew has a primarily coastal distribution. In NSW is mainly found in intertidal mudflats and sometimes saltmarsh of sheltered coasts. Occasionally, found on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets (DoEE, 2019c)	23	Low. The development site does not support preferred habitat for the species.	Species/Ecosystem[3]	
Little Curlew (*Numenius minutus*)	-	M	In NSW most records are scattered east of the Great Dividing Range, from Casino, south to Greenwell Point with a few scattered records west of the Great Dividing Range. Most often found in short, dry grassland and sedgeland, including dry floodplains and blacksoil plains, which have scattered, shallow freshwater pools or areas seasonally inundated (DoEE 2019).	1	Low. The development site does not support preferred habitat for the species.	- [3]	

Name	BC Act	EPBC Act	Habitat requirements	No. of records (Bionet 10km buffer)	Likelihood of occurrence	Ecosystem or species credit species?	IBRA subregion
Whimbrel (*Numenius phaeopus*)	-	M	Primarily has a coastal distribution. Often found on the intertidal mudflats of sheltered coasts. It is also found in harbours, lagoons, estuaries and river deltas, often those with mangroves, but also open, unvegetated mudflats. It is occasionally found on sandy or rocky beaches, on coral or rocky islets, or on intertidal reefs and platforms (DoEE, 2019c).	7	Low. The development site does not support preferred habitat for the species.	- [3]	
Blue-billed Duck (*Oxyura australis*)	V	-	Prefers deep water in large permanent wetlands and swamps with dense aquatic vegetation.	1	Low. The development site does not support preferred habitat for the species.	Ecosystem	
Eastern Osprey (*Pandion cristatus (syn. P. haliaetus)*)	V	M	Favours coastal areas, especially the mouths of large rivers, lagoons and lakes. Feeds on fish over clear, open water. Breeds from July to September in NSW. Nests are made high up in dead trees or in dead crowns of live trees, usually within one kilometre of the sea.	9	Low. The development site does not support preferred habitat for the species.	Species/ Ecosystem[1,2,3]	Hunter
Scarlet Robin (*Petroica boodang*)	V	-	In NSW, it occurs from the coast to the inland slopes. The Scarlet Robin lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs.	3	Moderate. Marginal habitat present.	Ecosystem[2]	Hunter

Name	BC Act	EPBC Act	Habitat requirements	No. of records (Bionet 10km buffer)	Likelihood of occurrence	Ecosystem or species credit species?	IBRA subregion
Grey-crowned Babbler (*Pomatostomus temporalis temporalis*)	V	-	Within NSW the Grey-crowned Babbler (eastern subspecies) occurs on the western slopes of the Great Dividing Rang and on the western plains as far as Louth and Balranald, they also occur in woodlands in the Hunter Valley and in several locations on the north coast of NSW. May be extinct in the southern, central and New England tablelands. Found in Box-Gum Woodlands on the slopes and Box-Cypress-pine and open Box woodlands on alluvial plains as well as woodlands on fertile soils in coastal regions.	40	Recorded.	Ecosystem[2]	Hunter and Karuah Manning
Ruff (*Philomachus pugnax*)	-	M	In Australia the Ruff is found on generally fresh, brackish of saline wetlands with exposed mudflats at the edges. It is found in terrestrial wetlands including lakes, swamps, pools, lagoons, tidal rivers, swampy fields and floodlands. They are occasionally seen on sheltered coasts, in harbours, estuaries, seashores and are known to visit sewage farms and saltworks (DoEE, 2019c).	1	Low. The development site does not support preferred habitat for the species.	- [3]	
Glossy Ibis (*Plegadis falcinellus*)	-	M	The Glossy Ibis' preferred habitat for foraging and breeding are fresh water marshes at the edges of lakes and rivers, lagoons, flood-plains, wet meadows,	13	Low. The development site does not support preferred habitat for the species.	-	

Name	BC Act	EPBC Act	Habitat requirements	No. of records (Bionet 10km buffer)	Likelihood of occurrence	Ecosystem or species credit species?	IBRA subregion
			swamps, reservoirs, sewage ponds, rice-fields and cultivated areas under irrigation (DoEE, 2019c).				
Pacific Golden Plover (*Pluvialis fulva*)	-	M	In non-breeding grounds in Australia this species usually inhabits coastal habitats, though it occasionally occurs around inland wetlands. Usually found on beaches, mudflats and sandflats (sometimes in vegetation such as mangroves, low saltmarsh such as Sarcocornia, or beds of seagrass) in sheltered areas including harbours, estuaries and lagoons, and also in evaporation ponds in saltworks. (DoEE, 2019c).	13	Low. The development site does not support preferred habitat for the species.	- [3]	
Grey Plover (*Pluvialis squatarola*)	-	M	In non-breeding grounds in Australia, Grey Plovers occur almost entirely in coastal areas, where they usually inhabit sheltered embayments, estuaries and lagoons with mudflats and sandflats, and occasionally on rocky coasts with wave-cut platforms or reef-flats, reefs within muddy lagoons, around terrestrial wetlands such as near-coastal lakes and swamps, or salt-lakes. (DoEE, 2019c).	5	Low. The development site does not support preferred habitat for the species.	- [3]	
Wompoo Fruit-dove (*Ptilinopus magnificus*)	V	-	Distributed along the coast and coastal ranges from the Hunter River in NSW to Cape York Peninsula, rarely sighted south of Coffs Harbour. Inhabits in or near	1	Low. The development site does not support preferred habitat for the species.	Ecosystem	

Name	BC Act	EPBC Act	Habitat requirements	No. of records (Bionet 10km buffer)	Likelihood of occurrence	Ecosystem or species credit species?	IBRA subregion
			rainforest, low elevation moist eucalypt forest and brush box forests. Most often seen in mature forests but also found in remnant and regenerating rainforest.				
Rose-crowned Fruit-Dove (*Ptilinopus regina*)	V	-	Rose-crowned Fruit-doves occur mainly in sub-tropical and dry rainforest and occasionally in moist eucalypt forest and swamp forest, where fruit is plentiful.	1	Low. The development site does not support preferred habitat for the species.	Ecosystem	
Superb Fruit-Dove (*Ptilinopus superbus*)	V	V	The Superb Fruit-dove occurs principally from north-eastern in Queensland to north-eastern NSW. It inhabits rainforest and similar closed forests.	1	Low. The development site does not support preferred habitat for the species.	Ecosystem	
Australian Painted Snipe (*Rostratula australis*)	E	E	The Australian Painted Snipe is restricted to Australia. Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber.	3	Low. The development site does not support preferred habitat for the species.	Ecosystem[3]	
Rufous fantail (*Rhipidura rufifrons*)	-	M	In east and south-east Australia, the Rufous Fantail mainly inhabits wet sclerophyll forests, often in gullies dominated by eucalypts, usually with a dense shrubby understorey often including ferns. They also occur in subtropical and temperate rainforests (DoEE 2019).	0	Low. The development site does not support preferred habitat for the species. Species not recorded in 10km of development site.	- [3]	

Name	BC Act	EPBC Act	Habitat requirements	No. of records (Bionet 10km buffer)	Likelihood of occurrence	Ecosystem or species credit species?	IBRA subregion
Diamond Firetail (*Stagonopleura guttata*)	V	-	Widely distributed in NSW, the species is found in grassy eucalypt woodlands, open forest, mallee, Natural Temperate Grasslands, secondary derived grasslands, riparian area and occasionally in wooded farmland.	0	Low. Marginal habitat present. Species not recorded in 10km of development site.	Ecosystem[2]	Hunter and Karuah Manning
Little Tern (*Sternula albifrons*)	E	-	Almost exclusively coastal, preferring sheltered environments; however may occur several kilometres from the sea in harbours, inlets and rivers (with occasional offshore islands or coral cay records).	2	Low. The development site does not support preferred habitat for the species.	Species/Ecosystem	
Australian Fairy Tern (*Sternula nereis nereis*)	-	V	The Fairy Tern (Australian) nests on sheltered sandy beaches, spits and banks above the high tide line and below vegetation. The subspecies has been found in embayments of a variety of habitats including offshore, estuarine or lacustrine (lake) islands, wetlands and mainland coastline (DoEE, 2019c).	0	Low. The development site does not support preferred habitat for the species.	Species[3]	
Freckled Duck (*Stictonetta naevosa*)	V	-	Widely distributed in NSW, the species is found in grassy eucalypt woodlands, open forest, mallee, Natural Temperate Grasslands, secondary derived grasslands, riparian area and occasionally in wooded farmland.	6	Low. The development site does not support preferred habitat for the species.	Ecosystem	
Spectacled Monarch	-	M	Occurs in dense vegetation, mainly in rainforest but also in moist forest or wet sclerophyll and	0	Low.	- [3]	

