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Valencia Road Carmel

Flora, vegetation and cockatoo habitat survey

Background

Strategen was commissioned to undertake an environmental assessment at Valencia Nursing Home in Carmel, approximately 24 km south east of Perth. The total area of the site is approximately 1.2 hectares (ha), with less than 1 ha of parkland cleared native vegetation proposed to be impacted by the proposed development.

The aim of the environmental assessment was to determine the flora and vegetation values at the site and investigate the presence of potential black cockatoo foraging habitat and potential breeding trees. The objectives of the survey were to:

- Investigate and broadly describe the flora and vegetation type and condition at the site
- Identify the extent of black cockatoo habitat; including mapping, identification and measuring of any significant trees (>500 mm diameter at breast height, DBH), and an assessment of the presence of any hollows and their suitability for breeding purposes

Methods, results and discussions

The site was traversed on foot by a Strategen Ecologist on 14 December 2017, and the following information was recorded from the assessment:

- broad vegetation structure
- vegetation condition (based on the Keighery (1994) condition scale)
- suitability of species and vegetation types as black cockatoo foraging habitat
- location and description of any trees suitable as potential breeding habitat for black cockatoo species.

1.1.1 Flora and vegetation assessment

The flora present on site comprised parkland cleared Marri (*Corymbia calophylla*) open woodland with emergent Jarrah (*Eucalyptus marginata*) over scattered Grass trees (*Xanthorrhoea preissii*), over introduced grasses, garden plants and weeds (Figure 1).

Vegetation condition was Completely Degraded across the site (Figure 1). Vegetation structure had been severely impacted by historical clearing, and while the upper storey retained some native vegetation, having been selectively felled, the structure of the mid and under story was almost completely without native species.



Figure 1: Vegetation assemblage at the site comprising parkland cleared Marri Woodland

No Threatened or Priority Ecological Communities, or Threatened or Priority flora were recorded at the site at the time of the survey. The survey was undertaken in early summer (December) when most of the ephemeral taxa had senesced for the year. It should be noted that ephemeral Threatened, and Priority flora taxa have been recorded within 5 km of the site (DBCA 2017). There is potential that these taxa may be recorded at the site in optimal conditions during Spring (September to November), however this is unlikely given the degraded nature and lack of native understory at the site.

Weed species were prevalent in the understory, and scattered throughout the mid and upper storey, however many of these are garden varieties that have been intentionally planted at the site. No Weeds of National Significance or Declared Plants under the *Biosecurity and Agriculture Management Act 2007* were recorded at the site.

1.1.2 Black cockatoo habitat assessment

Three species of black cockatoo are listed as Threatened, and are protected, under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), these are:

- Carnaby's cockatoo (*Calyptorhynchus latirostris*) – Endangered
- Forest Red-tailed Black-Cockatoos (*Calyptorhynchus banksii naso*) - Vulnerable
- Baudin's Cockatoo (*Calyptorhynchus baudinii*) – Vulnerable

The site is in the Jarrah Forest bioregion, which is dominated by Jarrah and Marri woodland. All three black cockatoo species breed in this region (DEE 2017). Furthermore, Marri, which is the dominant flora species at the site, is a primary foraging species for Baudin's and the Forest Red-tailed Black Cockatoo (DEE 2017).

Carnaby's Black-cockatoo (CBC), *Calyptorhynchus latirostris*, listed as Endangered under the EPBC Act, feed on the seeds, nuts and flowers, of a variety of native and introduced plant species and insect larvae (DEE 2016). Food plants of CBC typically comprise the proteaceous genera such as *Banksia*, *Dryandra*, *Hakea* and *Grevillea*, though are known to include eucalypt species in woodland areas. Carnaby's black cockatoos have also adapted to feeding on exotic species such as pines and cape lilac and weeds such as wild radish and wild geranium (DEE 2016). Carnaby's black cockatoos usually breed between July and December in the hollows of live or dead eucalypts; primarily in Salmon Gum and Wandoo, but also within Jarrah, Marri and other eucalypt species (Johnstone 2010). Hollows are usually at least 2 m above ground, sometimes over 10 m and the depth of the hollow varies from 0.25 m to 6 m (DEE 2016). The Western Australian Department of Parks and Wildlife (now the Department of Biodiversity, Conservation and Attractions, DBCA), renewed the Carnaby's Cockatoo Recovery Plan in 2013, clearly mapping the distribution of likely breeding and non-breeding areas in south-west WA for CBC (Parks and Wildlife 2013). Based on this map, the site is situated within the CBC breeding range.

