



## CLEARING PERMIT

*Granted under section 51E of the Environmental Protection Act 1986*

<b>Purpose Permit number:</b>	CPS 9237/1
<b>Permit Holder:</b>	Shire of Augusta-Margaret River
<b>Duration of Permit:</b>	From 15 January 2022 to 15 January 2037

The permit holder is authorised to clear *native vegetation* subject to the following conditions of this permit.

### **PART I – CLEARING AUTHORISED**

#### **1. Clearing authorised (purpose)**

The permit holder is authorised to clear native vegetation for the purpose of road construction or upgrades.

#### **2. Land on which clearing is to be done**

Cowaramup Bay Road reserves (PINs 11476612, 11139300, 11476657, 11476658), Cowaramup  
Unnamed road reserves (PINs 11476661, 11476659), Cowaramup  
Lot 5266 on Deposited Plan 220451 (Crown Reserve R 47049), Cowaramup

#### **3. Clearing authorised**

The permit holder must not clear more than 1.5 hectares of native vegetation within the area cross-hatched yellow in Figure 1(a), Figure 1(b), Figure 1(c), Figure 1(d), Figure 1(e), Figure 1(f) and Figure 1(g) of Schedule 1.

#### **4. Period during which clearing is authorised**

The permit holder must not clear any *native vegetation* after 15 January 2027.

## **PART II – MANAGEMENT CONDITIONS**

### **5. Avoid, minimise, and reduce impacts and extent of clearing**

In determining the *native vegetation* authorised to be cleared under this permit, the permit holder must apply the following principles, set out in descending order of preference:

- (a) avoid the clearing of *native vegetation*;
- (b) minimise the amount of *native vegetation* to be cleared; and
- (c) reduce the impact of clearing on any environmental value.

### **6. Weed and dieback management**

When undertaking any clearing authorised under this permit, the permit holder must take the following measures to minimise the risk of introduction and spread of *weeds* and *dieback*:

- (a) clean earth-moving machinery of soil and vegetation prior to entering and leaving the area to be cleared;
- (b) ensure that no known *dieback* or *weed*-affected soil, *mulch*, *fill*, or other material is brought into the area to be cleared; and
- (c) restrict the movement of machines and other vehicles to the limits of the areas to be cleared.

### **7. Fauna management – western ringtail possums and south-western brush-tailed phascogales**

- (a) In relation to the area cross-hatched yellow in Figure 1(a), Figure 1(b), Figure 1(c), Figure 1(d), Figure 1(e), Figure 1(f) and Figure 1(g) of Schedule 1, the permit holder must engage a *fauna specialist* to inspect that area, including all trees and tree hollows present, within 24 hours prior to, and for the duration of clearing, for the presence of (*Pseudocheirus occidentalis*) western ringtail possum(s) and southwestern brush-tailed phascogales (*Phascogale tapoatafa*).
- (b) Clearing activities must cease in any area where fauna referred to in condition 7(a) are identified until either:
  - (i) the western ringtail possum(s) and/or south-western brush-tailed phascogale individual has moved on from that area to adjoining *suitable habitat*; or
  - (ii) the western ringtail possum(s) individual(s) has been removed by a *western ringtail possum specialist* and/or the south-western brush-tailed phascogale individual(s) has been removed by a *fauna specialist*
- (c) Any western ringtail possum (*Pseudocheirus occidentalis*) individuals removed in accordance with condition 7(b)(ii) of this Permit must be relocated by a *western ringtail possum specialist* to *suitable habitat*.
- (d) Any south-western brush-tailed phascogale individuals removed in accordance with condition 7(b)(ii) of this Permit must be allowed to disperse into adjacent vegetation or must be relocated by a *fauna specialist* to *suitable habitat*.
- (e) Where fauna is identified under condition 7(a) of this Permit, the Permit Holder must provide the following records to the *CEO* as soon as practicable:
  - (i) the number of individuals identified;
  - (ii) the date each individual was identified;
  - (iii) the location where each individual was identified recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994

- (iv) the number of individuals removed and relocated;
- (v) the date each individual was removed;
- (vi) the method of removal;
- (vii) the date each individual was relocated;
- (viii) the location where each individual was relocated to, recorded using a GPS unit set to GDA94, expressing the geographical coordinates in Eastings and Northings or decimal degrees; and
- (ix) details pertaining to the circumstances of any death of, or injury sustained by, an individual.

## 8. Fauna management – black cockatoo habitat

- (a) Within 72 hours prior to undertaking any clearing authorised under this permit within the combined areas cross-hatched yellow on in Figure 1(a), Figure 1(b), Figure 1(c), Figure 1(d), Figure 1(e), Figure 1(f) and Figure 1(g) of Schedule 1, the permit holder must engage a *fauna specialist* to inspect all *black cockatoo habitat trees* proposed to be cleared for *evidence* of current or past breeding use by *black cockatoo species* listed below:
  - (i) *Calyptorhynchus lateriosis* (Carnaby’s cockatoo);
  - (ii) *Calyptorhynchus banksii naso* (forest red-tailed black cockatoo); and
  - (iii) *Calyptorhynchus baudinii* (Baudin’s cockatoo).
- (b) Where *black cockatoo habitat tree/s* are identified under condition 8(a), the permit holder must engage a *fauna specialist* to map *black cockatoo habitat tree/s* within the permit area.
- (c) Each *black cockatoo habitat tree* identified must be inspected by a *fauna specialist* for *evidence* of current or past breeding use by *black cockatoo species*.
- (d) Where a *black cockatoo habitat tree* with no *evidence* of current or past use by *black cockatoo species* is identified in accordance with condition 8(a), that tree must only be cleared immediately after the inspection.
- (e) Where a *black cockatoo habitat tree* is identified within the combined areas cross-hatched yellow on Figure 1(a), Figure 1(b), Figure 1(c), Figure 1(d), Figure 1(e), Figure 1(f) and Figure 1(g) of Schedule 1 and that tree shows *evidence* of current or past breeding use by *black cockatoo species* under condition 8(c), and clearing of that tree cannot be avoided, that tree must be monitored by a *fauna specialist* to determine when it is no longer in use for that breeding season.
- (f) Any *black cockatoo habitat tree* with *evidence* of current breeding use by *black cockatoo species* must not be cleared whilst it is in use for that breeding season as determined by the *fauna specialist* under condition 8(e).
- (g) For each *black cockatoo habitat tree* with *evidence* of current or past breeding use by *black cockatoo species* identified that cannot be avoided, the permit holder must install an artificial black cockatoo nest hollow.
- (h) Each artificial black cockatoo nesting hollow required by condition 8(g) must be installed prior to commencement of any clearing activities otherwise authorised under this permit.
- (i) The artificial black cockatoo nest hollow(s) required by condition 8(g) of this permit must:
  - (i) be installed within the area cross-hatched red on Figure 1(h) of Schedule 1;
  - (ii) be designed and placed in accordance with the specifications detailed in

- Schedule 2; and
- (iii) be monitored and maintained in accordance with the specifications detailed in Schedule 3, for a period of at least ten years.
- (j) Within two months of clearing authorised under this permit within the combined areas cross-hatched yellow Figure 1(a), Figure 1(b), Figure 1(c), Figure 1(d), Figure 1(e), Figure 1(f) and Figure 1(g) of Schedule 1, the permit holder must provide the results of the *fauna specialists* inspection to the CEO.
  - (k) The *fauna specialists* inspection report must include the following;
    - (i) the location of the *black cockatoo habitat tree(s)* recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994 (GDA94), expressing the geographical coordinates in Eastings and Northings or decimal degrees;
    - (ii) the name and amount of each fauna species identified;
    - (iii) whether the *black cockatoo habitat tree/s* identified show current or past use by black cockatoo species;
    - (iv) the methodology, used to survey the permit area;
    - (v) a photo of the black cockatoo habitat tree(s) identified; and
    - (vi) a description of the black cockatoo habitat tree(s) identified, including the:
      - (A) species of *black cockatoo habitat tree(s)*; and
      - (B) condition of the *black cockatoo habitat tree(s)*.

### **PART III - RECORD KEEPING AND REPORTING**

#### **9. Records that must be kept**

The permit holder must maintain records relating to the listed relevant matters in accordance with the specifications detailed in Table 1.

**Table 1: Records that must be kept**

No.	Relevant matter	Specifications
1.	In relation to the authorised clearing activities generally	<ul style="list-style-type: none"> <li>(a) the species composition, structure, and density of the cleared area;</li> <li>(b) the location where the clearing occurred, recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994 (GDA94), expressing the geographical coordinates in Eastings and Northings;</li> <li>(c) the date that the area was cleared;</li> <li>(d) the size of the area cleared (in hectares); and</li> <li>(e) actions taken to avoid, minimise, and reduce the impacts and extent of clearing in accordance with condition 5; and</li> <li>(f) actions taken to minimise the risk of the introduction and spread of <i>weeds</i> and <i>dieback</i> in accordance with condition 6; and</li> <li>(g) actions taken to manage and mitigate impacts to western ringtail possums and south-west brush-tail phascogales in accordance with condition 7.</li> </ul>
2.	In relation to black cockatoo fauna	<ul style="list-style-type: none"> <li>(a) the time(s) and date(s) of inspection(s) of the suitable <i>black cockatoo habitat tree</i> by the <i>fauna specialist</i>;</li> </ul>

No.	Relevant matter	Specifications
	management pursuant to conditions 8	<p>(b) a description of the inspection methodology employed by the <i>fauna specialist</i>;</p> <p>(c) the species name of any fauna determined by the <i>fauna specialist</i> to be occupying the suitable <i>black cockatoo habitat tree</i>;</p> <p>(d) where the suitable <i>black cockatoo habitat tree</i> is determined by the <i>fauna specialist</i> to be occupied by <i>black cockatoo species</i>:</p> <p style="padding-left: 40px;">(i) the time and date that it was determined to be no longer occupied; and</p> <p style="padding-left: 40px;">(ii) a description of the evidence by which it was determined to be no longer occupied;</p> <p style="padding-left: 40px;">and</p> <p>(e) the time and date that the suitable <i>black cockatoo habitat tree</i> was cleared.</p>

## 10. Reporting

The permit holder must provide to the *CEO* the records required under condition 9 of this permit when requested by the *CEO*.

## DEFINITIONS

In this permit, the terms in Table have the meanings defined.

**Table 2: Definitions**

Term	Definition
black cockatoo breeding trees	means black cockatoo habitat trees that exhibit evidence of current or past breeding use by black cockatoo species.
black cockatoo habitat trees	means trees that have a diameter, measured at 130 centimetres from the base of the tree, of 50 centimetres or greater (or 30 centimetres or greater for <i>Eucalyptus salmonophloia</i> or <i>Eucalyptus wandoo</i> ) that contain hollows suitable for breeding by black cockatoo species, as identified by a <i>fauna specialist</i> .
black cockatoo species	means one or more of the following species: (a) <i>Calyptorhynchus lateriosis</i> (Carnaby's cockatoo); (b) <i>Calyptorhynchus baudinii</i> (Baudin's cockatoo); and/or (c) <i>Calyptorhynchus banksii naso</i> (forest red-tailed black cockatoo).
CEO	Chief Executive Officer of the department responsible for the administration of the clearing provisions under the <i>Environmental Protection Act 1986</i> .
clearing	has the meaning given under section 3(1) of the EP Act.
condition	a condition to which this clearing permit is subject under section 51H of the EP Act.
dieback	means the effect of <i>Phytophthora</i> species on native vegetation.
evidence	means showing chew marks or scratchings on the habitat tree representative of the species being surveyed, the presence of the species entering or leaving the habitat tree, and/or the presence of chicks/young.
fauna specialist	means a person who holds a tertiary qualification specialising in environmental science or equivalent, and has a minimum of 2 years work experience in fauna identification and surveys of fauna native to the region being inspected or

Term	Definition
	surveyed, or who is approved by the <i>CEO</i> as a suitable fauna specialist for the bioregion, and who holds a valid fauna licence issued under the <i>Biodiversity Conservation Act 2016</i> .
fill	means material used to increase the ground level, or to fill a depression.
department	means the department established under section 35 of the <i>Public Sector Management Act 1994</i> (WA) and designated as responsible for the administration of the EP Act, which includes Part V Division 3.
EP Act	<i>Environmental Protection Act 1986</i> (WA)
mulch	means the use of organic matter, wood chips or rocks to slow the movement of water across the soil surface and to reduce evaporation.
native vegetation	has the meaning given under section 3(1) and section 51A of the EP Act.
suitable habitat (western ringtail possum)	means habitat known to support western ringtail possums ( <i>Pseudocheirus occidentalis</i> ) within the known current distribution of the species, typically characterised by abundant foliage, presence of suitable nesting structures such as tree hollows, as well as high canopy cover and continuity. Known habitat includes peppermint ( <i>Agonis flexuosa</i> ) dominated woodlands, jarrah ( <i>Eucalyptus marginata</i> ) and marri ( <i>Corymbia calophylla</i> ) forests, riparian vegetation with a canopy of Bullich ( <i>Eucalyptus megacarpa</i> ) or flooded gum ( <i>Eucalyptus rudis</i> ), karri ( <i>Eucalyptus diversicolor</i> ) forests, sheoak ( <i>Allocasuarina fraseriana</i> ) dominated woodlands, and other stands of myrtaceous trees growing near swamps, watercourses or floodplains.
Suitable habitat (south-western brush-tailed phascogale)	Suitable habitat for southwestern brush-tailed phascogale is typically characterised by dry sclerophyll forests and open woodlands that contain hollow-bearing trees but a sparse ground cover.
weeds	means any plant – (a) that is a declared pest under section 22 of the <i>Biosecurity and Agriculture Management Act 2007</i> ; or (b) published in a Department of Biodiversity, Conservation and Attractions species-led ecological impact and invasiveness ranking summary, regardless of ranking; or (c) not indigenous to the area concerned.
western ringtail possum specialist	means a <i>fauna specialist</i> who holds a tertiary qualification specialising in environmental science or equivalent, has a minimum of two years of work experience in western ringtail possum ( <i>Pseudocheirus occidentalis</i> ) identification, surveys of western ringtail possums and capture and handling of western ringtail possums, and holds a valid fauna licence issued under the <i>Biodiversity Conservation Act 2016</i> .

