

# PROPOSED BRIDGE AND ROAD UPGRADE, RAILWAY PARADE, UPPER SWAN

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## BLACK COCKATOO HABITAT ASSESSMENT

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The logo for PGV Environmental is located at the bottom of the page. It features the letters 'PGV' in a large, bold, white sans-serif font. Below 'PGV', the word 'ENVIRONMENTAL' is written in a smaller, white, all-caps sans-serif font. The background of the bottom half of the page is a vibrant orange with a subtle, curved white line that sweeps across the width of the page, creating a sense of movement and design.

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# 1 INTRODUCTION

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## 1.1 Background

The City of Swan is developing rapidly and as a result an alternative transport route west from new developments in The Vines, Ellenbrook and Aveyley areas is becoming increasingly a priority. In creating a new route the City of Swan proposes to upgrade the road on Railway Parade from Apple Street to Maralla Road, construct a bridge on Railway Parade over the Ellen Brook in Upper Swan and upgrade Apple Street from Railway Parade to Great Northern Hwy (Figure 1).

The requirement for road upgrades and a bridge crossing over Ellen Brook has been identified by the WAPC in approving nearby subdivisions in The Vines area. The bridge and roadway on Railway Parade and Apple Street are to be two lanes and constructed to withstand loads in accordance with a Network 1 road.

The site extends from the Great Northern Highway to the south east, along Apple Street. The site then extends from the intersection of Apple Street and Railway Parade north along Railway Parade to Ellen Brook. At Ellen Brook the proposed bridge will cross over and then the road extends north through a wetland area and then to the intersection of Railway Parade and Maralla Road (Figure 2).

An Environmental Assessment undertaken for the area by PGV Environmental in 2013 identified three species of Black Cockatoo that could potentially be found on the site. The three species of Black Cockatoos are listed as Matters of National Environmental Significance under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

These are:

- Carnaby's Cockatoo (*Calyptorhynchus latirostris*) (Endangered);
- Forest Red-Tailed Black Cockatoo (*Calyptorhynchus banksii naso*) (Vulnerable); and
- Baudin's Cockatoo (*Calyptorhynchus baudinii*) (Vulnerable).

## 1.2 Scope of Works

The Black Cockatoo Habitat Assessment has been prepared to:

- Describe the Black Cockatoo habitat on the site;
- Assess the impact of the proposed road and bridge construction on the Black Cockatoos;
- Ascertain whether referral of the proposed bridge and road construction is required under the EPBC Act; and
- Make recommendations on mitigating any impact on Black Cockatoo species.

## 2 BLACK COCKATOOS

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### 2.1 Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*)

Carnaby's Cockatoo is found in the south-west of Australia from Kalbarri through to Ravensthorpe. It has a preference for feeding on the seeds of *Banksia*, *Dryandra*, *Hakea*, *Eucalyptus*, *Grevillea*, *Pinus* and *Allocasuarina* spp. It is nomadic often moving toward the coast after breeding. It breeds in tree hollows that are 2.5 – 12m above the ground and have an entrance 23-30cm with a depth of 1-2.5m. Nesting mostly occurs in smooth-barked trees (e.g. Salmon Gum, Wandoo, Red Morrell). Eggs are laid from July to October, with incubation lasting 29 days (DoE, 2013).

The site is within the modelled distribution for this species on the edge of the breeding and non-breeding ranges (SEWPaC, 2012a).

### 2.2 Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*)

Forest Red-tailed Black Cockatoos frequent the humid to sub-humid south-west of Western Australia from Gingin in the north, to Albany in the south and west to Cape Leeuwin and Bunbury (SEWPaC, 2012a). It nests in tree hollows with a depth of 1-5m, that are predominately Marri (*Corymbia calophylla*), Jarrah (*Eucalyptus marginata*) and Karri (*E. diversicolor*) and it feeds primarily on the seeds of Marri and Jarrah (Johnstone and Kirkby, 2011).

The site is within the modelled distribution for this species (SEWPaC, 2012a).

### 2.3 Baudin's Black Cockatoo (*Calyptorhynchus baudinii*)

This species is most common in the far south-west of Western Australia. It is known to breed from the southern forests north to Collie and east to near Kojonup. Baudin's Black Cockatoo is typically found in vagrant flocks and utilises the taller, more open Jarrah and Marri woodlands, where it feeds mainly on Marri seeds and various Proteaceous species (Johnstone and Kirkby, 2011).

The site is outside of the modelled distribution for Baudin's Black Cockatoos and therefore habitat specific to this species has not been investigated further in this assessment (SEWPaC, 2012a ; Garnett *et al.*, 2011).