Forest Red-tailed Black-cockatoos, *Calyptorhynchus banksii naso*, listed as Vulnerable under the EPBC Act, depend primarily on Marri and Jarrah trees for both foraging and nesting. The seeds of both eucalypts are the favoured food source of the species, and hollows within live or dead individual trees are utilised for nesting purposes (Johnstone & Kirkby 1999). Breeding varies between years and occurs at times of Jarrah and Marri fruiting. These black cockatoos breed in woodland, forest or artificial nest boxes, but may also breed in former woodland or forest that has been reduced to isolated trees (DEE 2016).

Baudin's Black-cockatoos, *Calyptorhynchus baudinii*, primarily occur in eucalypt forests and forage at all strata levels within the forests with a tendency to favour areas containing Marri (Johnstone and Kirkby 2008, DEE 2016). Breeding generally occurs in the Jarrah, Marri and Karri forests of the southwest of Western Australia in areas averaging more than 750 mm of rainfall annually (DEE 2016). As with the other two species of Threatened black cockatoos in Western Australia, breeding habitat also occurs in former woodland or forest that has been reduced to isolated trees (DEE 2016).

Black Cockatoo Foraging Habitat

Foraging habitat of black cockatoo is defined as plants of species known to support foraging (DEE 2017). The remnant vegetation at the site is dominated by Marri, with emergent Jarrah, which are primary foraging species for Baudin's and the Forest Red-tailed Black Cockatoo, and can also be foraging species for Carnaby's Black Cockatoo (DEE 2017). Grass Tree was also present at the site, which is a foraging species of both Baudin's and Carnaby's Black Cockatoo. Less than 1 ha of foraging habitat was recorded at the site. No black cockatoos were observed during the survey, however evidence of black cockatoo foraging at the site included large numbers of Marri nuts chewed by Forest Red-tailed cockatoo and to a lesser extent nuts that may have been chewed by Baudin's cockatoo (Figure 2).



Figure 2: Black cockatoo foraging evidence at the site including Marri nuts with Forest Red-tailed black cockatoo bite marks (left), Marri nut with possible Baudin's cockatoo bite marks (right)

The quality of the foraging habitat at the site was Moderate (based on the criteria in Table 1) because the density of plant species suitable for foraging for black cockatoos was only 20 to 30%, and food sources were typically present in the upper strata, except for a few scattered Grass Trees. The black cockatoo foraging plant species within the site are summarised in Table 2.

Table 1: Classification scale used to assess black cockatoo foraging habitat at the site

Foraging quality	Justification
Excellent	High density of species suitable for foraging by black cockatoos (i.e. foliage cover of suitable species >60%) and presence of food sources at several strata (i.e. canopy, midstorey and understorey).
Good	High density of species suitable for foraging by black cockatoos (i.e. foliage cover of suitable species >60%) but food sources only present at one or two strata (i.e. canopy and midstorey).
Moderate	Moderate foraging value density of species suitable for foraging by black cockatoos (i.e. foliage cover of suitable species 20-40%) and food sources only present at one or two strata (i.e. canopy and midstorey).
Poor	Low density of species suitable for foraging by black cockatoos (i.e. foliage cover of suitable species 10-20%) and presence of food sources at only one stratum (i.e. canopy).
Very poor	Very low density of species suitable for foraging by black cockatoos (i.e. foliage cover of suitable species <10%) and presence of food sources at only one stratum (i.e. canopy).
Nil	Cleared areas - no suitable vegetation present.

Table 2: Vegetation types and black cockatoo foraging species within the site

Vegetation type	Black cockatoo foraging species	Foraging quality	Area (ha)
Marri open woodland with emergent Jarrah over scattered Grass trees	<u>CBC</u> – Marri, Jarrah, Grass Tree	<u>CBC</u> – Moderate	< 1
	<u>BBC</u> – Marri, Jarrah, Grass Tree	<u>BBC</u> – Moderate	
	<u>FRTBC</u> – Marri, Jarrah	<u>FRTBC</u> – Moderate	

Black Cockatoo Breeding Habitat

Breeding habitat is defined as trees of suitable species (listed in Table 3) with a diameter at breast height (DBH) greater than 500 mm (> 300 mm for salmon gum and wandoo) (DSEWPac [now DEE] 2012). These trees are large enough to potentially contain hollows suitable for nesting black cockatoos, or have the potential to develop suitable hollows over the next 50 years. Trees of this size may also be large enough to provide roosting habitat (i.e. trees which provide a roost or rest area for the birds).

