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PRELIMINARY DOCUMENTATION

ATTACHMENT G RESPONSE TO LETTER FROM COMMONWEALTH DEPARTMENT OF ENVIRONMENT AND ENERGY (17 APRIL 2018)

[redacted]

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17 April 2018

[redacted]

Re: Response to letter from Department of the Environment and Energy, regarding 182 lot sub-division, Berringer and Cunjurong Roads, Manyana

Dear [redacted],

I am writing to provide you with further analysis of the potential for Matters of National Environmental Significance (MNES) as listed in the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), occurring at the site of a proposed 182 lot residential sub-division at Berringer and Cunjurong Roads, Manyana (hereafter the 'study area', **Figure 1**).

Background and purpose of report

The proposed residential sub-division is situated on land that is currently zoned R2 – Low Density Residential under the Shoalhaven Local Environmental Plan 2014 (LEP). At present, the two lots have approval to be sub-divided into one hundred and eighty-two (182) residential allotments. The subdivision will be implemented over 6 stages, with each stage including the addition of approximately 30 lots. The sub-division received approval under Part 3A of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act), 8 July 2008.

It is understood that the proponent for the proposed sub-division was contacted in writing by the Commonwealth Department of Environment and Energy (DoEE), 22 December 2017 (DoEE 2017), to advise that a number of relevant MNES may occur at the study area. Specifically, the letter from DoEE refers to the following MNES:

- Illawarra and south coast lowland forest and woodland – critically endangered ecological community,
- Greater Glider,
- Southern Brown Bandicoot,
- Grey-headed Flying Fox, and
- Large-eared Pied Bat.

This report has been prepared to address whether these MNES and other MNES identified in the literature review or field survey that have the potential to occur on the study area may be impacted by the proposal, and whether adequate consideration was given to MNES during the assessment process for the Part 3A approval.

Methods

The ecological values and constraints within the site were assessed during the preparation of a Flora and Fauna Management Plan (FFMP) (Ecoplanning 2017), through a site specific literature review and site inspection, undertaken on 14 June 2017 by Thomas Hickman (Ecologist, Ecoplanning) and Kieren Northam (Graduate Ecologist, Ecoplanning). The site visit was undertaken to validate vegetation condition, management requirements and locate HBTs at the study area.

A site-specific literature and database review was undertaken prior to undertaking field survey and the preparation of the FFMP (Ecoplanning 2017) and updated for this report. This included desktop analysis of aerial photography and regional scale information from the following sources:

- Native vegetation of southeast NSW: a revised classification and map for the coast and eastern tablelands (Tozer et al. 2010)
- BioNet Atlas of NSW Wildlife (NSW Office of Environment and Heritage 2018)
- Protected Matters Search Tool (Commonwealth Department of Environment and Energy 2018)

Previous reports of relevance to the subject land reviewed include:

- BES (2006). Flora and Fauna Assessment – Proposed Subdivision, Lot 172 DP 755923 & Lot 823 DP 247285 Berringer Road and Cunjurong Point Road, Manyana, BES (Bushfire and Environmental Services), St Georges Basin.

Threatened species, populations and migratory species recorded within 5 km of the study area (the locality) in a search of the Atlas of NSW Wildlife (OEH 2018b) and the EPBC Protected Matters Search Tool were consolidated and their likelihood of occurrence was assessed by:

- review of location and date of recent (<5 years) and historical (>5-20 years) records
- review of available habitat within the study area and surrounding areas
- review of the scientific literature pertaining to each species and population
- applying expert knowledge of each species

The potential for each threatened species, population and/or migratory species to occur was then considered following review of available habitat within the study area. The potential for species to utilise the site and to be affected directly or indirectly by the proposed action were considered as either:

- “Recent record” = species has been recorded in the study area a within the past 5 years
- “High” = species has previously been recorded in the study area (>5 years ago) or in close proximity (for mobile species), and/or habitat is present that is likely to utilised by a local population
- “Moderate” = suitable habitat for a species is present onsite but no evidence of a species detected and relatively high number of recent records (5-20 years) in the locality or species is highly mobile

- "Low" = suitable habitat for a species is present onsite but limited or highly degraded, no evidence of a species detected and relatively low number of recent records in the locality
- "Not present" – suitable habitat for the species is not present onsite or adequate survey has determined species does not occur in the study area

The updated Atlas of NSW Wildlife (OEH 2018b) search identified a recent record of an observation of Southern Brown Bandicoot (eastern) (*Isoodon obesulus obesulus*) adjacent to the study area (**Figure 5**). The record was discussed with Threatened Species Officers at the NSW Office of Environment and Heritage and an additional targeted remote camera survey was undertaken by Ecoplanning in March 2018.

The targeted remote camera survey involved installing nine remote cameras over 14 days from 11/3/2018 until 29/3/2018. The cameras were placed in low shrubby areas and facing universal bait lures (made using oats, peanut butter and truffle oil) (**Figure 5**). All remote camera images of bandicoots were collated and identification confirmed with OEH Threatened Species Officers and experienced fauna ecologists.

Results

No threatened flora or fauna species or ecological communities listed under the EPBC Act were recorded during the site inspection (Ecoplanning 2017). Searches of relevant databases (OEH 2018; EPBC 2018) identified three recent fauna records (from 2017) listed under the EPBC Act in the study area; Greater Glider (*Petauroides volans*), Southern Brown Bandicoot (eastern) and Swift Parrot (*Lathamus discolour*). Additionally, Spotted-tailed Quoll (*Dasyurus maculatus*) has previously been recorded just south of the study area.

Specifically, Southern Brown Bandicoots were not recorded in the remote camera survey. Images of the more common Long-nosed Bandicoot (*Perameles nasuta*) were recorded on three different nights during the survey (**Figure 6**). The identification was confirmed due to the large upright ears, pale tops to feet, elongated nose and the illusion of barring in the flanks which are distinctive features of the Long-nosed Bandicoot (Andrew Claridge, pers. comm. 16 April 2018).

Fourteen (14) threatened species listed under the EPBC Act have been previously recorded within a 5 km radius of the study area, comprising one amphibian, eight birds, four mammals, and one flora species (**Figure 3**). Additionally, one bird and two mammals which are marine species are recorded in the locality but were not included in this assessment.

BES (2006) considered the impacts to the following MNES and found no significant impacts were considered likely:

- Vulnerable Species: Leafless Tongue Orchid (*Cryptostylis hunteriana*) and Giant Burrowing Frog (*Heleioporus australiacus*);
- Migratory Species: Black-faced Monarch (*Monarcha melanopsis*), Rufous Fantail (*Rhipidura rufifrons*) and Satin Flycatcher (*Myiagra cyanoleuca*).

The MNES referred to in the DoEE (2017) letter are discussed with reference to the BES (2006) assessment below:

- Illawarra and south coast lowland forest and woodland – critically endangered ecological community
    - not listed at the time of the BES (2006) assessment; does not occur at the study area (Ecoplanning 2017)
- Greater Glider (*Petauroides volans*) – vulnerable
    - observed at the study area but not listed at the time of the BES (2006) assessment (listed in 2016); considered relatively abundant in the locality by BES (2006; Section 5.5)
- Southern Brown Bandicoot (eastern) (*Isoodon obesulus obesulus*) – endangered
    - Listed at the time of the BES (2006) assessment (listed in 2001), considered unlikely following targeted survey (cage trapping) and habitat assessment (BES 2006; Section 4.2, Table 7)
- Grey-headed Flying Fox (*Pteropus poliocephalus*) – vulnerable
    - Listed at the time of the BES (2006) assessment (listed in 2001); not observed during survey but considered likely to utilise the study area from time to time (BES 2006; Section 5.2)
- Large-eared Pied Bat (*Chalinolobus dwyeri*) – vulnerable
    - Listed at the time of the BES (2006) assessment (listed in 2001), but not detected during targeted survey (Anabat ultrasonic sound recording; Section 2.3, Table 4)

The impact to vegetation was assessed by BES (2006) and was assessed to impact a total of 18.22 ha of vegetation comprising approximately 12.90 ha of Northern Coastal Sands Shrub/Fern Forest and 5.32 ha of Bangalay Moist Woodland/Open-forest. Since this assessment, the boundaries for the proposal has been modified and calculations for water retention basins and road batters have been refined. Additionally, the vegetation mapping had to be redrawn by digitising vegetation mapping provided in the report (BES 2006).

A total impact of 17.18 ha of vegetation has been used for this assessment, comprising 5.39 ha of Bangalay Moist Woodland Open Forest and 10.79 ha of Northern Coastal Sands Shrub/Fern Forest with 1 ha of disturbed/cleared area.

Impact assessment and conclusions

Following the literature and database review and field assessment, impact assessment in accordance with the MNES Significant Impact Guidelines (DoE 2013) has been undertaken for Greater Glider, Grey-headed Flying Fox, Southern Brown Bandicoot (eastern), Spotted-tailed Quoll, Swift Parrot and the three migratory birds, Black-faced Monarch, Rufous Fantail, and Satin Flycatcher. Impacts of the proposal are not considered significant and hence a referral is not recommended for these MNES.

An impact assessment was not undertaken for Large-eared Pied Bat due to the low likelihood of occurrence. The species is associated with areas of extensive cliffs and caves (OEH 2018a) and areas of low to mid-elevation dry open forest nearby these features. There are no records of this species in the locality with the closest records in the ranges that contain these key habitat features south and west of the study area.

If you would like to discuss any of the above comments and recommendations further, please contact me on the below details.

