



Flora and Fauna Assessment Report

90 Garlicks Range Road, Orangeville NSW 2570

Report prepared by First Field Environmental

11 March 2019

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Version	Date	Author
Amended	11 March 2019	Michelle Evans

Cover image: Looking into the site from Garlicks Range Road

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Definitions

Activity	A project, development, undertaking, activity or series of activities, or an alteration of any of these things.
AHD	Australian height datum
BC Act	Biodiversity Conservation Act 2016
EP&A Act	Environmental Planning and Assessment Act 1979
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
GDA	Geocentric datum of Australia
Habitat	An area occupied, whether periodically or constantly by a species, population or ecological community
ha	Hectare
km	Kilometre
m	Metre
MGA	Map grid of Australia
mm	Millimetre
SEPP	State Environmental Planning Policy No 44—Koala Habitat Protection [NSW]
Site	The area of the properties on which the proposed activities would occur
Study Area	The properties known as Lot 25 DP 811476 and Lot 70 DP 751295 Garlicks Range Road Orangeville NSW 2570 and adjacent properties, including areas which would reasonably impact or be impacted by the proposed development
Threatened biodiversity	Species, populations, ecological communities or their habitats
Vegetation community	An assemblage of native flora species known to occur in association as a result of topography, soil landscape and rainfall

Summary

First Field Environmental has been commissioned to prepare a *Flora and Fauna Report* in support of a development application for the construction of a depot at 90 Garlicks Range Road (Lot 25 DP 811476) Orangeville NSW 2570.

The site is generally disturbed and is characterised by the placement of various sheds, equipment storage and access paths. Vegetation removal and disturbance has been limited to the area of the property not mapped as biobanking.

Vegetation within the site is consistent with Shale Hills Woodland and Western Sydney Dry Rainforest. Fauna habitat within these areas retain good complexity and quality and are well connected with natural vegetation on adjacent properties and across the broader study area.

The development is not likely to have a significant impact on a Matter of National Environmental Significance listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

The development is not likely to have a significant impact on threatened species, populations or endangered communities (and their habitats) listed under the NSW *Biodiversity Conservation Act 2016*.

Certification

The results presented in this report are a true and accurate record. Survey work has been carried out in accordance with the *Threatened Species and Regional Biodiversity Survey and Assessment Guidelines* (DECC, 2007). Flora and fauna investigations have been prepared in consideration of the schedules and requirements of the NSW *Biodiversity Conservation Act 2016* and Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. The results of this survey report are available to the public for future use and have been supplied to The NSW Office of Environment and Heritage for inclusion on the *Atlas of NSW Wildlife Database*.

Survey and assessment of threatened biodiversity have been undertaken by an experienced and qualified Environmental Scientist. Michelle Evans has extensive experience with flora and fauna surveys and the interpretation of conservation significance in NSW.

Relevant qualifications, experience and insurance details are provided in Appendix A.

1. Introduction

First Field Environmental has been commissioned to prepare a *Flora and Fauna Report* in support of a development application for the construction of a depot. The site comprises approximately 4 hectares within 90 Garlicks Range Road (Lot 25 DP 811476) Orangeville NSW 2570.

The site is located at GDA-MGA56 276880E, 6230343N (shown in red on Figure 1) and is within the Wollondilly Local Government Area.



Figure 1 The subject site

Source: Six Maps 2019

1.1 Location

The site is situated within the suburb of Orangeville amongst extensive agricultural land uses. The site is approximately 18 km west of the Hume Motorway and approximately 60 km south west of Sydney.

1.2 Geology

The site is influenced by the Wianamatta Group shales and is characterised by broad, rounded crests and ridges with gently inclined slopes of 20-40%.

1.3 Landform and soils

The majority of the site supports colluvial soils of the Picton Soil Landscape. Margins of the property adjacent to Garlicks Range Road support residual Blacktown soils.

The *Picton Soil Landscape Unit* is comprised of red podzolic soils, yellow earths and yellow and brown podzolic soils with widespread mass movement hazard and localised seasonal waterlogging and low fertility.

The *Blacktown Soil Landscape Unit* is comprised of red and brown podzolic soils grading to yellow on lower slopes and drainage lines. Soils experience localised seasonal waterlogging and erosion hazard.

1.4 Hydrology

The study area is located within the Hawkesbury River catchment. Drainage from the site enters Wattle Creek and flows to the north east for less than 10 km before entering the Nepean River. The river flows approximately 50 km north to its confluence with Grose River and the commencement of the Hawkesbury River.

1.5 Rainfall

Mean annual rainfall has been determined from observations from Picton Council Depot weather station. The weather station has recorded a mean annual rainfall of 803.4 mm across 117 years of observations. The weather station is located ~14 km east and within 40 m elevation of the site and data is considered generally consistent with weather conditions experienced in the study area.

1.6 Land use

The site is zoned for RU2 – Rural Landscape land use under the *Wollondilly Local Environmental Plan 2011* (see Figure 2).



Figure 2 Zoning

Source: NSW Planning Portal 2019

1.7 Disturbance history

Areas of the site have been cleared of vegetation to enable construction of sheds and associated access paths. The understorey of vegetation existing in the central portion and margins of the site is generally disturbed and contains the priority weeds *Lantana camara* and *Olea europaea* ssp. *cuspidata* as well as exotic plantings and grasses. The natural topography of the site has been altered in conjunction with built structures.

It is unclear when disturbance occurred however anecdotal evidence suggests that changes to the southern portion of the site were effected prior to the purchase of the property by the current owner.

2. Aims and objectives

The aim of this report is to address the legislative requirements of an assessment of significance under the *Environmental Planning and Assessment Act 1979* and the *Biodiversity Conservation Act 2016*. The objectives of the flora and fauna survey and assessments of significance are to determine the potential impacts of the proposed residential development on threatened species, populations and ecological communities and their habitats, as listed under State and Commonwealth legislation.

2.1 Constraints

Timing of surveys – The report was commissioned in February 2019 for completion by March 2019. This timeframe has not enabled the development and implementation of rigorous survey as recommended by scientific guidelines. Surveys undertaken during the project period have been developed to take advantage of study opportunities and do not reflect optimum best practise.

Seasonality – It is acknowledged that a number of species may visit the site sporadically or in response to seasonal triggers, such as flowering or fruiting times. Habitat utilisation may also depend on the life stage of the species and the resources available in the study area. Given the timeframe of this project it has not been possible to conduct surveys at times more appropriate to life cycle or foraging behaviour.

Survey effort – The site is considered to be small and does not accommodate the employment of transect and quadrat survey techniques. Surveys have been opportunistic and have generally followed random meanders.

3. Report structure

This flora and fauna assessment report is structured in accordance with the *Threatened Species and Regional Biodiversity Survey and Assessment Guidelines* (Department of Environment and Conservation, 2007) and includes:

- **Legislative framework** – Identifying legislative requirements relevant to the proposed development, including environmental planning instruments, legislative provisions, approvals, consents and licenses.
- **Methods** – Describing the desktop and field survey techniques involved in the preparation of this report.
- **Results** – Presenting the findings of desktop and field surveys.
- **Impacts** – Describing potential impacts of the proposed development and identifies appropriate mitigation and amelioration measures.
- **Significance assessments** – Assessing the likelihood of the proposed development having a significant impact on threatened biodiversity known or with the potential to occur in the study area.
- **Conclusion** – Providing a summary of results, potential impacts and limitations related to the proposed development.

4. Legislative framework

Table 1 identifies legislative requirements relevant to the proposed development and includes environmental planning instruments, legislative provisions, approvals, consents and licenses.

Table 1 Legislative requirements

Name	Relevance to the proposal	Relevance to proposed development
<i>Commonwealth</i>		
<i>Environment Protection and Biodiversity Conservation Act 1999</i>	Aims to provide protection of the environment, especially to matters of national environmental significance.	It is considered possible that the site may support a number of vulnerable or endangered species, ecological communities and their habitats.
<i>State</i>		
<i>Aboriginal and Torres Strait Islander Heritage Protection Act 1984</i>	The Act provides for the constitution of local, regional and state Aboriginal Land Councils and a mechanism for Councils to claim Crown Land.	There are no known granted claims over Crown Land within the study area.
<i>Biodiversity Conservation Act 2016</i>	The Act sets out specific objects relating to the conservation of biological diversity and the promotion of ecologically sustainable development.	A number of threatened species, populations and ecological communities listed under the Act have been recorded within the study area.
<i>Biosecurity Act 2015</i>	Under the Act, public authorities are required to control priority weeds that are likely to spread to adjoining land.	Priority weeds were recorded on or within proximity to the proposed site during field investigations.
<i>Environmental Planning and Assessment Act 1979</i>	Encourages the protection and conservation of native animals and plants. Requires the determination of whether the proposed activity is likely to have a significant effect on threatened species, populations or ecological communities or their habitats.	In accordance with the requirements of section 5A of the Act, an Assessment of Significance has been undertaken for all threatened entities listed under the <i>Biodiversity Conservation Act 2016</i> known or likely to occur in the study area.
<i>Heritage Act 1977</i>	The State's historical archaeological relics, buildings, structures, archaeological deposits and features are protected under the Act.	No items or places of historical significance have been recorded or observed on the site.
<i>Rural Fires Act 1997</i>	The Act requires that areas of bushfire prone land be mapped.	The site is within land mapped as bushfire prone.

Name	Relevance to the proposal	Relevance to proposed development
<i>State Environmental Planning Policy No 44 – Koala Habitat Protection</i>	The Policy aims to encourage the proper conservation and management of areas of natural vegetation that provide habitat for koalas to ensure a permanent free- living population over their present range and reverse the current trend of koala population decline.	Trees of the types listed in Schedule 2 of the Policy constitute at least 15% of the total number of trees in the upper or lower strata of the tree component and the property is therefore potential Koala habitat.
<i>Local</i>		
<i>Wollondilly Local Environmental Plan 2011</i>	The principal planning instrument affecting land use in the Wollondilly LGA prepared under Part 3 of the <i>EP&A Act</i> .	The proposed development must comply with land uses set out in zoning provisions of the LEP.

5. Methods

Preliminary investigations have made use of species, population, community and habitat records held by the Australian Government Department for the Environment and Energy and the NSW Office of Environment and Heritage.

The results of surveys undertaken for this report will be made available to the NSW Office of Environment and Heritage for inclusion on the *Atlas of NSW Wildlife Database*.

5.1 Preliminary investigation

A search of the *Atlas of NSW Wildlife Database* (NSW OEH 2018) was undertaken on 17 February 2019. The search produced a list of threatened, vulnerable and endangered species and communities listed under the *BC Act 2018* recorded within but not limited to a 10km radius of the subject site.

Threatened species and ecological communities listed under the *EPBC Act* have been identified through interrogation of the *Protected Matters Search Tool* (DoE 2018) for an area of 5km radius from the subject site.

The likelihood of these species, populations, ecological communities or their habitats occurring in the study area has been determined in accordance with descriptions published by the Australian Government Department of the Environment and the NSW Government Office of Environment and Heritage and is presented in Appendix B.

5.2 Vegetation surveys

Vegetation surveys were conducted during daylight hours of 18 February 2019 and included the identification of native and exotic species in the study area and observation of vegetation on adjoining properties. The surveys were conducted as a random meander across the entirety of the study area. Vegetation surveys targeted the identification of native and threatened biodiversity.

5.3 Fauna surveys

Targeted fauna surveys were not undertaken due to time constraints associated with the project. The likelihood of species being present or utilising the site has been determined through interrogation of published observations, research and assessment of habitat features during field survey.

5.4 Habitat assessment

Habitat assessment was conducted in conjunction with random meanders. Preliminary assessment of threatened biodiversity likely to occur in the study area provided details of required habitat. Habitat identification and assessment targeted:

- Tree hollows;
- Loose bark;
- Roosting trees;
- Nesting sites;
- Fruiting and flowering plants;
- Bare branches;
- Dead trees and logs;
- Termite mounds;
- Rocks;
- Exposed bedrock;
- Scats;
- Tree scratching;
- Scrapes or diggings;
- Hair;
- Burrows;
- Waterbodies; and
- Aquatic vegetation

6. Results

6.1 Weather conditions

Weather conditions at the time of survey were significantly drier than yearly average records for February, with monthly rainfall of 18.0 mm in compared to the mean rainfall of 95.4 mm for February over 76 years of observations. The survey was conducted on a clear day, with a maximum temperature of 38.8° and minimum of 15.1° (BoM 2019). Winds were calm.

6.2 Threatened species, populations, endangered ecological communities and their habitats

Species listed under the *BC Act* 2016 and /or identified as Matters of National Environmental Significance under the *EPBC Act* 1999 and which have been previously recorded in the area are identified in Appendix B. Threatened species known or considered likely to occur within the study area are summarised in Table 2.