Table 3: Black cockatoo potential breeding and roosting tree species (Groom 2011, DSEWPaC 2012)

Scientific name	Common name	Breeding	Roosting
<i>Corymbia calophylla</i>	Marri	Yes	Yes
<i>Corymbia maculata</i>	Spotted Gum		Yes
<i>Eucalyptus accedens</i>	Powderbark	Yes	
<i>Eucalyptus camaldulensis</i>	River Red Gum		Yes
<i>Eucalyptus citriodora</i>	Lemon Scented Gum		Yes
<i>Eucalyptus diversicolor</i>	Karri	Yes	
<i>Eucalyptus globulus</i>	Tasmania Blue Gum		Yes
<i>Eucalyptus gomphocephala</i>	Tuart	Yes	Yes
<i>Eucalyptus grandis</i>	Flooded Gum, Rose Gum		Yes
<i>Eucalyptus longicornis</i>	Red Morrell	Yes	
<i>Eucalyptus loxophleba</i>	York Gum	Yes	
<i>Eucalyptus marginata</i>	Jarra	Yes	Yes
<i>Eucalyptus megacarpa</i>	Bullich	Yes	Yes
<i>Eucalyptus occidentalis</i>	Swamp Yate	Yes	
<i>Eucalyptus patens</i>	Blackbutt	Yes	Yes
<i>Eucalyptus robusta</i>	Swamp Mahogany		Yes
<i>Eucalyptus rudis</i>	Flooded Gum	Yes	Yes
<i>Eucalyptus salmonophloia</i>	Salmon Gum	Yes	
<i>Eucalyptus salubris</i>	Gimlet	Yes	
<i>Eucalyptus wandoo</i>	Wandoo	Yes	Yes
<i>Pinus pinaster</i>	Pinaster, Maritime Pine		Yes
<i>Pinus radiata</i>	Monterey, Radiata Pine		Yes

Seventeen potential breeding trees (also considered suitable for roosting) were recorded at the site, comprising 15 Marri, one Jarrah and one dead stag (Table 4). One of these trees, the dead stag, which was an indeterminate Eucalypt species, had at least one small hollow. The locations of potential breeding trees within the survey area were recorded using a handheld Global Positioning System (GPS) device with an accuracy of ± 5 metres and mapped (Figure 3). Please note that some trees appear to be outside the site boundary, however this is because of the ± 5 metre accuracy of the handheld GPS.

Table 4: Potential breeding trees recorded at the site

Code	Species	Location GDA 94; Zone 50 H		DBH (mm)	Hollows	Health
		Easting	Northing			
ST01	Dead stag	414851	6456852	680	Yes	Dead
ST02	Marri	414855	6456876	580	No	Good
ST03	Marri	414878	6456885	500	No	Good
ST04	Marri	414887	6456869	1030	No	Stressed
ST05	Marri	414860	6456858	710	No	Good / Slightly stressed
ST06	Marri	414867	6456835	560	No	Good / Slightly stressed
ST07	Marri	414874	6456832	520	No	Good
ST08	Marri	414889	6456831	500	No	Good
ST09	Marri	414900	6456853	500	No	Good / Slightly stressed
ST10	Jarrah	414912	6456821	640	No	Good
ST11	Marri	414933	6456799	990	No	Good
ST12	Marri	414891	6456785	1330	No	Good
ST13	Marri	414879	6456796	560	No	Good
ST14	Marri	414882	6456781	550	No	Good
ST15	Marri	414868	6456754	600	No	Good
ST16	Marri	414858	6456754	900	No	Good
ST17	Marri	414848	6456754	880	No	Good