### 3 METHODOLOGY

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The methodology to assess Black Cockatoo Habitat is contained in *EPBC Act referral guidelines for three threatened black cockatoo species: Carnaby's cockatoo (endangered) Calyptorhynchus latirostris Baudin's cockatoo (vulnerable) Calyptorhynchus baudinii Forest red-tailed black cockatoo (vulnerable) Calyptorhynchus banksii naso* (SEWPaC, 2012b) and outlined in the SPRAT Database for each of the Black Cockatoo species for Black Cockatoo Habitat Assessments.

A site visit was undertaken by PGV Environmental on 27 September 2013. The site was traversed on foot and information on black cockatoo foraging, roosting and breeding habitat was assessed.

The extent, type and quality of the vegetation present, including the presence and extent of plants known to be used by Black Cockatoos was investigated for this assessment using the results of flora and vegetation studies undertaken concurrently on the site (PGV Environmental, 2014). The quality of the vegetation was ascertained in the context of foraging habitat for Black Cockatoos. During the site visit a search for feeding signs or feeding debris such as 'chewed' Banksia cones and Jarrah nuts was undertaken.

The site was also searched for evidence of roosting including areas of droppings, moulted feathers, feather down or clippings from branches under trees.

Breeding habitat is defined in the Referral Guidelines as trees of species known to support breeding within the range of the species which either have a suitable nest hollow OR are of a suitable diameter at breast height (DBH) to develop a nest hollow. For most tree species, suitable DBH is 500 mm. The Significant Tree Survey component of this assessment was undertaken to identify trees within the site that have a DBH greater than 500mm. The location, species, tree trunk diameter at breast height (DBH) and any other important descriptive information about each tree located within the site was recorded.

## 4 BLACK COCKATOO HABITAT

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### 4.1 Habitat definitions

'Foraging habitat' for Carnaby's Black Cockatoos is determined from the plant species that are present on the site and evidence of feeding such as direct observation of birds or by chewed nuts and cones. 'Roosting habitat' is usually evident due to the presence of the cockatoos on the site in the evening and early morning and of scat under the roosting area. 'Breeding habitat' is defined as trees of species known to support breeding within the range of the species which either have a suitable nest hollow OR are greater than 500mm DBH.

### 4.2 Vegetation Descriptions

A Level 2 Flora and Vegetation Survey was undertaken on the site in 2013 (PGV Environmental, 2014). The vegetation types recorded on the site were:

- **CcAs** *Corymbia calophylla* (Marri) Low Open Woodland over *Acacia saligna* Closed Heath
- **Cc** *Corymbia calophylla* (Marri) Low Woodland over *Watsonia bulbifera* Closed Herbland
- **Js** *Jacksonia sternbergiana* Tall Open Shrubland over *Grevillea*
- **Er** *Eucalyptus rudis* (Flooded Gum) Low Woodland over *Watsonia bulbifera* Closed Herbland
- **ErMr** *Eucalyptus rudis/Melaleuca raphiophylla* Low Open Woodland over weeds
- **Ba** *Banksia attenuata* Low Open Woodland over weeds
- **Nf** *Nuytsia floribunda* (WA Christmas Tree) Low Open Woodland over mixed shrubs and herbs

The vegetation condition assessed by PGV Environmental (2013) according to the system devised by Keighery and described in Bush Forever (Government of Western Australia, 2000a) (Table 1).

**Table 1: Vegetation Condition Rating Scale**

Condition	Description
Pristine	Pristine or nearly so, no obvious signs of disturbance.
Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species.
Very Good	Vegetation structure altered, obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbance. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and grazing.

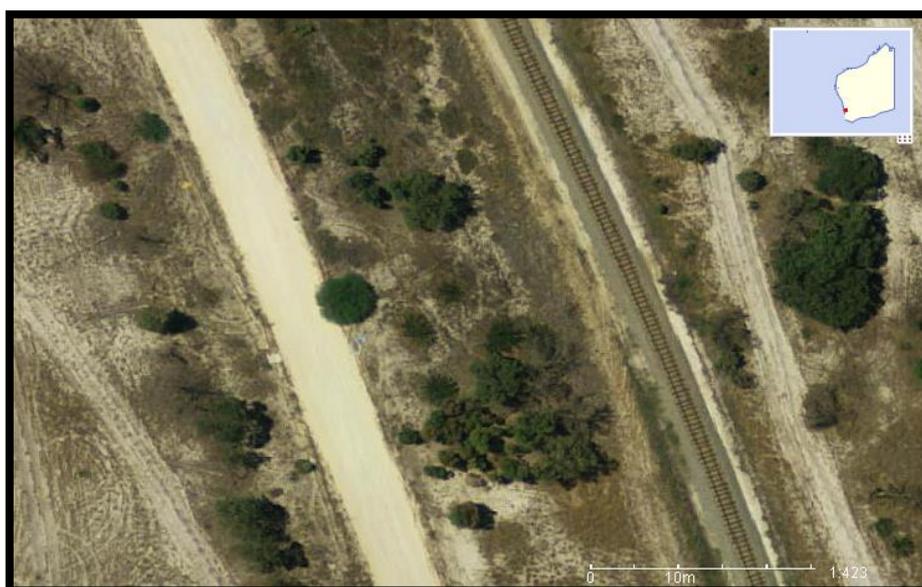
Condition	Description
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.
Completely Degraded	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees or shrubs.