Name	BC Act	EPBC Act	Habitat requirements	No. of records (Bionet 10km buffer)	Likelihood of occurrence	Ecosystem or species credit species?	IBRA subregion
(*Symposiachrus trivirgatus* (*syn. Monarcha trivirgatus*))			occasionally in other dense vegetation such as mangroves, drier forest and woodlands (DoEE, 2019c).		The development site does not support preferred habitat for the species.		
Hooded Plover (eastern) (*Thinornis rubricollis rubricollis*)	-	V	Prefers sandy ocean beaches, particularly broad and flat, with a wide wave-wash zone for feeding, much beachcast seaweed, and backed by sparsely vegetation sand-dunes for shelter and nesting. Occasionally found on tidal bays and estuaries, rock platforms and rocky or sand-covered reefs near sandy beaches, and small beaches in lines of cliffs. Regularly uses near-coastal saline and freshwater lakes and lagoons, often with saltmarsh (DoEE, 2019c).	0	Low. The development site does not support preferred habitat for the species.	- 3	
Grey-tailed Tattler (*Tringa brevipes*)	-	M	Grey-tailed Tattlers breed in Siberia. In Australia, more commonly found in the north. Usually seen in small flocks on sheltered coasts with reefs and rock platforms or with intertidal mudflats. They are also found in intertidal rocky, coral or stony reefs, platforms and islets that are exposed at high tide, also shores of rock, shingle, gravel and shells and on intertidal mudflats in embayments, estuaries and coastal lagoons, especially those fringed with mangroves. (DoEE, 2019c).	2	Low. The development site does not support preferred habitat for the species.	- 3	

Name	BC Act	EPBC Act	Habitat requirements	No. of records (Bionet 10km buffer)	Likelihood of occurrence	Ecosystem or species credit species?	IBRA subregion
Wood Sandpiper (*Tringa glareola*)	-	M	In NSW there are records east of the Great Divide, from Stratheden and Casino, south to Nowra and elsewhere, mostly from the Riverina, but also from the Upper and Lower Western Regions. Usually found in well-vegetated, shallow, freshwater wetlands such as swamps, billabongs, lakes, pools and waterholes. (DoEE, 2019c).	2	Low. The development site does not support preferred habitat for the species.	-	
Wandering Tattler (*Tringa incana*)	-	M	The Wandering Tattler is generally found on rocky coasts with reefs and platforms, points, spits, piers, offshore islands and shingle beaches or beds. It is occasionally seen on coral reefs or beaches, and tends to avoid mudflats.	1	Low. The development site does not support preferred habitat for the species.	-	
Common Greenshank (*Tringa nebularia*)	-	M	The species has been recorded in most coastal regions. It is widespread west of the Great Dividing Range, especially between the Lachlan and Murray Rivers and the Darling River drainage basin, including the Macquarie Marshes, and north-west regions. It occurs in sheltered coastal habitats, typically with large mudflats and saltmarsh, mangroves or seagrass and a wide variety of inland wetlands and sheltered coastal habitats of varying salinity (DoEE, 2019c).	14	Low. The development site does not support preferred habitat for the species.	- 3	

Name	BC Act	EPBC Act	Habitat requirements	No. of records (Bionet 10km buffer)	Likelihood of occurrence	Ecosystem or species credit species?	IBRA subregion
Marsh Sandpiper (*Tringa stagnatilis*)	-	M	The Marsh Sandpiper lives in permanent or ephemeral wetlands of varying salinity, including swamps, lagoons, billabongs, saltpans, saltmarshes, estuaries, pools on inundated floodplains, and intertidal mudflats and also regularly at sewage farms and saltworks (DoEE, 2019c).	7	Low. The development site does not support preferred habitat for the species.	- [3]	
Red-backed Button-quail (*Turnix maculosus*)	V	-	In NSW, said to occur in grasslands, heath and crops. Said to prefer sites close to water, especially when breeding. The species has been observed associated with the following grasses (in various vegetation formations): speargrass *Heteropogon*, Blady Grass *Imperata cylindrica*, *Triodia*, *Sorghum*, and Buffel Grass *Cenchrus ciliaris*.	0	Low. Marginal habitat present. Species not recorded in 10km of development site.	Species[1]	Karuah Manning
Eastern Grass Owl (*Tyto longimembris*)	V	-	Within NSW the Eastern Grass Owl is likely to be resident in the north-east. Occurs mainly in areas of tall grass including tussock grassland, in swampy areas, grassy plain, swampy heath and in cane grass or sedges on floodplains.	21	Moderate. Marginal foraging habitat present.	Ecosystem	Hunter
Masked Owl (*Tyto novaehollandiae*)	V	-	Occurs from the eastern coast of NSW inland to the western plains. Found in eucalypt forests and woodlands from sea level to 1100 m. Hunts in and along the edges	11	High. Foraging habitat present. No suitable hollows for breeding identified in	Species/ Ecosystem[1,2]	Hunter and Karuah Manning

Name	BC Act	EPBC Act	Habitat requirements	No. of records (Bionet 10km buffer)	Likelihood of occurrence	Ecosystem or species credit species?	IBRA subregion
			of forests, including roadsides for arboreal and terrestrial mammals. Roosts and nests in large tree hollows within moist eucalypt forested gullies.		development site (species credits do not apply).		
Terek Sandpiper (*Xenus cinereus*)	V	M	A rare migrant to the eastern and southern Australian coasts. The two main sites for the species in NSW are the Richmond River estuary and the Hunter River estuary. Recorded on coastal mudflats, lagoons, creeks and estuaries.	5	Low. The development site does not support preferred habitat for the species.	Species/Ecosystem[3]	
Mammals							
Rufous Bettong (*Aepyprymnus rufescens*)	V	-	In NSW it has largely vanished from inland areas but there are sporadic, unconfirmed records from the Pilliga and Torrington districts. Inhabits a variety of forests from tall, moist eucalypt forest to open woodland, with a tussock grass understorey.	0	Low. Marginal habitat present. Species not recorded in 10km of development site.	Species[1]	Karuah Manning
Eastern Pygmy-possum (*Cercartetus nanus*)	V	-	Found in a range of habitat from rainforest through sclerophyll forest to tree heath. It feeds largely on the nectar and pollen of banksias, eucalypts and bottlebrushes and sometimes soft fruits. It nests in very small tree holes, between the wood and bark of a tree, abandoned birds' nests and shredded bark in the fork of trees.	1	Low. The development site does not support preferred habitat for the species.	Species[1]	Hunter and Karuah Manning

Name	BC Act	EPBC Act	Habitat requirements	No. of records (Bionet 10km buffer)	Likelihood of occurrence	Ecosystem or species credit species?	IBRA subregion
Large-eared Pied Bat (*Chalinolobus dwyeri*)	V	V	Found mainly in areas with extensive cliffs and caves, from Rockhampton in Queensland south to Bungonia in the NSW Southern Highlands. Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, mud nests of the Fairy Martin (Petrochelidon ariel), frequenting low to mid-elevation dry open forest and woodland close to these features.	2	Low. The development site does not support preferred habitat for the species. The species was not recorded during Anabat surveys.	Species[1,3]	Hunter and Karuah Manning
Spotted-Tailed Quoll (*Dasyurus maculatus*)	V	E	Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Individual animals use hollow-bearing trees, fallen logs, small caves, rock outcrops and rocky-cliff faces as den sites.	20	Low. Woodland habitats too small and fragmented/isolated to support the species.	Ecosystem[2,3]	Hunter and Karuah Manning
Eastern False Pipistrelle (*Falsistrellus tasmaniensis*)	V	-	Occurs along the east coast of NSW, where it inhabits tall moist forests. Roosts in hollows of eucalypts, occasionally under loose bark on trees or in buildings.	31	Recorded.	Ecosystem[2]	Hunter and Karuah Manning
Golden-tipped Bat (*Kerivoula papuensis (syn. Phoniscus papuensis)*)	V	-	Found in rainforest and adjacent wet and dry sclerophyll forest up to 1000m. Also recorded in tall open forest, *Casuarina*-dominated riparian forest and coastal *Melaleuca* forests. Roost mainly	0	Low. The development site does not support preferred habitat for the species.	Ecosystem[2]	Hunter and Karuah Manning

Name	BC Act	EPBC Act	Habitat requirements	No. of records (Bionet 10km buffer)	Likelihood of occurrence	Ecosystem or species credit species?	IBRA subregion
			in rainforest gullies on small first- and second-order streams in usually abandoned hanging Yellow-throated Scrubwren and Brown Gerygone nests. Bats may also roost under thick moss on tree trunks, in tree hollows, dense foliage and epiphytes. Bats will use multiple roost and change roosts regularly. Maternity roots may occur away from water sources with one maternity roost found 450m upslope of the nearest water course in a broken bough.				
Eastern Coastal Free-tailed Bat (*Micronomus norfolkensis*)	V	-	Occurs in dry sclerophyll forest, woodland, swamp forest and mangrove forests. Roost mainly in tree hollows but will also roost under bark or in man-made structures.	96	Recorded.	Ecosystem[2]	Hunter and Karuah Manning
Little Bentwing-Bat (*Miniopterus australis*)	V	-	Feeds on small insects beneath the canopy of well-timbered habitats including rainforest, Melaleuca swamps and dry sclerophyll forest. Roosts in caves and tunnels and has specific requirements for nursey sites. Distribution becomes coastal towards the southern limit of its range in NSW. Nesting sites are in areas where limestone mining is preferred.	170	Recorded. No maternity caves present (species credits do not apply).	Species/ Ecosystem[1,2]	Hunter and Karuah Manning