Sincerely,

[redacted]

[redacted]

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References

Atlas of Living Australia (ALA) (2018). Atlas of Living Australia website. Accessed at: https://www.ala.org.au/

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Commonwealth Department of the Environment and Energy (DoEE) (2018b). Species Profile and Threats Database. Available at: http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl

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Tozer, M.G., Turner, K., D.A. Keith, D.A., Tindall, D., Pennay, C. , Simpson, C., MacKenzie, B., P. Beukers, P. and Cox, S. (2010) Native vegetation of southeast NSW: a revised classification and map for the coast and eastern tablelands. *Cunninghamia* **11(3):** 359–406

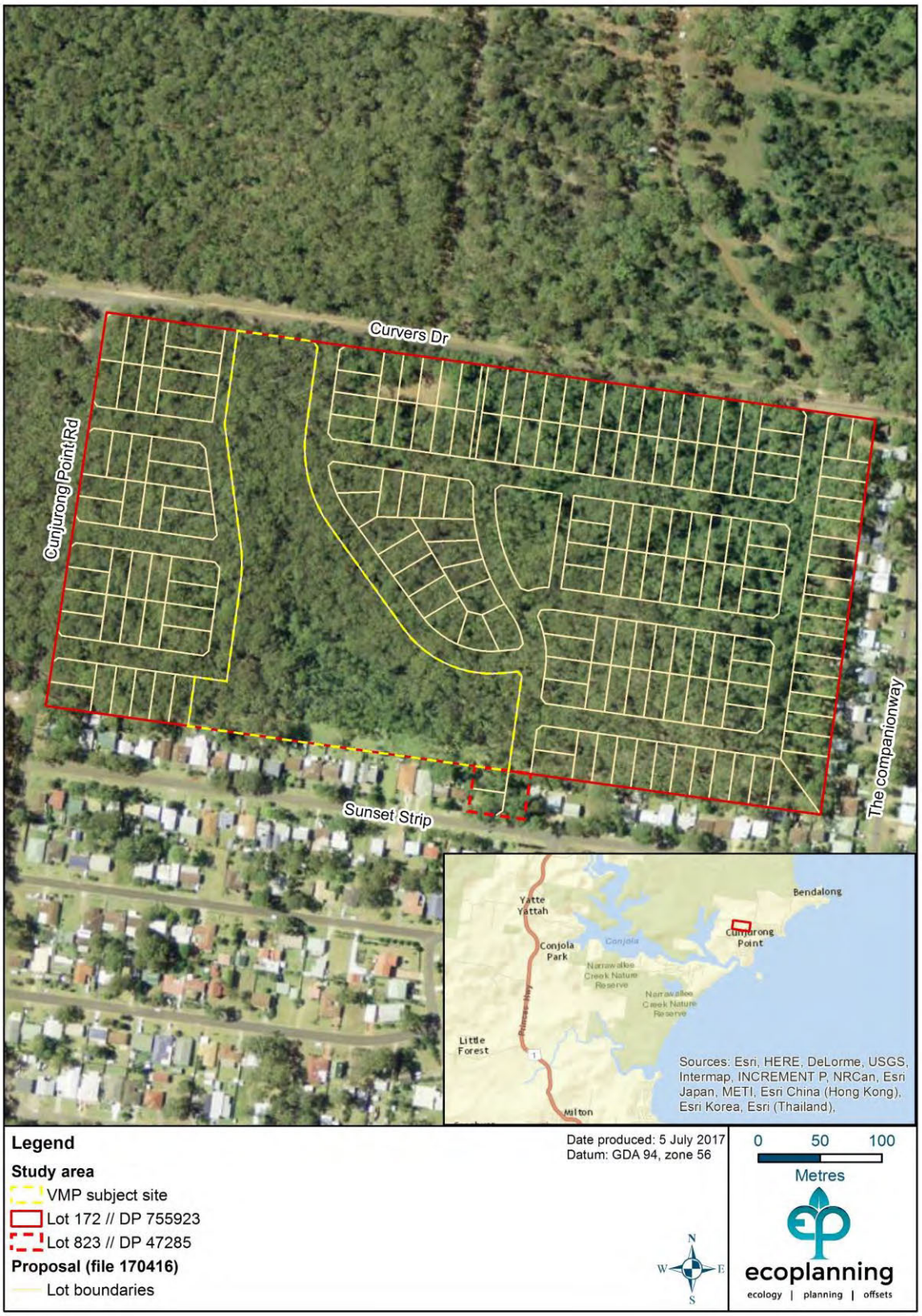

Figure 1:Study area.

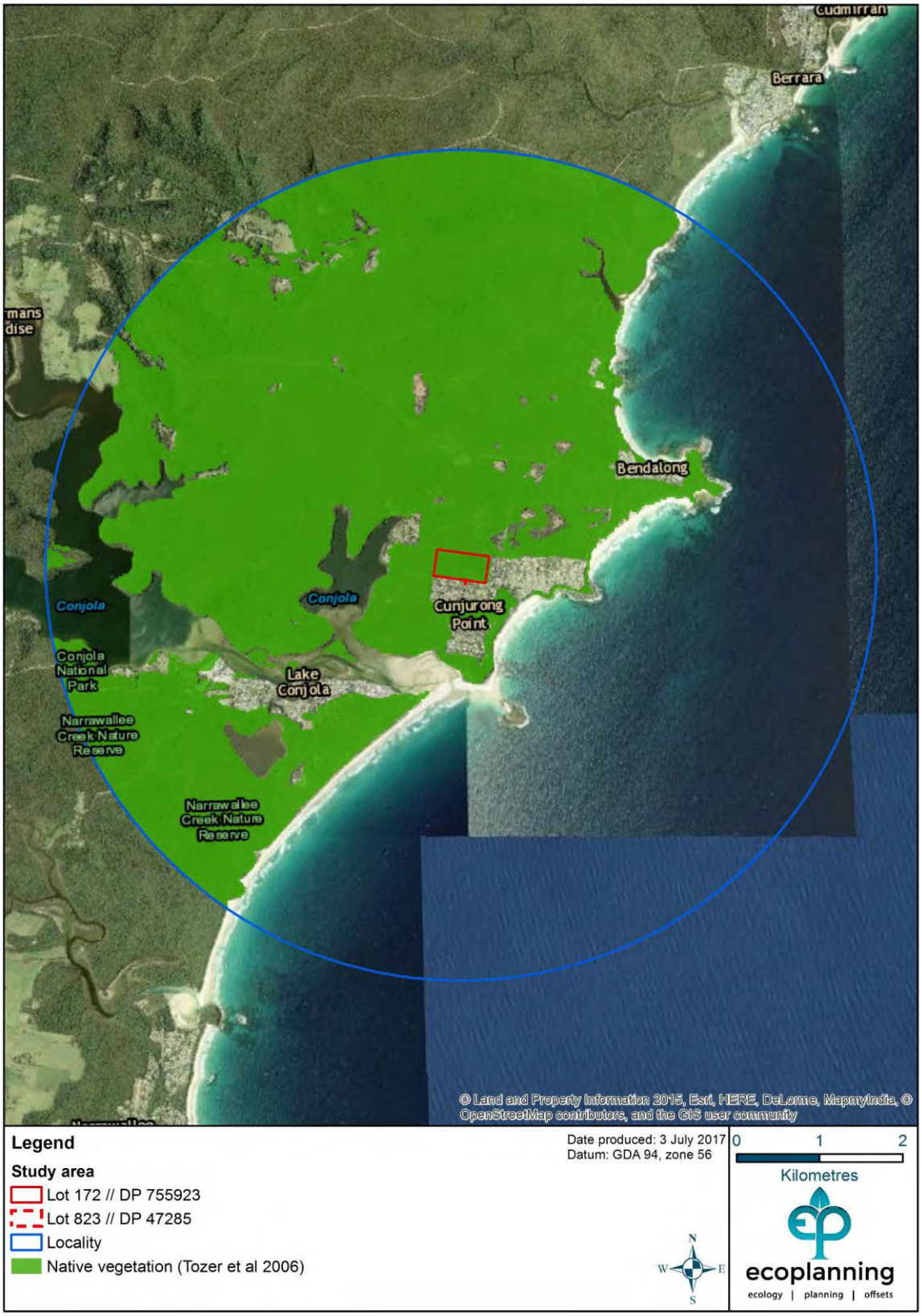

Figure 2: Native vegetation in the locality (Tozer et al. 2006).

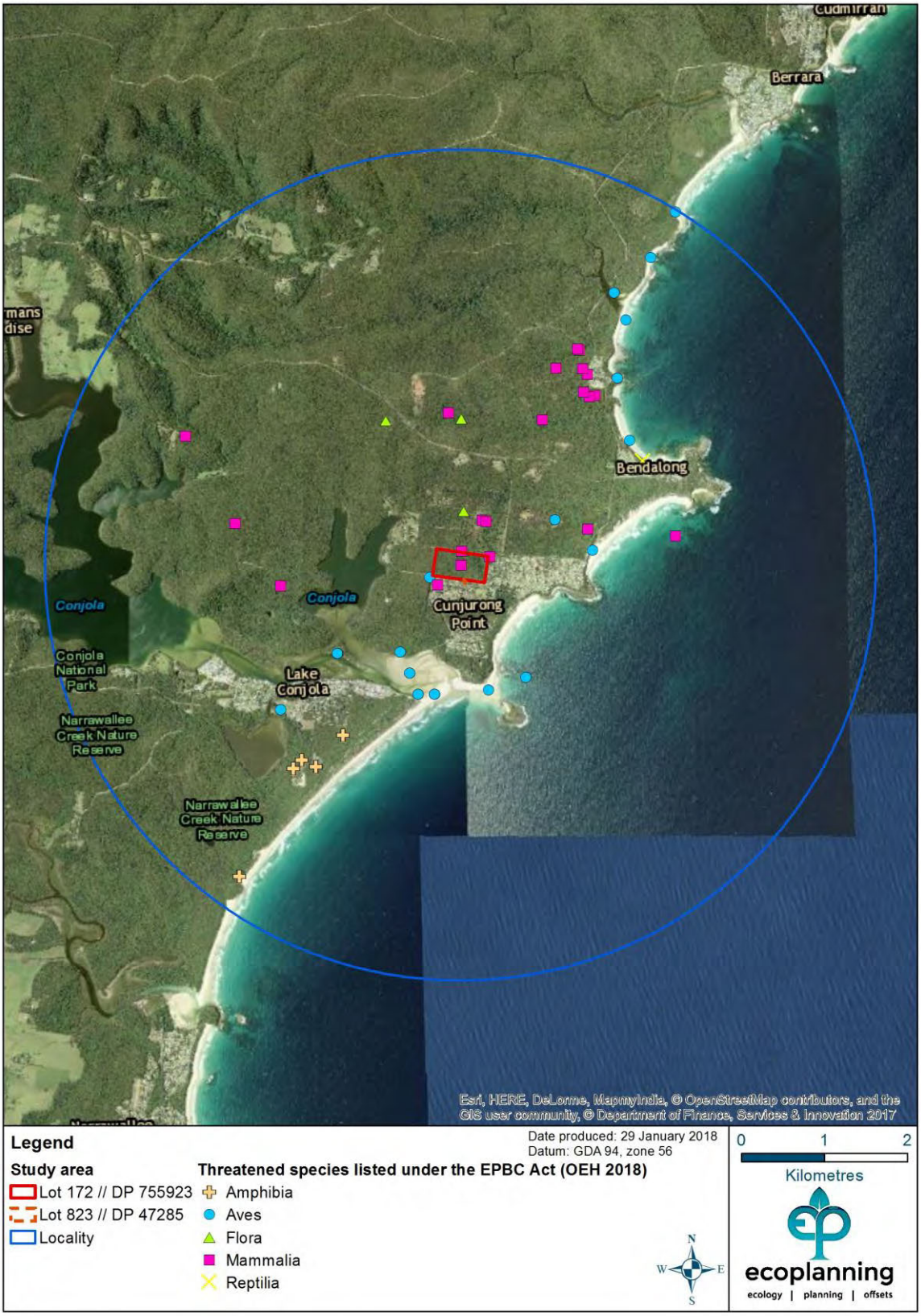

Figure 3: Threatened species listed under the EPBC Act in the locality (OEH 2018).