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## END OF CONDITIONS



**Meenu Vitarana**

**A/Manager**

### NATIVE VEGETATION REGULATION

*Officer delegated under Section 20  
of the Environmental Protection Act 1986*

23 December 2021

# Schedule 1

The boundary of the area authorised to be cleared is shown in the maps below (Figure 1(a) to Figure 1(g)) and areas subject to conditions is show in Figure 1(h)

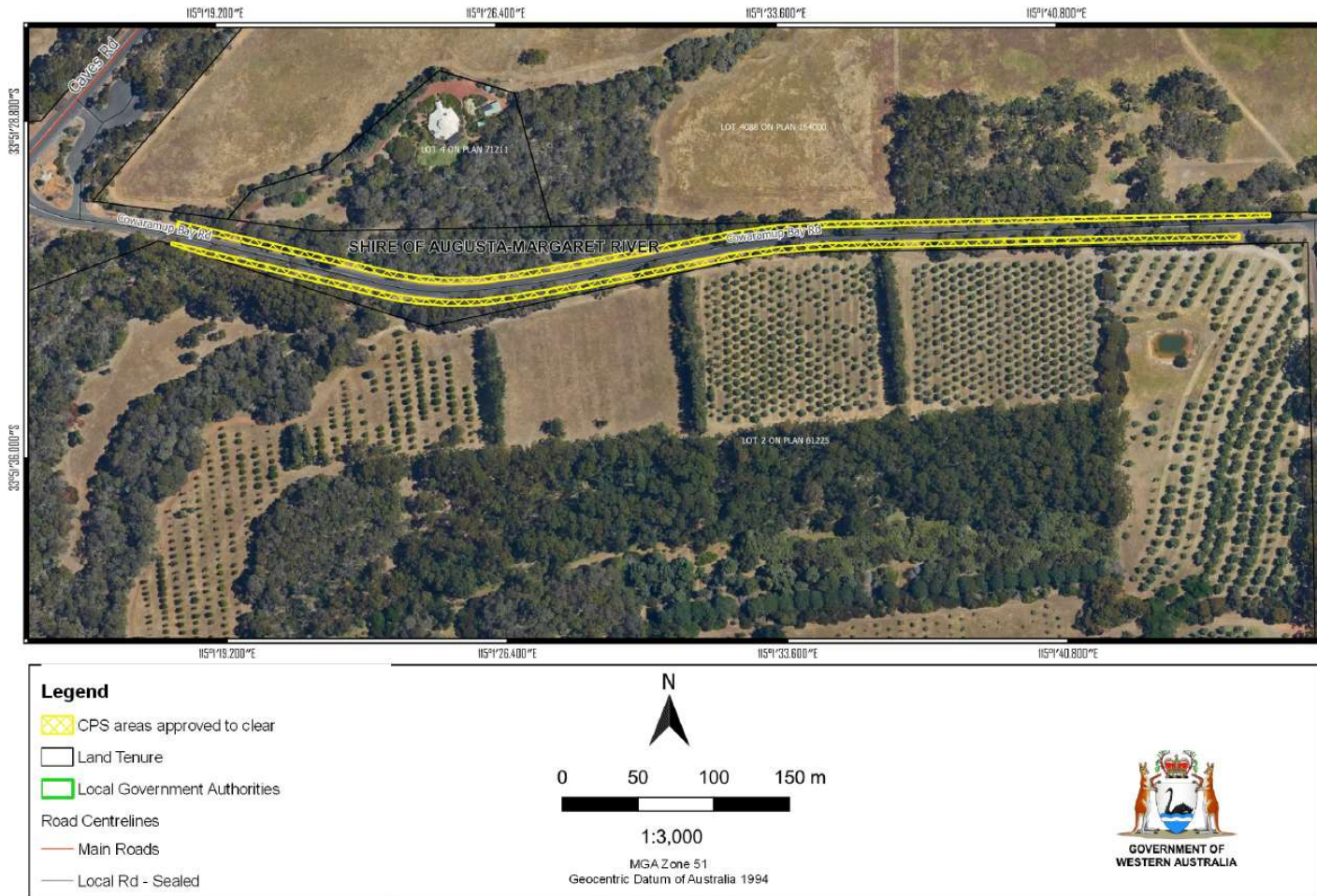


Figure 1(a)



Figure 1 (b)





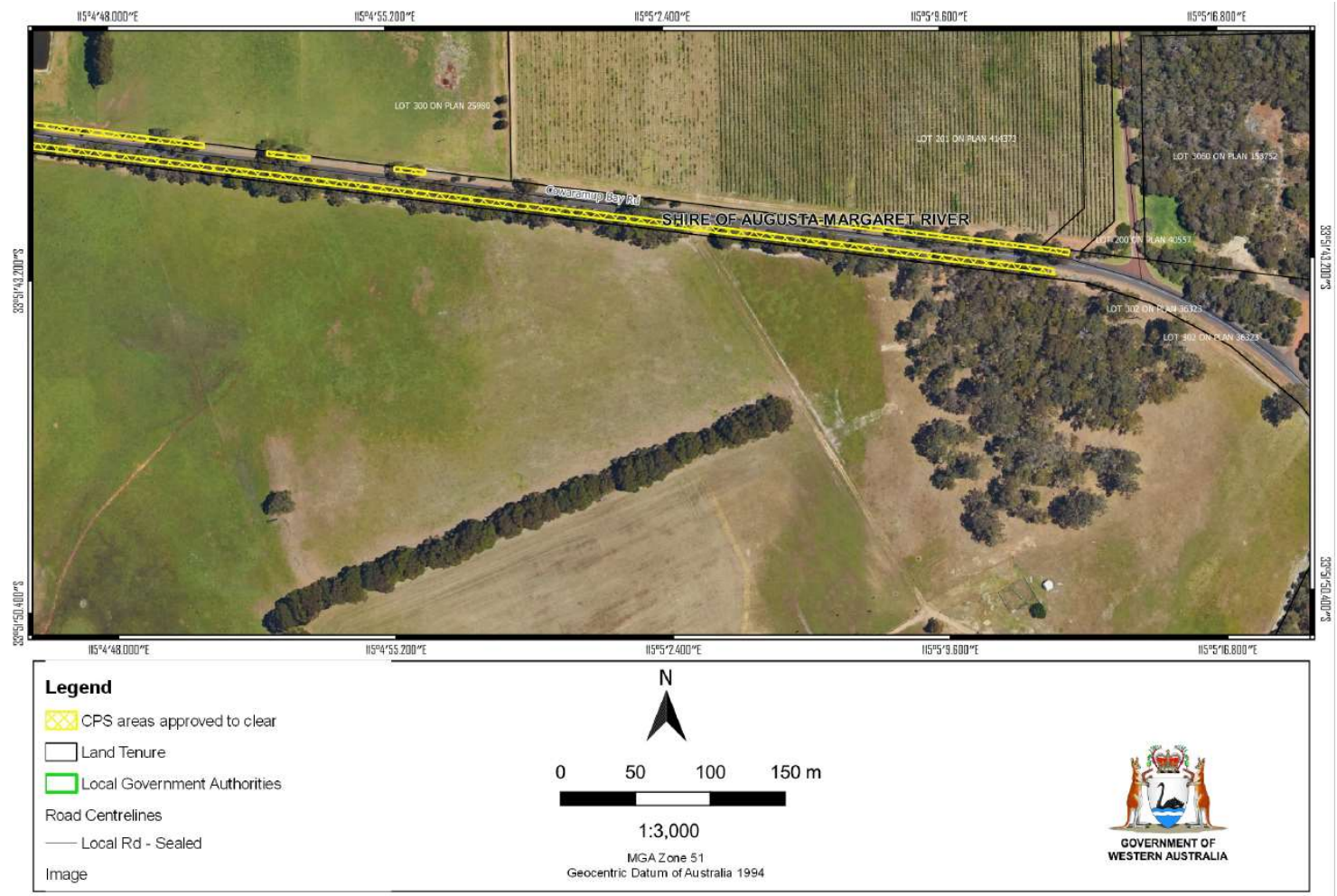
Figure 1(c)



Figure 1(d)



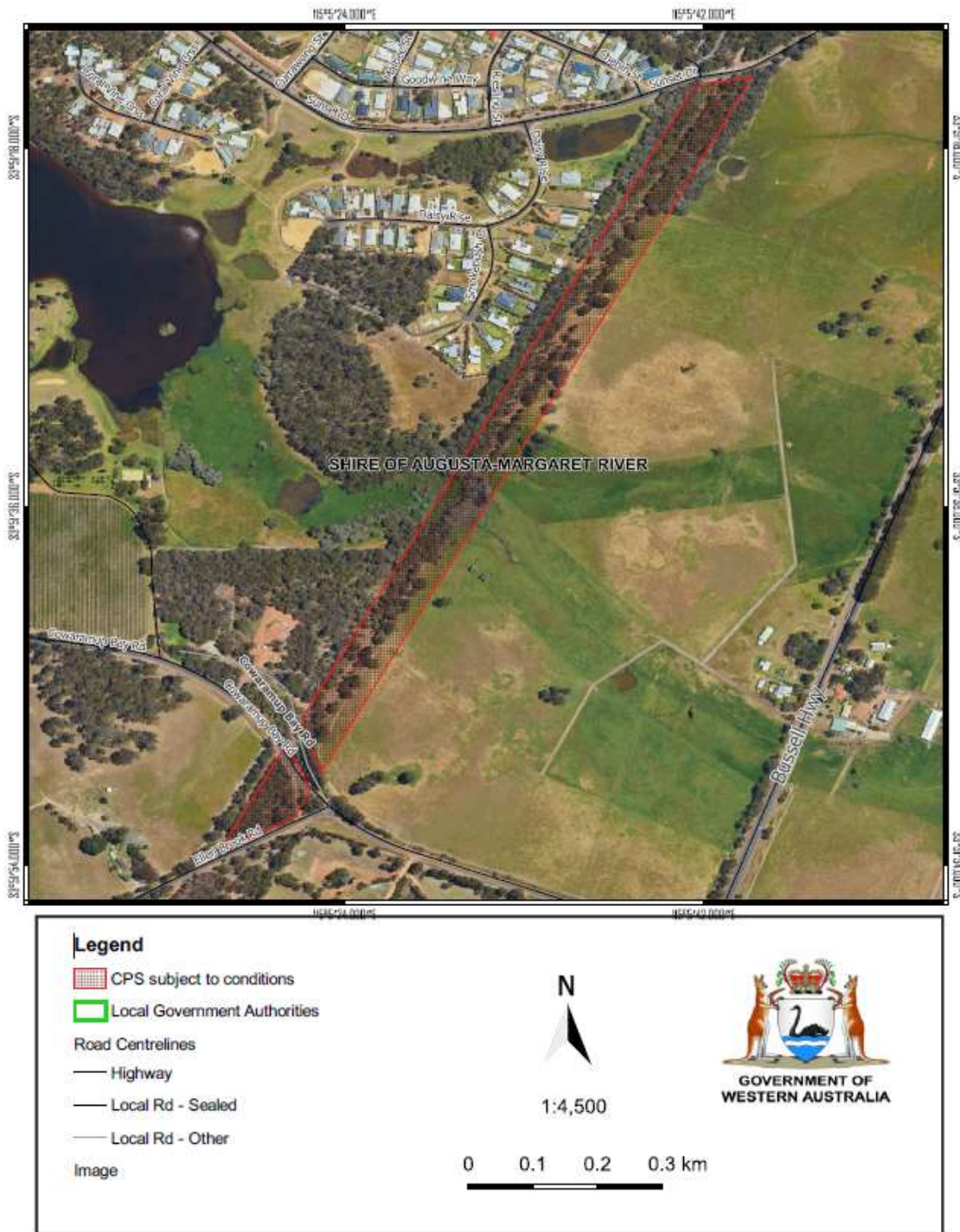
Figure 1(e)



**Figure 1(f)**



Figure 1(g)



**Figure 1(h): The boundary of the area within which the artificial black cockatoo nest hollow(s) required by condition 8(g) of this permit applies**

## Artificial hollows for Carnaby's cockatoo



## How to design and place artificial hollows for Carnaby's cockatoo

Artificial hollows can be used to help conserve the threatened Carnaby's cockatoo by enabling the cockatoos to breed in areas where natural hollows are limited.

A wide variety of artificial hollow designs have been used with mixed success. Evidence suggests that, while the hollow must meet some basic requirements, other factors such as proximity to existing breeding areas may be more important in determining the success of artificial hollows. Before using this information sheet to construct or install an artificial hollow, you should refer to the criteria listed in the separate information sheet; *When to use artificial hollows for Carnaby's cockatoo*.

This information sheet contains broad guidelines for the design and placement of artificial hollows for Carnaby's cockatoo.

Below are three examples of successful artificial hollows used by Carnaby's cockatoo for nesting. Artificial hollows made from a natural log with cut side entrance (left), white industrial pipe with top entrance (centre) and natural log with natural side entrance (right).