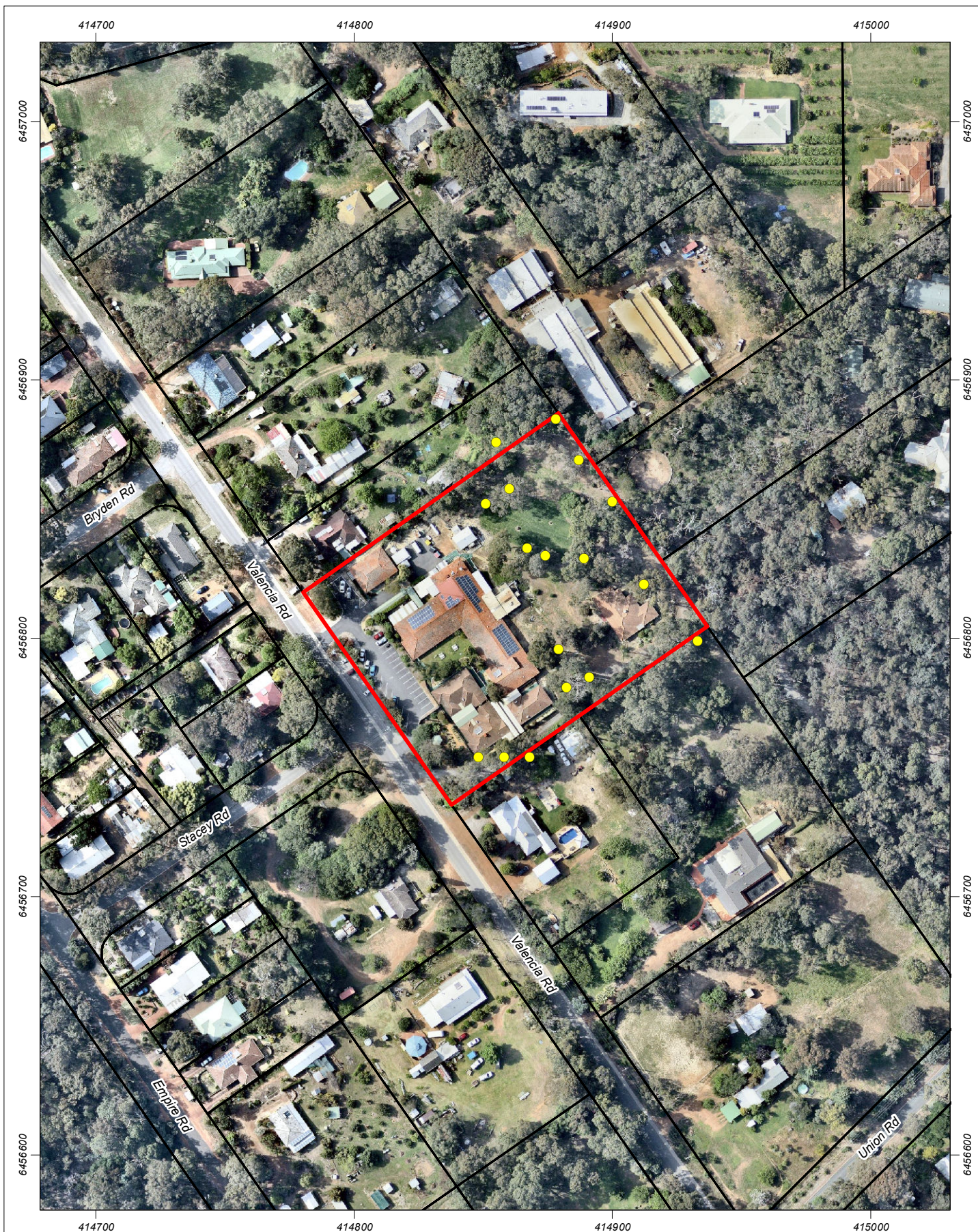
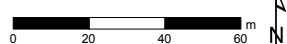


Figure 3: Location of significant trees recorded at the site

Scale 1:2,000 at A4



Coordinate System: GDA 1994 MGA Zone 50
Note that positional errors may occur in some areas
Date: 21/12/2017

Author: JCrute

Source: Aerial image: Nearmap, flown 10/2017.
Existing cadastre: Landgate 04/2017.

Path: Q:\Consult\2017\ADP\ADP17679\01_GIS_documents\ArcMap_documents\ADP17679_G001_RevA.mxd

Legend

- Significant trees
- Survey area
- Existing cadastre

Conclusion

Flora and vegetation

The vegetation type recorded on site does not meet the key diagnostic criteria that defines an area as a Threatened Ecological Community or Priority Ecological Community. Furthermore, there was no visual evidence of Threatened or Priority flora being present at the site at the time of the survey. No Weeds of National Significance or Declared Plants were recorded at the site.

Black cockatoo habitat

The proposal may impact upon potential breeding and foraging habitat of Baudin's, Forest Red-tailed and Carnaby's Black-Cockatoos. There are two relevant Commonwealth policy documents which provide guidance for the evaluation of significant of impacts on Black-Cockatoo species. These are:

1. DSEWPac (2012) EPBC Act 1999: Referral Guidelines for three threatened black-cockatoo species.
2. DEWHA (2009) Matters of National Environmental Significance, Significant Impact Guidelines 1.1.

An evaluation of the proposal against each of these guidelines is provided below. The proposal is assessed against referral triggers identified in the Referral Guidelines for three threatened Black-Cockatoo species Table 5. Following this, an impact assessment of the proposed action on Black-Cockatoo species, with reference to the Significant Impact Guidelines is detailed in Table 6.