Table 2 Listed species with potential to occur on subject site

Scientific Name Common Name	NSW status	C'wealth status	Habitat ¹²
Aves			
<i>Artamus cyanopterus</i> <i>cyanopterus</i> Dusky Woodswallow	Vulnerable	-	Found in woodlands and dry open sclerophyll forests, usually dominated by eucalypts, including mallee associations. Also recorded in shrublands and heathlands and various modified habitats, including regenerating forests; very occasionally in moist forests or rainforests. Prefers understorey typically open with sparse eucalypt saplings, acacias and other shrubs, including heath. Ground cover may consist of grasses, sedges or open ground, often with coarse woody debris. Also often observed in farm land, usually at the edges of forest or woodland or in roadside remnants or wind breaks with dead timber.
<i>Callocephalon fimbriatum</i> Gang-gang Cockatoo	Vulnerable	-	In spring and summer, generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. Autumn and winter, the species often moves to lower altitudes in drier, more open eucalypt forests and woodlands, particularly box-gum and box-ironbark assemblages, or dry forest in coastal areas and is often found in urban areas. May also occur in sub-alpine Snow Gum woodland and temperate rainforests. Favours old growth forest and woodland attributes for nesting and roosting. Nests are located in hollows that are 10 cm in diameter or larger and at least 9m above the ground.
<i>Chthonicola sagittata</i> Speckled Warbler	Vulnerable	-	Lives in a wide range of Eucalyptus dominated communities that have a grassy understorey, often on rocky ridges or in gullies. Large, relatively undisturbed remnants are required for the species to persist in an area. Pairs are sedentary and occupy a territory of about ten hectares, slightly larger when not breeding. The rounded, domed, roughly built nest is located in a slight hollow in the ground or the base of a low dense plant, between August and January.
<i>Daphoenositta chrysoptera</i> Varied Sittella	Vulnerable	-	Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland. Feeds on arthropods. Builds a cup-shaped nest of plant fibres and cobwebs in an upright tree fork high in the living tree canopy, and often re-uses the same fork or tree in successive years.

¹ NSW Office of Environment & Heritage, Threatened Species, <<http://www.environment.nsw.gov.au/threatenedSpeciesApp/>>

² Australian Government Department of the Environment, Species Profile and Threats Database, <<http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl>>

Scientific Name Common Name	NSW status	C'wealth status	Habitat ¹²
<i>Glossopsitta pusilla</i> Little Lorikeet	Vulnerable	-	Forages primarily in the canopy of open Eucalyptus forest and woodland but also finds food in Angophora, Melaleuca and other tree species, riparian habitats particularly are used. Isolated flowering trees in open country, e.g. paddocks, roadside remnants and urban trees also help sustain populations. Feeds mostly on nectar and pollen, also on native fruits and only rarely in orchards. Nests in proximity to feeding areas if possible, most typically selecting hollows in the limb or trunk of smooth-barked Eucalypts.
<i>Ninox connivens</i> Barking Owl	Vulnerable	-	Inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. It is flexible in its habitat use, and hunting can extend in to closed forest and more open areas. Sometimes able to successfully breed along timbered watercourses in heavily cleared habitats due to the higher density of prey on these fertile soils. Nesting occurs during mid-winter and spring but is variable between pairs and across years.
<i>Ninox strenua</i> Powerful Owl	Vulnerable	-	Inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest. Breeds and hunts in open or closed sclerophyll forest or woodlands and occasionally hunts in open habitats. Roosts by day in dense vegetation comprising species such as <i>Syncarpia glomulifera</i> , <i>Allocasuarina littoralis</i> , <i>Acacia melanoxylon</i> , <i>Angophora floribunda</i> , <i>Exocarpus cupressiformis</i> and a number of Eucalypt species. Nests in large tree hollows (at least 0.5 m deep), in large Eucalypts (diameter at breast height of 80-240 cm) that are at least 150 years old.
<i>Tyto novaehollandiae</i> Masked Owl	Vulnerable	-	Lives in dry eucalypt forests and woodlands from sea level to 1100 m. A forest owl, but often hunts along the edges of forests, including roadsides. Roosts and breeds in moist eucalypt forested gullies, using large tree hollows or sometimes caves for nesting.
<i>Dasyornis brachypterus</i> Eastern Bristlebird	-	-	Habitat for central and southern populations is characterised by dense, low vegetation including heath and open woodland with a heathy understorey. Shy and cryptic and rarely flies, although can be seen scampering over the ground; when approached, may move to a lookout perch 1 m or more above the ground, then retreat into dense vegetation. Nests are elliptical domes constructed on or near the ground amongst dense vegetation.
<i>Grantiella picta</i> Painted Honeyeater	-	-	Inhabits Boree, Brigalow and Box-Gum Woodlands and Box-Ironbark Forests. A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus <i>Amyema</i> . Nest from spring to autumn in a small, delicate nest hanging within the outer canopy of drooping eucalypts, she-oak, paperbark or mistletoe branches.
Endangered Ecological Communities			

Scientific Name Common Name	NSW status	C'wealth status	Habitat ¹²
Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest		Critically Endangered Ecological Community	Typically occurs on heavy clay soils derived from Wianamatta Shale. The dominant canopy species are <i>Eucalyptus moluccana</i> , <i>Eucalyptus tereticornis</i> , <i>Corymbia maculata</i> and <i>Eucalyptus eugenioides</i> .
Cumberland Plain Woodland in the Sydney Basin Bioregion	Critically Endangered Ecological Community		
Western Sydney Dry Rainforest and Moist Woodland on Shale		Critically Endangered	This community consists of two vegetation units, being Western Sydney Dry Rainforest and Moist Shale Woodland. A low closed rainforest, typically in gullies or lower slopes, to more open moist woodland on upper slopes and disturbed sites. Emergent trees can grow up to 25m. Almost grows exclusively on clay soils derived from Wianamatta Group shales. Lower slopes and gullies are dominated by <i>Melaleuca styphelioides</i> . Other common tree species include <i>Acacia implexa</i> , <i>Alectryon ubcinereus</i> , <i>Brachychiton populneus</i> , <i>Corymbia maculata</i> , <i>Melicope micrococci</i> and <i>Streblus Brunonianus</i> . Eucalyptus species are present as emergent in rainforest forms, and in moist woodlands, grade into a canopy. Dominant species include <i>E. tereticornis</i> , <i>E.moluccana</i> and/or <i>E.crebra</i> .
Western Sydney Dry Rainforest in the Sydney Basin Bioregion	Endangered Ecological Community		
Flora			
<i>Acacia bynoeana</i> Bynoe's Wattle	-	-	Occurs on sandy soils, in heath or dry sclerophyll forest. Appears to have preference for open sites, sometimes disturbed, such as recently burnt areas, and roadside spoil mounds and trail margins. Grows with overstorey species including Scribbly Gum, Red Bloodwood, Narrow-leaved Apple, Saw Banksia and Parramatta Red Gum.
<i>Acacia pubescens</i> Downy Wattle	-	-	Occurs on alluviums, shales and at the intergrade between shales and sandstones. The soils are characteristically gravelly soils, often with ironstone. Occurs in open woodland and forest, in a variety of plant communities, including Cooks River/Castlereagh Ironbark Forest, Shale/Gravel Transition Forest and Cumberland Plain Woodland. Flowers from August to October.
<i>Cryptostylis hunteriana</i> Leafless Tongue Orchid	-	-	Found in a range of habitats, including woodland, sedgeland, forest, wetlands and swamp heath. Large populations occur in woodland dominated by <i>Eucalyptus sclerophylla</i> , <i>E. sieberi</i> , <i>Corymbia gummifera</i> and <i>Allocasuarina littoralis</i> . Occurs on moist and sandy soils, dry soils, and peaty soils.
<i>Cynanchum elegans</i> White-flowered Wax Plant	-	-	Occurs at the edge of dry rainforest vegetation. May also be associated with littoral rainforest, <i>Leptospermum laevigatum</i> – <i>Banksia integrifolia</i> subsp. <i>integrifolia</i> coastal scrub; <i>Corymbia maculata</i> aligned open forest and woodland; <i>Melaleuca armillaris</i> scrub to open scrub; and <i>Eucalyptus tereticornis</i> aligned open forest and woodland.

Scientific Name Common Name	NSW status	C'wealth status	Habitat ¹²
<i>Melaleuca deanei</i> Deane's Paperbark	-	-	Occurs in sandy soils, woodlands and wet heath on sandstone. Found in mostly ridgetop woodland, with fewer sites in heath on sandstone.
<i>Persoonia acerosa</i>	-	-	Occurs in dry sclerophyll forest, scrubby low-woodland and heath on low fertility soils. Seems to benefit from the reduced competition and increased light available on disturbance margins including roadsides.
<i>Pimelea curviflora</i> var. <i>curviflora</i>	-	-	Occurs on shaley/lateritic soils over sandstone and shale/sandstone transition soils on ridgetops and upper slopes amongst woodlands. Flowers October to May. Has an inconspicuous cryptic habit as it is fine and scraggly and often grows amongst dense grasses and sedges.
Gastropoda			
<i>Meridolum corneovirens</i> Cumberland Plain Land Snail	Endangered	-	Primarily inhabits the critically endangered ecological community Cumberland Plain Woodland and grassy open woodland with occasional dense patches of shrubs. Also known from Shale Gravel Transition Forests, Castlereagh Swamp Woodlands and the margins of River-flat Eucalypt Forest. Lives under litter, bark, leaves and logs, or shelters in loose soil around grass clumps. Occasionally shelters under rubbish. Generally active at night.
Mammalia			
<i>Chalinolobus dwyeri</i> Large-eared Pied Bat	Vulnerable	Vulnerable	Roosts in cave entrances, crevices in cliffs, old mine workings and the disused, bottle-shaped mud nests of the Fairy Martin. Frequents low to mid-elevation dry open forest and woodland close to these features. Females raise young in maternity roosts from November to January in roof domes in sandstone caves and overhangs. They remain loyal to the same cave over many years.
<i>Dasyurus maculatus</i> Spotted-tailed Quoll	Vulnerable	Endangered	Found in a variety of areas including open forest, rainforest, woodland, coastal heath and inland riparian forest. Uses tree hollows, logs, rock outcrops, small caves and rocky cliff faces as dens. Uses flat rocks amongst boulder sites, rocky stream beds or banks and rocky cliff faces as latrine sites.
<i>Mormopterus norfolkensis</i> Eastern Freetail-bat	Vulnerable	-	Occurs in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range. Roosts mainly in tree hollows but also under bark or in man-made structures. Usually solitary but also recorded roosting communally.
<i>Myotis macropus</i> Southern Myotis	Vulnerable	-	Generally roosts in groups of 10 - 15, close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage. Forages over streams and pools catching insects and small fish by raking their feet across the water surface. In NSW, females have one young each year usually in November or December.

Scientific Name Common Name	NSW status	C'wealth status	Habitat ¹²
<i>Petauroides volans</i> Greater Glider	-	Vulnerable	Feeds exclusively on Eucalypt leaves, buds, flowers and mistletoe. Shelters during the day in tree hollows and will use up to 18 hollows in their home range.
<i>Phascolarctos cinereus</i> Koala	Vulnerable	Vulnerable	Inhabits Eucalypt woodlands and forests. Feeds on the foliage of more than 70 Eucalypt species and 30 non-Eucalypt species, but in any one area will select preferred browse species.
<i>Pteropus poliocephalus</i> Grey-headed Flying-fox	Vulnerable	Vulnerable	Occurs in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies close to water in vegetation with a dense canopy. Feeds on the nectar and pollen of native trees, in particular Eucalyptus, Melaleuca and Banksia, and fruits of rainforest trees and vines. Also forages in cultivated gardens and fruit crops.
<i>Pseudomys novaehollandiae</i> New Holland Mouse	-	-	Known to inhabit open heathlands, woodlands and forests with a heathland understorey and vegetated sand dunes. Social animal, living predominantly in burrows shared with other individuals.

6.3 Vegetation

The study area is located within the Sydney Bioregion. Vegetation identified within the site is consistent with the following vegetation community descriptions from the *Native Vegetation of the Cumberland Plain* map (NSW National Parks and Wildlife Service 2002):

- PCT 850 – Grey Box – Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion;
- PCT 877 – Grey Myrtle dry rainforest of the Sydney Basin Bioregion and South East Corner Bioregion.

Figure 3 shows the location and extent of native vegetation on and in the vicinity of the site.