Name	BC Act	EPBC Act	Habitat requirements	No. of records (Bionet 10km buffer)	Likelihood of occurrence	Ecosystem or species credit species?	IBRA subregion
Large Bent-winged Bat (*Miniopterus orianae oceanensis*)	V	-	The Eastern Bentwing-bat forages in forested areas. Caves are the primary roosting habitat, but they also use derelict mines, storm-water tunnels, buildings and other man-made structures. They form discrete populations centred on a maternity cave that is used annually in spring and summer for the birth and rearing of young. Populations disperse within about 300 km range of maternity caves.	50	Recorded. No maternity caves present (species credits do not apply).	Species/ Ecosystem[1,2]	Hunter and Karuah Manning
Southern Myotis (*Myotis macropus*)	V	-	Southern Myotis generally roost in groups of 10-15 close to water in caves, mine shafts, hollow-bearing trees, stormwater channels, buildings, under bridges and in dense foliage. They forage over streams and pools catching insects and small fish by raking their feet across the water surface.	32	High. Potentially recorded. Core foraging habitat not present in development site, though occurs nearby.	Species[1]	Hunter and Karuah Manning
Corben's Long-eared Bat (*Nyctophilus corbeni*)	V	V	Occurs in mallee, bulloke and box eucalypt dominated communities.	1	Low. The development site does not support preferred habitat for the species.	Ecosystem	
Greater Glider (*Petauroides volans*)	-	V	The Greater Glider has restricted distribution in eastern Australia, from the Windsor Tableland in north Queensland to central Victoria, with an elevated range from sea level to 1200 metres above sea level. The species is largely restricted to eucalypt	0	Low. The development site does not support preferred habitat for the species.	Species[3]	

Name	BC Act	EPBC Act	Habitat requirements	No. of records (Bionet 10km buffer)	Likelihood of occurrence	Ecosystem or species credit species?	IBRA subregion
			forests and woodlands. It is found in abundance in montane eucalypt forest with relatively old trees and an abundance of hollows and with a diversity of eucalypts (DoEE, 2019c).				
Yellow-bellied Glider (*Petaurus australis*)	V	-	The Yellow-bellied Glider is found along the eastern coast to the western slopes of the Great Dividing Range, from southern Queensland to Victoria. Occurs in tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils.	1	Low. The development site does not support preferred habitat for the species.	Ecosystem[2]	Hunter and Karuah Manning
Squirrel Glider (*Petaurus norfolcensis*)	V	-	Inhabits mature or old growth Box, Box-Ironbark woodlands and River Red Gum forest west of the Great Dividing Range and Blackbutt-Bloodwood forest with heath understorey in coastal areas.	80	Moderate. Marginal habitat present. Species not recorded during targeted surveys for this project nor for the adjacent Kings Hill URA.	Species[1]	Hunter and Karuah Manning
Brush-tailed Rock-wallaby (*Petrogale penicillata*)	E	V	In NSW they occur from the Queensland border in the north to the Shoalhaven in the south, with the population in the Warrumbungle Ranges being the western limit. Occupies rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges, often facing north.	0	Low. The development site does not support preferred habitat for the species.	Species[1,3]	Hunter and Karuah Manning
Brush-tailed Phascogale (*Phascogale tapoatafa*)	V	-	The Brush-tailed Phascogale had a scattered distribution around the coast of Australia, within NSW	33	Moderate. The species was not identified during field	Species[1]	Hunter and Karuah Manning

Name	BC Act	EPBC Act	Habitat requirements	No. of records (Bionet 10km buffer)	Likelihood of occurrence	Ecosystem or species credit species?	IBRA subregion
			they are mainly found east of the Great Dividing Range. Prefers dry sclerophyll open forest with spare groundcover of herbs, grasses, shrubs or leaf litter. Also inhabits heath, swamps, rainforest and wet sclerophyll forest. Nest and shelter in tree hollows with entrances 2.5 – 4 cm wide.		surveys though is known to occur on the adjacent URA. Marginal habitat present.		
Koala (*Phascolarctos cinereus*)	V	V	In NSW, koala populations are found on the central and north coasts, southern highlands, southern and northern tablelands, Blue Mountains, southern coastal forests, with some smaller populations on the plains west of the Great Dividing Range. Inhabit eucalypt woodlands and forests.	2419	High. The species was not identified during field surveys though is known to occur on the adjacent URA. Feed trees identified in some areas.	Species/ Ecosystem[1,2,3]	Hunter and Karuah Manning
Koala, Hawks Nest and Tea Gardens population (*Phascolarctos cinereus* - endangered population)	E	-	Swamp Mahogany and Tallowwood are of primary importance to this Koala population. Koalas in this population are found in a range of Eucalypt forest and woodland communities, including coastal forests, rainforest, riparian areas, swamp sclerophyll forests, heathland and shrubland. The Myall River represents a major barrier between Koalas on the eastern Hawks Nest side of the river and the western Tea Gardens side of the river, although occasional movements between these two locations have been known to occur.	-	Low. Geographic extent of population does not include the development site.	Species[1]	Karuah Manning

Name	BC Act	EPBC Act	Habitat requirements	No. of records (Bionet 10km buffer)	Likelihood of occurrence	Ecosystem or species credit species?	IBRA subregion
Common Planigale (*Planigale maculata*)	V	-	Occurs from the Queensland border and south to the Upper Hunter River. The southernmost record is from Gosford. Common Planigales inhabit rainforest, eucalypt forest, heathland, marshland, grassland and rocky areas where there is surface cover, and usually close to water. Habitat selection is considered to be dependent on an adequate surface cover of grasses, hollow logs, rocks and leaf litter. It feeds on insects, spiders and small lizards. This species shelters under rocks, timber, rubbish (e.g. sheet iron) and in termite mounds.	0	Low. Marginal habitat present. Species not recorded in 10km of development site.	Species[1]	Hunter and Karuah Manning
Long-nosed Potoroo (SE mainland) (*Potorous tridactylus tridactylus*)	V	V	In NSW it is generally restricted to coastal heaths and forests east of the Great Dividing Range, with an annual rainfall exceeding 760 mm. Inhabits coastal heaths and dry and wet sclerophyll forests with a dense understorey.	1	Low. The development site does not support preferred habitat for the species.	Ecosystem[3]	
Eastern Chestnut Mouse (*Pseudomys gracilicaudatus*)	V	-	In NSW the Eastern Chestnut Mouse is mostly found, in low numbers, in heathland and is most common in dense, wet heath and swamps. Optimal habitat appears to be in vigorously regenerating heathland burnt from 18 months to four years previously. By the time the heath is mature, the larger Swamp Rat becomes dominant,	0	Low. The development site does not support preferred habitat for the species.	Ecosystem[2]	Hunter and Karuah Manning

Name	BC Act	EPBC Act	Habitat requirements	No. of records (Bionet 10km buffer)	Likelihood of occurrence	Ecosystem or species credit species?	IBRA subregion
			and Eastern Chestnut Mouse numbers drop again.				
New Holland Mouse (*Pseudomys novaehollandiae*)	-	V	The New Holland Mouse has a fragmented distribution across Tasmania, Victoria, NSW and Queensland. The species is known to inhabit open heathlands, woodlands and forests with a heathland understorey and vegetated sand dunes.	40	Low. The development site does not support preferred habitat for the species.	Ecosystem[3]	
Grey-headed Flying-fox (*Pteropus poliocephalus*)	V	V	Occurs in subtropical and temperate rainforests, tall sclerophyll forest and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy.	137	Recorded.	Species/ Ecosystem[1,2,3]	Hunter and Karuah Manning
Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*)	V	-	Occurs throughout tropical and south-east of Australia, excluding Tasmania. Found in a variety of habitat types including wet and dry sclerophyll forest, open woodland, Acacia shrubland, mallee, grassland and desert. Forages for insects above the tree canopy. Roosts in tree hollows, abandoned sugar glider nests or animal burrows.	6	Low. The species was not identified during field surveys. Marginal habitat present.	Ecosystem[2]	Hunter and Karuah Manning

Name	BC Act	EPBC Act	Habitat requirements	No. of records (Bionet 10km buffer)	Likelihood of occurrence	Ecosystem or species credit species?	IBRA subregion
Greater Broad-nosed Bat (*Scoteanax rueppellii*)	V	-	In NSW it is widespread on the New England Tablelands. Utilises a variety of habitats from woodland through to moist and dry eucalypt forest and rainforest, though it is most commonly found in tall wet forest.	46	High. Probable recording of species.	Ecosystem[2]	Hunter and Karuah Manning
Eastern Cave Bat (*Vespadelus troughtoni*)	V	-	Found in a broad band on both sides of the Great Dividing Range from Cape York to Kempsey, with records from the New England Tablelands and the upper north coast of NSW. The western limit of the Eastern Cave Bat distribution in NSW appears to be the Warrumbungle Range. A cave-roosting species usually found in dry open forest and woodland, near cliffs or rocky overhangs. Has also been recorded roosting in disused mine workings. Occasionally found along cliff-lines in wet eucalypt forest and rainforest.	10	Low. The development site does not support preferred habitat for the species. Not recorded during Anabat surveys.	Species[1]	Hunter and Karuah Manning
Reptiles							
Pale-headed Snake (*Hoplocephalus bitorquatus*)	V	-	A patchy distribution of the Pale-headed Snake occurs in the north-eastern area of NSW although historical records show a much wider distribution. Is found mainly in dry eucalypt forests and woodlands, cypress forest and occasionally in rainforest or moist	0	Low. Marginal habitat present. Species not recorded in 10km of development site.	Species[1]	Hunter and Karuah Manning

Name	BC Act	EPBC Act	Habitat requirements	No. of records (Bionet 10km buffer)	Likelihood of occurrence	Ecosystem or species credit species?	IBRA subregion
			eucalypt forest, may spend weeks at a time hidden in tree hollows.				
Fish							
Black Rockcod (*Epinephelus daemelii*)	V	V	Generally inhabit near-shore rocky reefs at depths down to 50 m. Found in rock caves, rock gutters and on rock reefs. Juvenile black cod are often found in coastal rock pools while slightly older juveniles commonly occur in estuary systems.	0	Low. The development site does not support preferred habitat for the species.	- [3]	
Insects							
Golden Sun Moth (*Synemon plana*)	E	CE	Occurs in grassy Box-Gum Woodlands and Natural Temperate Grasslands dominated by wallaby grasses. Habitat may contain several wallaby grass species.	0	Low. The development site does not support preferred habitat for the species.	Species[3]	

APPENDIX E EPBC ACT SIGNIFICANT IMPACT ASSESSMENTS

Significant Impact Assessments have been carried out for threatened species listed under the EPBC Act which are known or considered to have a high or moderate likelihood of occurrence within the development site.