Photos by Christine Groom (left and right) and Rick Dawson (centre)

## Walls

The walls of the artificial hollow need to be constructed from a material that is;

- Durable enough to withstand exposure to elements for an extended period of time (i.e. 20+ years).
- Able to simulate the thermal properties of a natural tree hollow.
- Not less than 380 mm in internal diameter.
- Preferably 1.2 m deep overall and 1m deep to top of substrate/nesting material.

Successful artificial hollows have been constructed from sections of salvaged natural hollow, black and white industrial pipe. When using non-natural materials care must be taken to ensure there are no toxic residues and that the materials are safe to ingest.

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## Base

The base of the artificial hollow must be;

- Able to support the adult and nestling(s).
- Durable enough to last the life of the nest.
- Free draining.
- At least 380 mm in diameter.
- Covered with 200 mm of sterile, dry, free draining material such as charcoal, hardwood woodchips or wood debris.

### Do not use:

- Saw dust or fibre products that will retain moisture.

Example materials that could be used for artificial hollow bases include heavy duty stainless steel, galvanised or treated metal (e.g. Zinalume ®), thick hardwood timber slab or marine ply (not chipboard or MDF). The base material must be cut to size to fit internally with sharp or rough edges ground away or curled inwards and fixed securely to the walls.



Carnaby's cockatoo eggs in an artificial hollow.  
*Photo by Rick Dawson*

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## Entrance

The entrance of the artificial hollow must;

- Have a diameter of at least 270 mm).
- Preferably be top entry which will minimise use by non-target species.

Top entry hollows are unattractive to nest competitors such as feral bees, galahs and corellas. Side entry hollows have been successful in areas where feral bees are not a problem and where galahs and corellas are deterred.



## Ladder

For artificial hollows made of non-natural materials, or of processed boards, it is necessary to provide a ladder to enable the birds to climb in and out of the hollow easily.

The ladder must be;

- Securely mounted to the inside of the hollow.
- Made from an open heavy wire mesh such as WeldMesh™ with mesh size of 30 - 50 mm, or heavy chain.

### Do not use:

- A material that the birds can chew.
- Galvanized because the birds may grip or chew the ladder and ingest harmful compounds.

If using mesh for the ladder, the width will depend on the curvature of the nest walls. A minimum width of about 60 - 100 mm is recommended.

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## Sacrificial chewing posts

For artificial hollows made of non-natural materials, or of processed boards, it is necessary to provide sacrificial chewing posts. The birds chew material to prepare a dry base on which to lay their egg(s).

The sacrificial chewing posts must:

- Be made of untreated hardwood such as jarrah, marri or wandoo
- Be thick enough to satisfy the birds' needs between maintenance visits.
- Extend beyond the top of the hollow as an aid to see whether the nest is being used.
- Be placed on the inside of the hollow.
- Be attached in such a way that they are easy to replace e.g. hook over the top of hollow or can slide in/out of a pair of U bolts fitted to the side of the hollow.

It is recommended that at least two posts are provided. Posts 70 x 50 mm have been used, but require replacing at least every second breeding season when the nest is active. Birds do vary in their chewing habits and therefore the frequency at which the chewing posts require replacement will also vary.



Bottom of an artificial hollow showing ladder that is fixed to the wall and a chewed sacrificial post which is 200 mm from the floor.

*Photo by Rick Dawson*

## Mountings

The artificial hollows must be mounted such that:

- The fixings used will last the duration of the nest e.g. galvanized bracket or chain fixed with galvanized coach screws.
  - It is secured by more than one anchor for security and stability.
  - It is positioned vertically or near vertically.
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## Placement

Sites should be chosen within current breeding areas and where they can be monitored, but preferably not conspicuous to the general public. It is important that artificial hollows are placed where they will be accessible for future monitoring and maintenance. For more detail refer to the separate information sheet; *When to use artificial hollows for Carnaby's cockatoo*.

The height at which artificial hollows should be placed is variable. The average height of natural hollows in dominant tree species in the area is a good guide. Natural hollows used by Carnaby's cockatoos have been recorded as low as 2 m above the ground. If located on private property the hollows can be placed lower to the ground so they are accessible by ladder or a rope and pulley system can be used. Where public access is possible artificial hollows should be placed at least 7 m high (i.e. higher than most ladders) and on the side of the tree away from public view to reduce the chance of interference or poaching.

Carnaby's cockatoo show no preference for aspect of natural hollows, however, it may still be beneficial to place artificial hollows facing away from prevailing weather and where they receive the most shade and protection.

Artificial hollows to be placed in trees require:

- Accessibility of the tree for a vehicle, elevated work platform or cherry picker.
- A section of trunk 2-3 m long suitable for attaching the hollow

If necessary, artificial hollows may be placed on poles, but this may result in excessive exposure to sun during very hot weather. When erected on poles there should be"

- A hinge at the bottom of the pole that can be secured when the pole is in the upright position.
- Access for a vehicle to assist raising the pole.

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## Safety

Care needs to be taken when placing artificial hollows to ensure safety is considered at all times. Artificial hollows are heavy and require lifting and manoeuvring into position up to 7 m above the ground.

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## Maintenance and monitoring

Once artificial hollows have been placed they require monitoring and maintenance to ensure they continue to be useful for nesting by Carnaby's cockatoo. It is important to monitor artificial hollows to determine use by Carnaby's cockatoo, other native species as well as pest species. By undertaking monitoring the success of the design and placement of artificial hollows can be determined and areas for improvement identified for future placement of artificial hollows.

Monitoring can also assess whether any maintenance is required. Without regular maintenance artificial hollows are unlikely to achieve their objective (that is, they will fail to provide nesting opportunities for threatened cockatoos). Therefore it is important to continue a regime of regular maintenance while the artificial hollow is required. It may be several (to many) decades until a natural replacement hollow is available.

For further advice on monitoring and maintenance of artificial hollows please refer to the separate information sheet; *How to monitor and maintain artificial hollows for Carnaby's cockatoo*.



Carnaby's cockatoo female prospecting an artificial hollow.  
*Photo by Rick Dawson*



Example fixing for artificial hollow  
*Photo by Christine Groom*

### **Acknowledgements**

This information sheet is a joint initiative of Birdlife Australia, the Western Australian Museum and the Department of Parks and Wildlife. Many individuals have contributed to its preparation. Special acknowledgement is made for the contributions of Ron Johnstone from the WA Museum, Alan Elliott from the Serpentine-Jarrahdale Land care Centre and Denis Saunders. This updated version was compiled by Rick Dawson (Department of Parks and Wildlife).

### **Other information sheets in the series: Artificial hollows for Carnaby's cockatoo**

- *How to design and place artificial hollows for Carnaby's cockatoo*
- *How to monitor and maintain artificial hollows for Carnaby's cockatoo*

Information sheets available on the *Saving Carnaby's cockatoo* webpage:

<http://www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities/threatened-animals/208-saving-carnaby-s-cockatoo>

#### **Further information**

Last updated 28/04/2015

Contact [fauna@dpaw.wa.gov.au](mailto:fauna@dpaw.wa.gov.au) or your local office of the Department of Parks and Wildlife

See the department's website for the latest information: [www.dpaw.wa.gov.au](http://www.dpaw.wa.gov.au)

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## Artificial hollows for Carnaby's cockatoo



## How to monitor and maintain artificial hollows for Carnaby's cockatoo

It is important to monitor and maintain artificial hollows after they have been erected. Monitoring ensures that the effectiveness of the artificial hollow can be determined. It also means that problems with pest species or any maintenance requirements can be identified and resolved.

Without regular maintenance, artificial hollows are likely to fail to achieve their objective (that is, they will fail to provide nesting opportunities for threatened cockatoos). Therefore it is important to continue a regime of regular maintenance while the artificial hollow is required. It may be several (to many) decades until a natural replacement hollow is available.

Monitoring should be undertaken in order to detect:

- Use by Carnaby's cockatoo
- Maintenance requirements
- Use by other native species
- Use by pest species (e.g. feral bees, galahs, corellas etc.)



Carnaby's cockatoo female prospecting an artificial hollow.  
*Photo by Rick Dawson*

### **How do I monitor artificial hollows?**

Before undertaking monitoring of artificial hollows for Carnaby's cockatoo it is recommended that you seek advice from BirdLife Australia, the WA Museum or the Department of Parks and Wildlife. It is also important to contact Parks and Wildlife, Wildlife Licensing Section, to determine if a scientific licence is required ([wildlifelicencing@dpaw.wa.gov.au](mailto:wildlifelicencing@dpaw.wa.gov.au)).

Monitoring artificial hollows requires keen observation and naturalist skills. It is often not possible to observe evidence of breeding directly (i.e. nestlings or eggs) and inferences must be made based on observation. There are many techniques available to monitor artificial hollows. A combination of several is likely to achieve the best results.

### **Looking for signs of use**

Cobwebs covering the entrance to the hollow will indicate that the hollow has not been used recently. This would also apply to other light debris that may have fallen to cover the opening partially. Signs of recent use or interest in the hollow include evidence of chewing.

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### **Observing parent behaviour around the hollow**

The behaviour of parent birds around a hollow will indicate an approximate age of young in the nest.

<b>Parent behaviour</b>	<b>Approximate age/stage of young</b>
Prospecting for hollow	Unborn
Male only seen out of hollow	Egg or very young nestling (< 3 - 4 weeks)
Both parents seen entering/exiting the hollow	Nestling(s) have hatched (> 3 - 4 weeks)

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### **Observing feeding flocks**

Flocks of all male birds indicate that the females are incubating eggs. When flocks are mixed it suggests the birds have either not laid yet or that the nestlings have hatched and no longer require brooding (approximately 3 - 4 weeks old).

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### **Tapping**

When females are sitting on eggs they will usually respond to tapping at the base of their tree (or pole) by appearing at the entrance or flying from the hollow opening. This is not a guarantee of breeding activity, but an indication that it is possibly occurring in the hollow.

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### **Observing insect activity around nest**

The faecal matter produced by nestlings in a nest attracts insects, especially flies and ants. The type and number of these insects will help indicate how old any nestlings present may be. Factors such as temperature and humidity will also affect insect activity and so observations of insect activity should only be used as supporting evidence for other indications of age/use. Blowflies around a nest usually indicate that a death has occurred.

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### **Listening for nestlings**

With experience it is possible to determine if one or two nestlings are present and a broad estimate of age based on the type and loudness of noises they make.

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### **Looking inside the nest**

This can be achieved either with the aid of a telescopic pole and camera or mirror, or with the use of a ladder or other climbing equipment. This method can obtain the most detailed monitoring information for artificial hollows. However it is also the most time consuming and difficult to organise. Special equipment is likely to be needed depending on the height and positioning of artificial hollows. There are also safety issues associated with ladder or rope climbing options to reach nests to undertake observations.

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### **How often should I monitor artificial hollows?**

The minimum frequency of monitoring and the techniques used will be determined by the aims of the monitoring and the resources available. It is important to limit disturbance to breeding birds and this should be considered when determining the techniques used and frequency.

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### **How do I maintain artificial hollows?**

Artificial hollows require maintenance to ensure they continue to have the greatest chance of them being used by Carnaby's cockatoos. Periodic maintenance checks should be undertaken at least every two years, preferably annually. These checks should be undertaken prior to the breeding season which is between July and January with breeding occurring later in this period in southern areas. It is important to maintain a regime of regular maintenance as long as the artificial hollow is required. It may take several (to many) decades until a natural replacement hollow is available.

Maintenance checks should assess the following as a minimum:

- Condition of chewing posts (if present)
- Condition of attachment points
- Condition of hollow bases
- Stability of tree or pole used to mount the artificial hollow



Artificial hollow base needing repair.  
*Photo by Christine Groom*

### **Repairing hollows**

Any problems identified during maintenance checks should be addressed, and any repairs required done, as soon as possible. If breeding is currently occurring, maintenance may need to be delayed if it is likely to disturb the parents or nestling. Likely maintenance needs include replacement of chewing posts (frequently) or nest bases (occasionally) and repairing of any cracks (infrequently). Maintenance concerns regarding the security of attachment points or the stability of the tree or pole should be addressed as a priority for safety reasons.

For artificial hollows known to be used, spare chewing posts should be taken into the field when undertaking maintenance checks.

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**Monitoring of artificial hollows:**

Monitoring aim	Frequency of visits	Monitoring techniques
<b>To determine possible use by Carnaby's cockatoo</b>	At least once during peak breeding season (i.e. between September and December)	<ul style="list-style-type: none"> <li>• Observing behaviour of adults around hollow</li> <li>• Tapping to see if female will flush from hollow (best undertaken between 10am and 3pm when females most likely to be sitting)</li> <li>• Listening for nestlings</li> <li>• Looking for evidence of chewing</li> <li>• Looking inside nest</li> </ul>
<b>To confirm use by Carnaby's cockatoo</b>	At least two visits during peak breeding season (i.e. between September and December)	<p>To observe at least two of the following:</p> <ul style="list-style-type: none"> <li>• Breeding behaviour of adults around hollow or evidence of chewing</li> <li>• Female flushed from hollow</li> <li>• Noises from nestlings in hollow</li> </ul> <p>Or to observe:</p> <ul style="list-style-type: none"> <li>• Nestlings or eggs in nest</li> </ul>
<b>To determine nesting success by Carnaby's cockatoo</b>	The more visits, the better. Preferably fortnightly visits between July and December. As a minimum, at least 3 visits spread throughout breeding season.	<ul style="list-style-type: none"> <li>• Looking inside nest to observe eggs or nestlings.</li> </ul>
<b>To determine use by any species</b>	As often as possible.	<ul style="list-style-type: none"> <li>• Inspection from ground as a minimum.</li> <li>• Looking inside nest for detailed observations.</li> </ul>
<b>To determine maintenance requirements</b>	At least every two years and preferably annually if hollow fitted with sacrificial chewing posts, can be longer if without.	<ul style="list-style-type: none"> <li>• A basic maintenance check can be undertaken from the ground. A ladder or elevated work platform will be required for a comprehensive check and to replace sacrificial chewing posts</li> </ul>

**Acknowledgements**

This information sheet is a joint initiative of Birdlife Australia, the Western Australian Museum and the Department of Parks and Wildlife. Many individuals have contributed to its preparation. The updated version was compiled by Rick Dawson (Department of Parks and Wildlife) with assistance from Denis Saunders.