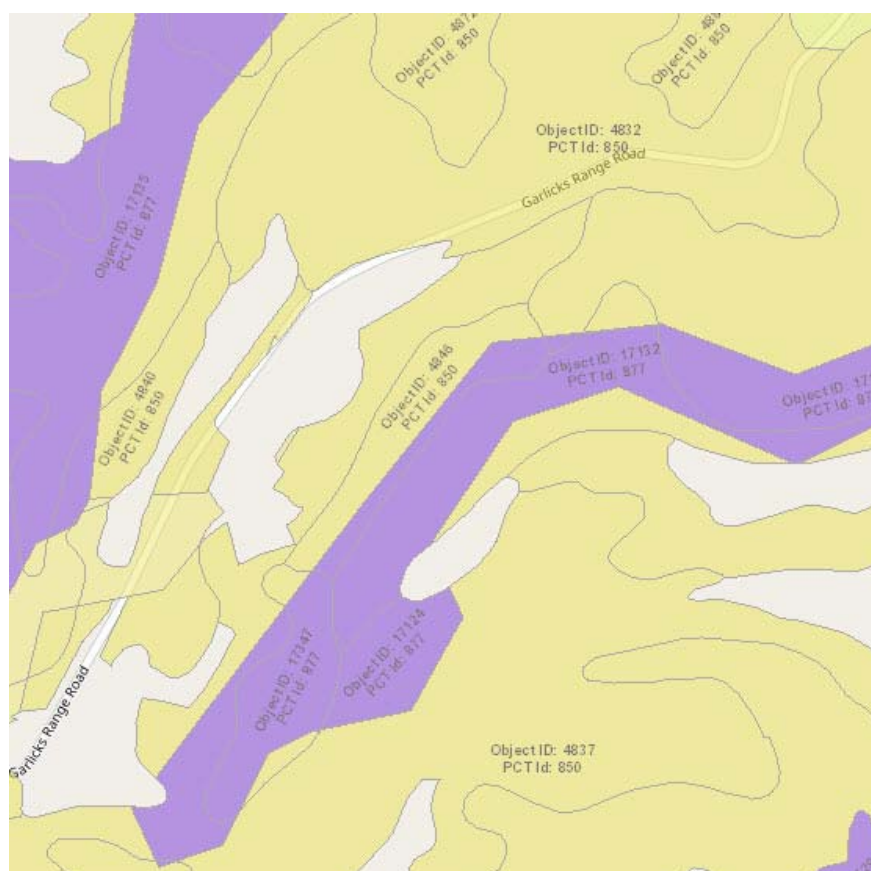


Figure 3 Location and extent of vegetation on the site

Source: OEH Bionet Vegetation Classification, viewed 19 February 2019

Natural vegetation within the site accounts for an area of approximately 1.7 ha and is dominated by a *Eucalyptus tereticornis* overstorey with sub-dominant *E. moluccana* to 30 m height. The sparse lower stratum supports mixed native shrubs to 4 m height. The understorey is dominated by mixed native herbs and grasses.

The vegetation community within the site meets the condition category A threshold for Cumberland Plain Shale Woodlands and is consistent with the Cumberland Plain Woodland Critically Endangered Ecological Community as listed under the *Biodiversity Conservation Act* 2016 and listed as Critically Endangered under the *Environment Protection and Biodiversity Conservation Act* 1999.

6.4 Fauna

The site has experienced recent vegetation clearance and earthworks. Natural vegetation remains along the margins of the site and is consistent with Shale Plains Woodland. Structural complexity of vegetation is medium to high, containing trees across varying age classes and stages of maturity.

The vegetation along the margins of the site would provide a source of pollen, nectar and fruit for local fauna, as well as nesting, foraging and hunting opportunities. Habitat complexity is high, evidenced by fallen timber and tree

The following species were observed during field surveys or were given as anecdotal evidence by the client:

- Goshawks;
- Owls;
- Lace Monitor;
- Diamond Python;
- Eastern Brown Snake;
- Red-bellied Black Snake;
- Short-beaked Echidna;
- Bell Miner;
- Bearded Dragon;
- Grey-headed Flying-fox;
- Australian King Parrot;
- Yellow-tailed Black-Cockatoo;
- Common Wombat;
- European Honeybee; and
- Satin Bowerbird.

The landholder reports seeing Grey-headed Flying-foxes feeding on exotic palm and fruit trees adjacent to the site. No vulnerable, endangered or critically endangered native fauna were identified within the site during the survey.

6.5 Connectivity

Natural vegetation within the site is well connected to natural vegetation of the broader study area. Vegetation to the east of the yellow dashed line in Figure 4 is subject to a Biobanking Agreement and is considered contiguous with vegetation within the site.



Figure 4 BioBanking agreement area

Source: Niche Environment and Heritage (2016)

6.6 Bushfire prone land

The property is located within an area mapped as containing bushfire prone land (see Figure 5). An assessment of potential risks and mitigation measures relating to bushfire is provided in the *Bushfire Hazard Assessment Report* (First Field Environmental 2019).



Figure 5 Bushfire prone land mapping

Source: NSW Planning Portal 2019

7. Assessment of potential impacts

The proposed development constitutes the following threatening processes for ecological communities on the site:

- Loss and degradation of native plant and animal habitat by invasion of escaped garden plants;
- Weed and foreign plant invasion, particularly African Olive and exotic grasses;
- Death of trees caused by fungus following borers;
- Bell miner associated dieback;
- Threat of further clearing for urban or rural development, and the subsequent impacts from fragmentation including increased roadkill of fauna;
- Inappropriate water run-off, which leads to increased nutrients and sedimentation;
- Predation of native fauna by cats and foxes;
- Grazing and mowing, which stops regrowth of the community;
- Clearing for both rural, industrial and urban development;
- Increased fragmentation of community and under scrubbing clearing of the mid and ground storey by private landholders;
- Mixed weed invasion: Broad-leafed Privet (*Ligustrum lucidum*), Lantana (*Lantana camara*), Cats Claw Creeper (*Dolichandra unguis-cati*), African Olive (*Olea europaea* subsp. *cuspidata*), invasive scramblers/vines, grasses and others;
- Inappropriate land use, including lack of knowledge, illegal clearing and lack of compliance;
- Erosion and landslip from clearing, over grazing and reduced vegetation on steep slopes; and
- Agricultural pollution, including nutrient plumes and nutrient loading from agricultural chemicals in soils and water table.

Vegetation removal has occurred within the site. Vegetation mapping and field survey observations suggest that the cleared vegetation was likely to have been consistent with Shale Hills Woodland and Western Sydney Dry Rainforest and have similar structural complexity and species diversity as the natural vegetation remaining along the site margins and extant across the immediate study area.

Earthworks have altered the natural topography of the site to achieve level areas on which to build and access paths within the site. Earthworks in the north-east portion of the site have encroached upon an area mapped for biobanking and it appears that some vegetation has been removed in association with this event.

Vegetation management within the site and as a result of the proposed development would not encroach further on adjacent vegetation subject to a Biobanking Agreement.

8. Significance assessments

8.1 Assessment of Significance

Determination of the likelihood of threatened species, populations or ecological communities or their habitats, as listed under State legislation occurring in the study area indicates that the proposed development may impact those species and communities listed in Table 2.

In accordance with the requirements of s5A of the *EP&A Act 1979*, an assessment of significance has been prepared for these species listed under the *BC Act 2016*. Part 7.3 of the *Biodiversity Conservation Act 2016* has been used to determine whether the proposed development is likely to significantly affect threatened species or ecological communities, or their habitats. Assessment of significance for each of these species is provided in Appendix C and summarised in the following tables.

Table 3 Summary of assessment of significance for birds

Significant impact criteria	<ul style="list-style-type: none"> • <i>Artamus cyanopterus cyanopterus</i> - Dusky Woodswallow • <i>Callocephalon fimbriatum</i> - Gang-gang Cockatoo • <i>Chthonicola sagittata</i> - Speckled Warbler • <i>Daphoenositta chrysoptera</i> - Varied Sittella • <i>Dasyornis brachypterus</i> – Eastern Bristlebird • <i>Glossopsitta pusilla</i> - Little Lorikeet • <i>Grantiella picta</i> – Painted Honeyeater • <i>Ninox connivens</i> - Barking Owl • <i>Ninox strenua</i> - Powerful Owl • <i>Tyto novaehollandiae</i> - Masked Owl
(a) life cycle	Not likely to be affected.
(b) endangered population	No endangered population has been recorded on the site.
(c) ecological community	N/A
(d) habitat	Suitable roosting habitat is available within the study area. The vegetation within the study area affords quality foraging habitat for this species.
(e) critical habitat	No critical habitat has been identified in or in the vicinity of the study area.
(f) recovery or threat abatement plan	<p>The following Recovery or Threat Abatement Plans exist:</p> <ul style="list-style-type: none"> • <i>National Recovery Plan for Eastern Bristlebird <u>Dasyornis brachypterus</u></i> • <i>Recovery Plan for the Large Forest Owls</i> • <i>Threat abatement plan for predation by feral cats</i>

Significant impact criteria	<ul style="list-style-type: none"> • <i>Artamus cyanopterus cyanopterus</i> - Dusky Woodswallow • <i>Callocephalon fimbriatum</i> - Gang-gang Cockatoo • <i>Chthonicola sagittata</i> - Speckled Warbler • <i>Daphoenositta chrysoptera</i> - Varied Sittella • <i>Dasyornis brachypterus</i> – Eastern Bristlebird • <i>Glossopsitta pusilla</i> - Little Lorikeet • <i>Grantiella picta</i> – Painted Honeyeater • <i>Ninox connivens</i> - Barking Owl • <i>Ninox strenua</i> - Powerful Owl • <i>Tyto novaehollandiae</i> - Masked Owl
	<ul style="list-style-type: none"> • <i>Threat abatement plan for predation by the European red fox</i> • <i>Threat abatement plan for predation, habitat degradation, competition and disease transmission by feral pigs <u>Sus scrofa</u></i>
(g) key threatening process	<ul style="list-style-type: none"> • Loss of hollow-bearing trees • Removal of dead wood and dead trees • Clearing of native vegetation • Forest eucalypt dieback associated with over-abundant psyllids and Bell Miners • Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants

Table 4 Summary of assessment of significance for flora

Significant impact criteria	<p>Flora</p> <ul style="list-style-type: none"> • <i>Acacia bynoeana</i> – Bynoe’s Wattle • <i>Acacia pubescens</i> – Downy Wattle • <i>Cryptostylis hunteriana</i> – Leafless Tongue Orchid • <i>Cynanchum elegans</i> – White-flowered Wax Plant • <i>Melaleuca deanei</i> – Deane’s Paperbark • <i>Persoonia acerosa</i> • <i>Pimelea curviflora</i> var. <i>curviflora</i>
(a) life cycle	Not likely to be affected.
(b) endangered population	No endangered population has been recorded on the site.
(c) ecological community	<ul style="list-style-type: none"> • Shale Hills Woodland is included as a sub-community of Cumberland Plain Woodland in the Sydney Basin Bioregion. • Western Sydney Dry Rainforest in the Sydney Basin Bioregion.
(d) habitat	Suitable roosting habitat is available within the study area.
(e) critical habitat	No critical habitat has been identified in or in the vicinity of the study area.
(f) recovery or threat abatement plan	<ul style="list-style-type: none"> • <i>Threat abatement plan for competition and land degradation by rabbits</i> • <i>Threat abatement plan for predation, habitat degradation, competition and disease transmission by feral pigs <u>Sus scrofa</u></i> • <i>Threat abatement plan for competition and land degradation by unmanaged goats</i>
(g) key threatening process	<ul style="list-style-type: none"> • Clearing of native vegetation • Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants

Table 5 Summary of assessment of significance for gastropods

Significant impact criteria	Gastropoda <ul style="list-style-type: none"> <i>Meridolum corneovirens</i> - Cumberland Plain Land Snail
(a) life cycle	Not likely to be affected.
(b) endangered population	No endangered population has been recorded on the site.
(c) ecological community	N/A
(d) habitat	Suitable habitat is available within the study area.
(e) critical habitat	No critical habitat has been identified in or in the vicinity of the study area.
(f) recovery or threat abatement plan	No Recovery of Threat Abatement Plan has been identified as being relevant for this species
(g) key threatening process	<ul style="list-style-type: none"> Removal of dead wood and dead trees Clearing of native vegetation Invasion of native plant communities by exotic perennial grasses Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants

Table 5 Summary of assessment of significance for mammals

Significant impact criteria	Mammals <ul style="list-style-type: none"> <i>Chalinolobus dwyeri</i> - Large-eared Pied Bat <i>Dasyurus maculatus</i> - Spotted-tailed Quoll <i>Mormopterus norfolkensis</i> - Eastern Freetail-bat <i>Myotis Macropus</i> - Southern Myotis <i>Phascolarctos cinereus</i> - Koala <i>Pteropus poliocephalus</i> - Grey-headed Flying-fox
(a) life cycle	Not likely to be affected.
(b) endangered population	No endangered population has been recorded on the site.
(c) ecological community	N/A
(d) habitat	The vegetation within the study area affords quality foraging habitat for this species.
(e) critical habitat	No critical habitat has been identified in or in the vicinity of the study area.
(f) recovery or threat abatement plan	<ul style="list-style-type: none"> <i>National Recovery Plan for the Spotted-tailed Quoll <u>Dasyurus maculatus</u></i> <i>Draft Recovery Plan for the Grey-headed Flying-fox <u>Pteropus poliocephalus</u></i> <i>National recovery plan for the large-eared pied bat <u>Chalinolobus dwyeri</u></i> <i>Recovery plan for the koala <u>Phascolarctos cinereus</u></i> <i>Threat abatement plan for predation by feral cats</i> <i>Threat abatement plan for predation by the European red fox</i>
(g) key threatening process	<ul style="list-style-type: none"> Loss of hollow-bearing trees Removal of dead wood and dead trees Clearing of native vegetation Invasion of native plant communities by exotic perennial grasses Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants

8.2 Matters of National Environmental Significance

An *EPBC Act* Protected Matters Report for the region is provided in Appendix D. The report identifies matters listed within a 5km radius of the subject site and includes:

- 9 listed threatened ecological communities; and
- 44 listed threatened species.