Significant Impact Assessments have been prepared for the threatened entities outlined in the following table:

Scientific name	Common Name	Status under EPBC Act	Potential occurrence
Fauna			
Anthochaera phrygia	Regent Honeyeater	CE	Moderate.
Lathamus discolor	Swift Parrot	CE	Moderate.
Phascolarctos cinereus	Koala	V	High.
Pteropus poliocephalus	Grey-headed Flying-fox	V	Recorded.

Swift Parrot (*Lathamus discolor*)

The Swift Parrot is listed as Critically Endangered under the EPBC Act. This species spends spring and summer in Tasmania during the breeding season and returns as a non-breeding migrant to the mainland to forage during winter. It moves in response to changing food availability returning to some foraging sites regularly.

The development site supports the following tree species that are known foraging resources for the Swift Parrot (Saunders and Tzaros 2011):

- *Eucalyptus tereticornis* (Forest Red Gum) – winter blossom
- *Corymbia maculata* (Spotted Gum) – winter blossom
- *Eucalyptus moluccana* (Coast Grey Box) – lerps

Important habitats for the Swift Parrot (Saunders and Tzaros 2011) include habitats which are used:

- For nesting (Tasmania only)
- By large proportions of the population
- Repeatedly between seasons
- For prolonged periods of time

The criteria listed above are broadly consistent with the criteria used by Birdlife Australia (IUCN 2016) to identify Key Biodiversity Areas (KBAs) (previously 'Important Bird Areas') for the Swift Parrot.

Draft KBAs for the Swift Parrot have been mapped by DPIE in Boomerang Park and Newbury Park. The mapped KBAs overlap with the development site, however in the overlapping areas, there are no potential feed trees. Some eucalypts are nearby though the densities are very low such that they are unlikely to be an important foraging resource for the species.

Known KBAs for the Swift Parrot in proximity to the development site (Birds Australia 2019) are:

- Hunter Valley KBA (Swift Parrot and Regent Honeyeater) – approximately 30 kilometres to the south west
- Lake Macquarie KBA (Swift Parrot and Regent Honeyeater) – approximately 35 kilometres to the south

The Swift Parrot occurs as a single population (Saunders and Tzaros 2011). The population was estimated in 2010 to be up to 1,000 pairs (Saunders et al. 2010).

The Swift Parrot was not recorded during surveys of the development site. The most recent Swift Parrot records from within 10 kilometres of the development site are from Wallaroo National Park in 2012, and the closest recent records to the development site are from Raymond Terrace in 2007 (DPIE 2019a).

Although not recorded during surveys, the species is considered 'moderately' likely to occur within the development site given the presence of suitable foraging habitat and nearby recent records (DPIE 2019a).

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

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

The Swift Parrot occurs as a single population of up to 1,000 pairs. This species is a non-breeding migrant to mainland Australia where it can occur throughout south-eastern Australia where suitable foraging habitat is present. The Swift Parrot has not been recorded from the development site but has been recorded from the locality as recently as 2012.

The development site supports three tree species that are known foraging species for the Swift Parrot. The Swift Parrot may therefore infrequently forage within the development site during non-breeding periods.

The development site does not provide habitat which is used by the Swift Parrot:

- For nesting
- By large proportions of the population
- Repeatedly between seasons

- For prolonged periods of time

Though the development site occurs within a draft KBA for the Swift Parrot, the mapped areas do not contain feed trees. As such the development site is not considered to provide important habitat for this species.

The Proposal would not impact breeding habitat for this species. A small area of potential foraging habitat would be removed for the Proposal, however much larger areas of better quality potential foraging habitat for the Swift Parrot occur in the locality surrounding the development site, including large areas protected in national parks, nature reserves and state conservation areas. As such, it is unlikely that the Proposal would lead to a long-term decrease in the size of the single population of the Swift Parrot.

Reduce the area of occupancy of the species

The area of occupancy of breeding habitat for the Swift Parrot is less than 500 square kilometres. Breeding habitat is located wholly within Tasmania, and no breeding of this species has been recorded from the mainland. During the non-breeding period the Swift Parrot may occur throughout south-eastern mainland Australia as far north as southeast Qld. This non-breeding area of occupancy for the Swift Parrot is around 4,000 square kilometres. Habitat loss throughout the distribution of the Swift Parrot is likely to have caused a decline in the area of occupancy for this species across its range.

The development site for the Proposal is located on mainland Australia and does not support breeding habitat for the Swift Parrot. The Swift Parrot has not been recorded from the development site, however the development site provides limited foraging resources that may be used infrequently by the Swift Parrot during non-breeding periods. Much larger areas of better quality potential foraging habitat for the Swift Parrot occur in the locality surrounding the development site, including large areas protected in national parks, nature reserves and state conservation areas. Important non-breeding habitat for the Swift Parrot occurs in the Hunter Valley KBA 30 kilometres to the south-west, and Lake Macquarie KBA 35 kilometres to the south.

Given the large area of occupancy on mainland Australia, the small area of potential habitat within the development site, the absence of records from the development site it is highly unlikely that the Proposal would reduce area of occupancy of the Swift Parrot.

Fragment an existing population into two or more populations

The single population of the Swift Parrot occurs throughout south-eastern mainland Australia as non-breeding migrants. This is a highly mobile species that may occur anywhere throughout its known mainland range (approximately 4,000 square kilometres) where suitable foraging resources are present. The development site supports approximately 5.22 hectares of potential foraging habitat for the Swift Parrot which would be removed for the Proposal.

Given the high mobility of this species and the small area of potential foraging habitat to be removed the Proposal would not fragment the single population of Swift Parrot into two or more populations.

Adversely affect habitat critical to the survival of a species

No critical habitat has been declared for the Swift Parrot. Draft KBAs for the Swift Parrot have been mapped by DPIE in Boomerang Park and Newbury Park. The mapped KBAs overlap with the development site, however in the overlapping areas, there are no potential feed trees that would be impacted.. As such the Proposal will not adversely affect habitat critical to the survival of the Swift Parrot.

Disrupt the breeding cycle of a population

The Swift Parrot is a non-breeding migrant to mainland Australia. Roosting sites (Saunders and Tzaros 2011) and KBAs may be important for social interactions for the Swift Parrot and, as such, may play a key role in the breeding cycle of this species.

The Swift Parrot was not recorded within the development site. No known roosting sites or areas of ‘important habitat’ occur near the development site. It is unlikely that the small area of potential habitat to be removed for the Proposal would provide significant foraging resources or opportunities for regular social interactions for this species. As such the Proposal is highly unlikely to disrupt the breeding cycle of the single population of the Swift Parrot.

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

The Swift Parrot has not been recorded from the development site. Although this species has recently been recorded from the locality (DPIE 2019a) there is no indication that the Swift Parrot occurs regularly, in large numbers or over a long period of time anywhere in the locality.

The development site supports approximately 5.22 hectares of potential foraging habitat for the Swift Parrot which would be removed for the Proposal. Much larger areas of better quality foraging habitat for the Swift Parrot occur in the wider locality, much of which is protected in national parks, nature reserves and state conservation areas. The Swift Parrot is a highly mobile species, and removal of a small area of potential habitat for the Proposal is unlikely to isolate remaining habitat for this species.

Only a small area of potential foraging habitat for the highly mobile Swift Parrot will be removed for the Proposal. Considering these factors it is highly unlikely that the Proposal will modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the Swift Parrot is likely to decline.

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

Sections of the development site are highly disturbed and modified and there is evidence of invasive fauna (i.e. fox and rabbit) and weed species. Mitigation strategies include the retention of remnant vegetation where possible and weed removal/control. The Proposal is unlikely to result in additional invasive species becoming established.

Introduce disease that may cause the species to decline

Beak and feather disease is capable of affecting the Swift Parrot and can result in high nestling mortality. It is spread by the movements of common species carrying the disease. The Proposal is unlikely to aid the spread of beak and feather disease.

Interfere with the recovery of the species

The Swift Parrot is a non-breeding migrant to the mainland. This species was not recorded from the development site but has been recorded infrequently from the locality (DPIE 2019a). A small area (5.22 hectares) of potential foraging habitat for the Swift Parrot will be removed for the Proposal, however the value of the foraging habitat within the development site to this species is low. It is considered unlikely that the removal of a relatively small area of low value foraging habitat will interfere with the recovery of the Swift Parrot.