**Other information sheets in the series: Artificial hollows for Carnaby's cockatoo**

- *How to design and place artificial hollows for Carnaby's cockatoo*
- *How to monitor and maintain artificial hollows for Carnaby's cockatoo*

Information sheets available on the *Saving Carnaby's cockatoo* webpage:

<http://www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities/threatened-animals/208-saving-carnaby-s-cockatoo>



# Clearing Permit Decision Report

## 1 Application details and outcome

### 1.1. Permit application details

<b>Permit number:</b>	CPS 9237/1
<b>Permit type:</b>	Purpose permit
<b>Applicant name:</b>	Shire of Augusta-Margaret River
<b>Application received:</b>	16 March 2021
<b>Application area:</b>	1.5 hectares of native vegetation
<b>Purpose of clearing:</b>	Road construction or upgrades
<b>Method of clearing:</b>	Mechanical
<b>Property:</b>	Cowaramup Bay Road reserves (PINs 11476612, 11476658, 11476657, 11139300), Unnamed Road reserves (PINs 11476661, 11476659) and Lot 5266 on Deposited Plan 220451 (Crown Reserve R 47049)
<b>Location (LGA area/s):</b>	Shire of Augusta Margaret River
<b>Localities (suburb/s):</b>	Cowaramup

### 1.2. Description of clearing activities

The vegetation proposed to be cleared is contained within multiple patches adjacent to Cowaramup Bay Road (see Figures 1(a) to 1(g), Section 1.5). The clearing is to reconstruct and widen a section of Cowaramup Bay Road between Bussell Highway and Caves Road to accommodate traffic volumes and associated drainage works (including culverts), improve driver visibility and overall road safety.

### 1.3. Decision on application

<b>Decision:</b>	Granted
<b>Decision date:</b>	23 December 2021
<b>Decision area:</b>	1.5 hectares of native vegetation trees, as depicted in Section 1.5, below.

### 1.4. Reasons for decision

This clearing permit application was submitted, accepted, assessed and determined in accordance with sections 51E and 51O of the *Environmental Protection Act 1986* (EP Act). The Department of Water and Environmental Regulation (DWER) advertised the application for 14 days and no submissions were received.

In making this decision, the Delegated Officer had regard for the site characteristics (see Appendix B), relevant datasets (see Appendix F.1), the findings of a flora and vegetation survey see (Appendix E), the clearing principles set out in Schedule 5 of the EP Act (see Appendix C), relevant planning instruments and any other matters considered relevant to the assessment (see Section 3). The Delegated Officer also took into consideration that the purpose of the clearing is to improve community safety by improving road width to accommodate traffic volumes, driver visibility, risks from falling branches and trees in close proximity to the road.



The assessment identified that the proposed clearing will result in:

- the potential loss of native vegetation that is suitable habitat for western ringtail possums (*Pseudocheirus occidentalis*) and an ecological linkage across the landscape,
- potential loss of habitat trees for black cockatoos (*Calyptorhynchus lateriosis* (Carnaby's cockatoo), *Calyptorhynchus baudinii* (Baudin's cockatoo) and *Calyptorhynchus banksii naso* (forest red-tailed black cockatoo), and
- the potential introduction and spread of weeds into adjacent vegetation, which could impact on the quality of the adjacent vegetation and its habitat values.

After consideration of the available information, as well as the applicant's minimisation and mitigation measures (see Section 3.1), the Delegated Officer determined the proposed clearing is unlikely to lead to appreciable land degradation or have long-term adverse impacts on conservation significant fauna or flora species and can be minimised and managed to be unlikely to lead to an unacceptable risk to environmental values. The applicant has suitably demonstrated avoidance and minimisation measures.

The Delegated Officer decided to grant a clearing permit subject to conditions to:

- avoid, minimise to reduce the impacts and extent of clearing,
- take hygiene steps to minimise the risk of the introduction and spread of weeds, and
- fauna management conditions for western ringtail possum, south-western brushtail phascogale and species of black cockatoo.

## 1.5. Site maps

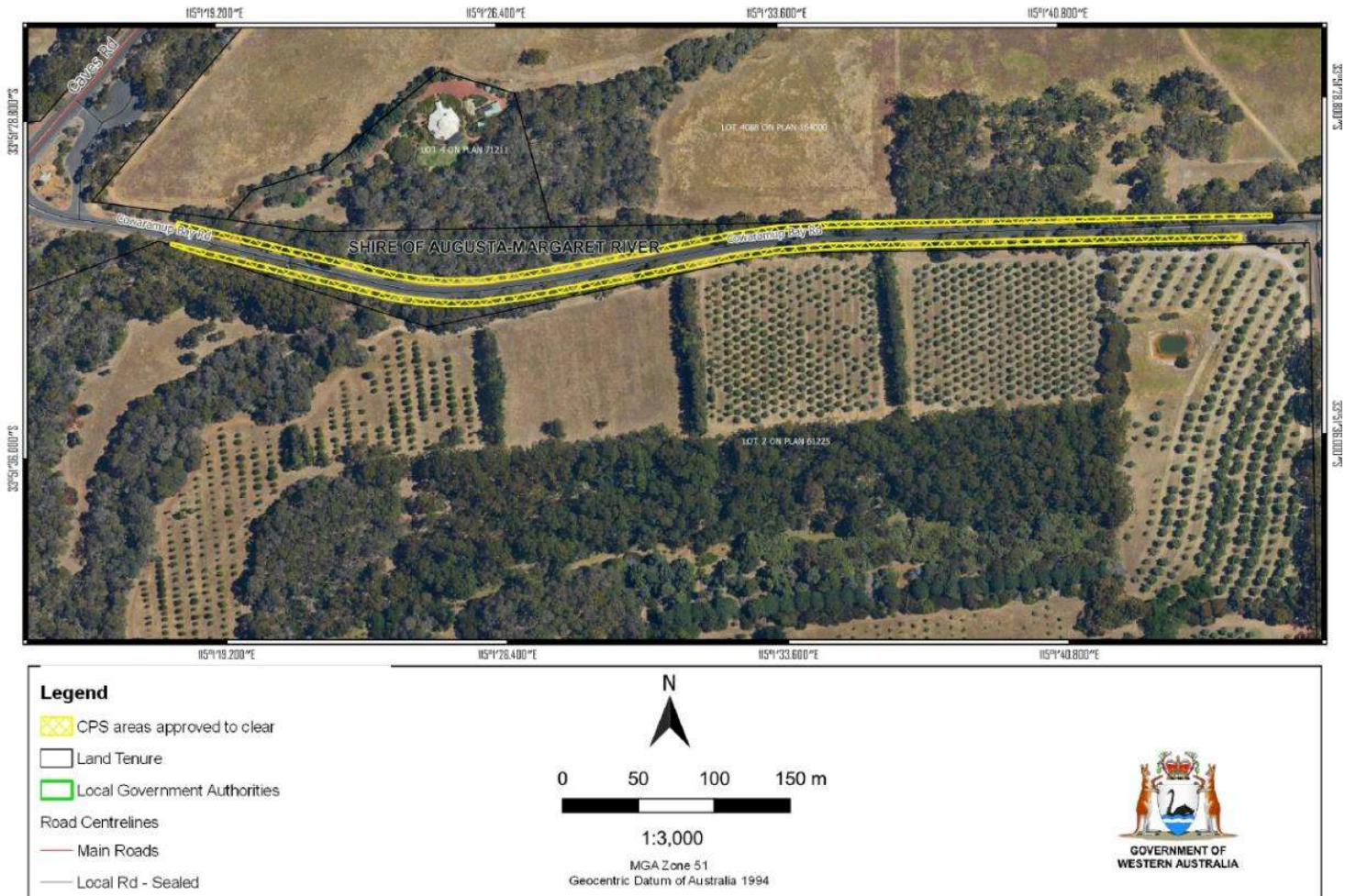


Figure 1(a) Map of the application area  
The areas crosshatched yellow indicate the areas authorised to be cleared under the granted clearing permit.



Figure 1(b) Map of the application area  
The areas crosshatched yellow indicate the areas authorised to be cleared under the granted clearing permit.



Figure 1(c) Map of the application area  
 The areas crosshatched yellow indicate the areas authorised to be cleared under the granted clearing permit.



Figure 1(d) Map of the application area  
 The areas crosshatched yellow indicate the areas authorised to be cleared under the granted clearing permit.



Figure 1(e) Map of the application area  
The areas crosshatched yellow indicate the areas authorised to be cleared under the granted clearing permit.

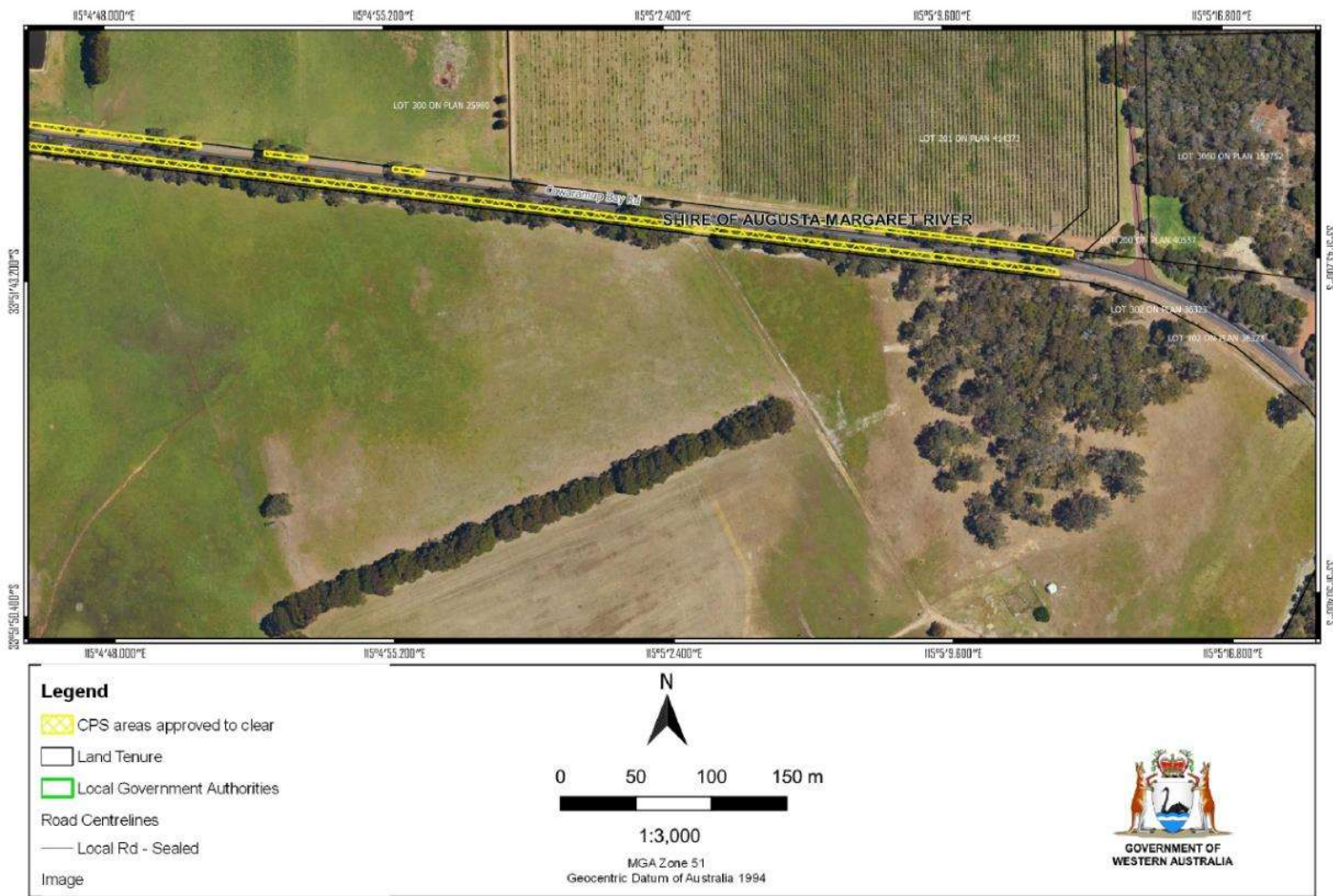


Figure 1(f) Map of the application area  
 The areas crosshatched yellow indicate the areas authorised to be cleared under the granted clearing permit.