Source: Government of Western Australia, 2000.

The road reserve along Apple Street was almost all Completely Degraded with the small area of *Acacia saligna* mapped as Degraded. The section of Railway Parade to the south of Ellen Brook was rated as Degraded. The vegetation on the banks of Ellen Brook were classified as Completely Degraded as was the vegetation on the wetland to the north of Ellen Brook, including the wetland. The *Banksia attenuata* woodland to the north of the wetland was classified as Completely Degraded and the area of *Nuytsia floribunda* Woodland near the intersection with Maralla Road was classified as Good.

The area to the north of Ellen Brook was burnt on 27 February 2013 which has impacted on the vegetation (Plate 1 and 2).

**Plate 1: Aerial Photography from January 2013 (Landgate, 2014)**



**Plate 2: Aerial Photography from November 2013 (Landgate, 2014)**



### **4.3 Foraging**

The Level 2 Flora and Vegetation Survey (PGV Environmental, 2014) identified nine native species recorded on the site that are recognised as foraging habitat for Black Cockatoos (Valentine and Stock, 2008; Groom, 2010). These are:

- Orange Wattle (*Acacia saligna*);
- Harsh Hakea (*Hakea prostrata*);
- Marri (*Corymbia calophylla*);
- Candle Stick Banksia (*Banksia attenuata*);
- Firewood Banksia (*Banksia menziesii*);
- Swamp Banksia (*Banksia littoralis*);
- Couch Honey-pot (*Banksia dallanneyi*);
- Grass Tree (*Xanthorrhoea preissii*); and
- Grey Stinkwood (*Jacksonia furcellata*).

Four of the vegetation types have foraging species as one of the main components in the vegetation. There are small areas of native vegetation along Apple Street that is dominated by *Acacia saligna* and another small area containing *Xanthorrhoea preissii* and another with Marri (*Corymbia calophylla*) which is considered to be foraging habitat (Plate 3, 4 and 5).

**Plate 3: *Acacia saligna* on Apple Street**



**Plate 4: *Xanthorrhoea preissii* on Apple Street**



**Plate 5: Marri (*Corymbia calophylla*) on Railway Parade**



The *Banksia attenuata* woodland is fire impacted vegetation (Plate 6).

**Plate 6: *Banksia attenuata* Woodland**



The majority of the site is Completely Degraded and does not contain foraging habitat. The scattered Marris (*Corymbia calophylla*) and areas dominated by *Acacia saligna*, *Xanthorrhoea preissii* and *Banksia attenuata* covers a total area of 0.98ha.

There are no guidelines that specify what constitutes ‘quality’ foraging habitat apart from stating that it refers to the use of the habitat by Black Cockatoos rather than the overall quality of the vegetation which would normally be described using understorey as well as tree canopy. To rate the quality of the foraging habitat on the site the matrix prepared by PGV Environmental was used (Table 2).

**Table 2: Foraging Value Rating Matrix**

Vegetation Type	Vegetation Condition	Foraging Observed	Foraging Value
<b>High Resource</b> eg. Banksia woodland Marri Woodland mixed Jarrah/Banksia mixed Jarrah/Marri	VG-E	Y	Excellent
		N	Very Good
	G	Y	Very Good
		N	Good
	D-CD	Y	Good
		N	Good
<b>Medium Resource</b> eg. Jarrah woodland Parrot Bush Heath	VG-E	Y	Very Good
		N	Good
	G	Y	Good
		N	Poor
	D-CD	Y	Good
		N	Poor
<b>Low Resource</b> eg. Mixed Tuart/Jarrah Woodland Tuart woodland Flooded Gum woodland	VG-E	Y	Good
		N	Poor
	G	Y	Good
		N	Poor
	D-CD	Y	Good
		N	Poor

There was no evidence of foraging on the site. The *Acacia saligna* and *Xanthorrhoea preissii* vegetation is considered a Low Resource and were in Degraded condition. The foraging value of this vegetation is rated as Poor using the foraging value rating matrix as outlined in Table 2. The *Banksia* Woodland and Marri dominated vegetation is classified as a High Resource and is in Degraded condition. The foraging value of these vegetation types was classified as Good.