Conclusion

Based on the above assessment, it is concluded that the action would not have a significant impact on the Swift Parrot as it would result in the removal of a relatively small amount of potential foraging habitat which is not likely to be critical to the survival of the species. It is unlikely to introduce diseases or invasive species that would impact this species.

Regent Honeyeater (*Anthochaera phrygia*)

The Regent Honeyeater is listed as Critically Endangered under the EPBC Act. The species has a wide distribution across mainland south-eastern Australia. It predominantly occupies dry open forest and woodland and riparian forests of *Casuarina cunninghamiana* (River Sheoak) along the ranges and western slopes of the Great Dividing Range. The Regent Honeyeater also occurs in coastal *Eucalyptus robusta* (Swamp Mahogany) and *Corymbia maculata* (Spotted Gum) forests (DPIE 2019a).

The Regent Honeyeater is a generalist forager, although it feeds mainly on the nectar from a relatively small number of eucalypts that produce high volumes of nectar. The development site supports (or is likely to support) the following plant species that are known foraging (blossom) resources for the Regent Honeyeater (CoA 2016, DPIE 2019a):

- Spotted Gum
- *Amyema miquelii* (Box Mistletoe)
- *Eucalyptus fibrosa* (Broad-leaved Ironbark, or Red Ironbark)

When nectar is scarce the Regent Honeyeater may also feed on lerps and honeydew. Insects form about 15% of the diet and are particularly important to nestlings (DPIE 2019c).

Habitat critical to the survival of the Regent Honeyeater (CoA 2016) includes:

- Any breeding or foraging habitat in areas where the species is likely to occur; and
- Any newly discovered breeding and foraging locations.

Birdlife Australia has identified a number of Key Biodiversity Areas (KBAs) (previously 'Important Bird Areas') for the Regent Honeyeater. The development site is not located within a KBA for the Regent Honeyeater. The nearest KBAs for the Regent Honeyeater to the development site (Birdlife Australia 2019) are:

- Hunter Valley KBA (Swift Parrot and Regent Honeyeater) – approximately 30 kilometres to the south west
- Lake Macquarie KBA (Swift Parrot and Regent Honeyeater) – approximately 35 kilometres to the south

The Hunter Valley/Central Coast is the nearest of four areas identified as 'regularly used areas' and 'key breeding areas' in the *National Recovery Plan for the Regent Honeyeater* (CoA 2016). The area mapped as the Hunter Valley KBA for the Regent Honeyeater by Birdlife Australia (2019) is consistent with the 'key breeding area' mapping provided in the recovery plan (CoA 2016).

The Regent Honeyeater occurs as a single population (CoA 2016). The population size was estimated in 2010 to be 350-400 individuals (Garnett et al., 2011; Regent Honeyeater Recovery Team, unpublished data).

The Regent Honeyeater was not recorded during surveys of the development site. The BioNet Wildlife Atlas (DPIE 2019a) shows the most recent record for this species in the locality at Medowie in 2002. The Regent Honeyeater has been observed more recently at the Hunter Region Botanic Gardens, approximately 10 kilometres to the south of the development site (Carl Corden pers. obs.). Up to six Regent Honeyeaters were reported by several observers at this location between 21 July and 11 August 2018 (Birdline NSW 2019). Birds were observed feeding on insects and nectar from the blossoms of *Eucalyptus pilularis* (Blackbutt) at this location.

Although not recorded during surveys, the species is considered 'moderately' likely to occur within the development site given the presence of potential foraging habitat and nearby recent records (DPIE 2019a, Birdline NSW 2019, Carl Corden pers. obs.).

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

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

The Regent Honeyeater occurs as a single population of 350-400 individuals. This species occurs throughout south-eastern Australia where suitable foraging habitat is present.

The Regent Honeyeater has not been recorded from the development site but has been recorded from the locality as recently as 2018. The development site supports three plant species that are known foraging

species for the Regent Honeyeater. The Regent Honeyeater may therefore infrequently forage within the development site during non-breeding periods.

The development site does not occur within or near any mapped KBAs for the Regent Honeyeater. As such the development site is not considered to provide important habitat or key breeding habitat for this species.

A small area of potential foraging habitat would be removed for the Proposal, however much larger areas of better quality potential foraging habitat for the Regent Honeyeater occur in the locality surrounding the development site, including large areas protected in national parks, nature reserves and state conservation areas. As such, it is unlikely that the Proposal would lead to a long-term decrease in the size of the single population of the Regent Honeyeater.

Reduce the area of occupancy of the species

The Regent Honeyeater occurs throughout south-eastern mainland Australia as far north as southeast Qld. This area of occupancy for the Regent Honeyeater is around 4,000 square kilometres. Habitat loss throughout the distribution of the Regent Honeyeater is likely to have caused a decline in the area of occupancy for this species across its range.

The Regent Honeyeater has not been recorded from the development site, however development site provides limited foraging resources that may be used infrequently by the Regent Honeyeaters. Much larger areas of better quality potential foraging habitat for the Regent Honeyeater occur in the locality surrounding the development site, including large areas protected in national parks, nature reserves and state conservation areas. Important habitat for the Regent Honeyeater occurs in the Hunter Valley KBA 30 kilometres to the south-west, and Lake Macquarie KBA 35 kilometres to the south. The Hunter Valley KBA is also identified as a ‘key breeding area’ for the Regent Honeyeater.

Given the large area of occupancy on mainland Australia, the small area of potential habitat within the development site, the absence of records from the development site and the distance from KBAs it is highly unlikely that the Proposal would reduce area of occupancy of the Regent Honeyeater.

Fragment an existing population into two or more populations

The single population of the Regent Honeyeater occurs throughout south-eastern mainland Australia. This is a highly mobile species that may occur anywhere throughout its known mainland range (approximately 4,000 square kilometres) where suitable foraging resources are present. The development site supports approximately 5.22 hectares of potential foraging habitat for the Regent Honeyeater which would be removed for the Proposal.

Given the high mobility of this species and the small area of potential foraging habitat to be removed the Proposal would not fragment the single population of Regent Honeyeater into two or more populations.

Adversely affect habitat critical to the survival of a species

No critical habitat has been declared for the Regent Honeyeater. ‘Habitat critical to the survival of the Regent Honeyeater’ (CoA 2016) includes all potential foraging and breeding habitat within the range of the species, and all ‘newly discovered breeding and foraging locations’. The Regent Honeyeater was first recorded foraging at the Hunter Region Botanic Gardens in July 2018. This is a new foraging location and may therefore be considered as habitat critical to the survival of the Regent Honeyeater.

Areas of ‘important habitat’ are considered to occur within the Hunter Valley KBA (30 kilometres to the south-west) and Lake Macquarie KBA (35 kilometres to the south). These KBAs and ‘critical habitat’ at Hunter Region Botanic Gardens will not be impacted by the Proposal. As such the Proposal will not adversely affect habitat critical to the survival of the Regent Honeyeater.

Disrupt the breeding cycle of a population

The Regent Honeyeater has not been recorded breeding in the development site or the locality. The Hunter Valley KBA is a key breeding area for the Regent Honeyeater. The Lake Macquarie KBA and the Hunter Region Botanic Gardens may be important for social interactions for the Regent Honeyeater and, as such, may play a key role in the breeding cycle of this species.

The Regent Honeyeater was not recorded within the development site. No known breeding sites, roosting sites or areas of ‘important habitat’ are known to occur near the development site. It is unlikely that the small area of potential habitat to be removed for the Proposal would provide significant foraging resources or

opportunities for regular social interactions for this species. As such the Proposal is highly unlikely to disrupt the breeding cycle of the single population of the Regent Honeyeater.

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

The Regent Honeyeater has not been recorded from the development site. Although this species has recently been recorded from the locality (DPIE2019a, Birdline NSW 2019, Carl Corden pers. obs.) there is no indication that the Regent Honeyeater occurs regularly, in large numbers or over a long period of time anywhere in the locality. The nearest 'important habitat' areas for the Regent Honeyeater occur in the Hunter Region Botanic Gardens (10 kilometres to the south), the Hunter Valley KBA (30 kilometres to the south-west) and Lake Macquarie KBA (35 kilometres to the south). These areas will not be impacted by the Proposal.

The development site supports approximately 5.22 hectares of potential foraging habitat for the Regent Honeyeater which would be removed for the Proposal. Much larger areas of better quality foraging habitat for the Regent Honeyeater occur in the wider locality, much of which is protected in national parks, nature reserves and state conservation areas. The Regent Honeyeater is a highly mobile species, and removal of a small area of potential habitat for the Proposal is unlikely to isolate remaining habitat for this species.

Only a small area of potential habitat for the highly mobile Regent Honeyeater will be removed for the Proposal. Large areas of potential habitat will remain in the locality, and the development site does not support 'important habitat' for the Regent Honeyeater. Considering these factors it is highly unlikely that the Proposal will modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the Regent Honeyeater is likely to decline.

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

Sections of the development site are highly disturbed and modified and there is evidence of invasive fauna (i.e. fox and rabbit) and weed species. Mitigation strategies include the retention of remnant vegetation where possible and weed removal/control. The Proposal is unlikely to result in additional invasive species becoming established.

Introduce disease that may cause the species to decline

No diseases have been identified that pose a threat to the Regent Honeyeater. As such the Proposal is highly unlikely to introduce disease that may cause the Regent Honeyeater to decline.