Table 5: Assessment of the proposal against the Black-Cockatoo Referral Guidelines

Referral trigger	Assessment of proposal against referral trigger
Clearing of any known nesting tree	No known nesting trees will be impacted by the proposed action. Seventeen trees over 500 mm DBH were recorded at the site. At least one small hollow was observed in one these trees. Approximately 15 of these trees potential breeding trees will be removed for the proposed action, including the tree with hollows.
Clearing or degradation of more than 1 ha of quality foraging habitat	Less than 1 ha of moderate quality foraging habitat is proposed to be cleared.
Clearing or degradation of a known night roosting tree	No known night roosting trees have been recorded within the proposal area (WAPC, 2011).
Creating a gap of more than 4 km between patches of Black Cockatoo habitat	The proposed clearing will not create a gap of more than 4 km. The site is close to existing reserves containing known Black-Cockatoo habitat, including Korung National Park, which is less than 400 m away, and Crown Reserves designated for conservation or recreation, the closest of which abuts the site.
Clearing or disturbance in areas surrounding breeding, foraging or roosting habitat that has the potential to degrade habitat	Less than 1 ha of habitat comprising Completely Degraded vegetation will be impacted by the proposal. This is unlikely to have a significant effect on surrounding areas given the large tracts of good quality habitat in Excellent condition that is available in the nearby Korung National Park and conservation reserves.
Actions that have the potential to increase competitors for nest hollows	The clearing of habitat at the site is unlikely to contribute to an increase in competition for nest hollows as no known breeding hollows have been identified within the survey area.
Actions that have the potential to introduce known plant diseases such as <i>Phytophthora cinnamomi</i> (Dieback)	A dieback survey of the lot has not been undertaken; however, the site supports an area of bushland that has been subject to a range of previous disturbances in developing the existing nursing home.

Table 6: Assessment of potential impacts to Black Cockatoo species against significant impact criteria

Significant Impact Criterion	Comment
Will the action lead to a long-term decrease in the size of a population?	The proposed action will result in the removal less than 1 ha of potential foraging habitat and approximately 15 potential breeding trees for Black-Cockatoos. The proposed clearing should not lead to a long-term decrease in the size of Black-Cockatoo populations because of the large areas of remnant vegetation within the locality and region, the nature of Black-Cockatoo populations, which are highly mobile with extensive ranges and the lack of known breeding trees at the site.
Will the action reduce the area of occupancy of the species?	The site is near existing reserves containing potential Black-Cockatoo habitat, including Korung National Park, which is less than 400 m away, and nearby conservation reserves. As such the proposed action will not reduce the area of occupancy of the species.
Will the action fragment an existing population into two or more populations?	The proposed impact area is less than 1 ha. Given that black cockatoos are highly mobile, this is unlikely to fragment any existing populations.
Will the action adversely affect habitat critical to the survival of a species?	The survey area contains potential foraging habitat for Black-cockatoos. However, there are no known breeding or roosting sites within the site. As such the action will not adversely affect habitat critical to the survival of the species.
Will the action disrupt the breeding cycle of a population?	A total of 17 potential breeding habitat trees have been identified within the survey area of which only one contains hollows. On this basis, the action is not likely to disrupt the breeding cycle of a population.
Will the action result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat?	No.
Will the action introduce disease that may cause the species to decline?	The proposed action will not involve any actions that may cause the introduction of new diseases to Black-cockatoos.
Will the action modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	The loss of habitat because of the proposed action represents only a small portion of the potential habitat available near the proposed clearing. Black-cockatoos are highly mobile species; therefore, the proposed action will not present a barrier to movement across the region.
Will the action interfere with the recovery of the species?	The proposed action is unlikely to interfere with the recovery of Black-cockatoo species as suitable habitat is retained in existing reserves nearby, including Korung National Park, which is less than 400 m away, and nearby conservation reserves.

Based on the assessment outcomes provided in Tables 4 to 6, providing an assessment of significance against current guidelines, the clearing of less than 1 ha of remnant vegetation at the site is unlikely to be considered as a significant impact and warrant referral under the EBPC Act.

1.2 References

- Department of Biodiversity, Conservation and Attractions (DBCA) 2017, *NatureMap: Mapping Western Australia's Biodiversity (custom search)*. Available online at <http://naturemap.dec.wa.gov.au./default.aspx>.
- Department of Environment and Energy (DEE) 2016, *Species Profiles and Threats Database*, [Online], Australian Government. Available online at <http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl> [18 December 2017].
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- Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) 2012 *Environment Protection and Biodiversity Conservation Act 1999 referral guidelines for three black cockatoo species: Carnaby's cockatoo (endangered) Calyptorhynchus latirostris, Baudin's cockatoo (vulnerable) Calyptorhynchus baudinii, Forest red-tailed black cockatoo (vulnerable) Calyptorhynchus banksii naso*, Australian Government, Canberra.
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