The total canopy cover of Poor foraging habitat on the site is approximately 0.89ha. The Good foraging habitat has a total canopy cover of approximately 0.09ha.

#### 4.4 Roosting

There were some *Eucalyptus rudis* trees recorded immediately to the north of Ellen Brook which are listed as a roosting species for Black Cockatoos (Groom, 2011) but there was no evidence of roosting such as droppings, moulted feathers, feather down or clippings from branches under the trees. There was also no evidence of Black Cockatoos roosting in the Marri trees on the site.

The site does not contain a known roosting site (DoP, 2011). The closest known roosting site is located approximately 2.1km to the west of the northern part of the site in The Vines (DoP, 2011).

#### **4.5 Breeding**

Black cockatoos are known to breed in hollows of large eucalypts. The site is not known as a breeding site (DoP, 2011) and the nearest known breeding site for Carnaby's Black Cockatoos is approximately 12km to the north-east of the site on the Darling Scarp.

The site contains eight Marri (*Corymbia calophylla*) trees that are classified as potential breeding habitat (known species that can be breeding habitat with a DBH greater than 500mm). None of these trees contained hollows. The details of these trees are in Appendix 1 and are shown on Figure 2. No evidence of breeding was observed on-site by PGV Environmental in 2013.

#### **4.6 Regional Context**

There are six Bush Forever sites within 5km of the site and a National Park with a total area of almost 3,000ha. These are described below and five contain vegetation that would be considered to be habitat for Black Cockatoos.

##### **4.6.1 Bush Forever Site 300**

Bush Forever Site 300 (Maralla Road Bushland, Ellenbrook/Upper Swan) runs through the proposed road and bridge alignment and in this area is associated with Ellen Brook. The Bush Forever Site consists of 641.5ha and is mostly vegetation associated with wetlands. The uplands in the site are generally Banksia woodlands (Government of Western Australia, 2000).

##### **4.6.2 Bush Forever Site 301**

Bush Forever Site 301 (Ellenbrook Nature Reserve and Adjacent Bushland, Upper Swan) is 320m to the east of the site and is made up of 63.6ha of woodlands of *Corymbia calophylla* with scattered *Eucalyptus rudis* (Government of Western Australia, 2000).

##### **4.6.3 Bush Forever Site 302**

Bush Forever Site 302 (Swan River and Jane Brook, Ashfield to Upper Swan) is 227.3ha and is located approximately 1.8km to the south of the proposed road and bridge site. The site contains woodlands of *Eucalyptus rudis*, *Eucalyptus wandoo*, *Corymbia calophylla* and *Eucalyptus marginata* which are all habitat trees for Black Cockatoos (Government of Western Australia, 2000).

##### **4.6.4 Bush Forever Site 400**

Bush Forever Site 400 (Twins Swamps Nature Reserve and Adjacent Bushland, Bullsbrook) is located 1.7km to the north and is 170.7ha. The site has only had a limited survey but the upland vegetation mainly consists of woodland to open forest of *Banksia attenuata* and *Banksia menziesii* (Government of Western Australia, 2000).

##### **4.6.5 Bush Forever Site 296**

Bush Forever Site 296 (Ellen Brook, Upper Swan) is approximately 1.4km to the east. The Bush Forever Site is 44.1ha which has vegetation mapped as *mostly Melaleuca dominated* with *Eucalyptus*

*rudis*. This Bush forever site contains minimal habitat except roosting for Black Cockatoos (Government of Western Australia, 2000).

#### **4.6.6 Bush Forever Site 412**

Bush Forever Site 412 (Walyunga Road Bushland, Bullsbrook) consists of 44.5ha, Bush Forever Site 348 is located 2.7km to the east of the site. The vegetation in this Bush Forever site is described as *Eucalyptus marginata* woodland, *Eucalyptus wandoo* woodland with *Corymbia calophylla* Woodland and *Banksia sessilis* Open Shrubland (Government of Western Australia, 2000).

#### **4.6.7 Walyunga National Park**

Walyunga National Park is approximately 1,800ha in size and covers a large part of the Darling Scarp. This area typically provides habitat for Black Cockatoos.

## 5 SIGNIFICANCE TEST

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### 5.1 Significant Impact Guidelines 1.1

The site contains 0.09ha of Good Foraging habitat and 0.89ha of Poor Foraging Habitat and eight potential breeding habitat trees. All of this habitat could potentially be cleared as a result of the road upgrade and bridge construction.

The significance of the impact, according to the Significant Impact Guidelines 1.1, depends on the sensitivity, value and quality of the environment and the intensity, duration, magnitude and geographic extent of the impacts. The significant impact criteria for listed flora and fauna species and ecological communities depend on the category of listing, eg. Endangered, Vulnerable or Migratory.