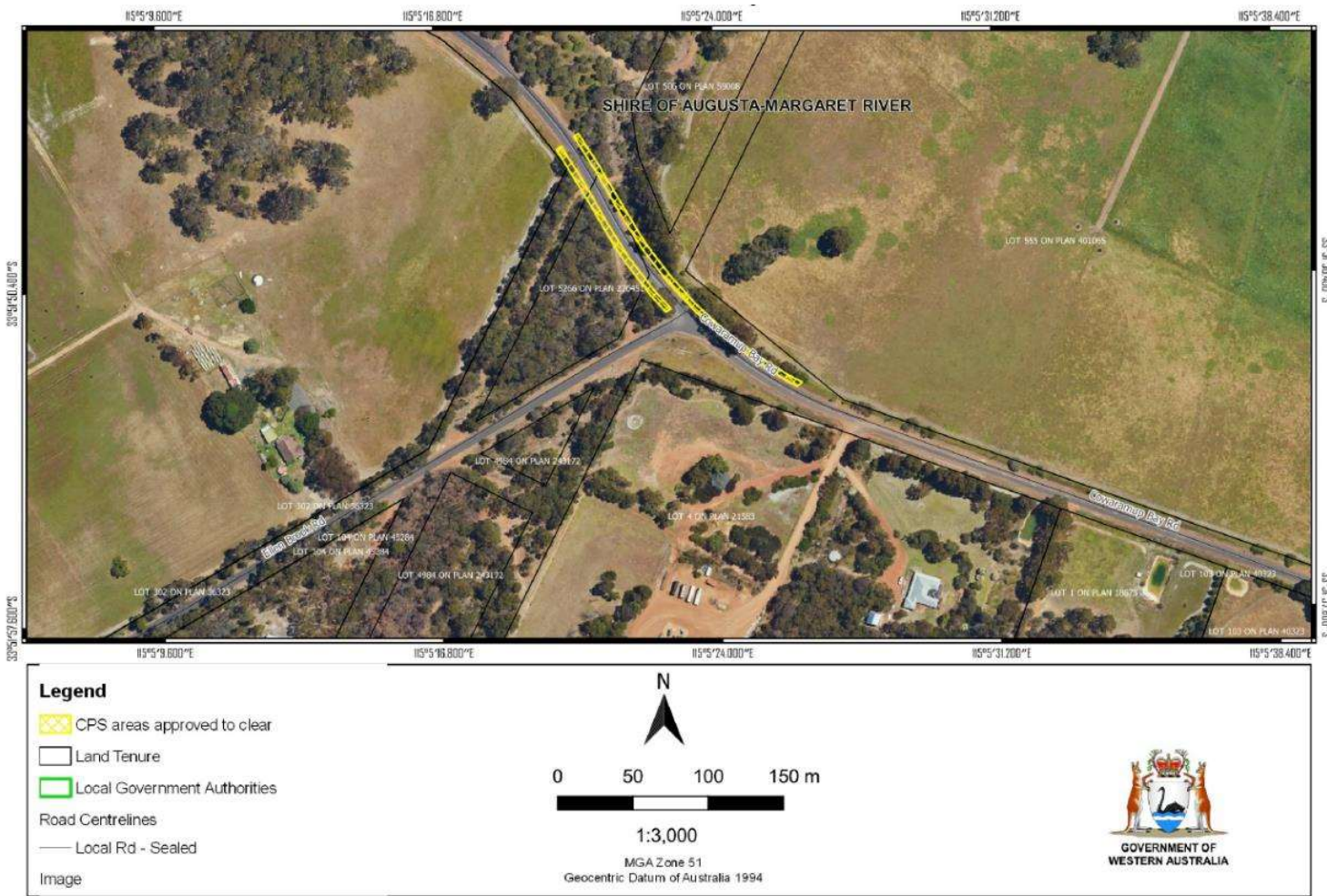


Figure 1(g) Map of the application area  
The areas crosshatched yellow indicate the areas authorised to be cleared under the granted clearing permit.



## 2 Legislative context

The clearing of native vegetation in Western Australia is regulated under the EP Act and the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* (Clearing Regulations).

In addition to the matters considered in accordance with section 51O of the EP Act (see Section 1.4), the Delegated Officer has also had regard to the objects and principles under section 4A of the EP Act, particularly:

- the precautionary principle
- the principle of intergenerational equity
- the principle of the conservation of biological diversity and ecological integrity.

Other legislation of relevance for this assessment include:

- *Biodiversity Conservation Act 2016* (WA) (BC Act)
- *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act)

The key guidance documents which inform this assessment are:

- *A guide to the assessment of applications to clear native vegetation* (DER, December 2013)
- *Procedure: Native vegetation clearing permits* (DWER, October 2019)
- Technical guidance – *Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA, 2016)

## 3 Detailed assessment of application

### 3.1. Avoidance and mitigation measures

The applicant advised “the clearing is required reconstruct and widen a section of Cowaramup Bay Road between Bussell Highway and Caves Road. The road is currently 5-6 metres wide, which is insufficient given the type and volumes of traffic it receives. The project will reconstruct and widen the existing sealed road to 7 metres, with 1 metre unsealed shoulders on either side, and associated drainage works (including culverts). The road reconstruction will improve driver visibility and overall road safety” (Shire of Augusta Margaret River, 2021a).

Reconstruction of this section of Cowaramup Bay Road is essential in order to improve driver visibility and overall road safety. The condition of roadside vegetation between Caves Road and Bussell Highway is predominantly degraded or completely degraded as a result of adjoining agricultural land use and historical disturbance contributing to the introduction of weeds to this area.

The road has been designed to minimise clearing of native roadside vegetation, particularly in the smaller pockets where vegetation is in ‘good’ or ‘very good’ condition. There are no known Threatened or Priority species or ecological communities located within or adjacent to the clearing area (Shire of Augusta Margaret River, 2021a).

Further evidence was submitted by the applicant, demonstrating that avoidance and mitigation measures had been considered. In particular, the Shire provided the following comments:

#### Avoidance

- The habitat values along the road will be incorporated into the road design process to avoid impacts to western ringtail possum (WRP). This could include (but not be limited to):
  - Shifting road widening/drainage works to avoid clearing vegetation that is in good or higher condition (as mapped by Stream Environment Water, 2020).
  - Utilising cleared or degraded areas for road works where possible.
  - Undertake retrenchment pruning as an alternative to tree removal.
  - Retention of native habitat trees (trees >50cm DBH) where possible.
- Note that over 55 per cent of the road reserve is already cleared or contains intentionally planted, exotic trees adjoining agricultural land, and all efforts will be made during the road design process to utilise these areas where possible. It’s also worth noting that for a majority of the alignment, the roadside vegetation is already located more than 1-2 metres from the road edge and are unlikely to be disturbed. It is difficult to quantify this in a purpose permit application but could be refined later on as more detailed road designs become available (Shire of Augusta Margaret River, 2021b).

### Mitigation

- Where removal of native vegetation is unavoidable, the Shire will undertake the following mitigation strategies (as outlined in our application):
  - Existing surface drainage patterns will be maintained during road reconstruction, with no changes to surface hydrology or movement of sediment into the surrounding environment.
  - Best practice weed and dieback hygiene measures will be implemented during clearing and construction (clean vehicles and machinery prior to entering the site).
  - Clearing will be implemented in strict accordance with DBCA's *Procedures to Minimise the Risk to Western Ringtail Possums during Vegetation Clearing and Building Demolition* (DBCA, 2015), including the presence of a qualified fauna specialist on site prior to and during construction in order to undertake a pre-clearing inspection of trees and manage any disturbed animals (Shire of Augusta Margaret River, 2021b).

### Shire's WRP recovery actions

The Shire is committed towards protecting the Critically Endangered WRP, and has a strong history of implementing recovery actions in the Region for this species, including:

- Implementation of an annual revegetation program on Shire-managed reserves in order to enhance habitat values and habitat connectivity for native fauna, including WRPs. In 2018-19, the Shire planted over 12,000 local native seedlings in Shire-managed reserves with over 8,000 planted in 2019-20.
- Supporting on-ground works and long term management of native vegetation in the West Cowaramup area through the formation of the Friends of Cowaramup Group in 2018-19 and subsequent weed control and revegetation projects, including the closure of a gravel track and subsequent revegetation of 650m<sup>2</sup> immediately east of the Curtis Rd area to re-connect two parcels of vegetation previously bisected by a road.
- Requiring WA Peppermint (*Agonis flexuosa*) as the predominant street tree in new development sites, and undertaking active planting of WA Peppermint in urban parklands with over 400 semi-mature trees planted in winter 2020.
- Contribution of funds between 2019-2022 to local NRM Group Nature Conservation Margaret River Region via the Shire of Augusta Margaret River's Environmental Management Fund, to collaboratively implement projects involving WRP recovery, including:
  - 3 year Western Ringtail Possum conservation project, including a citizen science survey, revegetation of 1.5 ha of WRP habitat along the Margaret River foreshore (in addition to Shire led revegetation), community WRP Spring tally, community nightstalk events, and a community WRP education and engagement program.
  - 3 year Environmental Education Program for school students to learn about the local environment, which includes WRP excursions.
  - Community engagement program to work with community volunteers and school students to implement conservation actions in local bushland reserves, including planting, brushing and weeding.
- Implementation of the Shire's annual weed control program, targeting both annual and woody weeds on Shire Reserves and Road Reserves, in order to enhance reserve native flora and fauna values.
- Naming of the local A Class Reserve as 'Nguraren Kalleep', meaning 'Ringtail Camp', which recognises the Wadandi cultural values of the Margaret River, and the reserve's significant habitat value for the critically endangered Western Ringtail Possum (Nguraren).
- Membership on the Capes Region Western Ringtail Possum Steering Committee along with DBCA, NRM groups and scientists to develop and implement projects to identify, protect and enhance WRP habitat values (Shire of Augusta Margaret River, 2021b).

During the assessment, the application area footprint was modified from being 1.5 hectares within a 13.2 hectare footprint to 1.5 hectares within a 2.4 hectare footprint. This reduction also included the reduction to the width of the corridor in which the footprint occurred, from 20 meters to 8 meters (with up to 4 meters on either side of the road).

The Delegated Officer was satisfied that the applicant has made a reasonable effort to avoid and minimise potential impacts of the proposed clearing on environmental values.

### **3.2. Assessment of impacts on environmental values**

In assessing the application, the Delegated Officer has had regard for the site characteristics (see Appendix B) and the extent to which the impacts of the proposed clearing present a risk to biological, conservation, or land and water resource values.

The assessment against the clearing principles (see **Error! Reference source not found.**) identified that the impacts of the proposed clearing present a risk to western ringtail possums and black cockatoos. The consideration of these

impacts, and the extent to which they can be managed through conditions applied in line with sections 51H and 51I of the EP Act, is set out below.

### **3.2.1. Biological value (fauna) - Clearing Principle (b)**

#### Assessment

Within the local area (10-kilometre radius of the application area), 43 conservation significant fauna species have been recorded. Of these recordings, 20 species occur within marine waters, freshwater or coastline habitats not represented within the application area. Of the remaining 23 species, two are known to be extinct, the broad-faced potoroo (*Potorous platyops*) and Rufous bristlebird (*Dasyornis broadbenti litoralis*). The application area does not contain a dense understory so is not considered to provide permanent habitat for ground dwelling species but is likely to provide an ecological linkage to an extent.

A review of available imagery shows most properties adjacent to the road are cleared except for a property which has a covenant on it. While the value of roadside vegetation for ecological linkage is acknowledged, noting the absence of connecting vegetation, this road reserve is unlikely to provide high quality ecological linkage value. Further, noting the applicant's avoidance measures of reducing the width of clearing from 20 meters to 8 meters (as described in Section 3.1 (Avoidance and mitigation measures)), it is considered that the roadside vegetation will retain some linkage values as a stepping stone for fauna moving across the landscape.

The application area is likely to provide habitat for arboreal species recorded within the local area including, but not limited to; *Phascogale tapoatafa wambenger* (south-western brush-tailed phascogale), *Tyto novaehollandiae novaehollandiae* (Masked Owl), *Calyptorhynchus banksii naso* (forest red-tailed black cockatoo), *Calyptorhynchus baudinii* (Baudin's cockatoo), *Calyptorhynchus latirostris* (Carnaby's cockatoo) *Pseudocheirus occidentalis* (western ringtail possum) and *Falco peregrinus* (Peregrine falcon).

#### **Western Ringtail Possum (*Pseudocheirus occidentalis*)**

The application area is within the South Coast Management Zone for the western ringtail possum (*Pseudocheirus occidentalis*) as described within the 'Western Ringtail Possum Recovery Plan' (Department of Parks and Wildlife, 2017). The management plan outlines strategies to slow the decline in population size, extent and area of occupancy through managing major threatening processes affecting the subpopulations and their habitats and allowing the persistence of the species in each of the identified key management zones: Swan Coastal Plain, southern forests and south coast (DPaW, 2017). The application area is located within the Swan Coastal Plain management zone.

Peppermint trees (*Agonis flexuosa*) are important habitat for western ringtail possum (WRP), listed as Critically Endangered under the BC Act and the EPBC Act. Populations in the Swan Coastal Plain management zone are associated with stands of myrtaceous trees (usually *Agonis flexuosa*) growing near swamps, watercourses or floodplains, and at topographic low points which provide cooler and often more fertile conditions. Habitat critical to survival for WRP comprises long unburnt mature remnant peppermint woodlands with high canopy continuity and high nutrient foliage with minimal periods of summer moisture stress, and habitat connecting patches of remnants

Considering the application area contains peppermint trees but is not well linked with canopy within the surrounding area, the application area is not likely to provide significant habitat for the species but may provide habitat for individuals moving within their home range. It is noted that an inspection of the application area by the applicant located a drey within a peppermint tree within the application area.

#### **Black Cockatoo species**

Carnaby's cockatoo and Baudin's cockatoo are listed as Endangered and forest red-tailed black cockatoo (FRTBC) is listed as Vulnerable under the *Biodiversity Conservation Act 2016*. All three species are protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The application area is within the known breeding range of Baudin's and Carnaby's black cockatoo and the 'core' habitat of FRTBC, and therefore, is within the known range for all three black cockatoo species. While habitat requirements for the three species of black cockatoos is different, the requirements in general can be categorised as breeding habitat, foraging habitat and night roosting habitat.