Figure 4: Vegetation mapping (BES 2006).

Figure 5: Targeted Southern Brown Bandicoot survey (Ecoplanning 2018).


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2018-03-15 1:45:03 AM M 1/3 21°C
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Figure 6: Remote camera images of Long-nosed Bandicoot (Perameles nasuta).

Appendix B – Likelihood of occurrence assessment for MNES

Scientific Name Common Name	Legal Status	Number of records	Closest record and date	Most recent and proximity	Likelihood of occurrence	
					BES (2006)	This assessment
KINGDOM: Animalia; CLASS: Amphibia						
Heleioporus australiacus Giant Burrowing Frog	BC Act: V EPBC Act: V	0	No records in locality	No records in locality	Unlikely	Not present
Litoria aurea Green and Golden Bell Frog	BC Act: E1 EPBC Act: V	5	2.49 km (6/3/2008)	26/11/2009 (2.98 km)	Unlikely	Not present
Litoria littlejohni Littlejohn's Tree Frog	BC Act: V EPBC Act: V	0	No records in locality	No records in locality	-	Not present
KINGDOM: Animalia; CLASS: Aves						
Anthochaera phrygia Regent Honeyeater	BC Act: CE EPBC Act: CE	0	No records in locality	No records in locality	Potential	Low
Actitis hypoleucos Common Sandpiper	EPBC Act: C,J,K	1	1.58km (27/03/2001)	One record in locality only	-	Not present
Charadruis mongolus Lesser Sand-plover	BC Act: V EPBC Act: E,C,J,K	1	1.57km (2/02/2001)	One record in locality only	-	Not present
Cuculus optatus Oriental Cuckoo	EPBC Act: C,J,R	0	No records in locality	No records in locality	-	Not present
Dasyornis brachypterus Eastern Bristlebird	BC Act: E EPBC Act: E	0	No records in locality	No records in locality	-	Not present
Haliaeetus leucogaster White-bellied Sea-Eagle	BC Act: V EPBC Act: C	5	1.27km (7/09/2012)	Same as proximal record	Unlikely	Low
Hirundapus caudactus White-throated Needletail	EPBC Act: C,J,K	1	2.64km (12/04/2013)	One record in locality only	Unlikely	Low

Scientific Name Common Name	Legal Status	Number of records	Closest record and date	Most recent and proximity	Likelihood of occurrence	
					BES (2006)	This assessment
Hydroprogne caspia Caspian Tern	EPBC Act: C,J	1	1.54km (1/01/2005)	One record in locality only	-	Not present
Lathamus discolor Swift Parrot	BC Act: E1 EPBC Act: CE	1	394m (25/03/2017)	One record in locality only	-	Recent record
Limosa lapponica Bar-tailed Godwit	EPBC Act: C,J,K	1	1.44km (20/10/1999)	One record in locality only	-	Not present
Monarcha melanopsis Black-faced Monarch	EPBC Act: B	0	No records in locality	No records in locality	Recorded	High
Monarcha trivirgatus Speckled Monarch	EPBC Act: B	0	No records in locality	No records in locality	-	Low
Myiagra cyanoleuca Satin Flycatcher	EPBC Act: B	0	No records in locality	No records in locality	Likely	Moderate
Neophema chrysogaster Orange-bellied Parrot	BC Act: CE EPBC Act: CE	0	No records in locality	No records in locality	-	Not present
Rhipidura rufifrons Rufous Fantail	EPBC Act: B	0	No records in locality	No records in locality	Recorded	High
Sternula albifrons Little Tern	BC Act: E1 EPBC Act: C,J,K	43	1.27km (3/09/2012)	Same as proximal record	-	Not present
Thinornis rubricollis Hooded Plover	BC Act: E4A EPBC Act: V	9	1.27km (3/09/2012)	Same as proximal record	-	Not present
KINGDOM: Animalia; CLASS: Mammalia						
Chalinolobus dwyeri Large-eared Pied Bat	BC Act: V EPBC Act: V	0	15.5km (20/02/2004)	No records in locality	-	Low
Dasyurus maculatus Spotted-tailed Quoll	BC Act: V EPBC Act: E	1	360m (30/06/2006)	One record in locality only	-	Moderate

Scientific Name Common Name	Legal Status	Number of records	Closest record and date	Most recent and proximity	Likelihood of occurrence	
					BES (2006)	This assessment
Isoodon obesulus obesulus Southern Brown Bandicoot (eastern)	BC Act: E1 EPBC Act: E	1	370m (24/03/2017)	One record in locality only	Unlikely	Unlikely following survey to confirm potential recent record
Petauroides volans Greater Glider	EPBC Act: V	18	In study area (2/08/2005)	15/04/2017 (In study area)	-	Recent record
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory)	BC Act: V EPBC Act: V	1	2.21km (01/10/1980 - 30/06/2006)*	One record in locality only	Unlikely	Low
Potorous tridactylus tridactylus Long-nosed Potoroo (SE mainland)	BC Act: V EPBC Act: V	0	No records in locality	No records in locality	-	Not present
Pseudomys novaehollandiae New Holland Mouse	EPBC Act: V	0	No records in locality	No records in locality	-	Low
Pteropus poliocephalus Grey-headed Flying-fox	BC Act: V EPBC Act: V	3	2.64km (12/04/2013)	Same as proximal record	-	High
KINGDOM: Animalia; CLASS: Reptilia						
Hoplocephalus bungaroides Broad-headed Snake	BC Act: E EPBC Act: V	0	No records in locality	No records in locality	-	Not present
KINGDOM: Plantae						
Caladenia tessellata Thick-lipped Spider-orchid	BC Act: E EPBC Act: V	0	No records in locality	No records in locality	-	Not present
Cryptostylis hunteriana Leafless Tongue Orchid	BC Act: V EPBC Act: V	1	649m (29/12/2000)	26/11/2001 (1.95km)	Unlikely	Low

Scientific Name Common Name	Legal Status	Number of records	Closest record and date	Most recent and proximity	Likelihood of occurrence	
					BES (2006)	This assessment
Genoplesium baueri Yellow Gnat-orchid	BC Act: E EPBC Act: E	0	No records in locality	No records in locality	-	Not present
Genoplesium vernale East Lynne Midge-orchid	BC Act: V EPBC Act: V	0	No records in locality	No records in locality	-	Not present
Melaleuca biconvexa Biconvex Paperbark	BC Act: V EPBC Act: V	0	No records in locality	No records in locality	-	Not present
Pterostylis gibbosa Illawarra Greenhood	BC Act: E EPBC Act: E	0	No records in locality	No records in locality	-	Not present
Syzygium paniculatum Magenta Lilly Pilly	BC Act: E EPBC Act: V	0	No records in locality	No records in locality	-	Not present
Thesium australe Austral Toadflax	BC Act: V EPBC Act: V	0	No records in locality	No records in locality	-	Not present

Unless other stated, text is taken from the OEH Threatened Species (http://www.environment.nsw.gov.au/threatenedspecies/); Legal Status codes from the Atlas of NSW Wildlife: V = Vulnerable, E1 = Endangered, E2 = Endangered Population, E4A = Critically Endangered, C = China and Australia Migratory Bird Agreement (CAMBA), J = Japan and Australia Migratory Bird Agreement (JAMBA); B = Bonn Convention; BC Act = Biodiversity Conservation Act 2016, EPBC Act = Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Species list is obtained from the OEH BioNet Atlas, EPBC PMST (DoEE 2018a) and BES (2006)

Records are measured from the centre point of the study area. Hence records within 400 m are likely to be within or adjacent to the study area.

* Note: data record defined date of record between these dates.

Appendix C – Updated EPBC Act Protected Matters Report

Australian Government
Department of the Environment and Energy

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

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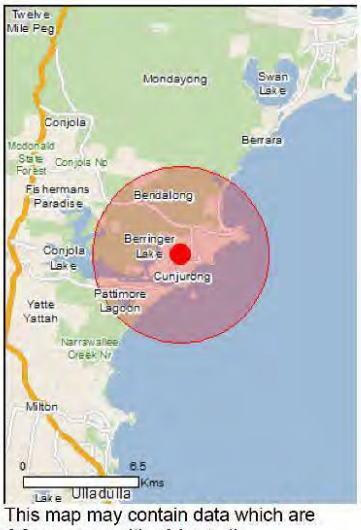

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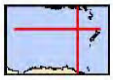

Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	2
Listed Threatened Species:	65
Listed Migratory Species:	45

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	77
Whales and Other Cetaceans:	12
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	2
Regional Forest Agreements:	1
Invasive Species:	39
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities [Resource Information]

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.

Name	Status	Type of Presence
Illawarra and south coast lowland forest and woodland ecological community	Critically Endangered	Community may occur within area
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat likely to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Dasyornis brachypterus Eastern Bristlebird [533]	Endangered	Species or species habitat likely to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea antipodensis gibsoni Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Fregetta grallaria grallaria White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian) [64438]	Vulnerable	Species or species habitat likely to occur within area

Name	Status	Type of Presence
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Limosa lapponica baueri Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat likely to occur within area
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit (menzbieri) [86432]	Critically Endangered	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area
Pterodroma neglecta neglecta Kermadec Petrel (western) [64450]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Breeding likely to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta cauta Shy Albatross, Tasmanian Shy Albatross [82345]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche cauta steadi White-capped Albatross [82344]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed	Vulnerable	Species or species

Name	Status	Type of Presence
Albatross [64459]		habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thinornis rubricollis rubricollis Hooded Plover (eastern) [66726]	Vulnerable	Species or species habitat known to occur within area
Fish		
Epinephelus daemelii Black Rockcod, Black Cod, Saddled Rockcod [68449]	Vulnerable	Species or species habitat likely to occur within area
Prototroctes maraena Australian Grayling [26179]	Vulnerable	Species or species habitat likely to occur within area
Frogs		
Heleioporus australiacus Giant Burrowing Frog [1973]	Vulnerable	Species or species habitat may occur within area
Litoria aurea Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat known to occur within area
Litoria littlejohni Littlejohn's Tree Frog, Heath Frog [64733]	Vulnerable	Species or species habitat likely to occur within area
Mammals		
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat likely to occur within area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat likely to occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area
Isoodon obesulus obesulus Southern Brown Bandicoot (eastern), Southern Brown Bandicoot (south-eastern) [68050]	Endangered	Species or species habitat known to occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Petauroides volans Greater Glider [254]	Vulnerable	Species or species habitat known to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Potorous tridactylus tridactylus Long-nosed Potoroo (SE mainland) [66645]	Vulnerable	Species or species habitat known to occur within area