Of these, it is considered that the following species have the potential to occur within the study area:

Birds

- *Botaurus poiciloptilus* - Australasian Bittern
- *Dasyornis brachyopterus* – Eastern Bristlebird
- *Grantiella picta* – Painted Honeyeater

Endangered Ecological Communities

- Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest
- Western Sydney Dry Rainforest and Moist Woodland on Shale

Flora

- *Acacia bynoeana* – Bynoe’s Wattle
- *Acacia pubescens* – Downy Wattle
- *Cryptostylis hunteriana* – Leafless Tongue Orchid
- *Cynanchum elegans* – White-flowered Wax Plant
- *Melaleuca deanei* – Deane’s Paperbark
- *Persoonia acerosa*
- *Pimelea curviflora* var. *curviflora*

Mammals

- *Chalinolobus dwyeri* - Large-eared Pied Bat
- *Dasyurus maculatus* - Spotted-tailed Quoll
- *Petauroides Volans* - Greater Glider
- *Phascolarctos cinereus* – Koala
- *Pseudomys novaehollandiae* – New Holland Mouse
- *Pteropus poliocephalus* - Grey-headed Flying-fox

Under the precautionary principle, an assessment of the likelihood that the proposed development will have a significant impact on this species has been undertaken in accordance with the *Matters of National Environmental Significance: Significant Impact Guidelines 1.1* (Australian Government Department of the Environment, 2013) and is provided in [Appendix E](#).

In summary, the proposed action is not likely to have a significant impact on these species for the following reasons:

- The loss of habitat is not likely to lead to a long-term decrease in the size of an important population of a species.
- The proposed action will not impact any known or important populations of these species.
- The site does not provide habitat that is critical to the survival of these species.
- It is unlikely that the proposal will disrupt the breeding cycle of an important species.
- The removal of foraging and breeding habitat will unlikely modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species are likely to decline.

- The proposed action would not result in an increase in invasive species, including weeds that would be detrimental to any of these species.
- It is unlikely that the proposal will introduce disease that may cause the species to decline.
- The proposed action is unlikely to interfere substantially with the recovery of the species. No critical foraging or breeding habitat has been identified within the subject site.

9. Mitigation measures

Activities to assist the endangered ecological communities include:

- Protection of habitat by minimising further clearing of the community;
- Promotion of regeneration by avoiding mowing or prolonged or heavy grazing;
- Protection of habitat by controlling run-off entering the site if it would change water, nutrient or sediment levels or cause erosion;
- Restoration including bush regeneration and revegetation; and
- Weed control, especially for woody weeds such as *Lantana* and *Olea* that have the ability to out-compete native species and produce a very altered community structure.

10. Recommendations

The proposed development constitutes threatening processes for the endangered ecological communities on and adjacent to the site. In order to protect the remaining environmental values on the site it is recommended that no further vegetation disturbance be undertaken within the site.

Control of *Lantana camara* and *Olea europaea* ssp. *cuspidata* should be undertaken as part of regeneration and restoration works.

11. Conclusion

Providing the recommendations of this report are achieved, the proposed development is not likely to have a significant impact on a Matter of National Environmental Significance listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

The proposed development is not likely to have a significant impact on threatened species, populations or endangered communities (and their habitats) listed under the NSW *Biodiversity Conservation Act 2016*.

Vegetation disturbance and weed control resulting from the proposed development would not disturb vegetation adjacent to the site and would not impact on the existing BioBanking Agreement.

12. References

- BoM (2019) *Camden Airport AWS 068192*, Climate Statistics, Bureau of Meteorology, <http://www.bom.gov.au/climate/data/>
- Commonwealth of Australia (2017) *Draft National Recovery Plan for the Grey-headed Flying-fox (Pteropus poliocephalus)*, Commonwealth of Australia
- Department of the Environment (2013) *Matters of National Environmental Significance: Significant Impact Guidelines*
- Department of Environment and Conservation (NSW) (2006) *NSW Recovery Plan for the Large Forest Owls: Powerful Owl (Ninox strenua), Sooty Owl (Tyto tenebricosa) and Masked Owl (Tyto novaehollandiae)* DEC, Sydney.
- Department of Environment and Climate Change (2007) *Threatened Species and Regional Biodiversity Survey and Assessment Guidelines*
- Department of Environment and Climate Change (2008) *Recovery plan for the koala (Phascolarctos cinereus)*
- Department of the Environment and Energy (2019) *Protected Matters Search Tool*, www.environment.gov.au/epbc/protected-matters-search-tool
- Department of the Environment and Energy (2019) *Species profile and threats database*, <http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl>
- Department of Environment and Resource Management (2011) *National recovery plan for the large-eared pied bat Chalinolobus dwyeri*. Report to the Department of Sustainability, Environment, Water, Population and Communities, Canberra.
- Department of Environment, Land, Water and Planning (2016) *National Recovery Plan for the Spotted-tailed Quoll Dasyurus maculatus*. Australian Government, Canberra.
- NSW Office of Environment and Heritage (2012) *National Recovery Plan for Eastern Bristlebird Dasyornis brachypterus*. Office of Environment and Heritage, Department of Premier and Cabinet (NSW), Sydney.
- NSW Office of Environment and Heritage (2019) *eSpade – NSW soil and land information*, <http://www.environment.nsw.gov.au/eSpadeWebapp/>
- NSW Office of Environment and Heritage (2019) *NSW BioNet – the website for the Atlas of NSW Wildlife*, <http://www.bionet.nsw.gov.au/>
- NSW Office of Environment and Heritage (2019) *Six Maps*, <http://maps.six.nsw.gov.au/>
- NSW Office of Environment and Heritage (2019) *Threatened species profiles* <http://www.environment.nsw.gov.au/threatenedSpeciesApp/>
- NSW Rural Fire Service (2006) *Planning for Bushfire Protection*
- Legislation**
- Aboriginal and Torres Strait Islander Heritage Protection Act 1984*
- Biodiversity Conservation Act 2016*
- Biosecurity Act 2015*
- Environmental Planning and Assessment Act 1979*

Environment Protection and Biodiversity Conservation Act 1999 Heritage Act 1977

National Parks and Wildlife Act 1974

Rural Fires Act 1997

State Environmental Planning Policy No 44 – Koala Habitat Protection

Wollondilly Local Environmental Plan 2011

Appendix A

Qualifications and experience



firstfield
ENVIRONMENTAL

NAME

Michelle Evans

POSITION

Environmental consultant

CORE SPECIALITIES

Field surveys

Environmental assessments

Bushfire management planning

PROFILE

Michelle is an Environmental Scientist with extensive practical experience in ecological and land capability assessments coupled with an in-depth understanding of soils, ecosystem interactions and botanical identification.

Michelle has completed a number of large-scale plans, incorporating ecological surveys to identify vegetation communities and species interactions associated with fire management. She is experienced providing environmental and legislative advice to public and private clients who operate across a range of industries, including Defence, building, power generation and coal mining industries.

EDUCATION

- Graduate Certificate in Bushfire Protection - University of Western Sydney
- Bushfire Planning and Management; Bushfire and Biodiversity; and Forests and Water - University of Melbourne
- Bachelor of Land Management - University of Sydney

PROJECT EXPERIENCE

Field Surveys

- Botanical and Butterfly Survey (EnergyAustralia) – Bathurst Copper Butterfly Monitoring to address Ministers Conditions of Approval for Stage 2 Extension of Pine Dale Coal Mine.
- Ecological Assessment for Upstream Coal Seam Gas Project (Origin Energy) – Pre-clearance flora surveys and environmental scouting at Talooka and on properties near Reedy Creek, Spring Gully and Chinchilla. Vegetation community identification, mapping and botanical identification.

Environmental Assessment

- Risk Management Assessment of planned discharge water relocation (EnergyAustralia NSW) – Preparation of risk assessment report. Site survey and identification of potential discharge pathways.
- Review of Environmental Factors, Gas Distribution Infrastructure Upgrade (Jemena Asset Management) – Assessment of six sites in Central NSW. Identification of potential impacts of the construction phase on surrounding land use and amenity. Recommendation of mitigation measures to support the preparation of a Construction Environmental Management Plan.

Bushfire Management Planning

- Western Region Bushfire Management Plan, Mount Piper and Wallerawang Power Stations (EnergyAustralia) – Preparation and delivery of 5 year Bush Fire Management Plan. Liaison with EnergyAustralia NSW personnel and NSW Rural Fire Service.
- Review of Bushfire Management Plan, Vales Point and Munmorah Power Stations (Delta Electricity) – Independent review of Bush Fire Management Plan. Liaison with NSW Rural Fire Service and preparation of Hazard Reduction Certificates.
- Marangaroo Bush Fire Management Plan (Department of Defence) – Preparation and delivery of Bush Fire Management Plan. Liaison with NSW Rural Fire Service and property custodian.
- Sydney Central Bushfire Management Plans (Department of Defence) – Consultation with Defence and civilian stakeholders across six Defence properties in the Sydney Central region. Site survey of each property, determination of fire and evacuation management strategies and the development of map based plans. Presentation of the plan to Defence stakeholders.
- Department of Defence, Singleton Military Area (Department of Defence) – Field surveys of topography, vegetation and threatened species to inform the determination of ecological burn intervals across the property. Stakeholder liaison to identify the operational requirements of the property and location of sensitive assets. Development of a mitigation schedule for required works.

Appendix B Threatened biodiversity

Scientific Name Common Name	NSW status	C'wealth status	Habitat ³⁴	Likelihood
Amphibia				
<i>Heleioporus australiacus</i> Giant Burrowing Frog	Vulnerable	Vulnerable	Found in heath, woodland and open dry sclerophyll forest on a variety of soil types except those that are clay based. Inhabits marshes, dams and stream-sides, particularly those containing <i>Typha</i> spp. or <i>Eleocharis</i> spp. Optimum habitat includes water-bodies that are unshaded, free of predatory fish such as <i>Gambusia holbrooki</i> , have a grassy area nearby and diurnal sheltering sites available. Some sites, particularly in the Greater Sydney region occur in highly disturbed areas. Spends more than 95% of its time in non-breeding habitat in areas up to 300 m from breeding sites. Burrows below the soil surface or in the leaf litter. Breeds in soaks or pools within first or second order streams.	Unlikely. Habitat does not occur on in the vicinity of the site.
<i>Litoria aurea</i> Green and Golden Bell Frog	Endangered	Vulnerable	Inhabits marshes, dams and stream-sides, particularly those containing <i>Typha</i> spp. or <i>Eleocharis</i> spp. Optimum habitat includes water-bodies that are unshaded, free of predatory fish such as <i>Gambusia holbrooki</i> , have a grassy area nearby and diurnal sheltering sites available. Some sites, particularly in the Greater Sydney region occur in highly disturbed areas.	Unlikely. Habitat does not occur on in the vicinity of the site.
<i>Litoria littlejohni</i> Littlejohn's Tree Frog	Vulnerable	Vulnerable	Found in perched swamps, upper reaches of permanent streams, dams, ditches, isolated pools, flooded hollows, creeks, streams and lagoons. Breeds in the upper reaches of permanent streams and in perched swamps. Non-breeding habitat is heath based forests and woodlands where it shelters under leaf litter and low vegetation. Eggs and tadpoles are mostly found in still or slow flowing pools that receive extended exposure to sunlight, but will also use temporary isolated pools.	Unlikely. Habitat does not occur on in the vicinity of the site.

³ NSW Office of Environment & Heritage, Threatened Species, <<http://www.environment.nsw.gov.au/threatenedSpeciesApp/>>

⁴ Australian Government Department of the Environment, Species Profile and Threats Database, <<http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl>>

Scientific Name Common Name	NSW status	C'wealth status	Habitat ³⁴	Likelihood
<i>Mixophyes balbus</i> Stuttering Frog	Endangered	Vulnerable	Found in rainforest and wet, tall open forest in the foothills and escarpment on the eastern side of the Great Dividing Range. Outside the breeding season adults live in deep leaf litter and thick understorey vegetation on the forest floor. Breeding occurs in streams during summer after heavy rain. Eggs are laid on rock shelves or shallow riffles in small, flowing streams.	Unlikely. Habitat does not occur on in the vicinity of the site.
Aves				
<i>Artamus cyanopterus</i> <i>cyanopterus</i> Dusky Woodswallow	Vulnerable	-	Found in woodlands and dry open sclerophyll forests, usually dominated by eucalypts, including mallee associations. Also recorded in shrublands and heathlands and various modified habitats, including regenerating forests; very occasionally in moist forests or rainforests. Prefers understorey typically open with sparse eucalypt saplings, acacias and other shrubs, including heath. Ground cover may consist of grasses, sedges or open ground, often with coarse woody debris. Also often observed in farm land, usually at the edges of forest or woodland or in roadside remnants or wind breaks with dead timber.	Possible
<i>Botaurus poeciloptilus</i> Australasian Bittern	Endangered	Endangered	Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes and spikerushes. Hides during the day and feeds, mainly at night. Feeding platforms may be constructed over deeper water from reeds and are often littered with prey remains. Breeding occurs in summer from October to January and the nest is a platform of reeds.	Unlikely. Habitat does not occur on in the vicinity of the site.
<i>Callocephalon fimbriatum</i> Gang-gang Cockatoo	Vulnerable	-	In spring and summer, generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. Autumn and winter, the species often moves to lower altitudes in drier, more open eucalypt forests and woodlands, particularly box-gum and box-ironbark assemblages, or dry forest in coastal areas and is often found in urban areas. May also occur in sub-alpine Snow Gum woodland and temperate rainforests. Favours old growth forest and woodland attributes for nesting and roosting. Nests are located in hollows that are 10 cm in diameter or larger and at least 9m above the ground.	Possible