#### Breeding habitat

Breeding habitat for species of black cockatoos is described within the document 'EPBC Act referral guidelines for three threatened black cockatoo species' (Commonwealth of Australia, 2012) as the following:

- Baudin's cockatoo - Generally in woodland or forest, but may also breed in former woodland or forest now present as isolated trees. Nest in hollows in live or dead trees of karri *Eucalyptus diversicolor*, marri *Corymbia calophylla*, wandoo *E. wandoo* and tuart *E. gomphocephala*.
- Carnaby's cockatoo - Generally in woodland or forest, but also breeds in former woodland or forest now present as isolated trees. Nest in hollows in live or dead trees of salmon gum *E. salmonophloia*, wandoo, tuart, jarrah *E. marginata*, flooded gum *E. rudis*, York gum *E. loxophleba* subsp. *loxophleba*, powder bark *E. accedens*, karri and marri.
- FRTBC - Generally in woodland or forest, but may also breed in former woodland or forest now present as isolated trees. Nest in hollows in live or dead trees of marri, karri, wandoo, bullish *E. megacarpa*, blackbutt *E. patens*, tuart and jarrah.

Breeding habitat as 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 millimetres.

Supporting documents with the application noted that 16 habitat trees (trees with DBH of over 500 millimetres) are located within the original application area. A review of the modified footprint noted that two of these trees had been avoided. The site inspection (Shire of Augusta-Margaret River) note that inspections of the trees noted no hollows large enough to support breeding habitat for black cockatoos were observed.

#### Foraging habitat

As with breeding habitat, foraging habitat differs between the three species of black cockatoos.

- Baudin's cockatoo - Mostly marri (seeds, flowers, nectar and grubs) and proteaceous trees and shrubs. Also other native seeds and introduced fruits; insects and insect larvae; pith of kangaroo paw *Anigozanthos flavidus*; juice of ripe persimmons; tips of *Pinus* spp. and seeds of apples and pears.
- Carnaby's cockatoo - Seeds, flowers and nectar of native proteaceous plant species (for example, *Banksia* spp., *Hakea* spp., *Dryandra* spp. and *Grevillea* spp), eucalypts and Callistemon. Also seeds of introduced species including *Pinus* spp., *Erodium* spp., wild radish, canola, almonds and pecan nuts; insects and insect larvae; occasionally flesh and juice of apples and persimmons.
- FRTBC - Mostly seeds of marri and jarrah, also *Eucalyptus caesia*, illyarrie *E. erythrocorys* and some introduced eucalypts such as river red gum *E. camaldulensis* and flooded gum *E. grandis*, *Allocasuarina* cones, fruits of snottygobble *Persoonia longifolia* and mountain marri *Corymbia haematoxylon*.

The flora and vegetation survey provided with the application (Stream Environment and Water, 2020) noted the vegetation types within the application area include woodlands of marri and some jarrah trees. Noting the above listed foraging preferences of black cockatoo species, the application area is considered to provide foraging habitat for black cockatoos.

While breeding, black cockatoos also generally forage within a 6 to 12-kilometre radius of their nesting site (Commonwealth of Australia, 2012). According to available datasets, mapped black cockatoo foraging habitat is recorded within a 12-kilometre radius of the application area, making it a suitable location for breeding if appropriate hollows are present. According to available databases, the closest confirmed breeding site for the white-tailed black cockatoo (Carnaby's or Baudin's) is approximately 21 kilometres east of the application area.

In context of the local area, the vegetation calculations completed reveal that the local area contains over 40 per cent remnant vegetation, of which 44 percent (6509.9 hectares) is mapped as being suitable vegetation for black cockatoo species. The majority of the application area is located within the Warren IBRA region with a one-kilometre portion within the Jarrah Forrest IBRA Bioregion. This IBRA region has been previously mapped for its foraging potential (Glossop et al., 2011). Given the Warren IBRA region has never been mapped with its foraging value, the mapped black cockatoo habitat is an under representation of the total foraging habitat within the local area.

Noting the above and the presence of approximately 41 per cent coverage of remnant vegetation in the local area, it is considered that abundant foraging resources are available within the local area. Therefore, the removal of up to 1.5 hectares of native vegetation along a liner area is unlikely to represent a significant impact to local foraging resources for black cockatoos.

### Night Roost sites

Available databases show that there are 17 records of black cockatoo roost sites within the local area but no mapped breeding locations of any of the three species. The closest known roosting location to the application area is just 25 meters away. Roosting habitat for the three black cockatoo species include:

- Baudin's cockatoo – Generally in or near riparian environments or other permanent water sources. Jarrah, marri, flooded gum, blackbutt *E. patens*, tuart, and introduced eucalypts including blue gum *E. globulus*, and lemon scented gum *Corymbia citriodora*.
- Carnaby's cockatoo - Generally in or near riparian environments or natural and artificial permanent water sources. Flat-topped yate *E. occidentalis*, salmon gum, wandoo, marri, karri, blackbutt, tuart, introduced eucalypts (for example blue gum) and introduced pines.
- FRTBC - tall jarrah, marri, blackbutt, tuart and introduced eucalypt trees within or on the edges of forests.

Given the distance to other roosting sites and the presence of water sources within the local area, the large trees within the application area are likely to provide night roosting habitat for species of black cockatoos.

### **South-western brush-tailed phascogale (*Phascogale tapoatafa wambenger*)**

In south-west WA, this species is known to occur in dry sclerophyll forests and open woodlands that contain hollow bearing trees, with records less common in higher rainfall areas. This species is said to occur in highest densities Perup/Kingston area, Collie River valley, and near Margaret River and Busselton (DEC, 2012). According to available databases, this species has been recorded 89 times within the local area. A site inspection of the application area conducted by the Shire did not observe and signs of this species however it is known the species is active between dusk and dawn.

In the absence of a fauna survey and noting the habitat for the species can include hollow tree limbs, rotten stumps and bird nests, it is considered the application area may provide habitat for these species.

### Conclusion

Based on the above assessment, the proposed clearing may result in potential impacts to individuals of western ringtail possum, south-western brush-tailed phascogales and black cockatoos if present during the clearing. The proposed clearing may impact on foraging and roosting habitat for black cockatoos and ecological linkage function of roadside vegetation.

For the reasons set out above, it is considered that the impacts of the proposed clearing on biological values can be acceptably managed through the avoidance and minimisation measures committed to by the applicant including the reduction of the footprint, as well as conditions as specified in the permit.

### Conditions

To address the above impacts, the following management measures will be required as conditions on the clearing permit:

- Avoidance and minimisations measures
- A fauna specialist to be present to monitor clearing and to take steps as specified in the permit conditions if nominated fauna species are present during the clearing, including identification and inspection of trees with suitable hollows for black cockatoos.
- weeds and dieback management measures as specified in the clearing permit

### **3.2.2. Relevant planning instruments and other matters**

The Shire of Augusta Margaret River advised DWER that the proposed clearing is consistent with the Shire's Local Planning Scheme.

The Shire also advised that the proposed road upgrade works does not include clearing within the watercourses within the application area, in the next 12 months. If there is potential for clearing at these sites in future years within the five-year permit period (e.g. for culvert upgrade works), the Shire will obtain a Bed and Banks Permit under the *Rights in Water and Irrigation Act 1914* (Shire of Augusta Margaret River, 2021b).

The application area is located within the boundaries of the Single Noongar Claim (Area 2 and a small portion of Area 1) and the South West Boojara #2 Indigenous Land Use Agreement. No Aboriginal Heritage Places have been mapped within the application area. It is the permit holder's responsibility to comply with the *Aboriginal Heritage Act 1972* (WA) and ensure that no Aboriginal Sites of Significance are damaged through the clearing process.

There are several Aboriginal Heritage Places within the local area (10-kilometre radius from the centre of the area proposed to be cleared) with the closest being Cowaramup Brook artefact scatter and archaeological deposit (approximately 1 kilometre away) and the next closest being Cowaramup Sale Yards Camp and Corroboree Grounds (approximately 1.2 kilometres away).

It is the permit holder's responsibility to comply with the *Aboriginal Heritage Act 1972* (WA) and ensure that no Aboriginal Sites of Significance are damaged through the clearing process.

**End**

## Appendix A. Additional information provided by applicant

During the assessment, the applicant responded to a request for information on the following:

- Further information on avoidance and minimisation
- Confirmation on if the applicant intends on clearing withing the watercourses that intersect the application area.

The applicant provided an adequate response which has been included within relevant sections of this report (3.1 Avoidance and minimisation and under 3.2.2 Relevant planning instruments and other matters).

## Appendix B. Site characteristics

### B.1. Site characteristics

Characteristic	Details																						
Local context	<p>The area proposed to be cleared is a 1.5-hectare area of native vegetation along a road reserve within an intensive land use zone of Western Australia. The majority of this roadside vegetation is adjacent to cleared paddocks used for agricultural purposes. The proposed clearing area contributes to an ecological linkage in an east west direction between parcels of native vegetation.</p> <p>Aerial imagery and spatial data indicate the local area (10-kilometre radius from the centre of the area proposed to be cleared) retains approximately 41 percent of the original native vegetation cover.</p>																						
Ecological linkage	The eastern extent of the application area intersects the Southwest Regional Ecological Linkage (Object ID 110). Vegetation within the application area along the roadside is likely to serve an ecological linkage function between parcels of vegetation within the local area on an east west alignment.																						
Conservation areas	<table border="1"> <thead> <tr> <th>Name</th> <th>Proximity (m)</th> </tr> </thead> <tbody> <tr> <td>DBCA Covenant (Burden) Lot 101 on Plan 6260</td> <td>2</td> </tr> <tr> <td>Leeuwin-Naturaliste National Park Conservation Commission Of WA</td> <td>453</td> </tr> <tr> <td>2819/890</td> <td>1125</td> </tr> <tr> <td>Ngari Capes Marine Park Marine Parks And Reserves Authority</td> <td>2819</td> </tr> <tr> <td>Bramley National Park Conservation Commission Of WA</td> <td>3283</td> </tr> <tr> <td>Keenan State Forest Conservation Commission Of WA</td> <td>5522</td> </tr> <tr> <td>North East Margaret River State Forest Conservation Commission Of WA</td> <td>6591</td> </tr> <tr> <td>Conservation Commission Of WA</td> <td>7401</td> </tr> <tr> <td>Walburra Nature Reserve Conservation Commission Of WA</td> <td>7894</td> </tr> <tr> <td>Yelverton National Park Conservation Commission Of WA</td> <td>9785</td> </tr> </tbody> </table>	Name	Proximity (m)	DBCA Covenant (Burden) Lot 101 on Plan 6260	2	Leeuwin-Naturaliste National Park Conservation Commission Of WA	453	2819/890	1125	Ngari Capes Marine Park Marine Parks And Reserves Authority	2819	Bramley National Park Conservation Commission Of WA	3283	Keenan State Forest Conservation Commission Of WA	5522	North East Margaret River State Forest Conservation Commission Of WA	6591	Conservation Commission Of WA	7401	Walburra Nature Reserve Conservation Commission Of WA	7894	Yelverton National Park Conservation Commission Of WA	9785
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Vegetation description	<p>A vegetation survey (Stream Environmental and Water, 2020) indicates that the vegetation complex within the proposed clearing area consists of the following vegetation types:</p> <ul style="list-style-type: none"> <li>• <b>CcAfXp</b> - Woodland of <i>Corymbia calophylla</i> over open woodland of <i>Agonis flexuosa</i> over shrubland of <i>Xanthorrhoea preissii</i> and <i>Bossiaea ornata</i></li> <li>• <b>CcEmBI</b> - Woodland of <i>Corymbia calophylla</i> and <i>Eucalyptus marginata</i> over open shrubland of <i>Bossiaea linophylla</i> and <i>Xanthorrhoea preissii</i> over shrubland of <i>Hibbertia Hypericoides</i></li> <li>• <b>CcTp</b> - Woodland of <i>Corymbia calophylla</i> over shrubland of <i>Taxandria parviceps</i> over sedgeland of <i>Mesomelaena tetragona</i> and <i>Cyathochaeta avenacea</i></li> <li>• <b>PI</b> – Planted</li> <li>• <b>CI</b> – cleared or parkland cleared</li> </ul>																						

Characteristic	Details
	<p>Representative photos and the full survey descriptions and maps are available in Appendix E.</p> <p>Portions of the application area are consistent with the mapped vegetation types, which include:</p> <ul style="list-style-type: none"> <li>• Cowaramup, C2, which is described as open forest of <i>Eucalyptus marginata</i> subsp. <i>marginata</i>-<i>Corymbia calophylla</i>-<i>Banksia grandis</i> on lateritic uplands in perhumid and humid zones.</li> <li>• Cowaramup, CW2, which is described as woodland of <i>Eucalyptus marginata</i> subsp. <i>marginata</i>-<i>Corymbia calophylla</i> on slopes and low woodland of <i>Melaleuca preissiana</i>-<i>Banksia littoralis</i> on depressions in perhumid and humid zones.</li> <li>• Wilyabrup, W1, which is described as tall open forest of <i>Eucalyptus diversicolor</i>-<i>Corymbia calophylla</i>-<i>Allocasuarina decussata</i>-<i>Agonis flexuosa</i> on deeply incised valleys in the hyperhumid zone.</li> <li>• Wilyabrup Ww2, Tall open forest of <i>Eucalyptus diversicolor</i>-<i>Agonis flexuosa</i>-<i>Callistachys lanceolata</i> with some <i>Corymbia calophylla</i> on flats and valleys in the hyperhumid zone.</li> </ul> <p>The mapped vegetation types retain between 20 and 53 per cent of the original extent (Government of Western Australia, 2019).</p>
Vegetation condition	<p>Vegetation survey (Stream Environmental, 2020) provided by the applicant indicates the vegetation within the application area is in Very Good, Good, Degraded and Completely Degraded condition (Keighery, 1994) condition, described as:</p> <ul style="list-style-type: none"> <li>• Very Good - Vegetation structure altered, with obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and/or grazing.</li> <li>• Good - structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it.</li> <li>• Degraded - Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management.</li> <li>• Completely Degraded - The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees or shrubs.</li> </ul> <p>The full Keighery (1994) condition rating scale is provided in 0. The full survey descriptions and mapping are available in Appendix E.</p>
Climate and landform	<p>Rainfall: 1100 millilitres per annum and 1200 millilitres per annum Evapotranspiration: 800 millilitres per annum.</p> <p>Geology: Gneiss and Alluvial, shoreline, and eolian deposits and Basic and ultrabasic intrusive rocks.</p>
Soil description	<p>The mapped soil types within the application area include:</p> <ul style="list-style-type: none"> <li>• Cowaramup flats Phase, described as: Flats (0-2% gradient) with gravelly duplex (Forest Grove) and pale grey mottled (Mungite) soils.</li> <li>• Cowaramup gentle slope Phase, described as: Gentle slope (2-5% gradient) with gravelly duplex (Forest Grove) soils.</li> <li>• Cowaramup ironstone rises Phase, described as: Flats and gentle slopes (0-5% gradient) with some laterite outcrop and shallow gravelly sands over laterite.</li> <li>• Cowaramup wet flats Phase, described as: Poorly drained flats and slight depressions with pale grey mottled (Mungite).</li> <li>• Cowaramup wet vales Phase, described as: Poorly drained flats and slight depressions with pale grey mottled (Mungite).</li> </ul>