Name	Status	Type of Presence
Pseudomys novaehollandiae New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat may occur within area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Plants		
Caladenia tessellata Thick-lipped Spider-orchid, Daddy Long-legs [2119]	Vulnerable	Species or species habitat likely to occur within area
Cryptostylis hunteriana Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat known to occur within area
Genoplesium baueri Yellow Gnat-orchid [7528]	Endangered	Species or species habitat may occur within area
Genoplesium vernale East Lynne Midge-orchid [68379]	Vulnerable	Species or species habitat may occur within area
Melaleuca biconvexa Biconvex Paperbark [5583]	Vulnerable	Species or species habitat may occur within area
Pterostylis gibbosa Illawarra Greenhood, Rufa Greenhood, Pouched Greenhood [4562]	Endangered	Species or species habitat may occur within area
Syzygium paniculatum Magenta Lilly Pilly, Magenta Cherry, Daguba, Scrub Cherry, Creek Lilly Pilly, Brush Cherry [20307]	Vulnerable	Species or species habitat known to occur within area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely 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	Species or species habitat known to occur within area
Hoplocephalus bungaroides Broad-headed Snake [1182]	Vulnerable	Species or species habitat likely to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Sharks		
Carcharias taurus (east coast population) Grey Nurse Shark (east coast population) [68751]	Critically Endangered	Species or species habitat likely to occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur

Name	Status	Type of Presence within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
Anous stolidus Common Noddy [825]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat may occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Sternula albifrons Little Tern [82849]		Breeding likely to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Tasmanian Shy Albatross [89224]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Migratory Marine Species		
Balaena glacialis australis Southern Right Whale [75529]	Endangered*	Species or species habitat known to occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species

Name	Threatened	Type of Presence
		habitat may occur within area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely 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	Species or species habitat known to occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area
Manta birostris Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray [84995]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
Migratory Terrestrial Species		
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat known to occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur

Name	Threatened	Type of Presence within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat likely to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Anous stolidus Common Noddy [825]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known to occur

Name	Threatened	Type of Presence within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat likely to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat likely to occur within area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat may occur within area
Catharacta skua Great Skua [59472]		Species or species habitat may occur within area
Cuculus saturatus Oriental Cuckoo, Himalayan Cuckoo [710]		Species or species habitat may occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea gibsoni Gibson's Albatross [64466]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Foraging, feeding or related behaviour likely to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat may occur within area
Sterna albifrons Little Tern [813]		Breeding likely to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Tasmanian Shy Albatross [89224]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed	Vulnerable	Species or species

Name	Threatened	Type of Presence
Albatross [64459]		habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or 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 Hooded Plover [59510]		Species or species habitat known to occur within area
Thinornis rubricollis rubricollis Hooded Plover (eastern) [66726]	Vulnerable	Species or species habitat known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area
Fish		
Acentronura tentaculata Shortpouch Pygmy Pipehorse [66187]		Species or species habitat may occur within area
Cosmocampus howensis Lord Howe Pipefish [66208]		Species or species habitat may occur within area
Heraldia nocturna Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area
Hippocampus abdominalis Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area
Hippocampus breviceps Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area
Hippocampus whitei White's Seahorse, Crowned Seahorse, Sydney Seahorse [66240]		Species or species habitat may occur within area
Histiogamphelus briggsii Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area
Kimblaeus bassensis Trawl Pipefish, Bass Strait Pipefish [66247]		Species or species habitat may occur within area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area
Notiocampus ruber Red Pipefish [66265]		Species or species

Name	Threatened	Type of Presence
		habitat may occur within area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area
Solenostomus cyanopterus Robust Ghostpipefish, Blue-finned Ghost Pipefish, [66183]		Species or species habitat may occur within area
Solenostomus paegnius Rough-snout Ghost Pipefish [68425]		Species or species habitat may occur within area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area
Stigmatopora olivacea a pipefish [74966]		Species or species habitat may occur within area
Syngnathoides biaculeatus Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area
Vanacampus phillipi Port Phillip Pipefish [66284]		Species or species habitat may occur within area
Mammals		
Arctocephalus forsteri Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area
Arctocephalus pusillus Australian Fur-seal, Australo-African Fur-seal [21]		Species or species habitat may occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely 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	Species or species habitat known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or

Name	Threatened	Type of Presence
		related behaviour known to occur within area

Whales and other Cetaceans		[Resource Information]
Name	Status	Type of Presence
Mammals		
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area
Delphinus delphis Common Dophin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
Conjola	NSW
Narrawallee Creek	NSW

Regional Forest Agreements	[Resource Information]
Note that all areas with completed RFAs have been included.	
Name	State

Name	State
Southern 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
Passer domesticus House Sparrow [405]		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
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
Capra hircus Goat [2]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur 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

Name	Status	Type of Presence
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
Sus scrofa Pig [6]		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		
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
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Chrysanthemoides monilifera subsp. monilifera Boneseed [16905]		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
Eichhornia crassipes Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur 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
Nassella neesiana Chilean Needle grass [67699]		Species or species habitat may occur within area
Nassella trichotoma Serrated Tussock, Yass River Tussock, Yass Tussock, Nassella Tussock (NZ) [18884]		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

Name	Status	Type of Presence
		area
Protasparagus densiflorus Asparagus Fern, Plume Asparagus [5015]		Species or species habitat likely to occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		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
Ulex europaeus Gorse, Furze [7693]		Species or species habitat likely to occur within area

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

-35.25556 150.50972

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
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-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 D – Assessments of Significance in accordance with the MNES Significant Impact Guidelines (DoE 2013)

The EPBC Act Matters of National Environmental Significance (EPBC Act Significant Impact Guidelines) (DoE 2013) provides 'Significant Impact Criteria' that are to be used to assist in determining whether a proposed action is likely to have a significant impact on a MNES and subsequently the need for referral. The following MNES identified within the study area or considered to have a moderate or greater likelihood of occurring in the study area have been addressed below:

- Black-faced Monarch (*Monarcha melanopsis*) – migratory
- Greater Glider (*Petauroides volans*) – vulnerable
- Grey-headed Flying-fox (*Pteropus poliocephalus*) – vulnerable
- Rufous Fantail (*Rhipidura rufifrons*) – migratory
- Satin Flycatcher (*Myiagra cyanoleuca*) – migratory
- Southern Brown Bandicoot (eastern) (*Isoodon obesulus obesulus*) – endangered
- Spotted-tailed Quoll (*Dasyurus maculatus*) – vulnerable
- Swift Parrot (*Lathamus discolor*) – critically endangered

The MNES Significant Impact Guidelines (DoE 2013) outline definitions of the terms used in the assessments below. The definitions have been used to identify if an important populations or habitat critical to the survival of each species is present in the study area.

The MNES Significant Impact Guidelines (DoE 2013) define an important population as:

> *'…a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:*

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

The MNES Significant Impact Guidelines (DoE 2013) define habitat critical to the survival of a species as:

> *'…areas that are necessary:*

- *for activities such as foraging, breeding, roosting, or dispersal*
- *for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators)*
- *to maintain genetic diversity and long term evolutionary development, or*
- *for the reintroduction of populations or recovery of the species or ecological community.*

> *Such habitat may be, but is not limited to: habitat identified in a recovery plan for the species or ecological community as habitat critical for that species or ecological community; and/or habitat listed on the Register of Critical Habitat maintained by the minister under the EPBC Act'…*

Migratory Birds

Black-faced Monarch (Monarcha melanopsis),

Black-faced Monarch (*Monarcha melanopsis*) is widespread in eastern Australia, occurring in NSW along the eastern coast and tablelands. They are predominantly associated with rainforest ecosystems but are sometimes found in nearby open eucalypt forests (mainly wet sclerophyll forests) especially in gullies with a dense, shrubby understorey as well as in dry sclerophyll forests and woodlands, often with a patchy understorey (DoEE 2018b).

Black-faced Monarch was observed during surveys by BES (2006) with evidence of a breeding pair in the north-eastern part of the study area. They migrate from this south-eastern region to winter north in Australia and New Guinea.

The study area is within a region that supports an ecologically significant proportion of the population as the species is known to widely use the region (ALA 2018). and evidence of breeding activities have been observed in the study area and locality. Hence the study area is considered an area of important habitat for this migratory species.

Rufous Fantail (Rhipidura rufifrons)

Rufous Fantail (*Rhipidura rufifrons*) occurs in coastal and near-coastal regions of eastern Australia. In NSW it is distributed on and east of the Great Dividing Range. In east and south-east Australia, the Rufous Fantail mainly inhabits wet sclerophyll forests, often in gullies dominated by eucalypts. They occasionally occur in secondary regrowth, following logging or disturbance in forests or rainforests. When on passage, they are sometimes recorded in drier sclerophyll forests and woodlands (DoEE 2018b).

Rufous Fantail was observed during surveys by BES (2006) in the north-eastern part of the study area. They migrate from this south-eastern region to winter north in Australia and New Guinea.

The study area is within a region that supports an ecologically significant proportion of the population as the species is known to widely use the region and evidence of breeding activities have been observed in the region. Hence the study area is considered an area of important habitat for this migratory species.

Satin Flycatcher (Myiagra cyanoleuca)

Satin Flycatcher (Myiagra cyanoleuca) is widespread in eastern Australia and in NSW they are most common on and east of the Great Dividing Range. Satin Flycatchers inhabit heavily vegetated gullies in eucalypt-dominated forests and taller woodlands, and on migration, occur in coastal forests, woodlands, mangroves and drier woodlands and open forests (DoEE 2018b).

Satin Flycatcher hasn't been recorded in the study area but has been recorded substantially in the south-eastern region (ALA 2018). The species migrates north over winter to Northern Australia and New Guinea (DoEE 2018b).

The study area is within a region that supports an ecologically significant proportion of the population as the species is known to widely use the region and evidence of breeding activities have been observed in the region. Hence the study area is considered an area of important habitat for this migratory species.

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

- *substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species*

The proposal is unlikely to substantially modify an area of important habitat for a migratory species. The existing drainage line and vegetative buffer will be maintained and will provide vegetative connectivity through the study area. It will be managed by a Flora and Fauna Management Plan to ensure vegetation condition and hydrology is not significantly impacted during and post construction. This vegetative corridor will link to extensive habitat north of the study area. Additionally, two water quality facilities will be integrated into the water management which will control sediment and pollutant filtration and water levels. This will ensure the habitat for these migratory bird species is maintained at a high level of resilience.

- *result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species, or*

The Flora and Fauna Management Plan has identified problematic exotic species and has stipulated site-specific weed control techniques. The study area was noted to have a high resilience with a low dominance of exotic species. This will be maintained through monitoring and management of exotic species to ensure important habitat for these migratory bird species is maintained.

- *seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.*

The study area covers a small area of habitat that provides breeding and foraging potential for these migratory species. Due to its size, the study area cannot support a significant proportion of the population of any of these migratory species. The retention and management of the vegetative corridor through the study area will ensure that the species' can continue to use the study area for foraging and breeding activities.