Scientific Name Common Name	NSW status	C'wealth status	Habitat ³⁴	Likelihood
<i>Calyptrorhynchus lathamii</i> Glossy Black-Cockatoo	Vulnerable	-	Inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of sheoak occur. <i>Allocasuarina littoralis</i> and <i>A. torulosa</i> are important foods. Inland populations feed on a wide range of sheoaks, including <i>Allocasuarina diminuta</i> and <i>A. gymnathera</i> . Belah is also utilised and may be a critical food source for some populations. Dependent on large hollow-bearing eucalypts for nest sites.	Unlikely. Habitat does not occur on in the vicinity of the site.
<i>Chthonicola sagittata</i> Speckled Warbler	Vulnerable	-	Lives in a wide range of Eucalyptus dominated communities that have a grassy understorey, often on rocky ridges or in gullies. Large, relatively undisturbed remnants are required for the species to persist in an area. Pairs are sedentary and occupy a territory of about ten hectares, slightly larger when not breeding. The rounded, domed, roughly built nest is located in a slight hollow in the ground or the base of a low dense plant, between August and January.	Possible
<i>Daphoenositta chrysoptera</i> Varied Sittella	Vulnerable	-	Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland. Feeds on arthropods. Builds a cup-shaped nest of plant fibres and cobwebs in an upright tree fork high in the living tree canopy, and often re-uses the same fork or tree in successive years.	Possible
<i>Glossopsitta pusilla</i> Little Lorikeet	Vulnerable	-	Forages primarily in the canopy of open Eucalyptus forest and woodland but also finds food in Angophora, Melaleuca and other tree species, riparian habitats particularly are used. Isolated flowering trees in open country, e.g. paddocks, roadside remnants and urban trees also help sustain populations. Feeds mostly on nectar and pollen, also on native fruits and only rarely in orchards. Nests in proximity to feeding areas if possible, most typically selecting hollows in the limb or trunk of smooth-barked Eucalypts.	Possible
<i>Lathamus discolor</i> Swift Parrot	Endangered	Critically Endangered	Migrates to the Australian south-east mainland between March and October, where they occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations. Following winter they return to Tasmania where they breed from September to January, nesting in old trees with hollows and feeding in forests dominated by Tasmanian Blue Gum <i>Eucalyptus globulus</i> .	Unlikely. Habitat does not occur on in the vicinity of the site.

Scientific Name Common Name	NSW status	C'wealth status	Habitat ³⁴	Likelihood
<i>Ninox connivens</i> Barking Owl	Vulnerable	-	Inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. It is flexible in its habitat use, and hunting can extend in to closed forest and more open areas. Sometimes able to successfully breed along timbered watercourses in heavily cleared habitats due to the higher density of prey on these fertile soils. Nesting occurs during mid-winter and spring but is variable between pairs and across years.	Possible
<i>Ninox strenua</i> Powerful Owl	Vulnerable	-	Inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest. Breeds and hunts in open or closed sclerophyll forest or woodlands and occasionally hunts in open habitats. Roosts by day in dense vegetation comprising species such as <i>Syncarpia glomulifera</i> , <i>Allocasuarina littoralis</i> , <i>Acacia melanoxylon</i> , <i>Angophora floribunda</i> , <i>Exocarpus cupressiformis</i> and a number of Eucalypt species. Nests in large tree hollows (at least 0.5 m deep), in large Eucalypts (diameter at breast height of 80-240 cm) that are at least 150 years old.	Possible
<i>Tyto novaehollandiae</i> Masked Owl	Vulnerable	-	Lives in dry eucalypt forests and woodlands from sea level to 1100 m. A forest owl, but often hunts along the edges of forests, including roadsides. Roosts and breeds in moist eucalypt forested gullies, using large tree hollows or sometimes caves for nesting.	Possible
<i>Anthochaera phrygia</i> Regent Honeyeater	Critically Endangered	Critically Endangered	Inhabits dry open forest and woodland that have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes. Generalist forager, though it feeds mainly on the nectar from a small number of eucalypts that produce high volumes. Breeds between July and January and there are three known key breeding areas. Usually makes open, cup shaped nests in horizontal branches or forks in mature eucalypts, Sheoaks and mistletoe haustoria.	Unlikely. Habitat does not occur on in the vicinity of the site.
<i>Calidris ferruginea</i> Curlew Sandpiper	Endangered	Critically Endangered	General found in intertidal mudflats or sheltered coasts. Can also occur in non-tidal lakes, lagoons and swamps, sometimes at inland locations. Forages in shallow water, and sometimes on exposed algae mats or water weed. Roosts on beaches and wetlands, and sometimes on rocky shores and salt marshes.	Unlikely. Habitat does not occur on in the vicinity of the site.

Scientific Name Common Name	NSW status	C'wealth status	Habitat ³⁴	Likelihood
<i>Dasyornis brachypterus</i> Eastern Bristlebird	Endangered	Endangered	Habitat for central and southern populations is characterised by dense, low vegetation including heath and open woodland with a heathy understorey. Shy and cryptic and rarely flies, although can be seen scampering over the ground; when approached, may move to a lookout perch 1 m or more above the ground, then retreat into dense vegetation. Nests are elliptical domes constructed on or near the ground amongst dense vegetation.	Possible
<i>Grantiella picta</i> Painted Honeyeater	Vulnerable	Vulnerable	Inhabits Boree, Brigalow and Box-Gum Woodlands and Box-Ironbark Forests. A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus <i>Amyema</i> . Nest from spring to autumn in a small, delicate nest hanging within the outer canopy of drooping eucalypts, she-oak, paperbark or mistletoe branches.	Possible
<i>Numenius madagascariensis</i> Eastern Curlew	-	Critically Endangered	Generally occupies coastal lakes, inlets, bays and estuarine habitats, and in New South Wales is mainly found in intertidal mudflats and sometimes saltmarsh of sheltered coasts. Forages in or at the edge of shallow water, occasionally on exposed algal mats or waterweed, or on banks of beach-cast seagrass or seaweed. Roosts on sandy spits and islets, especially on dry beach sand near the high-water mark, and among coastal vegetation including low saltmarsh or mangroves. May also roost on wooden oyster leases or other similar structures.	Unlikely. Habitat does not occur on in the vicinity of the site.
<i>Rostratula australis</i> Australian Painted Snipe	Endangered	Endangered	Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber. Nests on the ground amongst tall vegetation, such as grasses, tussocks or reeds. The nest consists of a scrape in the ground, lined with grasses and leaves. Forages nocturnally on mud-flats and in shallow water. Feeds on worms, molluscs, insects and some plant-matter.	Unlikely. Habitat does not occur on in the vicinity of the site.
Endangered Ecological Communities				

Scientific Name Common Name	NSW status	C'wealth status	Habitat ³⁴	Likelihood
Castlereagh Scribbly Gum and Agnes Banks Woodlands of the Sydney Basin Bioregion	-	Endangered	Usually a low woodland, with a mid-layer of sclerophyll shrubs, and patchy sedge and grass ground cover. Occurs mostly on Tertiary sands and gravels of the Hawkesbury-Nepean river systems. May also occur on aeolian (wind-blown) sands on Tertiary alluvium. Grows on elevations up to 80m, which receive between 700-900mm annual rainfall. The canopy (10-20m) is often dominated by <i>Angophora bakeri</i> , <i>Eucalyptus racemose</i> , and <i>E. parramattensis</i> subsp. <i>parramattensis</i> . The shrub layer (approximately 2m) often includes various banksia and melaleuca species, and <i>Conospermum taxifolium</i> , <i>Leptospermum trinervium</i> , <i>Dillwynia sericea</i> , <i>Monotoca scoparia</i> , <i>Platysace ericoides</i> , <i>Persoonia nutans</i> , <i>Pimelea linifolia</i> subsp. <i>linifolia</i> and <i>Hakea sericea</i> . The ground layer consists of diverse forbs and graminoids including <i>Themeda triandra</i> , <i>Entolasia stricta</i> , <i>Cyathochaeta diandra</i> and <i>Dianella revoluta</i> subsp. <i>revolute</i> .	Unlikely. Habitat does not occur on in the vicinity of the site.
Cooks River/Castlereagh Ironbark Forest of the Sydney Basin Bioregion	-	Critically Endangered	An open forest to low woodland community, usually dominated by <i>Eucalyptus fibrosa</i> and <i>Melaleuca decora</i> , with <i>E. longifolia</i> often present. Also, sometimes found on Holocene Alluvium. Found on clay rich soils derived from Wianamatta Shale and Tertiary alluvium. If derived from Tertiary alluvium, the soils are less fertile gravelly clay loams. Grows below 100m, in areas with annual rainfall of 800-1000mm.	Unlikely. Habitat does not occur on in the vicinity of the site.
Cumberland Plain Woodland in the Sydney Basin Bioregion (sub-community Shale Plains Woodland)	-	Critically Endangered	Typically occurs on heavy clay soils derived from Wianamatta Shale. The dominant canopy species are <i>Eucalyptus moluccana</i> , <i>Eucalyptus tereticornis</i> , <i>Corymbia maculata</i> and <i>Eucalyptus eugenioides</i> .	Known
Natural Temperate Grassland of the South Eastern Highlands	-	Critically Endangered	Natural grassland community dominated by a range of perennial grass species and, in highly intact sites, containing a large range of herbaceous species. The community is often treeless, though trees of a range of species may occur in low densities, either as isolated individuals or in clumps. Seasonally wet areas within a site may also contain a range of wetland flora species, including rushes, sedges and a variety of wetland specialist forbs.	Unlikely. Habitat does not occur on in the vicinity of the site.

Scientific Name Common Name	NSW status	C'wealth status	Habitat ³⁴	Likelihood
Shale Sandstone Transition Forest of the Sydney Basin Bioregion	-	Critically Endangered	Generally a tall to open forest or woodland with a canopy dominated by various eucalypt species, with a sclerophyllous shrub understory, and grasses and herb ground cover. This transitional community is found between Hawkesbury Sandstone and Wianamatta shale geology, and species present will depend on level of shale influence. Soils tend to be clayey, but also have influence from weathered sandstone. Grows to elevations of up to 350m in Lower Blue Mountains and western Woronora Plateau, and up to 600m in the Southern Highlands. The canopy (10-30m) typically includes two or more of the following species: <i>Angophora bakeri</i> , <i>Eucalyptus crebra</i> , <i>E. punctata</i> , <i>E. fibrosa</i> subsp. <i>fibrosa</i> , <i>E. tereticornis</i> subsp. <i>tereticornis</i> , <i>E. resinifera</i> subsp. <i>resinifera</i> , <i>E. eugenioides</i> or <i>E. globoides</i> , depending on local conditions.	Unlikely. Habitat does not occur on in the vicinity of the site.
Turpentine-Ironbark Forest in the Sydney Basin Bioregion	-	Critically Endangered	A tall open forest that is typically dominated, or co-dominated, by <i>Syncarpia glomulifera</i> . Occurs at elevations from 2-308m, with annual precipitation of 825-1155mm. Grows on clay soils derived from Wianamatta Shale, but parent geology may also be Holocene Alluvium or the Mittagong Formation, or Hawkesbury Sandstone at margin areas. The canopy (which may attain heights of over 30m) also commonly includes various Ironbark species, depending on location, including <i>Eucalyptus paniculata</i> , <i>E. crebra</i> and/or <i>E. fibrosa</i> . Small trees may also occur, including <i>Acacia parramattensis</i> , <i>Pittosporum undulatum</i> and <i>Trema aspera</i> . If present, a shrub layer may include <i>Breynia oblongifolia</i> , <i>Echinopogon ovatus</i> , <i>Leucopogon juniperinus</i> , <i>Maytenus silvestris</i> , <i>Ozothamnus diosmifolius</i> , <i>Pittosporum revolutum</i>	Unlikely. Habitat does not occur on in the vicinity of the site.
Upland Basalt Eucalypt Forests of the Sydney Basin Bioregion	-	Endangered	Generally tall open eucalypt forests found on igneous rock in, or adjacent to, the Sydney Basin Bioregion. Occurs in areas of high rainfall, generally ranging from 950 to 1600 mm/year and typically occurs at elevations between 650 and 1050 m above sea level. The ecological community typically occurs as an open to tall open forest with a sparse to dense layer of shrubs and vines, and a diverse understorey of native grasses, forbs, twiners and ferns (Keith, 2004). Rainforest elements are also present in less coastal remnants with sheltered aspects and topography, and along watercourses.	Unlikely. Habitat does not occur on in the vicinity of the site.