#### 5.1.1 Forest Red-Tail Cockatoo

Assessment of the impact of clearing on Forest Red-tail Cockatoos against the criteria set out in these Guidelines for a significant impact on a Vulnerable species is made out below:

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

An important population is defined in the *Significant Impact Guidelines 1.1* as “a population that is necessary for a species’ long-term survival and recovery” and may be “key source populations either for breeding or dispersal, populations that are necessary for maintaining genetic diversity, and/or populations that are near the limit of the species’ range”.

Forest Red-tail Cockatoos occur in the humid and sub-humid zones in south-west Western Australia extending from north of Gingin to east of Albany. They predominantly occur in forested areas but also occur on the Swan Coastal Plain. The site also has limited preferred foraging habitat for this species with a small number of Marri trees only. The small number of birds that would use the site for foraging is not considered to meet the criteria for an important population. Therefore, the proposed development of the site would not result in this outcome.

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

The small population that could use the site is not considered to meet the criteria for an important population. Therefore, the proposed development on the site would not result in this outcome.

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

The small population that could forage on the site is not considered to meet the criteria for an important population. Therefore, the proposed development on the site would not result in this outcome.

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

Forest Red-tail Cockatoos do not breed on the site. The 0.98ha of Poor and Good foraging habitat are not considered to be critical to the survival of the species. Therefore, the proposed construction of the road and bridge on the site would not result in this outcome.

- *disrupt the breeding cycle of an important population*

Forest Red-tail Cockatoos do not breed on the site. It is considered that the proposed development on the site would not result in this outcome.

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

There is quality foraging habitat to the north with six Bush Forever Sites and Walyunga National Park within a 5km radius of the site contain both foraging and potential breeding habitat. Therefore clearing the limited foraging habitat on the site would not cause the species to decline.

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

Clearing for the proposed road and bridge would not result in invasive species being introduced. Therefore, development on the site would not result in this outcome.

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

Clearing for the construction of the road and bridge with the implementation of appropriate hygiene standards during vegetation clearing, would not result in disease being introduced. Therefore, development on the site would not result in this outcome.

- *interfere substantially with the recovery of the species*

The population that would use the site, if any, is very small in comparison to the geographic distribution of the species, and is not an important population. Therefore any clearing of habitat on the site would not interfere substantially with the recovery of the species.

The conclusion in this assessment in accordance with the criteria set out in Significant Impact Guidelines 1.1 is that the construction of the road and bridge would not have a significant impact on Forest Red-tail Cockatoos.

### **5.1.2 Carnaby's Black Cockatoo**

Assessment of the impact of clearing on Carnaby's Cockatoos against the criteria set out in these Guidelines for a significant impact on an Endangered species is below:

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

The clearing of 0.89ha of Poor and 0.09ha of Good foraging habitat on the site is highly unlikely to impact on the whole population of Carnaby's Cockatoos such that it will lead to a long-term decrease in the size of the population. Therefore, the proposed construction of the bridge and road would not result in this outcome.

- *Reduce the area of occupancy of the species*

There is 0.98ha of foraging habitat on the site but no evidence of recent foraging and no records or evidence of this species roosting or breeding on the site therefore the level of occupancy on the site

is considered to be very low. Therefore, the proposed construction of the bridge and road would not result in this outcome.

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

Clearing of the site is unlikely to fragment the populations into sub-populations as the level of occupancy on the site is considered to be very low. Therefore, the clearing for the proposed construction of the bridge and road would not result in this outcome.

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

Carnaby's Cockatoos do not breed on the site. The 0.98ha of foraging habitat on the site is considered to be Poor to Good and there is almost 3,000ha of foraging habitat in six Bush Forever sites and Walyunga National Park within a 5km radius and therefore the habitat on the site is not critical to the survival of the species. Therefore, the proposed construction of the bridge and road would not result in this outcome.

- *Disrupt the breeding cycle or a population*

Carnaby's Cockatoos do not breed on the site nor within close proximity. Therefore, the proposed construction of the bridge and road would not result in this outcome.

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

The site has limited quality foraging habitat and no records of this species roosting or breeding on the site therefore the level of occupancy on the site is considered to be very low such that clearing of vegetation would not cause the species to decline.

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

Clearing would not result in invasive species being introduced that would be harmful to Carnaby's Black Cockatoos. Therefore, the proposed construction of the bridge and road would not result in this outcome.

- *Introduce disease that may cause the species to decline*

Clearing for the proposed development with the implementation of appropriate hygiene standards during vegetation clearing, would not result in disease being introduced. Therefore, the proposed construction of the bridge and road would not result in this outcome.

- *Interfere with the recovery of the species*

The population that would use the site is very small in comparison to the geographic distribution of the species, and is not an important population. Therefore any clearing of habitat on the site would not interfere with the recovery of the species

The conclusion in this assessment in accordance with the criteria set out in Significant Impact Guidelines 1.1 is that the proposed construction of the road and bridge would not have a significant impact on Carnaby's Cockatoos.