Greater Glider (Petauroides volans) – vulnerable

Greater Gliders occur in eastern Australia, from the Windsor Tableland in north Queensland through to central Victoria. Its distribution is thought to be stable, but its area of occupancy within its distribution is thought to have substantially decreased, mostly due to land clearing. The decrease in occupancy is thought to continue to decrease due to further clearing, fragmentation, fire and forestry activities.

Greater Gliders utilise eucalypt forests and woodlands. It is typically found in taller, montane, moist eucalypt forests with relatively old trees and abundant hollows and favours a diversity of eucalypt species (TSSC 2016).

Greater Glider has been observed twice recently in the study area (2006 by BES (2006) and 2017 (OEH 2018a)) and are considered relatively abundant in the locality BES (2006). The locality is not considered to support an important population. It is not at the edge of the species range and it is well connected and hence spread of genetic diversity is not highly restricted. Populations that require conservation assistance have been identified as

Endangered Populations in NSW at Seven Mile Beach National Park area, Mount Gibraltar Reserve area and Eurobodalla local government area (OEH 2018a).

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*

The population in the study area is not considered an important population.

- *reduce the area of occupancy of an important population*

The population in the study area is not considered an important population.

- *fragment an existing important population into two or more populations*

The population in the study area is not considered an important population.

- *adversely affect habitat critical to the survival of a species*

Whilst the study area may be utilised for '*foraging, breeding, … or dispersal'* of Greater Glider, given extensive tracts of intact vegetation in the Reserve Estate adjacent to this site (see **Figure 2**), it is not considered to be habitat critical to the survival of the Greater Glider. Further, it has not been identified in a Recovery Plan or on a Critical habitat register.

The study area contains a number of hollows suitable for Greater Glider. Additionally, the Greater Glider has a small home range (1 ha – 4 ha) and hence the study area could provide foraging and breeding habitat for multiple breeding individuals. However, the removal of 16.18 ha of habitat is not considered an adverse impact due to the extensive distribution of habitat in the locality and the ability of the species to continue to utilise habitat in the retained habitat in and adjacent to the study area. Hence, long-term maintenance of the species, genetic diversity will not be inhibited by the proposal.

- *disrupt the breeding cycle of an important population*

The population in the study area is not considered an important population.

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

The proposal will result in the removal of up to 17.18 ha of foraging and breeding habitat for this species. This is unlikely to lead to the decline of the species given the extensive habitat available in the locality (see **Figure 2**).

- *result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat*

The proposal is unlikely to result in establishment of invasive species in potential foraging and breeding habitat of Greater Glider. Historical land use in the locality has led to the establishment of invasive species that are potentially harmful to this species' habitat. However, it is unlikely that additional invasive species would become established in the study area.

The Flora and Fauna Management Plan developed for the study area would manage and monitor feral animal, pest and weed species in the study area with the aim of reducing pressures from invasive species in the study area.

- *introduce disease that may cause the species to decline, or*

The proposal is unlikely to result in the introduction of disease that may cause decline of Greater Glider. There is potential for disease caused by the soil-borne plant pathogen *Phytophthora cinnamomi* to occur in the study area as a result of the proposal. This pathogen could impact on the vegetation communities that could support foraging and breeding habitat for this species. Control of transportation of the pathogen would occur by controlling soil transportation into the study area.

- *interfere substantially with the recovery of the species.*

It is unlikely that the proposal would substantially interfere with the recovery of the Greater Glider. The study area has not been assessed to adversely impact habitat critical to the survival of the species. The vegetation proposed for removal is unlikely to result in a long-term reduction in genetic fitness by creating a barrier to movement between areas of habitat critical to the species. Furthermore, the proposal would result in the removal of a small amount of available habitat.

Conclusion of EPBC Act Significant Impact Guidelines (DoE 2013) for Greater Glider.

A referral is not recommended for the Greater Glider, as:

- the proposal would not adversely affect critical habitat
- the proposal is unlikely to cause the species to decline
- the proposal is unlikely to substantially interfere with the recovery of the species

Grey-headed Flying-fox (Pteropus poliocephalus) – vulnerable

Grey-headed Flying-foxes occurs within 200 km of the eastern coastline of Australia, from Rockhampton in Queensland to Adelaide in South Australia. They have a preference for subtropical and temperate rainforest, tall sclerophyll forests and woodlands, as well as heaths and swamps. Roosting areas are often selected upon their proximity to a regular food source (within 20 km), often in gullies, close to water, or in vegetation with a dense canopy. This species roosts communally in large, established camps which can support several thousand individuals. The Grey-headed Flying-fox can travel up to 50 km from camp to forage (typically <20 km), where they feed on nectar and pollen from *Eucalyptus, Banksia* and *Melaleuca* spp., as well as the fruits of native and exotic species.

There have been three recorded observations of the Grey-headed Flying-fox in the locality (OEH 2018b). The closest and most recent record is from the 12/04/2013, approximately 2.64km from the study area (OEH 2018a). No observations were made of this species during field assessment, and no suitable roosting habitat that could support a large camp of Grey-headed Flying-foxes was identified in the study area. It is likely that Grey-headed Flying-fox use the study area for foraging. The closest known occupied Grey-headed Flying-fox camps are situated in Yatteyattah (approximately 5km west of the study area) and Wandandian, Bewong Creek (approximately 25 km north of the study area (DoE 2015)

Due to the great movement and constant genetic exchange of individual Grey-headed Flying-foxes through the species' entire geographic range, all individuals are considered part of one population. Instead they are separated into spatially structured colonies (DoEE 2018b). Therefore, the individuals that may use the study area are part of an important population.

Threats to this species include:

- Loss of roosting and foraging site
- Heat stress
- Electrocution on powerlines and entanglement in netting.

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*

The proposal is unlikely to lead to a long-term decrease to an important population of the Grey-headed Flying-fox, as the site does not contain a camp of Grey-headed Flying-fox. The proposed development will not lead to a decrease in the population of the Grey-headed Flying-fox, as the species is not being directly impacted by the proposal. The species may use the study area for foraging. Suitable foraging habitat is found within the locality, including the habitat surrounding the north and west of the study area.

- *reduce the area of occupancy of an important population*

This proposal will not reduce the area of occupancy of an important population of the Grey-headed Flying-fox, as no resident population occurs within the study area or immediate surrounds. Furthermore, the species could continue to occur in the study area as a fly over, or potentially forage on fruit or pollen bearing vegetation that is maintained along the drainage line or planted in the urban development.

- *fragment an existing important population into two or more populations*

This proposal will not lead to the fragmentation of a Grey-headed Flying-fox population. The ability for Grey-headed Flying-fox to travel large distances makes them less susceptible to the impacts of fragmentation of foraging habitat. Fragmentation is specifically threatening if individuals have to travel further from camps to forage (DoEE 2018b). The study area is sufficiently far enough away from the closest Grey-headed Flying-fox roosting site, as to not substantially impact on the species access to foraging recourses. Additionally, the proposal will not isolate patches of habitat which would require more energy consumption for individuals to access.

- *adversely affect habitat critical to the survival of a species*

This proposal is unlikely to adversely affect habitat critical to the survival of the Grey-headed Flying-fox. The Grey-headed Flying-fox is unlikely to utilise the study area for roosting as no signs of roosting have been observed and the site has never been identified as a permanent or temporary camp site (DoE 2015). According to the Draft National Recovery Plan for the Grey-headed Flying-fox, foraging habitat that meets at least one of the following criteria can be explicitly identified as habitat critical to survival, or essential habitat (DECCW 2009), including:

- productive during winter and spring, when food bottlenecks have been identified
- known to support populations of >30 000 individuals within an area of 50 km radius (the maximum foraging distance of an adult)

There are several large camps within 50 km that support over 30,000 individuals including the nationally important flying-fox camp at Kioloa and Nowra (DoE 2015). The study area is close to the maximum flying distance from each of these large camps and is not likely to support individuals from these populations with any regularity. The study area supports winter/spring flowering resource (*Eucalyptus botryoides* [Bangalay]), however, the vast majority of the Grey-headed Flying-fox population migrates north during the winter/spring period. Therefore, the study area is not considered to support habitat critical to the survival of this species.

- *disrupt the breeding cycle of an important population*

This proposal is unlikely to disrupt the breeding cycle of Grey-headed Flying-fox. No breeding occurs in or near the study area and the study area does not provide a reliable source of foraging habitat to support a camp.

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

The proposal will result in the removal of up to 17.18 ha of potential foraging habitat for this species. This is unlikely to lead to the decline of the species given the small amount of vegetation removal.

- *result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat*

The proposal is unlikely to result in establishment of invasive species in potential foraging and breeding habitat of Grey-headed Flying-fox. Historical land use in the locality has led to the establishment of invasive species that are potentially harmful to this species' habitat. However, it is unlikely that additional invasive species would become established in the study area.

The Flora and Fauna Management Plan developed for the study area would manage and monitor feral animal, pest and weed species in the study area with the aim of reducing pressures from invasive species in the study area.

- *introduce disease that may cause the species to decline, or*

The proposal is unlikely to result in the introduction of disease that may cause decline of Grey-headed Flying-fox. There is potential for disease caused by the soil-borne plant pathogen *Phytophthora cinnamomi* to occur in the study area as a result of the proposal. This pathogen could impact on the vegetation communities that could support foraging habitat for this species. Control of transportation of the pathogen would occur by controlling soil transportation into the study area.

- *interfere substantially with the recovery of the species.*

It is unlikely that the proposal would substantially interfere with the recovery of the Grey-headed Flying-fox. The study area has not been assessed to adversely impact habitat critical to the survival of the species. The vegetation proposed for removal is unlikely to result in a long-term reduction in genetic fitness by creating a barrier to movement between

areas of habitat critical to the species. Furthermore, the proposal would result in the removal of a small amount of potential foraging habitat. The study area does not contain a breeding camp and no indication of the species was observed during database review or field surveys.

Conclusion of EPBC Act Significant Impact Guidelines (DoE 2013) for Grey-headed Flying-fox.

A referral is not recommended for the Grey-headed Flying-fox, as:

- no breeding or roosting habitat would be removed
- the vegetation proposed for removal does not support a camp of Grey-headed Flying-fox
- the proposal is unlikely to impact on the breeding cycle of nearby populations
- the proposal would not affect critical habitat (e.g. further fragment the surrounding bushland or remove essential habitat)

Southern Brown Bandicoot (eastern) (Isoodon obesulus obesulus) – endangered

The Southern Brown Bandicoot (eastern) subspecies is currently restricted in NSW to the coastal fringe, south from the Hawkesbury River. It primarily occurs in two areas: Ku-ring-gai Chase and Garigal National Parks just north of Sydney and the far south-east corner of the state including Ben Boyd National Park, East Boyd State Forest, Nadgee Nature Reserve, Nadgee State Forest, South East Forest National Park, and Yambulla State Forest. Apart from these main locations, scattered records are reported within its range (DoEE 2018b).