Scientific Name Common Name	NSW status	C'wealth status	Habitat ³⁴	Likelihood
Western Sydney Dry Rainforest and Moist Woodland on Shale	-	Critically Endangered	This community consists of two vegetation units, being Western Sydney Dry Rainforest and Moist Shale Woodland. A low closed rainforest, typically in gullies or lower slopes, to more open moist woodland on upper slopes and disturbed sites. Emergent trees can grow up to 25m. Almost grows exclusively on clay soils derived from Wianamatta Group shales. Lower slopes and gullies are dominated by <i>Melaleuca styphelioides</i> . Other common tree species include <i>Acacia implexa</i> , <i>Alectryon ubcinereus</i> , <i>Brachychiton populneus</i> , <i>Corymbia maculata</i> , <i>Melicope micrococci</i> and <i>Streblus Brunonianus</i> . Eucalyptus species are present as emergent in rainforest forms, and in moist woodlands, grade into a canopy. Dominant species include <i>E. tereticornis</i> , <i>E. moluccana</i> and/or <i>E. crebra</i> .	Possible
White Box - Yellow Box - Blakeley's Red Gum Grassy Woodland and Derived Native Grassland	-	Critically Endangered	Characterised by the presence or prior occurrence of White Box, Yellow Box and/or Blakeley's Red Gum. The trees may occur as pure stands, mixtures of the three species or in mixtures with other trees, including wattles. The understorey in intact sites is characterised by native grasses and a high diversity of herbs. Remnants generally occur on fertile lower parts of the landscape where resources such as water and nutrients are abundant and support many species of threatened fauna and flora.	Possible
Flora				
<i>Acacia bynoeana</i> Bynoe's Wattle	Endangered	Vulnerable	Occurs on sandy soils, in heath or dry sclerophyll forest. Appears to have preference for open sites, sometimes disturbed, such as recently burnt areas, and roadside spoil mounds and trail margins. Grows with overstorey species including Scribbly Gum, Red Bloodwood, Narrow-leaved Apple, Saw Banksia and Parramatta Red Gum.	Possible
<i>Acacia pubescens</i> Downy Wattle	Vulnerable	Vulnerable	Occurs on alluviums, shales and at the intergrade between shales and sandstones. The soils are characteristically gravelly soils, often with ironstone. Occurs in open woodland and forest, in a variety of plant communities, including Cooks River/Castlereagh Ironbark Forest, Shale/Gravel Transition Forest and Cumberland Plain Woodland. Flowers from August to October.	Possible
<i>Allocasuarina glareicola</i>	Endangered	Endangered	Occurs in open woodland on tertiary alluvial gravels, with lateritic soil and yellow clayey subsoil, which are nutrient poor and acidic. Associated with <i>Eucalyptus parramattensis</i> , <i>Eucalyptus fibrosa</i> , <i>Angophora bakeri</i> , <i>Eucalyptus sclerophylla</i> and <i>Melaleuca decora</i> .	Unlikely. Habitat does not occur on in the vicinity of the site.

Scientific Name Common Name	NSW status	C'wealth status	Habitat ³⁴	Likelihood
<i>Asterolasia elegans</i>	Endangered	Endangered	Occurs on Hawkesbury sandstone. Found in sheltered forests on mid- to lower slopes and valleys, e.g. in or adjacent to gullies which support sheltered forest. The canopy at known sites includes <i>Syncarpia glomulifera</i> subsp. <i>glomulifera</i> , <i>Angophora costata</i> , <i>Eucalyptus piperita</i> , <i>Allocasuarina torulosa</i> and <i>Ceratopetalum gummiferum</i> .	Unlikely. Habitat does not occur on in the vicinity of the site.
<i>Cryptostylis hunteriana</i> Leafless Tongue Orchid	Vulnerable	Vulnerable	Found in a range of habitats, including woodland, sedgeland, forest, wetlands and swamp heath. Large populations occur in woodland dominated by <i>Eucalyptus sclerophylla</i> , <i>E. sieberi</i> , <i>Corymbia gummifera</i> and <i>Allocasuarina littoralis</i> . Occurs on moist and sandy soils, dry soils, and peaty soils.	Possible
<i>Cynanchum elegans</i> White-flowered Wax Plant	Endangered	Endangered	Occurs at the edge of dry rainforest vegetation. May also be associated with littoral rainforest, <i>Leptospermum laevigatum</i> – <i>Banksia integrifolia</i> subsp. <i>integrifolia</i> coastal scrub; <i>Corymbia maculata</i> aligned open forest and woodland; <i>Melaleuca armillaris</i> scrub to open scrub; and <i>Eucalyptus tereticornis</i> aligned open forest and woodland.	Possible
<i>Eucalyptus aggregata</i>	Vulnerable	Vulnerable	Grows in the lowest parts of the landscape in alluvial soils, on cold, poorly-drained flats and hollows adjacent to creeks and small rivers. Often found with other cold-adapted eucalypts, such as Snow Gum or White Sallee, Manna or Ribbon Gum, Candlebark, Black Sallee and Swamp Gum. Black Gum usually occurs in an open woodland formation with a grassy groundlayer and few shrubs but also as isolated paddock trees in modified native or exotic pastures and on travelling stock reserves.	Unlikely. Habitat does not occur on in the vicinity of the site.
<i>Eucalyptus benthamii</i> Camden White Gum	Vulnerable	Vulnerable	Requires a combination of deep alluvial sands and a flooding regime that permits seedling establishment. Recruitment of juveniles appears to be most successful on bare silt deposits in rivers and streams. The recorded elevation range for the species is from 30m ASL at Bents Basin to 750m ASL in the Kedumba population with most around 60 to 300m ASL. Occurs in open forest.	Unlikely. Habitat does not occur on in the vicinity of the site.
<i>Genoplesium baueri</i> Yellow Gnat-orchid	Vulnerable	Endangered	Found in open, shrubby and heathy forest, heathland to shrubby woodland. Also, grows in moss gardens on sandstone. Associated soils are sands or sandy loams.	Unlikely. Habitat does not occur on in the vicinity of the site.

Scientific Name Common Name	NSW status	C'wealth status	Habitat ³⁴	Likelihood
<i>Haloragis exalata</i> <i>subsp. exalata</i> Wingless Raspwort	Vulnerable	Vulnerable	Square Raspwort appears to require protected and shaded damp situations in riparian habitats. Flowering specimens in NSW are recorded from November to January.	Unlikely. Habitat does not occur on in the vicinity of the site.
<i>Melaleuca deanei</i> Deane's Paperbark	Vulnerable	Vulnerable	Occurs in sandy soils, woodlands and wet heath on sandstone. Found in mostly ridgetop woodland, with fewer sites in heath on sandstone.	Possible
<i>Pelargonium sp. Striatellum</i> Omeo Stork's-bill	Endangered	Endangered	Usually found at irregularly inundated or ephemeral lakes, just above the high water level. May cover exposed lake beds during dry periods.	Unlikely. Habitat does not occur on in the vicinity of the site.
<i>Persoonia acerosa</i>	Vulnerable	Vulnerable	Occurs in dry sclerophyll forest, scrubby low-woodland and heath on low fertility soils. Seems to benefit from the reduced competition and increased light available on disturbance margins including roadsides.	Possible
<i>Persoonia hirsuta</i> Hairy Geebung	Endangered	Endangered	"Found in dry sclerophyll open forest woodland with a shrubby understorey, heath, sandstone scrubs and shrubby thickets. Often found on mid slopes of hills and rises and ridge tops. Mostly grows on sandy to stony soils on sandstone and rarely on shale. May be present in disturbed areas such as track margins. Associated with Sydney Sandstone Ridge-top Woodland and Sydney Sandstone Open Forest. "	Unlikely. Habitat does not occur on in the vicinity of the site.
<i>Pimelea curviflora</i> var. <i>curviflora</i>	Vulnerable	Vulnerable	Occurs on shaley/lateritic soils over sandstone and shale/sandstone transition soils on ridgetops and upper slopes amongst woodlands. Flowers October to May. Has an inconspicuous cryptic habit as it is fine and scraggly and often grows amongst dense grasses and sedges.	Possible
<i>Pimelea spicata</i> Spiked Rice-flower	Endangered	Endangered	Found on well-structured clay soils. On the Cumberland Plain sites it is associated with Grey Box communities (particularly Cumberland Plain Woodland variants and Moist Shale Woodland) and in areas of ironbark. The co-occurring species <i>Eucalyptus moluccana</i> , <i>E. tereticornis</i> and <i>E. crebra</i> . <i>Bursaria spinosa</i> is often present at sites (and may be important in protection from grazing) and <i>Themeda australis</i> is usually present in the groundcover.	Unlikely. Habitat does not occur on in the vicinity of the site.

Scientific Name Common Name	NSW status	C'wealth status	Habitat ³⁴	Likelihood
<i>Pomaderris brunnea</i>	Endangered	Vulnerable	Grows in moist woodland or forest on clay and alluvial soils of flood plains and creek lines. Flowers appear in September and October. The species has been found in association with <i>Eucalyptus amplifolia</i> , <i>Angophora floribunda</i> , <i>Acacia parramattensis</i> , <i>Bursaria spinosa</i> and <i>Kunzea ambigua</i> .	Unlikely. Habitat does not occur on in the vicinity of the site.
<i>Pterostylis saxicola</i> Sydney Plains Greenhood	Endangered	Endangered	"Occurs in shallow soil depressions above cliff lines on sandstone rock shelves. Associated with sclerophyll forest or woodland and in heathy forest, supported by shale or shale/sandstone transitional soils (including sandy soils). Also found in sandstone boulder crevices, often near streams. Grows at altitudes between 10 and 60m, in small groups, loose colonies or as scattered individuals. "	Unlikely. Habitat does not occur on in the vicinity of the site.
<i>Pultenaea glabra</i>	-	Vulnerable	Grows in swamp margins, hillslopes, gullies and creekbanks and occurs within dry sclerophyll forest and tall damp heath on sandstone. Flowers September to November, fruit matures October to December.	Unlikely. Habitat does not occur on in the vicinity of the site.
<i>Thelymitra kangaloonica</i> Kangaloon Sun Orchid	Critically Endangered	Critically Endangered	Grows in seasonally swampy sedgeland on grey silty clay loam. Found at 600-700 m above sea level.	Unlikely. Habitat does not occur on in the vicinity of the site.
<i>Thesium australe</i> Austral Toadflax	Vulnerable	Vulnerable	Found in grassland on coastal headlands, and grassy woodland, shrubland or grassland at inland locations. Commonly found with <i>Themeda australis</i> . Occurs on soils derived from sedimentary, igneous and metamorphic geology, including peaty loams and black clay loams to yellow podzolics. Commonly present at damp sites.	Unlikely. Habitat does not occur on in the vicinity of the site.
Gastropoda				
<i>Meridolum corneovirens</i> Cumberland Plain Land Snail	Endangered	-	Primarily inhabits the critically endangered ecological community Cumberland Plain Woodland and grassy open woodland with occasional dense patches of shrubs. Also known from Shale Gravel Transition Forests, Castlereagh Swamp Woodlands and the margins of River-flat Eucalypt Forest. Lives under litter, bark, leaves and logs, or shelters in loose soil around grass clumps. Occasionally shelters under rubbish. Generally active at night.	Possible

Scientific Name Common Name	NSW status	C'wealth status	Habitat ³⁴	Likelihood
<i>Pommerhelix duralensis</i> Dural Land Snail	Endangered	Endangered	Has a strong affinity for communities in the interface region between shale and sandstone-derived soils, with forested habitats that have good native cover and woody debris. Favours sheltering under rocks or inside curled-up bark. Also observed resting in exposed areas such as on exposed rock or leaf litter, however it will also shelter beneath leaves, rocks and light woody debris.	Unlikely. Habitat does not occur on in the vicinity of the site.
Mammalia				
<i>Chalinolobus dwyeri</i> Large-eared Pied Bat	Vulnerable	Vulnerable	Roosts in cave entrances, crevices in cliffs, old mine workings and the disused, bottle-shaped mud nests of the Fairy Martin. Frequents low to mid-elevation dry open forest and woodland close to these features. Females raise young in maternity roosts from November to January in roof domes in sandstone caves and overhangs. They remain loyal to the same cave over many years.	Possible
<i>Dasyurus maculatus</i> Spotted-tailed Quoll	Vulnerable	Endangered	Found in a variety of areas including open forest, rainforest, woodland, coastal heath and inland riparian forest. Uses tree hollows, logs, rock outcrops, small caves and rocky cliff faces as dens. Uses flat rocks amongst boulder sites, rocky stream beds or banks and rocky cliff faces as latrine sites.	Possible
<i>Miniopterus schreibersii oceanensis</i> Eastern Bentwing-bat	Vulnerable	-	Caves are the primary roosting habitat. Also found in derelict mines, storm-water tunnels, buildings and other man-made structures. Forms discrete populations centred on a maternity cave that is used annually in spring and summer for the birth and rearing of young. At other times of the year, populations disperse within about 300 km range of maternity caves. Hunts in forested areas, catching moths and other flying insects above the treetops.	Unlikely. Habitat does not occur on in the vicinity of the site.
<i>Mormopterus norfolkensis</i> Eastern Freetail-bat	Vulnerable	-	Occurs in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range. Roosts mainly in tree hollows but also under bark or in man-made structures. Usually solitary but also recorded roosting communally.	Possible
<i>Myotis macropus</i> Southern Myotis	Vulnerable	-	Generally roosts in groups of 10 - 15, close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage. Forages over streams and pools catching insects and small fish by raking their feet across the water surface. In NSW, females have one young each year usually in November or December.	Possible

Scientific Name Common Name	NSW status	C'wealth status	Habitat ³⁴	Likelihood
<i>Petauroides volans</i> Greater Glider	-	Vulnerable	Feeds exclusively on Eucalypt leaves, buds, flowers and mistletoe. Shelters during the day in tree hollows and will use up to 18 hollows in their home range.	Possible
<i>Phascolarctos cinereus</i> Koala	Vulnerable	Vulnerable	Inhabits Eucalypt woodlands and forests. Feeds on the foliage of more than 70 Eucalypt species and 30 non-Eucalypt species, but in any one area will select preferred browse species.	Possible
<i>Pteropus poliocephalus</i> Grey-headed Flying-fox	Vulnerable	Vulnerable	Occurs in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies close to water in vegetation with a dense canopy. Feeds on the nectar and pollen of native trees, in particular Eucalyptus, Melaleuca and Banksia, and fruits of rainforest trees and vines. Also forages in cultivated gardens and fruit crops.	Possible
<i>Petrogale penicillata</i> Brush-tailed Rock-wallaby	Endangered	Vulnerable	Occupies rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges, often facing north. Browses on vegetation in and adjacent to rocky areas, eating grasses and forbs as well as the foliage and fruits of shrubs and trees. Shelters or basks during the day in rock crevices, caves and overhangs. Mostly active at night.	Unlikely. Habitat does not occur on in the vicinity of the site.
<i>Pseudomys novaehollandiae</i> New Holland Mouse	-	Vulnerable	Known to inhabit open heathlands, woodlands and forests with a heathland understorey and vegetated sand dunes. Social animal, living predominantly in burrows shared with other individuals.	Possible
Reptilia				
<i>Hoplocephalus bungaroides</i> Broad-headed Snake	Endangered	Vulnerable	Shelters in rock crevices and under flat sandstone rocks on exposed cliff edges during autumn, winter and spring. Moves from sandstone rocks to shelters in crevices or hollows in large trees within 500 m of escarpments in summer.	Unlikely. Habitat does not occur on in the vicinity of the site.