## **5.2 Black Cockatoo Referral Guidelines**

The EPBC Act referral guidelines for three threatened black cockatoo species: Carnaby's cockatoo (endangered) *Calyptorhynchus latirostris* Baudin's cockatoo (vulnerable) *Calyptorhynchus baudinii* and Forest red-tailed black cockatoo (vulnerable) *Calyptorhynchus banksii naso* (SEWPaC, 2012b) (Black Cockatoo Guidelines) contain several steps to determine whether a referral is required or not. These steps are:

- The definition of habitat (breeding, roosting and foraging – Table 1);
- A description of the type of action that may have a high or low risk of being a significant impact and therefore require referral (Table 3);
- Formulation of a mitigation strategy to reduce the scale of impact; and
- A flowchart to assist in decision making on whether an action should be referred or not.

### **5.2.1 Step 1: Black Cockatoo Habitat**

The first step is to determine whether the site contains habitat for any of the three listed Black Cockatoos. There is 0.89ha of Poor and 0.09ha of Good Quality foraging habitat. There is no recorded roosting or breeding on the site and limited potential breeding habitat (8 trees).

### **5.2.2 Step 2: Level of Impact**

#### *Foraging*

According to Table 3 in the Black Cockatoo Referral Guidelines the clearing of more than 1ha of quality foraging habitat has a high risk of causing a significant impact. Degradation of more than 1ha of quality habitat by such things as altered hydrology or fire regimes has an uncertain risk. The significance of degradation depends on the type of degradation and the quality of the habitat.

The foraging habitat on the site consists of approximately 0.89ha of Poor and 0.09ha of Good foraging habitat, therefore in accordance with the guidelines, clearing is not likely to have a high risk of a significant impact.

#### *Breeding*

According to Table 3 in the Black Cockatoo Referral Guidelines the clearing of any known nesting tree has a high risk of being a significant impact. Any known nesting tree is defined in the Black Cockatoo Referral Guidelines as any existing tree in which breeding has been recorded or suspected. No known nesting trees occur on the site therefore there is no risk of a significant impact on a known nesting tree.

The Black Cockatoo Guidelines also consider that the clearing of any part or degradation of breeding habitat is likely to have a high risk of a significant impact. Breeding habitat is defined in Table 1 of the Black Cockatoo Guidelines as any patch of woodland or forest that contains live or dead trees of certain species with either a diameter at breast height greater than 500mm or the presence of

suitable nest hollows. Marri trees are considered potential breeding habitat in the Black Cockatoo Guidelines.

Importantly the Black Cockatoo Guidelines state that breeding habitat predominantly applies to those areas within the breeding range of the Black Cockatoo species as shown in the maps attached to the Guidelines. The site is identified on the maps as being on the edge of the breeding range of Carnaby's Black Cockatoo species.

According to the Black Cockatoo Guidelines, the definition of breeding habitat outside the known breeding range still applies *unless proven otherwise* (our italics). By definition, a tree can only be breeding habitat if it contains a hollow large enough for a Black Cockatoo to enter and form a nest. No trees on the site had hollows identified during habitat assessment. No evidence of breeding now or in the past has been observed in any of the hollows. Therefore these trees are highly unlikely to be breeding habitat. The risk of a significant impact is considered Low.

### *Roosting*

The Black Cockatoo Referral Guidelines consider the clearing of a known roosting site as a high risk of being a significant impact. No roosting site is mapped on the site (DoP, 2011) and no evidence of roosting was observed during the survey. The closest mapped roosting site is approximately 2.1km away. The risk of a significant impact on a known roosting site is considered to be Low.

### **5.2.3 Step 3: Mitigation**

The Black Cockatoo Guidelines allow the consideration of a mitigation strategy in the determination of the level of impact and requirement to refer. Application of best practice mitigation strategy may reduce the level of impact and therefore the risk of a significant impact. Mitigation strategies including avoiding impact, managing impact so that there is no net decline in habitat, and monitoring the effectiveness of mitigation.

Retention of native vegetation and trees within the road reserve including some of the potential breeding habitat trees will reduce any potential impact on Black Cockatoos.

### **5.2.4 Step 4: Referral Advice**

Application of the Decision Making flowchart in Figure 1 of the Black Cockatoo Referral Guidelines is shown in sequence below as applied to the whole site.