Interfere with the recovery of the species

The Regent Honeyeater was not recorded from the development site but has been recorded infrequently from the locality (DPIE 2019a, Birdline NSW 2019, Carl Corden pers. obs.) A small area (5.22 hectares) of potential foraging habitat for the Regent Honeyeater will be removed for the Proposal, however the development site is not considered to provide 'important habitat' for this species.

Given the absence of records from the development site, the infrequency of records from the locality and the absence of important habitat it is considered unlikely that the Proposal will interfere with the recovery of the Regent Honeyeater.

Conclusion

Based on the above assessment, it is concluded that the action would not have a significant impact on the Regent Honeyeater as it would result in the removal of a relatively small amount of potential foraging habitat which is not likely to be critical to the survival of the species. It is unlikely to introduce diseases or invasive species that would impact this species.

Grey-headed Flying-fox (*Pteropus poliocephalus*)

The Grey-headed Flying-Fox is listed as Vulnerable under the EPBC Act. This species occurs from Bundaberg in Queensland in the north to Melbourne in Victoria to the south, typically between the coast and the western slopes of the Great Dividing Range.

The species may be found in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps, while additional foraging is provided by urban gardens and cultivated fruit crops.

Grey-headed Flying-foxes roost in large numbers, with up to tens of thousands of flying foxes using individual camps for mating, birth and rearing of young.

The Grey-headed Flying-fox is a highly mobile species with a nightly feeding range of 20 to 50 kilometres from a roosting camp. Diet typically comprises a wide variety of flowering and fruiting plants (Eby and Law 2008); non-indigenous and exotic tree species introduced to the urban landscape provide additional foraging habitat for this species.

The Grey-headed Flying-fox was recorded foraging in the canopy of flowering eucalypts within the development site during surveys. This species is therefore assumed to use all of the 5.22 hectares of native vegetation within the development site as foraging habitat, given this is a highly mobile species.

No active flying-fox camps were recorded within the development site for the Proposal during surveys, and none are mapped by the *National Flying-fox monitoring viewer* (DoEE 2019a) as occurring within the development site. At its closest point, the development site is located 50 metres from the nationally important flying-fox camp at Raymond Terrace (Camp ID 265). Up to approximately 10,000 flying foxes have been recorded roosting at Camp ID 265 in recent years (DoEE 2019a, PSC 2018). Other camps are located at Carrington Mangroves (Camp ID 608) and Blackbutt Reserve (Camp ID 99), located 21 and 25 kilometres from the development site, respectively.

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

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

Important populations are those that may be identified as such in recovery plans, and/or that are:

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

The development site for the Proposal is not near the limit of distribution for the Grey-headed Flying-fox, and this species has no separate or distinct populations (DoEE 2019b). The species constantly exchanges genetic information between camps throughout its geographic range. Camp ID 265 is a nationally important flying-fox camp. As such, direct impacts to the camp would constitute a risk of significant impacts to an ecologically significant proportion of the population of the Grey-headed Flying-fox (CoA 2015).

The *Referral guideline for management actions in Grey-headed and Spectacled Flying-fox camps* (CoA 2015) does not apply to “Actions in the vicinity of camps, such as development actions, firework displays or concerts, which may indirectly affect camps of EPBC”. The development site lies approximately 50 metres from the boundary of Camp ID 265. The Proposal will therefore not directly impact on Camp ID 265 and as such the referral guideline for camps (CoA 2015) does not apply.

Given the above factors, the Proposal would not lead to a long-term decrease in the size of an important population (or a significant proportion thereof) of the Grey-headed Flying-fox.

Reduce the area of occupancy of an important population

The development site does not support an important population of the Grey-headed Flying-fox, and the Proposal will not directly impact an ecologically significant proportion of the population of this species. The Proposal would result in the removal of 5.22 hectares of foraging resources. The removal of this potential habitat would have a minimal impact on the area of occupancy of the Grey-headed Flying-fox. The Proposal will result in construction noise in areas adjacent to the camp. Noise levels are

Fragment an existing important population into two or more populations

The development site does not support an important population of the Grey-headed Flying-fox. The Proposal will not directly impact Camp ID 265, and will not introduce barriers to movement by individual flying-foxes The removal of potential foraging habitat from the development site and indirect impacts to Camp ID 265 resulting from the Proposal would not fragment the population of the Grey-headed Flying-Fox into two or more populations.

Adversely affect habitat critical to the survival of a species

While the Proposal would result in the removal of potential foraging habitat, this habitat is not likely to be habitat critical to the survival of this species. Camp ID 265 supports an ecologically significant proportion of the population of the Grey-headed Flying-fox and is a nationally important camp and therefore the area inhabited by this camp could be considered critical to the survival of the species. No direct impacts to Camp ID 265 will occur. Indirect impacts could occur such as construction noise and increased human activity in the vicinity of the camp. Grey-headed Flying-foxes would be most sensitive to construction noise during the months of August to February:

- During August, females are reaching the end of their gestation period and have been known to abort young when stressed
- During September to November, the females have given birth and are lactating. Stressed females have been known to drop young during this period. Stressed young are also at risk of falling to the ground which could result in starvation, predation and death
- In December, juveniles are easily stressed which could result in falling to the ground
- During January to February, flying foxes are prone to heat stress. During this time, additional potential stressors such as noise can increase the likelihood of an individual falling from a tree due to heat stress.

Best practice guidelines for the Grey-headed Flying-fox (DECC 2008a) state that absolutely no work activities should be conducted (loud or quiet) in 'close proximity' to a camp between the months of September to February. The Raymond Terrace Grey-headed Flying-fox Camp Management Plan (Port Stephens Council 2018) states that any activity likely to disturb flying-foxes so that they take flight will be avoided during the day during August to December, and avoided altogether during creching, which usually occurs from November/December to February. Where works cannot be done at night during August to December, it is preferable they are undertaken in the late afternoon close to or at fly-out. If this is also not possible, a person experienced in flying-fox behaviour is required to monitor the camp for at least the first two scheduled actions to ensure impacts are not excessive and advise on the most appropriate methods (Port Stephens Council 2018)

Existing background noise levels 1.5 kilometres further northeast (adjacent to Adelaide Street) are likely to be similar to those at the camp. Here they range from 33-49 dB(A) at night and 42-59 dB(A) in the day (Resonate 2019). Typical worst-case construction noise levels (LAeq 15 minute) have been modelled at the camp where they range between 70-75 dB(A) (Resonate, 2019) about 30 dB(A) above the average day and night noise levels. The majority of works would take place in the day when existing background levels are highest. The species typically exit the camp at dusk to forage through the night and therefore impacts at night are likely to be minor. Reasonable and feasible noise mitigation measures would be implemented when works are occurring in proximity to the Grey-headed Flying-fox camp and are included in Table 9-1. They include the installation of temporary noise barriers in the vicinity of the camp which can reduce the noise impacts by about 10dB(A) (pers comm Andy Parker, Resonate). Construction in the vicinity of the camp would be limited to March-July to minimise potential impacts to breeding and heat-stressed individuals.

Disrupt the breeding cycle of an important population

Camp ID 265 provides breeding habitat for an ecologically significant proportion of the population of the Grey-headed Flying-fox. As such, indirect impacts associated with the Proposal have the potential to disrupt the breeding cycle of Grey-headed Flying-fox. Measures would be implemented to avoid or mitigate disruption to breeding Grey-headed Flying-foxes during construction for the Proposal. These measures would include avoiding construction in proximity to Camp ID 265 while pregnant females or dependant young are present. As such, the Proposal is not anticipated to disrupt the breeding cycle of Grey-headed Flying-foxes at Camp ID 265.

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

The Proposal would involve the removal of potential foraging habitat for the Grey-headed Flying-fox. This foraging resource does not comprise a significant area of foraging habitat within the development site or the locality. The loss of 5.22 hectares of foraging resources is not likely to be significant to the Grey-headed Flying-fox.

The Proposal would not result in direct impacts to Camp ID 265. Indirect impacts associated with the Proposal would be minor and short-term during construction. As such the Proposal would not impact the availability or quality of habitat such that the Grey-headed Flying-fox is likely to decline.

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

The action is unlikely to result in the establishment of an invasive species that is harmful to the Grey-headed Flying-fox. Known predators of the species include native reptiles and birds; no invasive exotic fauna species are known to predate upon Grey-headed Flying-foxes. The action is highly unlikely to result in the establishment of invasive flora species that are harmful to the Grey-headed Flying-fox.

Introduce disease that may cause the species to decline, or

The action is highly unlikely to introduce disease that may cause the Grey-headed Flying-fox to decline.

Interfere with the recovery of the species

There is currently no approved Recovery Plan in place for the Grey-headed Flying-fox. A *Draft National Recovery Plan for the Grey-headed Flying-fox* was prepared in January 2017 (CoA 2017). The Draft National Recovery Plan lists 10 specific objectives for the ten-year timeframe of the Plan. Of these, two could be considered relevant to the Proposal:

- Recovery objective 1: Identify, protect and enhance native foraging habitat critical to the survival of the Grey-headed Flying-fox.
- Recovery objective 2: Identify, protect and enhance roosting habitat of Grey-headed Flying-fox camps.