Southern Brown Bandicoots (eastern) are known to inhabit a variety of habitats including heathland, shrubland, sedgeland, heathy open forest and woodland and are usually associated with infertile, sandy and well drained soils, but can be found in a range of soil types. Within these vegetation communities they typically inhabit areas of dense ground cover. Vegetation structure appears to be more influential than floristics in determining Southern Brown Bandicoot (eastern) abundance. In particular, the density of ground layer vegetation appears to be important - sites with greater vegetation density in the ground layer are generally preferred (DoEE 2018b).

Southern Brown Bandicoot (eastern) was recently observed on the edge of the study area (2017) although no information is provided with the record to confirm how the sighting was made (OEH 2018b). Prior to this record, the closest records are from 4 km (1993), 22 km (1991) and 28 km (1991). The closest recent record is from 2014 and is from the Upper Kangaroo Valley approximately 67 km north of the study area. Bandicoot diggings were observed in the study area by BES (2006) but the species was not detected despite targeted cage trapping. The digging signs observed were attributable to the Long-nosed Bandicoot (*Perameles nasuta*) which is common in the locality.

Southern Brown Bandicoot (eastern) has been reintroduced into Booderee National Park, approximately 20 km north of the study area. They have been found to be successfully breeding at this site (TSRH 2017), however it is unlikely that these individuals have moved through to the study area (DoEE 2018b).

The scale and rapidity of decline mean that all extant populations are considered important for the survival of the subspecies (DoEE 2018b). Following the confirmation of Long-nosed

Bandicoot in the study area, the observation of a Southern Brown Bandicoot is considered an unlikely sighting. The precautionary principle has been applied to assess impact to potential habitat for Southern Brown Bandicoot in and north of the study area.

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

- *lead to a long-term decrease in the size of a population*

The proposal is unlikely to lead to a long-term decrease in the size of a population. It is unlikely that a population of Southern Brown Bandicoot utilises habitat in the study area. The study area provides potential habitat for the species and this habitat would be maintained and would continue to connect the VMP subject site with habitat north of the study area.

- *reduce the area of occupancy of the species*

The study area is unlikely to be occupied by the species and hence the proposal is unlikely to reduce the area of occupancy of the species.

- *fragment an existing population into two or more populations*

The proposal is unlikely to fragment an existing population into two or more populations. The species is known to occur in fragmented populations along the eastern coast. The habitat in the study area would not be fragmented as a habitat corridor would be maintained through the study area and adjoin habitat north of the study area.

- *adversely affect habitat critical to the survival of a species*

The proposal is unlikely to affect habitat critical to the survival of the species. Critical habitat was not declared for this species under the *Threatened Species Conservation Act 1995* (DEC 2006). Any area where the species is detected is likely to represent a significant area of habitat (NPWS 2001). The Saving Our Species supports the site-based significance of this species by identifying three areas which are significant to the survival of this species. The study area is not within any of the three areas and it is unlikely that the species was detected in or adjacent to the study area.

- *disrupt the breeding cycle of a population*

It is unlikely that the proposal would disrupt the breeding cycle of a population. It is unlikely that the study area supports a breeding population. The habitat in the study area is potential habitat for the species which could be used for breeding. The retention of the habitat corridor which links to extensive habitat north of the study area would maintain potential breeding habitat in the study area and locality.

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

The proposal is unlikely to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline. The study area is not within known areas of importance for this species. The potential habitat in the study area would be maintained in the VMP subject site and this habitat corridor would link to extensive habitat north of the study area.

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

The proposal would not result in additional invasive species becoming established in the study area. The European Fox (*Vulpes vulpes*) and feral cat (*Felis catus*) are known key threats to this species (NPWS 2001, DEC 2006). These species are already established in the study area and European Foxes were recorded frequently during the remote camera survey.

- *introduce disease that may cause the species to decline, or*

It is unlikely that the proposal would introduce a disease that may cause the species to decline. The infection of native plants by *Phytophthora cinnamomi* is a known threat to this species (DEC 2006) as it reduces habitat complexity and has potential to destroy habitat (DEC 2006). There is potential for this soil-borne plant pathogen to occur in the study area as a result of the proposal. Control of transportation of the pathogen would occur by controlling soil transportation into the study area.

- *interfere with the recovery of the species.*

It is unlikely that the proposal would substantially interfere with the recovery of the species. The study area is not located within any of the areas of significance for this species (OEH 2018a). It is unlikely that a population of the species is established in the study area. Furthermore, habitat would be available in the VMP subject site and would be connected to extensive habitat north of the study area.

Conclusion of EPBC Act Significant Impact Guidelines (DoE 2013) for Southern Brown Bandicoot (eastern).

A referral is not recommended for the Southern Brown Bandicoot (eastern), as:

- the proposal would not adversely affect critical habitat
- the proposal is unlikely to cause the species to decline
- the proposal is unlikely to substantially interfere with the recovery of the species

Spotted-tailed Quoll (Dasyurus maculatus) – vulnerable

The range of the Spotted-tailed Quoll has contracted considerably since European settlement. It is now found in eastern NSW, eastern Victoria, south-east and north-eastern Queensland, and Tasmania (OEH 2018a).

The Spotted-tailed Quoll has been recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Individual animals use hollow-bearing trees, fallen logs, small caves, rock outcrops and rocky-cliff faces as den sites.

A Spotted-tailed Quoll has been recorded in habitat south of the study area in 2006 (OEH 2018b). This is the only record from the locality over the past 20 years. The study area supports potential habitat for this species including den sites and foraging resources.

The study area is not within a key management area for this species and hence the potential population in the locality is not considered an important population (OEH 2018a).

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*

The population in the study area is not considered an important population (see DoEE 2013).

- *reduce the area of occupancy of an important population*

The population in the study area is not considered an important population.

- *fragment an existing important population into two or more populations*

The population in the study area is not considered an important population.

- *adversely affect habitat critical to the survival of a species*

The study area is not considered to be habitat critical to the survival of the Spotted-tailed Quoll. Whilst the study area may be utilised for '*foraging, breeding, … or dispersal'* of Spotted-tailed Quoll, given extensive tracts of intact vegetation in the Reserve Estate adjacent to this site (see **Figure 2**), it is not considered to be habitat critical to the survival of the Spotted-tailed Quoll. Further, it has not been identified in a Recovery Plan or on a Critical habitat register.

The study area contains a selection of hollow logs and tree hollows which are key habitat features for Spotted-tailed Quoll. Additionally, the study area provides prey which creates important links between prey and den sites which supports female territories (DoEE 2018b). However, the removal of 16.18 ha of habitat is not considered an adverse impact due to the extensive distribution of habitat in the locality and the ability of the species to continue to utilise habitat in the retained habitat in and adjacent to the study area. Hence, long-term maintenance of the species will not be inhibited by the proposal.

- *disrupt the breeding cycle of an important population*

The population in the study area is not considered an important population.

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

The proposal will result in the removal of up to 17.18 ha of foraging and breeding habitat for this species. This is unlikely to lead to the decline of the species given the small amount of vegetation removal and the extensive habitat available in the locality.

- *result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat*

The proposal is unlikely to result in establishment of invasive species in potential foraging and breeding habitat of Spotted-tailed Quoll. Historical land use in the locality has led to the establishment of invasive species that are potentially harmful to this species' habitat. However, it is unlikely that additional invasive species would become established in the study area.

The Flora and Fauna Management Plan developed for the study area would manage and monitor feral animal, pest and weed species in the study area with the aim of reducing pressures from invasive species in the study area.

- *introduce disease that may cause the species to decline, or*

The proposal is unlikely to result in the introduction of disease that may cause decline of Spotted-tailed Quoll. There is potential for disease caused by the soil-borne plant pathogen *Phytophthora cinnamomi* to occur in the study area as a result of the proposal. This pathogen could impact on the vegetation communities that could support foraging and breeding habitat for this species. Control of transportation of the pathogen would occur by controlling soil transportation into the study area.

- *interfere substantially with the recovery of the species.*

It is unlikely that the proposal would substantially interfere with the recovery of the Spotted-tailed Quoll. The study area has not been assessed to adversely impact habitat critical to the survival of the species. The vegetation proposed for removal is unlikely to result in a long-term reduction in genetic fitness by creating a barrier to movement between areas of habitat critical to the species. Furthermore, the proposal would result in the removal of a small amount of available habitat.

Conclusion of EPBC Act Significant Impact Guidelines (DoE 2013) for Spotted-tailed Quoll.

A referral is not recommended for the Spotted-tailed Quoll, as:

- the proposal would not adversely affect critical habitat
- the proposal is unlikely to cause the species to decline
- the proposal is unlikely to substantially interfere with the recovery of the species

Swift Parrot (Lathamus discolor) – critically endangered

Swift Parrots migrate to the mainland of Australia in the autumn and winter months to south-eastern Australia from Victoria and the eastern parts of South Australia to south-east Queensland. In NSW, they mostly occur on the coast and south west slopes.

On the mainland they occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations. *Corymbia gummifera* (Red Bloodwood) is in the study area and is a favoured winter feed tree.

There is one recent record in the locality from the edge of the study area on 25/03/2017. This is considered a very early record in the season as the birds are known to migrate from Tasmania to the mainland and back between March and October. There is a continual stream of records along the east coast fringe (OEH 2018b).

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

- *lead to a long-term decrease in the size of a population*

The proposal is unlikely to lead to a long-term decrease in the size of a population. The population moving through the south coast is likely to utilise areas dominated by favoured feed trees including Swamp Mahogany (*Eucalyptus robusta)*, Spotted Gum (*Corymbia maculata)*, and Red Bloodwood (*C. gummifera).* The proposal would remove some *C. gummifera* but the small number of trees to be removed would not impact foraging such that it would lead to a long-term decrease in the size of a population.

- *reduce the area of occupancy of the species*

The proposal is unlikely to reduce the area of occupancy of the Swift Parrot. It would not impact any breeding habitat or any key wintering sites. Any foraging in the study area would be sporadic.

- *fragment an existing population into two or more populations*

The proposal would not fragment an existing population into two or more populations. The Swift Parrot moves over a large distance and would be able to continue migration through the plentiful habitat available in the locality.

- *adversely affect habitat critical to the survival of a species*

The study area is not considered habitat critical to the survival of the Swift Parrot. No breeding would occur in the study area. Additionally, the foraging resources in the study area are not abundant as the study area doesn't support a diversity of favoured feed trees.

- *disrupt the breeding cycle of a population*

The study area does not provide breeding habitat for 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 proposal would not impact habitat to the extent that the species is likely to decline. No breeding habitat would be impacted. Additionally, the foraging habitat in the study area is not critical to the survival of the species and only provides scattered favoured feed trees. The species would be able to forage and migrate through the locality using the abundant habitat available.