- 1 Could the impacts of your action occur within the modelled distribution of the black cockatoos? – YES
- 2 Could the impacts of your action affect any black cockatoo habitat or individuals? - YES
- 3 Have you surveyed for black cockatoo habitat using the recommended methods? – YES
- 4 Could your action have an impact on black cockatoos or their habitat? – YES
- 5 Is your impact mitigation best practice so that it may reduce the significance of your impacts on black cockatoos? – YES (if required)
- 6 Could your action require a referral to the federal environment minister for significant impacts on black cockatoos? –LOW risk for foraging, breeding and roosting habitat.

RESULT – Referral Not Required.

## 6 SUMMARY AND CONCLUSION

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The potential for Black Cockatoo species to occur on the site was investigated with Carnaby's Black Cockatoos and Forest Red-tailed Black Cockatoos considered likely to visit the site. Baudin's Black Cockatoos were not investigated as the site is outside of the modelled distribution of this species and it is highly unlikely to be present on the site.

The field survey of the site did not identify any evidence of foraging on the site. The breeding and potential breeding habitat was limited to eight Marri trees with a diameter at breast height greater than 500mm but no hollows have formed as yet. No evidence of breeding on the site has been recorded and there was no evidence that the site was used as roosting habitat.

The proposed construction of the road and bridge could, at worst case scenario remove approximately 0.09ha of Good Foraging habitat and 0.89ha of Poor Foraging Habitat, the loss of some potential roosting habitat and seven potential breeding habitat trees. The proposed construction of the road and bridge could retain some of the potential breeding habitat trees as well as some of the vegetation that is rated as Good quality foraging habitat on the site.

PGV Environmental considers the clearing for the proposed road and bridge construction would have a Low risk of a significant impact on Black Cockatoo species and in accordance with the referral guidelines, referral to the Department of the Environment under the EPBC Act is not required.

## 7 REFERENCES

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# FIGURES



N

0 50 100 150 200 250m

SCALE 1 : 7 500 at A3 (MGA)

**Legend**

- Site Boundary
- Cadastral Boundary
- - - Easement Boundary
- Topographic Contour

CADASTRAL SOURCE: Landgate, February 2013.  
 AERIAL PHOTOGRAPH SOURCE: NearMap, flown January 2013.  
 CONTOURS SOURCE: Landgate, 1:50,000 Topographic Mapping.