Appendix C

Assessment of significance

To comply with State legislative requirements, an Assessment of Significance under 5A of the *Environmental Planning and Assessment Act 1979* and 7.3 of the *Biodiversity Conservation Act 2016* has been undertaken for the following species:

Birds

- *Artamus cyanopterus cyanopterus* - Dusky Woodswallow
- *Callocephalon fimbriatum* - Gang-gang Cockatoo
- *Chthonicola sagittata* - Speckled Warbler
- *Daphoenositta chrysoptera* - Varied Sittella
- *Dasyornis brachypterus* – Eastern Bristlebird
- *Glossopsitta pusilla* - Little Lorikeet
- *Grantiella picta* – Painted Honeyeater
- *Ninox connivens* - Barking Owl
- *Ninox strenua* - Powerful Owl
- *Tyto novaehollandiae* - Masked Owl

Flora

- *Acacia bynoeana* – Bynoe’s Wattle
- *Acacia pubescens* – Downy Wattle
- *Cryptostylis hunteriana* – Leafless Tongue Orchid
- *Cynanchum elegans* – White-flowered Wax Plant
- *Melaleuca deanei* – Deane’s Paperbark
- *Persoonia acerosa*
- *Pimelea curviflora* var. *curviflora*

Gastropoda

- *Meridolum corneovirens* - Cumberland Plain Land Snail

Mammals

- *Chalinolobus dwyeri* - Large-eared Pied Bat
- *Dasyurus maculatus* - Spotted-tailed Quoll
- *Mormopterus norfolkensis* - Eastern Freetail-bat
- *Myotis Macropus* - Southern Myotis
- *Phascolarctos cinereus* - Koala
- *Pteropus poliocephalus* - Grey-headed Flying-fox

(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction

The proposed development is unlikely to impact the life cycle of a threatened species such that a viable local population is likely to be at risk of extinction.

Avian species are highly mobile and are likely to utilise habitat and resources within and adjacent to the site. Habitat and resources available within the site are consistent with disturbed and natural habitat and resources in the local area.

Threatened flora species may exist on the site. Habitat and resources available within the site are consistent with disturbed and natural habitat and resources in the local area. The area impacted by the proposed development is disturbed and adversely affected by exotic plants and weeds. The proposed activity would include weed management and is likely to benefit the natural vegetation remaining on the site and adjacent to the site.

Mammals may utilise habitat resources within the site. Each of the species listed in Table 2 are considered to be highly mobile and are likely to utilise habitat resources available in the areas of native vegetation remaining on and adjacent to the site.

(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction

The proposed action is not likely to have an adverse effect on the life cycle of any **endangered population**. No endangered populations have been recorded in the study area and none were observed during field survey.

(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

- (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or**
- (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction**

The proposed action is not likely to have an adverse effect on an Endangered Ecological Community such that their local occurrence is likely to be placed at risk of extinction.

(d) in relation to the habitat of a threatened species, population or ecological community:

- i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and**
- ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and**
- iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality**

Avian and mammalian species are highly mobile and are considered likely to utilise areas of habitat within the broader study area.

Any potential **threatened flora** habitat occurring on the site is considered to be well-represented in the surrounding study area and the proposed action is not likely to result in fragmentation or isolation.

The habitat that would be removed or modified by the proposed action is not considered to be of importance to the long-term survival of any species, population or ecological community. No threatened species or population was observed on the site during survey. Potential habitat on the site is well represented in the broader study area.

(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly)

No critical habitat as determined by the *EPBC Act* 1999 or *BC Act* 2016 has been recommended or declared within the study area.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan

The following apply to the proposed development:

Recovery Plans

- *Draft Recovery Plan for the Grey-headed Flying-fox Pteropus poliocephalus*
- *National Recovery Plan for the Eastern Bristlebird Dasyornis brachypterus*
- *National recovery plan for the Large-eared Pied Bat Chalinolobus dwyeri*
- *National Recovery Plan for the Spotted-tailed Quoll Dasyurus maculatus*
- *National Recovery Plan for the Thick-lip Spider-orchid Caladenia tessellata*
- *Recovery plan for the Koala Phascolarctos cinereus*
- *Recovery Plan for the Large Forest Owls*

Threat Abatement Plans

- *Threat abatement plan for competition and land degradation by rabbits*
- *Threat abatement plan for competition and land degradation by unmanaged goats*
- *Threat abatement plan for infection of amphibians with chytrid fungus resulting in chytridiomycosis*
- *Threat abatement plan for predation by feral cats*
- *Threat abatement plan for predation by the European red fox*
- *Threat abatement plan for predation, habitat degradation, competition and disease transmission by feral pigs Sus scrofa*

The objectives for the recovery of the Grey-headed Flying-fox are to:

- Identify, protect and enhance native foraging habitat critical to the survival of the Grey-headed Flying-fox.
- Identify, protect and enhance roosting habitat of Grey-headed Flying-fox camps.
- Determine population trends in Grey-headed Flying-foxes so as to monitor the species' national distribution and conservation status.
- Build community capacity to coexist with flying-foxes and minimise the impacts on urban settlements from existing camps without resorting to dispersal.
- Increase public awareness and understanding of Grey-headed Flying-foxes and the recovery program, and involve the community in the recovery program where appropriate.
- Improve the management of Grey-headed Flying-fox camps in sensitive areas.
- Significantly reduce levels of deliberate Grey-headed Flying-fox destruction associated with commercial horticulture.
- Support research activities that will improve the conservation status and management of Grey-headed Flying-foxes.
- Assess and reduce the impact on Grey-headed Flying-foxes of electrocution on power lines, and entanglement in netting and on barbed-wire.

The proposal does not intervene with the above objectives as no critical foraging or roosting habitat for the Grey-headed Flying-fox has been identified in the study area.

The objectives for the recovery of the Eastern Bristlebird are to:

- Maintain and improve the condition and extent (carrying capacity) of Eastern Bristlebird habitat and minimise known or likely threats for all populations, with particular emphasis on fire prescriptions, minimising habitat fragmentation and control of: feral predators, exotic herbivores, overgrazing and weeds;
- Undertake survey, monitoring and mapping to improve knowledge of all Eastern Bristlebird populations. Population dynamics and habitat condition will be monitored in each population. Methods including survey effort and frequency will be reviewed and standardised and will be subject to ongoing review according to census results or special circumstances such as wildfire. Potential habitat will be surveyed to locate new colonies in the northern and southern populations, and to estimate more accurately the population size for all populations;
- Enhance/augment northern and southern populations, building towards viable populations as determined by population viability analysis;
- Conduct research to increase knowledge of ecology, threats and habitat management requirements of the Eastern Bristlebird;
- Increase community awareness, understanding and involvement in the Eastern Bristlebird recovery effort, particularly on private land. Improve communication between working groups and stakeholders including Australian and State Government agencies, CMAs and other NRM bodies, the Aboriginal community, landholders, land managers, rural fire services and interest groups; and
- Effectively organise and administer the recovery effort to ensure that recovery plan objectives are met. The proposed activity may impact the condition and extent of Eastern Bristlebird habitat on the property.

The objectives for the recovery of the Large-eared Pied Bat are to:

- Identify priority roost and maternity sites for protection;
- Implement conservation and management strategies for priority sites;
- Educate the community and industry to understand and participate in the conservation of the large-eared pied bat;
- Research the large-eared pied bat to augment biological and ecological data to enable conservation management; and

Determine the meta-population dynamics throughout the distribution of the large-eared pied bat. The proposal does not intervene with the above objectives.

The objectives for the recovery of the Spotted-tailed Quoll are to:

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

- Determine the likely impact of climate change on Spotted-tailed Quoll populations; and
 - Increase community awareness of the Spotted-tailed Quoll and involvement in the Recovery Program.
- The proposed activity may impact the condition and extent of Spotted-tailed Quolls habitat on the property.

The objectives for the recovery of the Thick-lip Spider-orchid are to:

- Determine taxonomy, distribution, abundance and population structure;
- Determine habitat requirements;
- Ensure that all populations and their habitat are protected and managed appropriately;
- Manage threats to populations;
- Identify key biological functions;
- Determine growth rates and viability of populations;
- Establish a population in cultivation; and
- Build community support for conservation.

The proposed development may impact populations and habitat.

The objectives for the recovery of the Koala are to:

- To conserve koalas in their existing habitat;
- To rehabilitate and restore koala habitat and populations;
- To develop a better understanding of the conservation biology of koalas;
- To ensure that the community has access to factual information about the distribution, conservation and management of koalas at a national, state and local scale;
- To manage captive, sick or injured koalas and orphaned wild koalas to ensure consistent and high standards of care;
- To manage overbrowsing to prevent both koala starvation and ecosystem damage in discrete patches of habitat; and
- To coordinate, promote the implementation, and monitor the effectiveness of the NSW Koala Recovery Plan across NSW.

The proposal does not intervene with the above objectives.

The objectives for the recovery of the Large Forest Owls are to:

- Assess the distribution and amount of high quality habitat for each owl species across public and private lands to get an estimate of the number and proportion of occupied territories of each species that are, and are not, protected;
- To monitor trends in population parameters (numbers, distribution, territory fidelity and breeding success) across the range of the three species and across different land tenures and disturbance histories;
- To assess the implementation and effectiveness of forest management prescriptions designed to mitigate the impact of timber-harvesting operations on the three owl species and, (if necessary), to use this information to refine the prescriptions so that forestry activities on state forests are not resulting in adverse changes in species abundance and breeding success;
- Ensure the impacts on large forest owls and their habitats are adequately assessed during planning and environmental assessment processes.
- Minimise further loss and fragmentation of habitat by protection and more informed management of significant owl habitat (including protection of individual nest sites)

- To improve the recovery and management of the three large forest owls based on an improved understanding of key areas of their biology and ecology;
- To raise awareness of the conservation requirements of the three large forest owls amongst the broader community, to involve the community in owl conservation efforts and in so doing increase the information base about owl habitats and biology; and
- To coordinate the implementation of the recovery plan and continually seek to integrate actions in this plan with actions in other recovery plans or conservation initiatives.

The proposed development is to ensure the impacts on large forest owls and their habitats are adequately assessed during the planning and environmental assessment processes.

(g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process

The proposed action constitutes key threatening processes as listed in Schedule 3 of the *BC Act 2016* to the survival or evolutionary development of species in the study area.

Bushrock removal – The proposed development may cause the removal of bushrock.

Clearing of native vegetation - The proposed development would result in clearing of native vegetation within the site. Field surveys show that much of this area is disturbed however the remaining vegetation is representative of a native vegetation community.

Forest eucalypt dieback associated with over-abundant psyllids and Bell Miners – The proposed development is likely to result in vegetation disturbance, habitat fragmentation, nutrient enrichment, altered fire regimes and weed invasion.

Invasion of native plant communities by exotic perennial grasses – The proposed development may introduce exotic perennial grasses to the site, by way of landscaping and erosion management.

Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants - The proposed development would include ongoing weed management and would not result in the spread of exotic garden species to the site.

Loss of hollow-bearing trees – The proposed development may result in removal of hollow-bearing trees from the site and may include large, isolated trees, many with tree hollows greater than 10 cm diameter.

Removal of dead wood and dead trees – The margins of the site support intact vegetation communities which contain fallen timber and standing dead wood and would be removed as a result of the proposed development.

Appendix D

Matters of national environmental significance



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.