Characteristic	Details
	<ul style="list-style-type: none"> <li>• Cowaramup, undifferentiated upland Phase, described as: Flats and gentle slopes (0-5% gradient) with gravelly duplex (Forest Grove) and pale grey mottled (Mungite) soils.</li> <li>• Wilyabrup gentle slope Phase, described as: Gradients 5-10%</li> <li>• Wilyabrup narrow valley floor Phase described as: Narrow V-shaped drainage depressions.</li> <li>• Cowaramup ironstone rises Phase, described as: Flats and gentle slopes (0-5% gradient) with some laterite outcrop and shallow gravelly sands over laterite.</li> </ul>
Land degradation risk	All land degradation risks vary across the different mapped soil types along the application area. The land degradation risk table below identifies the mapped risks for each soil type.
Waterbodies	<p>Available databases indicate that a nonperennial watercourse (Cowaramup Brook) intersects the application area at two locations.</p> <p>A palusvale wetland is mapped as occurring approximately 25 metres to the north of the road, this is within a cleared paddock. No wetlands are mapped as occurring within the application area.</p>
Hydrogeography	<p>The application area is within the Cape-to-Cape North Surface Water Area (proclaimed under the <i>Rights in Water and Irrigation Act 1914</i>) and the Busselton-Capel Irrigation Area (also proclaimed under the RIWI Act).</p> <p>According to available databases, the groundwater salinity ranges from 1000 to 3000 milligrams to litres total dissolved solids which can be described as brackish to saline.</p>
Flora	<p>There are records of 30 conservation significant flora within the local area. The closest record is a Priority 3 species <i>Boronia anceps</i>, this recording is approximately 853 meters from the application area.</p> <p>There are no records of conservation significant flora within the application area and no conservation significant flora were recorded during a floristic survey of the application area (Stream Environment Water, 2020).</p>
Ecological communities	<p>There are three conservation significant ecological communities within the local area:</p> <ul style="list-style-type: none"> <li>• Low shrublands on acidic grey-brown sands of the Gracetown soil-landscape system (P2)</li> <li>• Melaleuca lanceolata forests, Leeuwin Naturaliste Ridge (P2)</li> <li>• Shrublands of near permanent wetlands in creeklines of the Whicher Scarp (Whicher Scarp community G2) (P1)</li> </ul> <p>None of these communities are mapped as occurring within the application area.</p>
Fauna	<p>There are records of 43 conservation significant fauna species the local area.</p> <p>There are no records of black cockatoo roost or breeding trees within the application area. The closest confirmed black cockatoo roost is 25 metres south of the application area on the western end.</p> <p>There are no confirmed black cockatoo breeding trees within the application area or local area. The closest confirmed forest red-tailed black cockatoo breeding tree is 23.45 kilometres to the north of the application area and the closest confirmed white-tailed black cockatoo breeding is 21.33 kilometres southwest of the application area.</p>

## B.2. Vegetation extent

	Pre-European extent (ha)	Current extent (ha)	Extent remaining (%)	Current extent in all DBCA managed land (ha)	Current proportion (%) of pre-European extent in all DBCA managed land
IBRA bioregion*					
Jarrah Forests	4,506,660.25	2,399,838.15	53.25	1,673,614.25	37.14
Vegetation complex					
Cowaramup C2**	13,692.45	4,442.60	32.45	863.08	6.30
Cowaramup Cw2**	6,654.67	1,352.26	20.32	245.24	3.69
Wilyabrup W1**	7,296.19	3,915.60	53.67	1,878.79	25.75
Wilyabrup Ww1**	2,267.64	1,218.01	53.71	495.37	21.85
Local area calculation					
10km radius			41	-	-

\*Government of Western Australia (2019a)

\*\*Government of Western Australia (2019b)

## B.3. Fauna analysis table

Species name	Conservation status	Suitable habitat features? [Y/N]	Suitable vegetation type? [Y/N]	Distance of closest record to application area (km)	Are surveys adequate to identify? [Y, N, N/A]
Baudin's cockatoo ( <i>Calyptorhynchus baudinii</i> )	EN	Y	Y	0	Y
bilby, dalgyte, ninu ( <i>Macrotis lagotis</i> )	VU	N	N	8.4	N
broad-faced potoroo ( <i>Potorous platyops</i> )	EX	N	N/A	N/A	N/A
Carnaby's cockatoo ( <i>Calyptorhynchus latirostris</i> )	EN	Y	Y	0.006	N
chuditch, western quoll ( <i>Dasyurus geoffroii</i> )	VU	N	N/A	5.4	N/A
forest red-tailed black cockatoo ( <i>Calyptorhynchus banksii naso</i> )	VU	Y	Y	4.7	N
malleefowl ( <i>Leipoa ocellata</i> )	VU	N	N/A	7	N/A
Masked Owl (southwest) ( <i>Tyto novaehollandiae novaehollandiae</i> )	P3	Y	Y	9.9	N
Peregrine falcon ( <i>Falco peregrinus</i> )	OS	Y	N/A	4.9	N
Quenda, southwestern brown bandicoot ( <i>Isodon fusciventer</i> )	P4	Y	Y	1.4	N
Quokka ( <i>Setonix brachyurus</i> )	VU	N	N/A	1.8	N/A
Rufous bristlebird ( <i>Dasyornis broadbenti litoralis</i> )	EX	N	N/A	5.1	N/A
south-western brush-tailed phascogale, ( <i>Phascogale tapoatafa wambenger</i> )	CD	Y	Y	0	N
Tingle pygmy trapdoor spider ( <i>Bertmainius tingle</i> )	EN	N	N	5.8	N/A
Water-rat, rakali ( <i>Hydromys chrysogaster</i> )	P4	N	N	2.5	N/A
western brush wallaby ( <i>Notamacropus Irma</i> )	P4	N	Y	4.2	N/A
western false pipistrelle, western falsistrelle ( <i>Falsistrellus mackenziei</i> )	P4	N	N	3.5	N/A
western pygmy trapdoor spider ( <i>Bertmainius opimus</i> )	P4	N	Y	5.8	N/A

Species name	Conservation status	Suitable habitat features? [Y/N]	Suitable vegetation type? [Y/N]	Distance of closest record to application area (km)	Are surveys adequate to identify? [Y, N, N/A]
western ringtail possum, ( <i>Pseudocheirus occidentalis</i> )	CR	Y	Y	0.3	N
western whipbird ( <i>Psophodes nigrogularis</i> )	P3	N	N/A	6.2	N/A
western whipbird (western heath) ( <i>Psophodes nigrogularis nigrogularis</i> )	EN	N	N/A	3.5	N/A

T: threatened, CR: critically endangered, EN: endangered, VU: vulnerable, P: priority

#### B.4. Ecological community analysis table

Community name	Conservation status	Suitable habitat features? [Y/N]	Suitable vegetation type? [Y/N]	Suitable soil type? [Y/N]	Distance of closest record to application area (km)	Are surveys adequate to identify? [Y, N, N/A]
Low shrublands on acidic grey-brown sands of the Gracetown soil-landscape system	P2	N	N	N	2.72	Y
Melaleuca lanceolata forests, Leeuwin Naturaliste Ridge	P2	N	N	N	9.54	Y
Shrublands of near permanent wetlands in creeklines of the Whicher Scarp (Whicher Scarp community G2)	P1	N	N	N	9.83	Y

T: threatened, CR: critically endangered, EN: endangered, VU: vulnerable, P: priority

## B.5. Land degradation risk table

<b>Risk categories</b>	<b><i>Land Unit 1 - Cowaramup flats Phase</i></b>
Wind erosion	>70% of map unit has a high to extreme wind erosion risk
Water erosion	<3% of map unit has a high to extreme water erosion risk
Salinity	<3% of map unit has a moderate to high salinity risk or is presently saline
Subsurface Acidification	>70% of map unit has a high subsurface acidification risk or is presently acid
Flood risk	<3% of the map unit has a moderate to high flood risk
Water logging	30-50% of map unit has a moderate to very high waterlogging risk
Phosphorus export risk	3-10% of map unit has a high to extreme phosphorus export risk

<b>Risk categories</b>	<b><i>Land Unit 2 - Cowaramup gentle slope Phase</i></b>
Wind erosion	>70% of map unit has a high to extreme wind erosion risk
Water erosion	<3% of map unit has a high to extreme water erosion risk
Salinity	<3% of map unit has a moderate to high salinity risk or is presently saline
Subsurface Acidification	>70% of map unit has a high subsurface acidification risk or is presently acid
Flood risk	<3% of the map unit has a moderate to high flood risk
Water logging	3-10% of map unit has a moderate to very high waterlogging risk
Phosphorus export risk	10-30% of map unit has a high to extreme phosphorus export risk

<b>Risk categories</b>	<b><i>Land Unit 3 - Cowaramup wet flats Phase</i></b>
Wind erosion	3-10% of map unit has a high to extreme wind erosion risk
Water erosion	<3% of map unit has a high to extreme water erosion risk
Salinity	<3% of map unit has a moderate to high salinity risk or is presently saline
Subsurface Acidification	>70% of map unit has a high subsurface acidification risk or is presently acid
Flood risk	<3% of the map unit has a moderate to high flood risk
Water logging	>70% of map unit has a moderate to very high waterlogging risk
Phosphorus export risk	30-50% of map unit has a high to extreme phosphorus export risk

<b>Risk categories</b>	<b><i>Land Unit 4 - Cowaramup wet vales Phase</i></b>
Wind erosion	50-70% of map unit has a high to extreme wind erosion risk
Water erosion	10-30% of map unit has a high to extreme water erosion risk
Salinity	<3% of map unit has a moderate to high salinity risk or is presently saline
Subsurface Acidification	>70% of map unit has a high subsurface acidification risk or is presently acid
Flood risk	10-30% of the map unit has a moderate to high flood risk
Water logging	50-70% of map unit has a moderate to very high waterlogging risk
Phosphorus export risk	30-50% of map unit has a high to extreme phosphorus export risk

<b>Risk categories</b>	<b><i>Land Unit 5 - Cowaramup undifferentiated upland Phase</i></b>
Wind erosion	>70% of map unit has a high to extreme wind erosion risk
Water erosion	3-10% of map unit has a high to extreme water erosion risk
Salinity	<3% of map unit has a moderate to high salinity risk or is presently saline
Subsurface Acidification	>70% of map unit has a high subsurface acidification risk or is presently acid

Flood risk	<3% of the map unit has a moderate to high flood risk
Water logging	<3% of map unit has a moderate to very high waterlogging risk
Phosphorus export risk	10-30% of map unit has a high to extreme phosphorus export risk

<b>Risk categories</b>	<b>Land Unit 6 - Wilyabrup gentle slope Phase</b>
Wind erosion	>70% of map unit has a high to extreme wind erosion risk
Water erosion	3-10% of map unit has a high to extreme water erosion risk
Salinity	<3% of map unit has a moderate to high salinity risk or is presently saline
Subsurface Acidification	>70% of map unit has a high subsurface acidification risk or is presently acid
Flood risk	<3% of the map unit has a moderate to high flood risk
Water logging	<3% of map unit has a moderate to very high waterlogging risk
Phosphorus export risk	10-30% of map unit has a high to extreme phosphorus export risk

<b>Risk categories</b>	<b>Land Unit 7 - Wilyabrup narrow valley floor Phase</b>
Wind erosion	30-50% of map unit has a high to extreme wind erosion risk
Water erosion	10-30% of map unit has a high to extreme water erosion risk
Salinity	<3% of map unit has a moderate to high salinity risk or is presently saline
Subsurface Acidification	50-70% of map unit has a high subsurface acidification risk or is presently acid
Flood risk	10-30% of the map unit has a moderate to high flood risk
Water logging	10-30% of map unit has a moderate to very high waterlogging risk
Phosphorus export risk	30-50% of map unit has a high to extreme phosphorus export risk

<b>Risk categories</b>	<b>Land Unit 8 - Cowaramup ironstone rises Phase</b>
Wind erosion	>70% of map unit has a high to extreme wind erosion risk
Water erosion	<3% of map unit has a high to extreme water erosion risk
Salinity	<3% of map unit has a moderate to high salinity risk or is presently saline
Subsurface Acidification	>70% of map unit has a high subsurface acidification risk or is presently acid
Flood risk	<3% of the map unit has a moderate to high flood risk
Water logging	<3% of map unit has a moderate to very high waterlogging risk
Phosphorus export risk	3-10% of map unit has a high to extreme phosphorus export risk