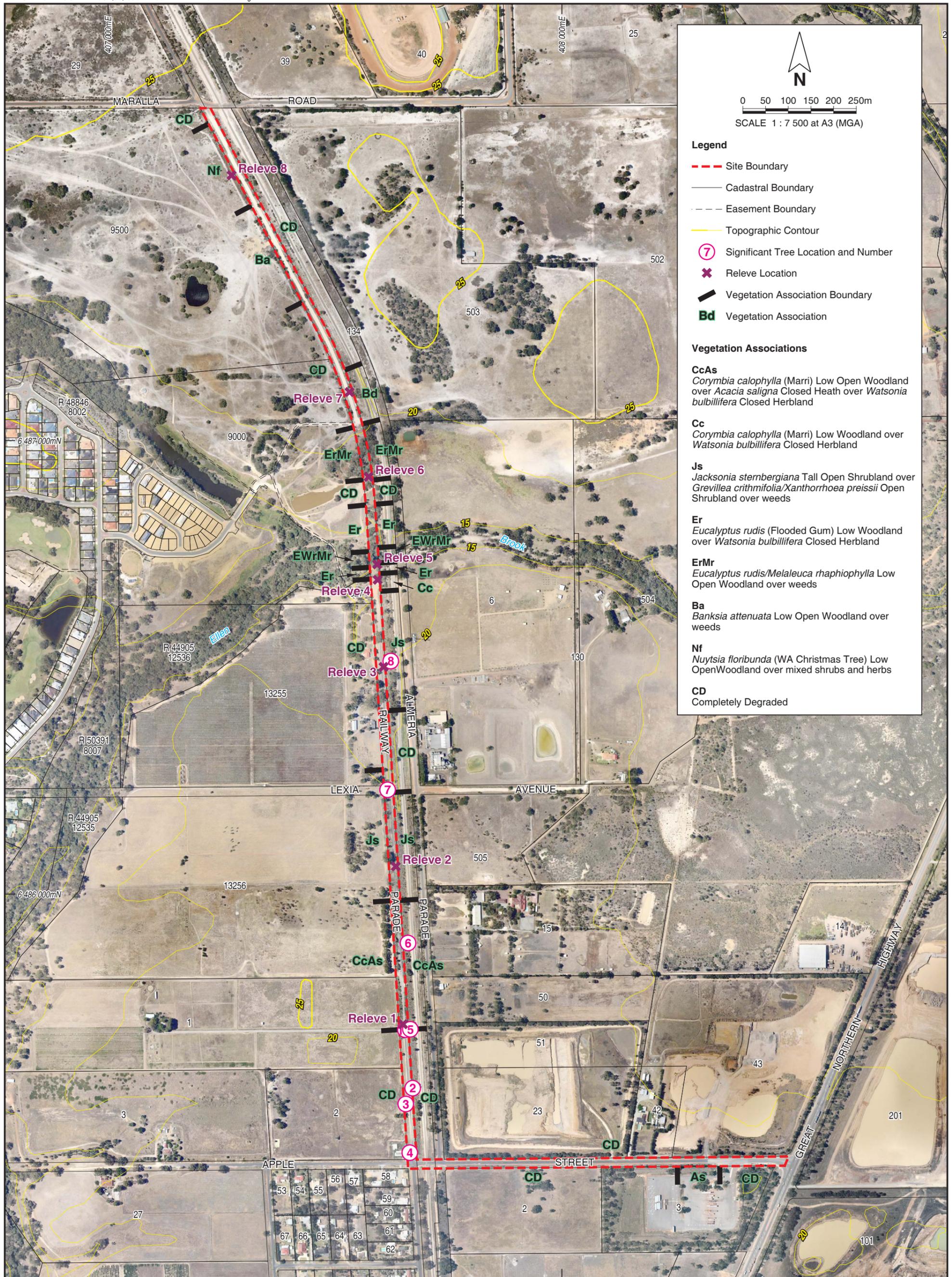
**pgv** ENVIRONMENTAL

Drawn: J. Hams	Date: 9 May 2014
Job: 10112 Rpt: 2014-128	Revision: A

City of Swan  
 BLACK COCKATOO HABITAT ASSESSMENT  
 PROPOSED BRIDGE AND ROAD UPGRADE, RAILWAY PARADE, UPPER SWAN

**SITE LOCATION AND TOPOGRAPHY**

**Figure 1**





N



SCALE 1 : 7 500 at A3 (MGA)

**Legend**

- Site Boundary
- Cadastral Boundary
- Easement Boundary
- Topographic Contour
- ⑦ Significant Tree Location and Number
- ✕ Revele Location
- ▬ Vegetation Association Boundary
- Bd** Vegetation Association

**Vegetation Associations**

**CcAs**  
*Corymbia calophylla* (Marri) Low Open Woodland over *Acacia saligna* Closed Heath over *Watsonia bulbiflora* Closed Herbland

**Cc**  
*Corymbia calophylla* (Marri) Low Woodland over *Watsonia bulbiflora* Closed Herbland

**Js**  
*Jacksonia sternbergiana* Tall Open Shrubland over *Grevillea crithmifolia*/*Xanthorrhoea preissii* Open Shrubland over weeds

**Er**  
*Eucalyptus rudis* (Flooded Gum) Low Woodland over *Watsonia bulbiflora* Closed Herbland

**ErMr**  
*Eucalyptus rudis*/*Melaleuca raphiophylla* Low Open Woodland over weeds

**Ba**  
*Banksia attenuata* Low Open Woodland over weeds

**Nf**  
*Nuytsia floribunda* (WA Christmas Tree) Low Open Woodland over mixed shrubs and herbs

**CD**  
 Completely Degraded

CADASTRAL SOURCE: Landgate, February 2013.  
 AERIAL PHOTOGRAPH SOURCE: NearMap, flown January 2013.  
 CONTOURS SOURCE: Landgate, 1:50,000 Topographic Mapping.

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**VEGETATION ASSOCIATIONS AND SIGNIFICANT TREES**

**Figure 2**

**APPENDIX 1**  
**Significant Tree Survey Results**

Tree Number	Species	Easting MGA zn50	Northing MGA zn50	Photo Number	Height	Diameter	Second Branch	Notes (hollows, bees etc.)
1	Marri ( <i>Corymbia calophylla</i> )	407655	6485701	6068	10	550		No Hollows, Good Condition
2	Marri ( <i>Corymbia calophylla</i> )	407671	6485572	6069	9	700	30	No Hollows, Good Condition
3	Marri ( <i>Corymbia calophylla</i> )	407656	6485537	6070	9	550		No Hollows, Good Condition
4	Marri ( <i>Corymbia calophylla</i> )	407665	6485430	6071	8	700		No Hollows, Poor Condition
5	Marri ( <i>Corymbia calophylla</i> )	407666	6485702	6073	10	500		No Hollows, Good Condition
6	Marri ( <i>Corymbia calophylla</i> )	407661	6485892	6077	10	500		No Hollows, Good Condition
7	Marri ( <i>Corymbia calophylla</i> )	407616	6486230	6080	8	5600		No Hollows, Good Condition
8	Marri ( <i>Corymbia calophylla</i> )	407623	6486514	6083	8	700		No Hollows, Good Condition



Tree 1



Tree 2



Tree 3



Tree 4



Tree 5



Tree 6



Tree 7



Tree 8