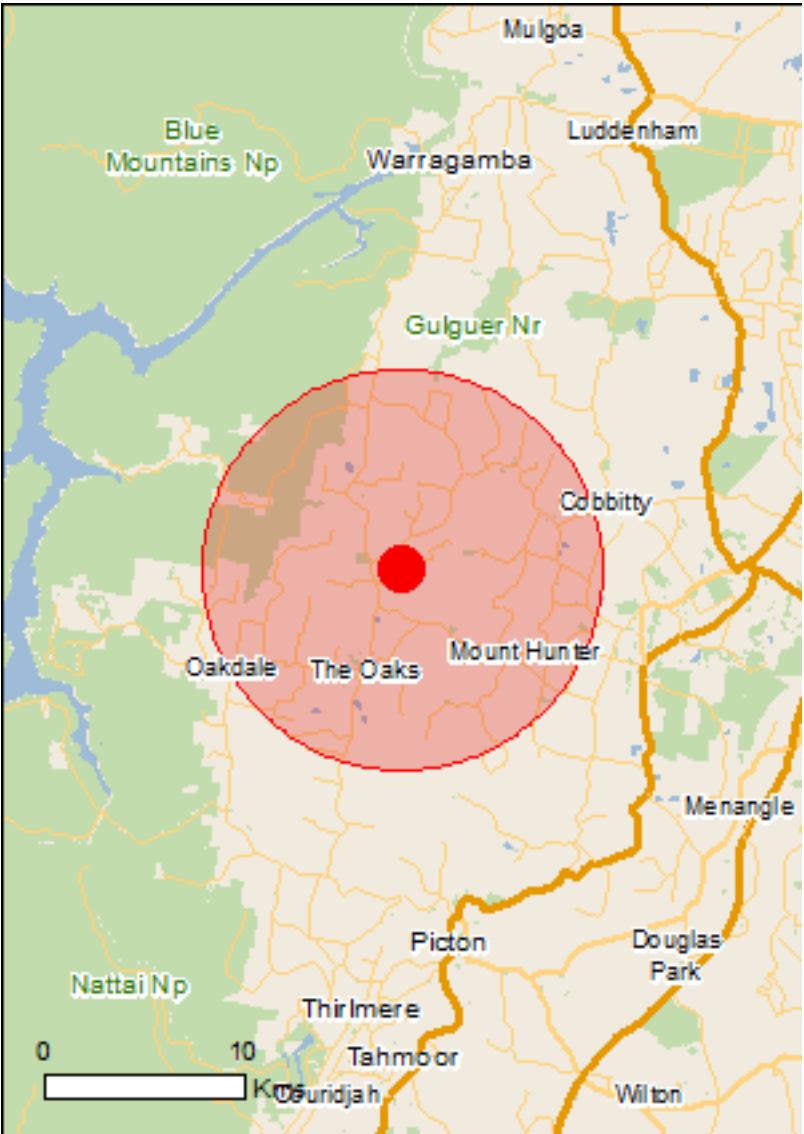
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- [Summary](#)
- [Details](#)

[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

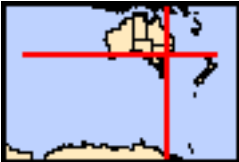
[Extra Information](#)
- [Caveat](#)
- [Acknowledgements](#)



This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

[Coordinates](#)

Buffer: 10.0Km



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:	9
Listed Threatened Species:	45
Listed Migratory Species:	15

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:	4
Commonwealth Heritage Places:	None
Listed Marine Species:	21
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	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:	None
Invasive Species:	52
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
Castlereagh Scribbly Gum and Agnes Banks Woodlands of the Sydney Basin Bioregion	Endangered	Community may occur within area
Cooks River/Castlereagh Ironbark Forest of the Sydney Basin Bioregion	Critically Endangered	Community may occur within area
Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest	Critically Endangered	Community likely to occur within area
Natural Temperate Grassland of the South Eastern Highlands	Critically Endangered	Community may occur within area
Shale Sandstone Transition Forest of the Sydney Basin Bioregion	Critically Endangered	Community likely to occur within area
Turpentine-Ironbark Forest of the Sydney Basin Bioregion	Critically Endangered	Community likely to occur within area
Upland Basalt Eucalypt Forests of the Sydney Basin Bioregion	Endangered	Community may occur within area
Western Sydney Dry Rainforest and Moist Woodland on Shale	Critically Endangered	Community likely to occur within area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community may 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
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known 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 may occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within

Name	Status	Type of Presence
area		
Rostratula australis Australian Painted-snipe, Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Fish		
Maccullochella peelii Murray Cod [66633]	Vulnerable	Species or species habitat may occur within area
Macquaria australasica Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area
Prototroctes maraena Australian Grayling [26179]	Vulnerable	Species or species habitat may occur within area
Frogs		
Heleioporus australiacus Giant Burrowing Frog [1973]	Vulnerable	Species or species habitat likely to occur within area
Litoria aurea Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat may occur within area
Litoria littlejohni Littlejohn's Tree Frog, Heath Frog [64733]	Vulnerable	Species or species habitat may occur within area
Mixophyes balbus Stuttering Frog, Southern Barred Frog (in Victoria) [1942]	Vulnerable	Species or species habitat likely to occur within area
Mammals		
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat known 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 known to occur within area
Petauroides volans Greater Glider [254]	Vulnerable	Species or species habitat known to occur within area
Petrogale penicillata Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat likely 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
Pseudomys novaehollandiae New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat may occur within area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area
Other		
Pommerhelix duralensis Dural Land Snail [85268]	Endangered	Species or species habitat likely to occur within area
Plants		
Acacia bynoeana Bynoe's Wattle, Tiny Wattle [8575]	Vulnerable	Species or species habitat may occur within

Name	Status	Type of Presence area
Acacia pubescens Downy Wattle, Hairy Stemmed Wattle [18800]	Vulnerable	Species or species habitat known to occur within area
Allocasuarina glareicola [21932]	Endangered	Species or species habitat may occur within area
Asterolasia elegans [56780]	Endangered	Species or species habitat may occur within area
Cryptostylis hunteriana Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat may occur within area
Cynanchum elegans White-flowered Wax Plant [12533]	Endangered	Species or species habitat known to occur within area
Eucalyptus aggregata Black Gum [20890]	Vulnerable	Species or species habitat may occur within area
Eucalyptus benthamii Camden White Gum, Nepean River Gum [2821]	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
Haloragis exalata subsp. exalata Wingless Raspwort, Square Raspwort [24636]	Vulnerable	Species or species habitat may occur within area
Melaleuca deanei Deane's Melaleuca [5818]	Vulnerable	Species or species habitat may occur within area
Pelargonium sp. Striatellum (G.W.Carr 10345) Omeo Stork's-bill [84065]	Endangered	Species or species habitat likely to occur within area
Persoonia acerosa Needle Geebung [7232]	Vulnerable	Species or species habitat likely to occur within area
Persoonia hirsuta Hairy Geebung, Hairy Persoonia [19006]	Endangered	Species or species habitat likely to occur within area
Pimelea curviflora var. curviflora [4182]	Vulnerable	Species or species habitat may occur within area
Pimelea spicata Spiked Rice-flower [20834]	Endangered	Species or species habitat likely to occur within area
Pomaderris brunnea Rufous Pomaderris [16845]	Vulnerable	Species or species habitat likely to occur within area
Pterostylis saxicola Sydney Plains Greenhood [64537]	Endangered	Species or species habitat likely to occur within area
Pultenaea glabra Smooth Bush-pea, Swamp Bush-pea [11887]	Vulnerable	Species or species habitat likely to occur within area

Name	Status	Type of Presence
Thelymitra kangaloonica Kangaloon Sun Orchid [81861]	Critically Endangered	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		
Hoplocephalus bungaroides Broad-headed Snake [1182]	Vulnerable	Species or species habitat likely to 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		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to 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
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur 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 may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		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 may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area

Name	Threatened	Type of Presence
Pandion haliaetus Osprey [952]		Species or species habitat may occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land	[Resource Information]
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The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name
Commonwealth Land - Commonwealth Land - Australian Telecommunications Commission Commonwealth Land - Commonwealth Trading Bank of Australia Defence - AIRTC CAMDEN

Listed Marine Species	[Resource Information]
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* 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 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]		Breeding known to occur 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 ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Chrysococcyx osculans Black-eared Cuckoo [705]		Species or species habitat likely to occur within area

Name	Threatened	Type of Presence
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Critically Endangered	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]		Species or species habitat known to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]	Critically Endangered	Species or species habitat known to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]		Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat may occur within area
Rhipidura rufifrons Rufous Fantail [592]	Endangered*	Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]		Species or species habitat likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat may occur within area

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
Burraborang	NSW
Gulguer	NSW

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
Carduelis chloris European Greenfinch [404]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Lonchura punctulata Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Passer montanus Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
Pycnonotus jocosus Red-whiskered Bulbul [631]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat 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

Name	Status	Type of Presence
Capra hircus Goat [2]		within area 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
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		
Alternanthera philoxeroides Alligator Weed [11620]		Species or species habitat likely to occur within area
Anredera cordifolia Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643]		Species or species habitat likely to occur within area
Asparagus aethiopicus Asparagus Fern, Ground Asparagus, Basket Fern, Sprengi's Fern, Bushy Asparagus, Emerald Asparagus [62425]		Species or species habitat likely to occur within area
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Asparagus scandens Asparagus Fern, Climbing Asparagus Fern [23255]		Species or species habitat likely to occur within area
Cabomba caroliniana Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Chrysanthemoides monilifera subsp. monilifera Boneseed [16905]		Species or species habitat likely to occur

Name	Status	Type of Presence
Chrysanthemoides monilifera subsp. rotundata Bitou Bush [16332]		within area Species or species habitat likely to occur within area
Cytisus scoparius Broom, English Broom, Scotch Broom, Common Broom, Scottish Broom, Spanish Broom [5934]		Species or species habitat likely to occur within area
Eichhornia crassipes Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
Genista monspessulana Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126]		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] Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area Species or species habitat likely to occur within area
Nassella neesiana Chilean Needle grass [67699]		Species or species habitat likely to 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
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Sagittaria platyphylla Delta Arrowhead, Arrowhead, Slender Arrowhead [68483]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Senecio madagascariensis Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]		Species or species habitat likely to occur within area
Ulex europaeus Gorse, Furze [7693]		Species or species habitat likely to occur within area
Reptiles		
Hemidactylus frenatus Asian House Gecko [1708]		Species or species

Name	Status	Type of Presence
		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

-34.04088 150.58693

Acknowledgements

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

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

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

Please feel free to provide feedback via the [Contact Us](#) page.

Appendix E

Federal legislative considerations for threatened species

The *Significant Impact Guidelines 1.1* provide guidelines on determining whether a proposed action is likely to have a significant impact on a matter of national significance. The following assessment has been undertaken considering the impacts of the proposed development on the following species, listed on Section 178 of the *Environment Protection and Biodiversity Conservation Act 1999*:

Birds

- *Botaurus poiciloptilus* - Australasian Bittern
- *Dasyornis brachyopterus* – Eastern Bristlebird
- *Grantiella picta* – Painted Honeyeater

Endangered Ecological Communities

- Cumberland Plain Woodland in the Sydney Basin Bioregion (sub-community Shale Plains Woodland)
- White Box - Yellow Box - Blakeley's Red Gum Grassy Woodland and Derived Native Grassland

Flora

- *Acacia bynoeana* – Bynoe's Wattle
- *Acacia pubescens* – Downy Wattle
- *Cryptostylis hunteriana* – Leafless Tongue Orchid
- *Cynanchum elegans* – White-flowered Wax Plant
- *Melaleuca deanei* – Deane's Paperbark
- *Persoonia acerosa*
- *Pimelea curviflora* var. *curviflora*

Mammals

- *Chalinolobus dwyeri* - Large-eared Pied Bat
- *Dasyurus maculatus* - Spotted-tailed Quoll
- *Petauroides Volans* - Greater Glider
- *Phascolarctos cinereus* – Koala
- *Pseudomys novaehollandiae* – New Holland Mouse
- *Pteropus poliocephalus* - Grey-headed Flying-fox

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 proposed action would not have a significant impact on any known important avian, flora or mammalian population within the study area and is unlikely to lead to a long-term decrease in the size of an important population of these species.

...reduce the area of occupancy of an important population

The site is adjacent to large areas of potential habitat and the proposed action is unlikely to reduce the area of occupancy for these populations. Vegetation and habitat adjacent to the site would not be impacted by the proposed activity and habitat connectivity would be retained.

...fragment an existing important population into two or more populations

The proposed action would not fragment any known important avian, flora or mammalian population. Vegetation and habitat adjacent to the site would not be impacted by the proposed activity and habitat connectivity would be retained.

...adversely affect habitat critical to the survival of a species

No critical habitat would be adversely affected by the proposed activity.

...disrupt the breeding cycle of an important population

The site does not constitute significant breeding habitat. The proposed action is unlikely to significantly disrupt the breeding cycle of an important population of any species.

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

The removal of a relatively small amount of habitat resulting from the proposed action is unlikely to result in a decline of any species. Vegetation and habitat adjacent to the site would not be impacted by the proposed activity and habitat connectivity would be retained.

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

The proposed action would include the management of weeds and invasive species and would not result in an increase in invasive species, including weeds that would be detrimental to any **listed species**.

...introduce disease that may cause the species to decline, or;

The proposed action would be conducted in such a way as to prevent the introduction or spread of disease that may cause the decline of any **listed species**.

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

The proposed action would be limited to the site and would not interfere substantially with the recovery of any **listed species**.