While the Proposal would result in the removal of potential foraging habitat, this habitat is not likely to be key foraging habitat or habitat critical to the survival of this species. No direct impacts to Camp ID 265 are anticipated to result from the Proposal, and indirect impacts would be minor and short-term. As such, the Proposal would not interfere with the recovery of the Grey-headed Flying-fox.

Conclusion

Based on the above assessment, it is concluded that the action would not have a significant impact on the Grey-headed Flying-fox. The Proposal would result in the removal of a relatively small amount of potential foraging habitat which is not likely to be critical to the survival of the species. The Proposal will not directly impact on Camp ID 265, and indirect impacts to the camp will be minor and short-term. The Proposal is unlikely to introduce diseases or invasive species that would impact the Grey-headed Flying-fox and will not interfere with the recovery of this species.

Koala (*Phascolarctos cinereus*) (combined populations of Queensland, New South Wales and the Australian Capital Territory)

The Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) is listed as Vulnerable under the EPBC Act. This species was not recorded within the development site during current surveys. The development site provides suitable foraging habitat for the Koala, and this species has been recorded from adjacent to the development site during surveys undertaken for the Kings Hill Development Species Impact Statement (RPS 2019). The Koala is therefore considered to have a 'high' likelihood of occurrence within the development site.

Bionet database search results (DPIE 2019a) show that there are 2,301 records of within 10 kilometres of the development site. A large number of records are located within Raymond Terrace township, Medowie State Forest to the north-east of Grahamstown Dam, and in native vegetation on the southern shores of Grahamstown Dam and between Newcastle Airport and Medowie. Few records are located in proximity to the development site or west of Grahamstown Dam.

The Koala has a fragmented distribution throughout eastern Australia from north-east Queensland to the Eyre Peninsula in South Australia. In NSW, Koala populations are found on the central and north coasts, southern highlands, southern and northern tablelands, Blue Mountains, southern coastal forests, with some smaller populations on the plains west of the Great Dividing Range.

Koalas inhabits a range of eucalypt forest and woodland communities, including coastal forests, the woodlands of the tablelands and western slopes, and the riparian communities of the western plains. Koalas are also known to utilise isolated paddock trees. Koalas feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species. The quality of forest and woodland communities as habitat for Koalas is influenced by a range of factors including species and size of trees present, structural diversity of the vegetation, soil nutrients, climate and rainfall and size and disturbance history of the habitat patch.

Koalas are generally solitary, but have complex social hierarchies based on a dominant male with a territory overlapping several females and sub-ordinate males on the periphery. The home range of Koalas varies depending on the quality of the habitat and the number of available food trees; studies in Port Stephens have determined that Koala home ranges vary between 0.2 – 500 hectares, with an average home range of 80 – 90 hectares (DECC 2008b).

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

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

No Koalas or signs of Koala activity were recorded within the development site during surveys undertaken by Arcadis is 2019. Koala surveys undertaken for the Kings Hill Development SIS (RPS 2019) recorded a total of 10 individual Koalas (four females and six males) from within the study area for the SIS. Koalas are considered likely to occur within the development site given the species is known to occur in the locality (DPIE 2019a, RPS 2019), however population density for the development site is assumed to be low given the absence of sightings or signs of activity (i.e. scats or scratches) during surveys.

The absence of Koala sightings or evidence of use during surveys, combined with the disturbed and highly fragmented nature of potential foraging habitat present, indicates that the native (PCT) vegetation of the development site is unlikely to support a significant population of Koalas, or to provide significant habitat for resident Koalas. No breeding Koalas were recorded within the development site.

'Important populations' of the Koala have not been identified in the referral guidelines for the Koala (CoA 2014). An important population of a species is defined in the MNES significant impact guidelines (CoA 2013) as:

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

It is uncertain whether Koalas occurring within the development site would conform with category 1 or category 2 above. Koalas that may occur within the development site are therefore assumed to be individuals from an important population as a precautionary measure.

Given the absence of sightings or evidence of activity it is unlikely that the development site provides breeding habitat for the Koala.

Due to the likely low levels of Koala activity, the small area of Koala habitat to be impacted (a total of 1.88 hectares of native vegetation) and low potential of occurrence of breeding, it is unlikely that the Proposal would lead to a long-term decrease in the size of an important population of the Koala.

Reduce the area of occupancy of an important population

The removal of a relatively small amount of potential habitat from the development site would not significantly reduce the area of occupancy of the species. The 1.88 ha of Potential Koala habitat to be removed from the development site does not comprises a significant area of Koala habitat that occurs in the surrounding locality.

Fragment an existing important population into two or more populations

Koala floppy-top fencing has been installed alongside the eastern margin of the Pacific Highway. This fencing aims to prevent Koala (and other terrestrial fauna) access to the highway, thereby reducing mortality resulting from vehicle strikes. However, this fencing also acts as a barrier to fauna movement, preventing the east-west movement of Koalas across the Pacific Highway in the northern portion of the development site. Koala movement in the northern portion of the development site is largely restricted to the north/south direction, or between the development site and habitat to the west.

Native vegetation has been historically cleared from much of the development site. Potential Koala habitat is now restricted to small, highly fragmented patches of native vegetation separated by large areas of Cleared grassland. Koalas are known to be capable of moving large distance (3 to 4km), and it is unlikely that the large areas of Cleared grassland would represent an impermeable barrier to Koala movement between habitat patches. Individual Koalas may therefore move infrequently across these gaps to access suitable habitat patches, although Koalas traversing Cleared grassland may be at greater risk of injury or mortality from dog attacks.

The clearing of native vegetation for the Proposal would exacerbate the loss and fragmentation of Koala habitat in Kings Hill. Given the low value of this habitat for movement, particularly east-west movement, impacts would be minor.

Given that east-west movement for the Koala are currently restricted and north-south movement is already limited, the Proposal is not likely to fragment an existing important population of the Koala into two or more populations.

Adversely affect habitat critical to the survival of a species

A total of 1.88 hectares of Potential Koala habitat would be cleared from the development site for the Proposal This does not comprises a significant area of Koala habitat that occurs in the surrounding locality.

The following Koala feed trees are present in the development site:

- Forest Red Gum – SEPP 44 and Primary Koala feed tree
- Grey Gum – SEPP 44 and Secondary Koala feed tree
- Grey Box – Secondary Koala feed tree

The study supports only a low abundance of the two SEPP 44 feed trees listed above.

No Koalas or signs of activity were recorded within the development site during surveys. Surveys did not record any evidence of breeding (i.e. females with young or juveniles) or resident Koalas. Given the absence of Koalas or activity recorded and the small, highly fragmented patches of habitat present, the development site is unlikely to provide significant habitat for a large number of Koalas

East-west connectivity for Koalas in the northern portion of the development site is further limited by the Koala fence along the eastern side of the Pacific Highway reducing its value as an east-west corridor.

Given the above factors, it is unlikely that the development site provides significant or important habitat for the Koala considered to be critical to its survival. As such the Proposal will not affect habitat critical to the survival of the Koala.

Disrupt the breeding cycle of an important population

Koalas potentially occurring within the development site are assumed as a precautionary measure to be from a larger important population in the wider locality. The absence of evidence of Koala activity (from scat searches) and absence of Koala sightings indicate that the potential Koala habitat of the development site is unlikely to support a significant population of Koalas, or to provide significant habitat for resident Koalas. No breeding Koalas were recorded within the development site. Given the absence of sightings or evidence of activity it is unlikely that the development site provides breeding habitat for the Koala.

Due to the absence of evidence of Koalas or Koala activity, the small area of potential Koala habitat to be impacted (a total of 1.88 hectares of native vegetation) and low potential of occurrence of breeding, it is unlikely that the Proposal would disrupt the breeding cycle of an important population of the Koala.

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

The 1.88 hectares of native vegetation to be removed for the Proposal provides potential foraging and movement habitat for the Koala. The absence of Koala sightings or evidence of activity indicate that the potential Koala habitat of the development site is unlikely to support a significant population of Koalas, or to provide significant habitat for resident Koalas.

Given the low significance of the value of habitat for the Koala in the development site, the removal of 1.88 hectares for the Proposal is not likely to result in the decline of the local Koala population.

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

The action is unlikely to result in the establishment of an invasive species that is harmful to the Koala.

Introduce disease that may cause the species to decline, or

The action is highly unlikely to introduce disease that may cause the Koala to decline.

Interfere with the recovery of the species

There is an approved Recovery Plan in place for the Koala for NSW (DECC 2008b). The Recovery Plan lists seven general objectives and a number of specific objectives and actions under each objective. Of these, one could be considered relevant to the Proposal:

- Objective 1b: Assess the impact of habitat loss and fragmentation on Koala populations

The Proposal assesses the impact of habitat loss through this Assessment of Significance and is therefore consistent with the objectives of the Recovery Plan for the species.

Conclusion

Under the EPBC Act an action requires referral to the Australian Government Minister for the Environment and Energy (DotEE) if the action has, will have, or is likely to have, a significant impact on a matter of national environmental significance such as the Koala. Furthermore, the Commonwealth have prepared EPBC Act Referral Guidelines for the vulnerable Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) (Commonwealth of Australia, 2014) to assist in determining the need for a referral. The relevant sections of the referral guidelines are assessed in relation to the Proposal and the table below. The below assessment determined the Proposal would not trigger the need for a referral under the guidelines. Furthermore, the above assessment, has determined that the Proposal would result in the removal of a relatively small amount of potential habitat which is not likely to be critical to the survival of the species nor is it likely to introduce diseases or invasive species that would impact this species.