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

The proposal is unlikely to result in establishment of invasive species in potential foraging and breeding habitat of Swift Parrot. Historical land use in the locality has led to the establishment of invasive species that are potentially harmful to this species' habitat. However, it is unlikely that additional invasive species would become established in the study area.

The Flora and Fauna Management Plan developed for the study area would manage and monitor feral animal, pest and weed species in the study area with the aim of reducing pressures from invasive species in the study area.

- *introduce disease that may cause the species to decline, or*

The proposal is unlikely to result in the introduction of disease that may cause decline of Swift Parrot. There is potential for disease caused by the soil-borne plant pathogen *Phytophthora cinnamomi* to occur in the study area as a result of the proposal. This pathogen could impact on the vegetation communities that could support foraging habitat for this species. Control of transportation of the pathogen would occur by controlling soil transportation into the study area.

- *interfere with the recovery of the species.*

It is unlikely that the proposal would substantially interfere with the recovery of the Swift Parrot. The study area has not been assessed to adversely impact habitat critical to the survival of the species. The vegetation proposed for removal is unlikely to result in a long-term reduction in genetic fitness by creating a barrier to movement between areas of habitat critical to the species. Furthermore, the proposal would result in the removal of a small amount of available habitat.

Conclusion of EPBC Act Significant Impact Guidelines (DoE 2013) for Swift Parrot.

A referral is not recommended for the Swift Parrot, as:

- the proposal would not adversely affect critical habitat (e.g. further fragment the surrounding bushland or remove essential habitat)
- the proposal is unlikely to cause the species to decline
- the proposal is unlikely to substantially interfere with the recovery of the species
- the proposal would not impact breeding habitat or areas of abundant favoured feed trees.

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PRELIMINARY DOCUMENTATION

ATTACHMENT H RESPONSE TO THE COMMONWEALTH DEPARTMENT OF ENVIRONMENT AND ENERGY (27 JULY 2018)

[redacted]

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27 July 2018

Re: Response to the Department of the Environment and Energy requesting additional information regarding EPBC Act application to the 182 lot residential subdivision at Berringer and Cunjurong Point Roads, Manyana.

[redacted],

I have reviewed the request by the Department of the Environment and Energy (the Department) for additional information on matters of national environmental significance (MNES) as listed in the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act), with reference to the 182 lot residential subdivision (the proposal) at Berringer and Cunjurong Point Roads, Manyana (the study area).

Attached to this letter is a response to the five additional requests by the Department. I have discussed the previous reports which provide the information requested. To aid the review, I have provided a copy of these reports zipped into a package with this letter.

If you would like to discuss any of my advice, please contact me on the details provided below.

Yours sincerely,

[redacted]

Comment 1: No soil or vegetation plot data has been provided that confirms the vegetation community on site. It is understood that the vegetation may support diagnostic species of the critically endangered Illawarra and south coast lowland forest and woodland (ISCLFW) ecological community.	
Conservation advice (TSSC 2016)	**Response in relation to the study area**
This community is considered an MNES under the EPBC Act where it meets: - Key diagnostic characteristics - At least the minimum condition thresholds for moderate condition (Category C or D)	The three ecological communities in the study area are described by BES (2006) and were confirmed during a site visit in 2017 and discussed in Ecoplanning (2017). Descriptions include floristics and soil characteristics. They have been discussed below with relation to the key diagnostic characteristics and the 'other' diagnostic considerations as required in the conservation advice (TSSC 2016).
Key diagnostic characteristics (page 9)	
The ecological community occurs within the state of New South Wales in the Jervis, Ettrema and Illawarra subregions of the Sydney Basin Bioregion and the Bateman subregion of the South East Corner Bioregion.	The proposal meets this requirement. The proposal is within the Jervis IBRA subregion of the Sydney Basin Bioregion.
The ecological community occurs below approximately 350 m ASL, on the coastal plain or foothills between the immediate coastal strip and the escarpment.	The proposal meets this requirement. The proposal occurs at below 50 m elevation on the coastal plain (FSDF 2018), and approximately 500 m from the coastline.
The ecological community is a forest or woodland with at least 10% foliage cover	The proposal meets this requirement. The vegetation within the proposal area is forest with over 10% foliage cover.
Eucalyptus tereticornis (Forest Red Gum) or *E. longifolia* (Woollybutt) is typically present and often dominant in the mature tree canopy. One or more of the following canopy species may also be dominant, especially where there has been selective removal of trees (for example, *E. tereticornis*) from some patches of the ecological community: *Angophora floribunda* (Rough-barked Apple); *E.*	The proposal **does not** meet this requirement for any of the ecological communities in the study area. There are three vegetation communities mapped within the study area (BES 2006) and this mapping was confirmed during a site visit by Ecoplanning in 2017.

Comment 1: No soil or vegetation plot data has been provided that confirms the vegetation community on site. It is understood that the vegetation may support diagnostic species of the critically endangered Illawarra and south coast lowland forest and woodland (ISCLFW) ecological community.

Conservation advice (TSSC 2016)	Response in relation to the study area
bosistoana (Coast Grey Box); *E. eugenioides* (Thin-leaved Stringybark); *E. globoidea* (White Stringybark). Amongst the other tree species commonly found in the ecological community, but not typically dominant are: *Corymbia maculata* (Spotted Gum); *E. amplifolia* subsp. *amplifolia* (Cabbage Gum); *E. botryoides*; *E. paniculata* subsp. *paniculata* (Grey Ironbark); *E. pilularis* (Blackbutt); and *E. quadrangulata* (Coastal White Wox).	1. Bangalay Paperbark Woodland ('endangered' under the TSC Act but not listed under the EPBC Act) (p7, Ecoplanning 2017). Neither of the two typically dominant canopy species are present. Canopy dominated by *E. botryoides*. Sub-canopy of *E. robusta* (Ecoplanning 2017). ISCLFW does not typically have *E. botryoides* dominant (it is rarely present away from infertile sandflats of the coast as opposed to ISCLFW which occurs predominantly on more fertile soils of Quaternary alluvium and soils derived from Budgong Sandstone [of volcanic origin] in the Illawarra), contrary to TSSC (2016), and *E. robusta* is not listed in the approved conservation advice (TSSC 2016). 2. Northern Coastal Sands Shrub/Fern Forest. Neither of the two typically dominant canopy species are present. Canopy dominated by *E. piperita, E. pilularis* and *C. gummifera* (species associated with sandy substrates). Other canopy species which occur less frequently are *E. eugenioides, E. globoidea, E. paniculata* and *E. botryoides* (Ecoplanning 2017). ISCLFW can be dominated by *E. eugenioides* or *E. globoidea* if selected removal of *E. tereticornis* or *E. longifolia* has occurred in the past. Neither of these species are dominant in this community in the study area. 3. Bangalay Moist Woodland Open Forest. Neither of the two typically dominant canopy species are present. Canopy dominated by *Angophora floribunda, E. botryoides, E. eugenioides,* and *E. paniculata* (Ecoplanning 2017). ISCLFW can be dominated by

Comment 1: No soil or vegetation plot data has been provided that confirms the vegetation community on site. It is understood that the vegetation may support diagnostic species of the critically endangered Illawarra and south coast lowland forest and woodland (ISCLFW) ecological community.	
Conservation advice (TSSC 2016)	**Response in relation to the study area**
	both *A. floribunda* and *E. eugenioides* if selected removal of *E. tereticornis* or *E. longifolia* has occurred in the past. However, *E. botryoides* and *E. paniculata* subsp. p*aniculata* can occur but are rare and in ISCLFW are not typically dominant.
The ecological community is characterised by the plant species described in Appendix A – Species lists: Table 8. Not all species are present at each site.	The proposal **does not** meet this requirement for any of the ecological communities in the study area. The ecological communities present in the study area include species listed in Appendix A of the conservation advice (TSSC 2016, Ecoplanning 2017, BES 2006). However, as none of the ecological communities are characterised by the dominant canopy species prescribed for ISCLFW, the ecological communities are not characterised by the species in Appendix A. Many of the species listed in Appendix A are common in the south coast in a range of ecological communities in varying cover and abundance.
Other diagnostic considerations (page 10)	
The ecological community may include drainage lines and periodically inundated areas but typically occurs in locations less subject to regular or long term inundation than two nearby ecological communities 'River-flat eucalypt forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions' (NSW Scientific Committee, 2004a) and 'Swamp sclerophyll forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions' (NSW Scientific Committee, 2004b).	There are two existing ephemeral first order watercourses in the study area, one flowing through the Bangalay Paperbark Woodland (synonymous with Swamp sclerophyll forest on coastal floodplains) and the second flowing through the Northern Coastal Sands Shrub/Fern Forest.
A sub-canopy of *Melaleuca decora* (Paper Bark), *M. ericifolia* (Swamp	The proposal **does not** meet this consideration for any of the ecological

Comment 1: No soil or vegetation plot data has been provided that confirms the vegetation community on site. It is understood that the vegetation may support diagnostic species of the critically endangered Illawarra and south coast lowland forest and woodland (ISCLFW) ecological community.	
Conservation advice (TSSC 2016)	**Response in relation to the study area**
Paper Bark), *M. styphelioides* (Prickly-leaved Tea Tree), tree-sized *Acacias* and/or *Casuarina glauca* (Swamp Oak) may be present.	communities in the study area. The Bangalay Paperbark Woodland (synonymous with Swamp sclerophyll forest on coastal floodplains) has *M ericifolia* in the midstorey but not as a dominant species, which is typical of this community. None of the other ecological communities in the study area have this sub-canopy character.
The ecological community occurs on a variety of substrates, most commonly fine grained sedimentary or plutonic rocks, from which sandy loam, loam to clay loam soils with moderately high fertility are derived. It does not typically occur on infertile sandy soils or primary alluvium. It can occur on basic volcanic soils but in the northern part of the range these soils more typically support other ecological communities.	The study area is underlain by Tertiary undifferentiated sediments comprising gravel, sand, clay, quartzite, sandstone and conglomerate (Ulladulla 1:250000 Geological Series Sheet S1 56-13). These have weathered to form red loamy and sandy soils typical of the Manyana area. Soils throughout much of the study area are covered by a thick humus layer (BES 2006), and are predominantly infertile sandy soils.
The ecological community is less likely to be present where there is dominance by rainforest-associated plant species, particularly palms or tree ferns.	The rainforest elements present indicate the ecological communities are less likely to be ISCLFW. 1. Bangalay Paperbark Woodland have an abundance of rainforest elements in the sub-canopy (*Livistona australis* (Cabbage Palm) and *Cyathea australis* (Rough Tree Fern)) (BES 2006). 2. Bangalay Moist Woodland Open Forest has an abundance of rainforest elements in the understorey (BES 2006).