EPBC referral guidelines for the Koala

Flow chart question	Response
Does your impact area contain habitat critical to the survival of the Koala (habitat score ≥ 5)?	The development site has been determined to support Koala habitat with a score of 6 (refer to Table 3-13).
Do the area(s) proposed to be cleared contain known Koala food trees?	Yes. Koala feed trees *Eucalyptus moluccana* (Grey Box), *Eucalyptus tereticornis* (Forest Red Gum) and *Eucalyptus*

Flow chart question	Response
	punctata (Grey gum) occur within 1.88 ha of potential Koala habitat that will be cleared.
Are you proposing to clear ≤ 2 ha of habitat containing known Koala food trees in an area with a habitat score of 5?	No. 1.88 ha of potential Koala habitat would be cleared.
Are you proposing to clear ≥ 20 ha of habitat containing known Koala food trees in an area with a habitat score of ≥ 8?	No. 1.88 ha of potential Koala habitat would be cleared.
Will your action adversely affect habitat critical to the survival of the Koala?	No. 1.88 ha of potential Koala habitat to be cleared from the development site does not comprises a significant area of koala habitat that occurs in the surrounding locality. Koala feed trees present in the development site are: ▪ Forest Red Gum – SEPP 44 and Primary ▪ Grey Gum – SEPP 44 and Secondary ▪ Grey Box – Secondary The study supports only a low abundance of the two SEPP 44 feed trees listed above. No Koalas were sighted within the development site during surveys. No evidence of Koala activity (e.g. scats or scratches) was recorded from the development site during surveys. Surveys did not record any evidence of breeding (i.e. females with young or juveniles) or resident Koalas. Given the absence of records of Koalas or evidence of Koala activity and the small patches of highly fragmented habitat present, the development site is unlikely to provide significant habitat for a large number of Koalas East-west connectivity for Koalas is further limited by the Koala fence along the eastern side of the Pacific Highway in the northern portion of the development site, reducing its value as an east-west corridor. Given the above factors, it is unlikely that the development site provides significant or important habitat for the Koala considered to be critical to its survival. As such the Proposal will not affect habitat critical to the survival of the Koala.
Could your action interfere substantially with the recovery of the Koala? Impacts which are likely to substantially interfere with the recovery of the Koala may include one or more of the following: 1. 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. 2. 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. 3. Facilitating the introduction or spread of disease or pathogens for example Chlamydia or *Phytophthora cinnamomi*, to habitat critical to the survival of the Koala, that are likely to significantly reduce the reproductive output of Koalas or reduce the carrying capacity of the habitat.	The Proposal would not interfere substantially with the recovery of the Koala as follows: 1. The Proposal will not introduce dogs to the area or facilitate an increase in dog abundance. The project is unlikely to contribute to any increase in Koala mortality due to dog attacks 2. The Proposal would not introduce any additional hazards of vehicle collisions or remove existing fauna fencing from adjacent to the Pacific Highway. The Proposal would not introduce or increase Koala fatalities from vehicle strikes. 3. Mitigation measures outlined in Section 5 aim to minimise the risk of introducing disease or pathogens to the development site during construction/operation of the project. Therefore the Proposal is unlikely to significantly reduce the reproductive output of Koalas or reduce the carrying capacity of the habitat. 4. The Proposal would remove small patches of potential habitat that may provide 'stepping stone' linkage for Koalas. Given the absence of Koala sightings or

Flow chart question	Response
4. 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. 5. 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.	evidence of Koala activity it is considered unlikely that these habitat patches are currently used regularly or by a significant number of Koalas The Proposal would not create any additional barriers to north-south or east-west movement. 5. Run-off from the Proposal would be directed towards and contained within the concurrently proposed stormwater channel. Accordingly, habitat adjoining the development site is unlikely to be subject to increased volume or velocity of run-off. Changes to hydrology are unlikely to degrade habitat.
Conclusion	**As the Proposal would not affect habitat critical to the survival of the species and would not substantially interfere with the recovery of the species, the Proposal is unlikely to have a significant impact on the Koala in accordance with Figure 1 of the *EPBC Act Referral Guidelines for the vulnerable Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory)* (Commonwealth of Australia, 2014). An EPBC Referral is not considered necessary.**

APPENDIX F CREDIT REPORTS

BAM Credit Summary Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00013407/BAAS17070/20/00017583	Kings Hill Pipeline Sydney Basin Bioregion	26/11/2019
Assessor Name	Report Created	BAM Data version *
	13/02/2020	22
Assessor Number	BAM Case Status	Date Finalised
	Open	To be finalised
Assessment Revision	Assessment Type	
0	Part 4 Developments (General)	

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Ecosystem credits for plant communities types (PCT), ecological communities & threatened species habitat

Zone	Vegetation zone name	Vegetation integrity loss / gain	Area (ha)	Constant	Species sensitivity to gain class (for BRW)	Biodiversity risk weighting	Potential SAII	Ecosystem credits
Smooth-barked Apple - Red Bloodwood - Brown Stringybark - Hairpin Banksia heathy open forest of coastal lowlands								
1	1619_Poor	25.8	0.7	0.25	High Sensitivity to Potential Gain	1.50		6
2	1619_Moderate	45.4	0.4	0.25	High Sensitivity to Potential Gain	1.50		7

3	1619_Planted_trees	14.0	2.2	0.25	High Sensitivity to Potential Gain	1.50		0
							Subtotal	**13**
Spotted Gum - Broad-leaved Mahogany - Red Ironbark shrubby open forest								
4	1590_Poor	14.6	0.1	0.25	High Sensitivity to Potential Gain	1.50		0
							Subtotal	**0**
							Total	**13**

Species credits for threatened species

Vegetation zone name	Habitat condition (HC)	Area (ha) / individual (HL)	Constant	Biodiversity risk weighting	Potential SAII	Species credits
Myotis macropus / Southern Myotis (Fauna)						
1590_Poor	14.6	0.07	0.25	2	False	1
					Subtotal	**1**
Petaurus norfolcensis / Squirrel Glider (Fauna)						
1619_Moderate	45.4	0.41	0.25	2	False	9
1590_Poor	14.6	0.07	0.25	2	False	1
					Subtotal	**10**
Phascogale tapoatafa / Brush-tailed Phascogale (Fauna)						
1619_Moderate	45.4	0.41	0.25	2	False	9
1590_Poor	14.6	0.07	0.25	2	False	1
					Subtotal	**10**

Phascolarctos cinereus / Koala (Fauna)						
1619_Moderate	45.4	0.27	0.25	2	False	6
1590_Poor	14.6	0.07	0.25	2	False	1
					Subtotal	**7**

BAM Credit Summary Report

Proposal Details

Assessment Id
00013407/BAAS17070/20/00013408

Proposal Name
Kings Hill Pipeline Karuah Manning North Coast

BAM data last updated *
26/11/2019

Assessor Name
Kate Carroll

Report Created
13/02/2020

BAM Data version *
22

Assessor Number
BAAS17070

BAM Case Status
Open

Date Finalised
To be finalised

Assessment Revision
0

Assessment Type
Part 4 Developments (General)

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Ecosystem credits for plant communities types (PCT), ecological communities & threatened species habitat

Zone	Vegetation zone name	Vegetation integrity loss / gain	Area (ha)	Constant	Species sensitivity to gain class (for BRW)	Biodiversity risk weighting	Potential SAII	Ecosystem credits
Spotted Gum - Broad-leaved Mahogany - Red Ironbark shrubby open forest								
2	1590_Poor	11.8	0.0	0.25	High Sensitivity to Potential Gain	1.50		0
3	1590_Moderate	66.6	0.1	0.25	High Sensitivity to Potential Gain	1.50		3

4	1590_Road_batter	28.3	0.4	0.25	High Sensitivity to Potential Gain	1.50		4
							Subtotal	**7**
Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter								
1	1600_Moderate	33.3	1.3	0.25	High Sensitivity to Potential Gain	2.00		22
							Subtotal	**22**
							Total	**29**

Species credits for threatened species

Vegetation zone name	Habitat condition (HC)	Area (ha) / individual (HL)	Constant	Biodiversity risk weighting	Potential SAII	Species credits
Myotis macropus / Southern Myotis (Fauna)						
1590_Poor	11.8	0.03	0.25	2	False	0
					Subtotal	**0**
Petaurus norfolcensis / Squirrel Glider (Fauna)						
1590_Poor	11.8	0.03	0.25	2	False	0
1590_Moderate	66.6	0.14	0.25	2	False	5
1600_Moderate	33.3	1.32	0.25	2	False	22
					Subtotal	**27**
Phascogale tapoatafa / Brush-tailed Phascogale (Fauna)						
1590_Poor	11.8	0.03	0.25	2	False	0
1590_Moderate	66.6	0.14	0.25	2	False	5

1600_Moderate	33.3	1.32	0.25	2	False	22
					Subtotal	**27**
Phascolarctos cinereus / Koala (Fauna)						
1590_Poor	11.8	0.03	0.25	2	False	0
1590_Moderate	66.6	0.14	0.25	2	False	5
1590_Road_batter	28.3	0.05	0.25	2	False	1
1600_Moderate	33.3	1.32	0.25	2	False	22
					Subtotal	**28**