Comment 2: A number of threatened fauna species, including the Southern Brown Bandicoot, Swift Parrot, Greater Glider, Spotted-tailed Quoll and migratory species are known to occur on or in close proximity to the site. However, the information provided does not adequately discuss the type and extent of habitat usage on site by these species. The Department considers that their occurrence on site warrants further investigation.	
Species	**Response in relation to the study area**
Southern Brown Bandicoot	Surveys undertaken: - Daytime searches for suitable habitat (BES 2006, Ecoplanning 2017) - Daytime searches for signs of activity (BES 2006, Ecoplanning 2017) - Baited camera traps in autumn (Ecoplanning 2018) - Liaison with specialists (Ecoplanning 2018) - Additional discussions with local ecologist who submitted record (20/06/2018) - Cage trapping (BES 2006) (acknowledging that Southern Brown Bandicoots are trap-shy and hence this is not a recommended survey technique for this species). Information provided: - Habitat description including observations of diggings (BES 2006, Ecoplanning 2017) - Remote camera images, sent to numerous OEH and external experts and Senior Ecologist, and all identified as Long-nosed Bandicoot (Ecoplanning 2018) - Discussions with OEH experts who have alluded to the record being questionable in the absence of other evidences, discussing the Southern Brown Bandicoot record on the Atlas database (Ecoplanning 2018, OEH 2018 [Andrew Claridge, Senior Conservation Officer, SOS Programs]) - Assessment of Significance in accordance with the MNES Significant Impact Guidelines (DoE 2013) Summary of findings: The record of the Southern Brown Bandicoot has been discussed with OEH and external experts, including OEH BioNET staff who contacted the local ecologist who submitted the record to the Atlas. The comment from local OEH expert is:

Comment 2: A number of threatened fauna species, including the Southern Brown Bandicoot, Swift Parrot, Greater Glider, Spotted-tailed Quoll and migratory species are known to occur on or in close proximity to the site. However, the information provided does not adequately discuss the type and extent of habitat usage on site by these species. The Department considers that their occurrence on site warrants further investigation.	
Species	**Response in relation to the study area**
	'I am not familiar with that particular record but would be highly dubious of it given the location. Outside of Booderee there are no known populations of the species between there and Ku-ring-gai Chase National Park to the north, and Eden to the south. The fact that it is a "O for Observation" makes me question it, given how common Long-nosed Bandicoots are in the local area. *Given this is tied in with development the record needs to be properly scrutinised. Put in a request to licensing for further information. Ideally, you would have further corroborating evidence before being accepting of the record itself.'* Critically, no photo evidence was provided with the record submission. During initial discussions with OEH ecologists, the validity of the record was questioned due to the general similarity of Long-nosed Bandicoot and Southern Brown Bandicoot and the type of conditions that often prevail in a field situation. An observation record without evidence is difficult to confirm as the observer requires sufficient skill and time to observe the differences for identification (Ecoplanning 2018). During later discussions with the observer who submitted the record, he acknowledged that Long-nosed Bandicoot are common in the area, but he is confident it was a Southern Brown Bandicoot. He subsequently discussed additional sightings of Southern Brown Bandicoot by local wildlife carers at Cunjurong Point and by himself at Monument Beach in previous years. These observations were not submitted to the Atlas, no photographic evidence of these records exists and otherwise cannot be verified beyond doubt. The targeted survey by Ecoplanning (2018) during optimal survey time (Autumn) using remote camera traps baited with oats, peanut butter, honey and truffle oil did not detect the species in the study area. Instead, the survey resulted in long-nosed bandicoot images being obtained. The precautionary principle was applied, and an Assessment of Significance was undertaken for Southern Brown Bandicoot, assuming the habitat in the study area is suitable for foraging and breeding. The habitat surveys identified potential foraging and breeding habitat for this species and so both habitat types were assessed. The reintroduction of the Southern Brown Bandicoot to Booderee National Park is discussed in Ecoplanning (2018) but it not likely to have resulted in individuals moving through the landscape to the study area.

Comment 2: A number of threatened fauna species, including the Southern Brown Bandicoot, Swift Parrot, Greater Glider, Spotted-tailed Quoll and migratory species are known to occur on or in close proximity to the site. However, the information provided does not adequately discuss the type and extent of habitat usage on site by these species. The Department considers that their occurrence on site warrants further investigation.	
Species	**Response in relation to the study area**
Swift Parrot	Swift Parrots are known to move up the east coast to forage. Although the recent record in the Atlas is the only record over the last 20 years in the locality (OEH 2018), it is likely that this species moves through the locality through the autumn and winter, without being detected or added to the Atlas. Preferred habitat in the study area is discussed in the Assessment of Significance. Additional surveys would not provide any further information required to complete the Assessment of Significance as Swift Parrot doesn't breed in the mainland and the study area has already been considered potential foraging habitat. The Significance Assessment considered the impact not to be significant, due to ample similar habitat in the locality, most of it in National Park.
Greater Glider	This species is known to be relatively abundant in the locality and there are 14 records in the locality over the last 20 years. It is not listed as threatened in NSW, and has only recently been listed as 'vulnerable' under the EPBC Act (May 2016), which generally leads to an increase in sightings as the species is targeted for survey. It's habitat requirements are discussed in the Assessment of Significance. Habitat in the study area is described in detail in BES (2006) and Ecoplanning (2017). The Assessment of Significance has been undertaken with the assumption that this species is present in the study area and has potential to forage and breed in the habitat. Additional surveys would not provide any further information required to complete the Assessment of Significance. The Significance Assessment considered the impact not to be significant, due to ample similar habitat in the locality, most of it in National Park.
Spotted-tailed Quoll	Although the record in the Atlas just south of the study area is the only record over the last 20 years in the locality (OEH 2018), this species is known to move over large distances and is recorded along the coastal fringe and ranges surrounding the locality. It's habitat requirements are discussed in the Assessment of Significance. Habitat in the study area is described in detail in BES (2006) and Ecoplanning (2017). The Assessment of Significance has been undertaken with the assumption that this species is present in the study area and has potential to forage and breed in the habitat. Additional surveys would not provide any further information required to complete the Assessment of Significance. The Significance Assessment considered the impact not to be significant, due to limited records of the species in the locality and ample similar habitat in the locality, most of it in National Park.

Comment 2: A number of threatened fauna species, including the Southern Brown Bandicoot, Swift Parrot, Greater Glider, Spotted-tailed Quoll and migratory species are known to occur on or in close proximity to the site. However, the information provided does not adequately discuss the type and extent of habitat usage on site by these species. The Department considers that their occurrence on site warrants further investigation.	
Species	**Response in relation to the study area**
Migratory species	The two migratory species observed in the study area (Black-faced Monarch and Rufous Fantail) as well as an additional migratory species which is likely to occur in the locality (Satin Flycatcher) have been assessed in the Assessment of Significance. Their habitat preferences and use of habitat in the study area is discussed in the assessments. The study area has been considered an area of important habitat for all three migratory species and has been assessed on this basis. Additional surveys would not provide any further information required to complete the Assessment of Significance.

Comment 3: It does not appear that targeted surveys, particularly for threatened flora species, have been conducted in accordance with Commonwealth guidelines.	
Species	**Response in relation to the study area**
Threatened flora species	All threatened flora species which are listed in the Protected Matters Search Tool (DoEE 2018) or recorded in the Atlas (OEH 2018) were considered in Appendix B of Ecoplanning (2018). Only one threatened flora species has been recorded in the locality; Leafless Tongue Orchid (*Cryptostylis hunteriana*) with 11 records within 5km (records from 2000 and 2001). BES (2006) considered impacts to *C. hunteriana,* by undertaking grid transects in suitable habitat, comparing a reference population and undertaking an Assessment of Significance. This species has a low likelihood of occurring in the study area. No other threatened flora species were likely to occur in the study area based on the results of the habitat assessments and hence additional targeted surveys would not provide any additional information on MNES.

Comment 4: Surveys are not contemporaneous to be able to determine the extent that the site supports threatened species.	
Species	**Response in relation to the study area**
All species	Due to the timeframes of the original Development Application, the original field surveys were conducted over 2005 and 2006. Survey timing in BES (2006) is suitable for targeted flora surveys (during flowering season to increase detectability) and broad flora and fauna surveys (during warmer months when fauna are more likely to be active and flora are more likely to be flowering and identifiable to species level). These surveys involved detailed flora and fauna surveys which have provided a useful resource for understanding the ecological values in the study area. The recent request for further federal assessment has involved re-doing the database assessment including a Protected Matters Search Tool report (dated 29.01.2018) (DoEE 2018), and an Atlas search of records within 5km of the locality and within the South East Local Land Services region (dated 14 January 2018) (OEH 2018). Those records which have been entered into the Atlas in response to the proposal for Swift Parrot, Southern Brown Bandicoot and Greater Glider, have been assessed in Ecoplanning (2017 and 2018) to update the existing assessment in BES (2006). Surveys for the Flora and Fauna Management Plan (Ecoplanning 2017) included revising the vegetation and ecological community results from BES (2006). The results from BES (2006) are discussed with reference to their validity in the current timeframe. The vegetation mapping was found to be consistent with the flora species observed in recent surveys (Ecoplanning 2017). Targeted surveys for Southern Brown Bandicoot (Ecoplanning 2018) were undertaken in autumn which is the recommended season in the Commonwealth survey guidelines (DSEWPaC 2011). There were used to update the existing survey effort and to tailor the method to increase the likelihood of detecting the trap-shy species. An updated hollow-bearing tree survey was undertaken (Ecoplanning 2017) to provide more specific details on the proposed impacts to hollow-bearing trees. This has been used to assess impacts to breeding / potential breeding habitat for Greater Glider and Spotted-tailed Quoll. Additional surveys are not considered necessary as those species with potential to occur in the study area have been assessed based on an 'assumed presence' for either foraging and/or breeding habitat.

Comment 5: Avoidance, mitigation and management measures have not been discussed.	
Issue	**Response in relation to the study area**
Avoidance, mitigation and management	Impact mitigation is discussed in BES (2006). This includes modified planning and design to avoid impacts to threatened ecological community and long-term management to maintain the habitat potential and connectivity through the implementation of a Vegetation Management Plan (part of the Flora and Fauna Management Plan FFMP). Subsequently, the FFMP addresses details on threatened ecological community protection and monitoring, hydrology, fire, weed control, soil disturbance, pedestrian access, revegetation, topsoil management, and fauna habitat management, ensuring performance criteria are achieved.

References

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Commonwealth Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) (2011). Survey guidelines for Australia's threatened mammals Guidelines for detecting mammals listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999

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NSW Office of Environment and Heritage (OEH) (2018). Atlas of NSW Wildlife

Threatened Species Scientific Committee (TSSC) (2016). Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) (s266B) Approved conservation advice (incorporating listing advice) for the Illawarra and south coast lowland forest and woodland ecological community. Conservation advice approved 26 August 2016

The Foundation Spatial Data Framework (FSDF) (2018) ELVIS – Elevation and Depth - Foundation Spatial Data. Accessed at: http://elevation.fsdf.org.au/