**Appendix C. Assessment against the clearing principles**

Assessment against the clearing principles	Variance level	Is further consideration required?
<b>Environmental value: biological values</b>		
<p><u>Principle (a):</u> <i>“Native vegetation should not be cleared if it comprises a high level of biodiversity.”</i></p> <p><u>Assessment:</u></p> <p>The area proposed to be cleared is not likely to contain local or regionally significant flora, fauna, habitats, assemblages of plants.</p> <p>No conservation significant ecological communities are mapped within or adjacent to the application area, this is consistent with the findings of a flora survey (Stream ENV, 2020).</p>	Not likely to be at variance	No

Assessment against the clearing principles	Variance level	Is further consideration required?
<p><u>Principle (b):</u> <i>“Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna.”</i></p> <p><u>Assessment:</u></p> <p>The area proposed to be cleared may contain habitat for western ringtail possums, black cockatoo species, south-western brushtail phascogales and masked owls.</p>	May be at variance	Yes <i>Refer to section 3.2.1</i>
<p><u>Principle (c):</u> <i>“Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora.”</i></p> <p><u>Assessment:</u></p> <p>The area proposed to be cleared is unlikely to contain habitat for flora species listed under the BC Act. A Reconnaissance and Targeted Flora and Vegetation Survey found no conservation significant flora species within the application area.</p>	Not likely to be at variance	No
<p><u>Principle (d):</u> <i>“Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a threatened ecological community.”</i></p> <p><u>Assessment:</u></p> <p>The area proposed to be cleared does not contain species that can indicate a threatened ecological community.</p>	Not likely to be at variance	No
<b>Environmental value: significant remnant vegetation and conservation areas</b>		
<p><u>Principle (e):</u> <i>“Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.”</i></p> <p><u>Assessment:</u></p> <p>The extent of the mapped vegetation type and native vegetation in the local area is consistent with the national objectives and targets for biodiversity conservation in Australia with the exception of Cowaramup, CW2. However, it is noted that the survey provided suggests vegetation present is only partially representative of the mapped units and so it is unlikely that the proposed clearing would significantly impact the mapped vegetation types. The application area is part of a local ecological linkage but noting that vegetation remains and considering the avoidance and minimisation measures to be undertaken by the applicant, the linkage would still remain.</p>	Not likely to be at variance	No
<p><u>Principle (h):</u> <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.”</i></p> <p><u>Assessment:</u></p> <p>The application area is adjacent to a property with a Department of Biodiversity Conservation (DBCA) Conservation Covenant. The proposed clearing has the potential to impact this area by the introduction of weeds and dieback.</p> <p>Potential impacts can be addressed within the permit to clear by the application of a weed and dieback condition.</p>	May be at variance	No
<b>Environmental value: land and water resources</b>		

Assessment against the clearing principles	Variance level	Is further consideration required?
<p><u>Principle (f):</u> <i>“Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.”</i></p> <p><u>Assessment:</u></p> <p>Given a minor nonperennial watercourse intersects the application area, the proposed clearing may impact on- or off-site hydrology and water quality.</p> <p>The mapped vegetation types within the survey (Stream Environment and Water, 2020) were not indicative of the riparian vegetation.</p>	May be at variance	No
<p><u>Principle (g):</u> <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.”</i></p> <p><u>Assessment:</u></p> <p>A number of soil types are mapped within the application area, some of which are susceptible to forms of land degradation. Noting the extent and location of the application area and the vegetation remaining within the road reserve, the proposed clearing is not likely to have an appreciable impact on land degradation.</p>	Not likely to be at variance	No
<p><u>Principle (i):</u> <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.”</i></p> <p><u>Assessment:</u></p> <p>The application area intersects a minor nonperennial watercourse at two locations. One of which a crossing is already constructed. The Shire have noted they do not intend on clearing within the watercourses. Noting this, the proposed clearing is not likely to cause deterioration in surface or groundwater quality.</p>	Not likely to be at variance	No
<p><u>Principle (j):</u> <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.”</i></p> <p><u>Assessment:</u></p> <p>Some of the mapped soil types within the application area have a moderate to high risk of flooding. These occurrences are aligned with the non-perennial watercourse which intersects the application area.</p> <p>Noting the area of intersection is minor, it is considered that the proposed clearing is unlikely to contribute to increased incidence or intensity of flooding.</p> <p>Soil types with high risk of waterlogging are mapped within the application area. These areas are associated with the nonperennial watercourse that intersects the application area. Noting the area of intersection of these soil types and the application area is minor, the proposed clearing is unlikely to contribute to waterlogging.</p>	Not likely to be at variance	No

## Appendix D. Vegetation condition rating scale

Vegetation condition is a rating given to a defined area of vegetation to categorise and rank disturbance related to human activities. The rating refers to the degree of change in the vegetation structure, density and species present in relation to undisturbed vegetation of the same type. The degree of disturbance impacts upon the vegetation's ability to regenerate. Disturbance at a site can be a cumulative effect from a number of interacting disturbance types.

Considering its location, the scale below was used to measure the condition of the vegetation proposed to be cleared. This scale has been extracted from Keighery, B.J. (1994) *Bushland Plant Survey: A Guide to Plant Community Survey for the Community*. Wildflower Society of WA (Inc). Nedlands, Western Australia.

### Measuring vegetation condition for the South West and Interzone Botanical Province (Keighery, 1994)

Condition	Description
Pristine	Pristine or nearly so, no obvious signs of disturbance.
Excellent	Vegetation structure intact, with disturbance affecting individual species; weeds are non-aggressive species.
Very good	Vegetation structure altered, with obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and/or grazing.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. 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/or grazing.
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/or grazing.
Completely degraded	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees or shrubs.



## Appendix E. Biological survey information excerpts

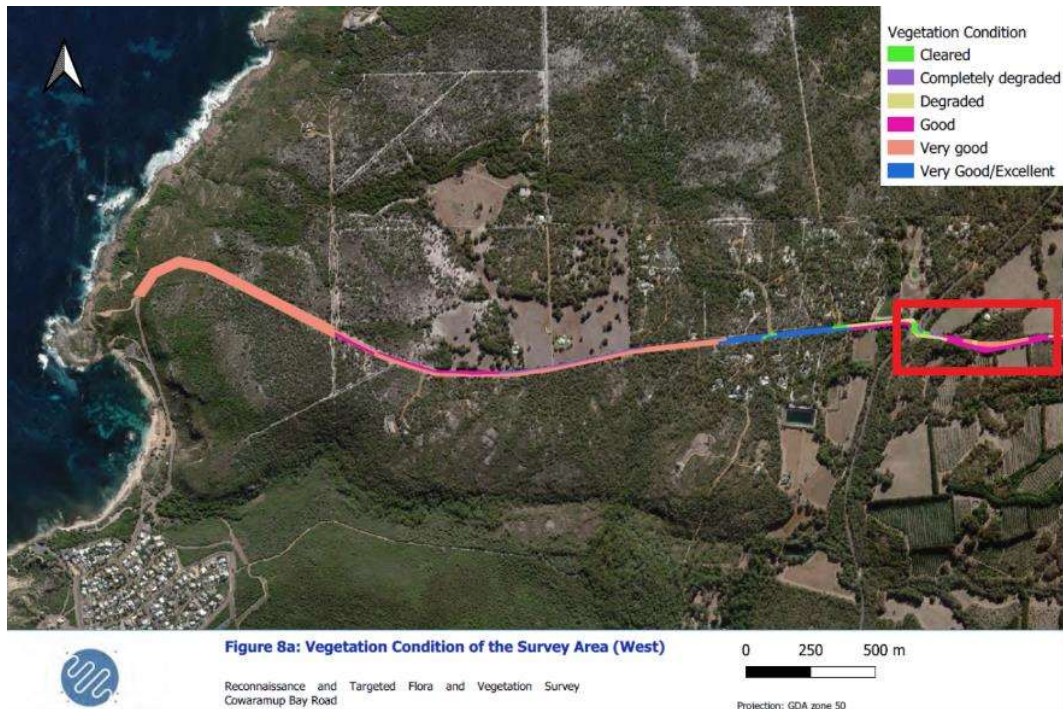


Figure 2: The application area in this map is restricted to the eastern side of Caves Road, highlighted by the red box. The above is an excerpt from the reconnaissance and targeted flora and vegetation survey (Stream Environment and Water, 2020)



Figure 3: The above is an excerpt from the reconnaissance and targeted flora and vegetation survey (Stream Environment and Water, 2020)



**Figure 8c: Vegetation Condition of the Survey Area (East)**



Reconnaissance and Targeted Flora and Vegetation Survey  
Cowaramup Bay Road  
Ref: 202201  
Date: 24/11/20 Author: JW

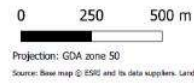


Figure 4: The above is an excerpt from the reconnaissance and targeted flora and vegetation survey (Stream Environment and Water, 2020)



**Figure 7b: Vegetation Units of the Survey Area (middle)**



Reconnaissance and Targeted Flora and Vegetation Survey  
Cowaramup Bay Road  
Ref: 202201

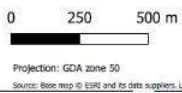


Figure 5: The above is an excerpt from the reconnaissance and targeted flora and vegetation survey (Stream Environment and Water, 2020)

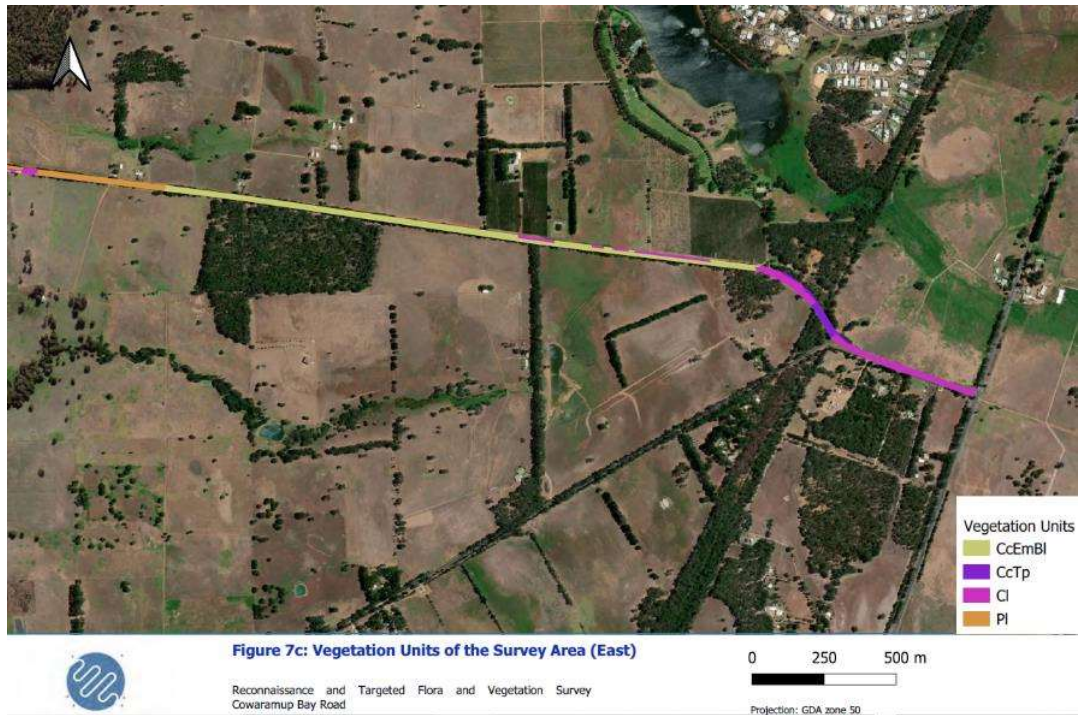


Figure 6: The above is an excerpt from the reconnaissance and targeted flora and vegetation survey (Stream Environment and Water, 2020)


Community Code	Description	Condition	Site reference	Example photo of community
CcEmBI	Woodland of <i>Corymbia calophylla</i> and <i>Eucalyptus marginata</i> over open shrubland of <i>Bossiaea linophylla</i> and <i>Xanthorrhoea preissii</i> over shrubland of <i>Hibbertia hypericoides</i>	Degraded to Good	Site 09	

Figure 7: Vegetation descriptions and photographs of vegetation units Stream Environment and Water, 2020)


CcAfXp	Woodland of <i>Corymbia calophylla</i> over open woodland of <i>Agonis flexuosa</i> over shrubland of <i>Xanthorrhoea preissii</i> and <i>Bossiaea ornata</i>	Mostly good to very good. Some areas degraded and completely corridor.	Site 01	
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Figure 8: Vegetation descriptions and photographs of vegetation units Stream Environment and Water, 2020)


Community Code	Description	Condition	Site reference	Example photo of community
CcTp	Woodland of <i>Corymbia calophylla</i> over shrubland of <i>Taxandria parviceps</i> over sedgeland of <i>Mesomelaena tetragona</i> and <i>Cyathochaeta avenacea</i>	Completely Degraded to Very Good	Site 08	

Figure 9: Vegetation descriptions and photographs of vegetation units Stream Environment and Water, 2020)

## 4.2 Field survey

### 4.2.1 Flora

The field survey recorded 145 taxa of vascular plants from 43 families (Appendix E). Nineteen of the 144 taxa are introduced. The most common families were Fabaceae (19 taxa), Myrtaceae (13 taxa) Poaceae (10 taxa) and Proteaceae (10 taxa). The representation of these families is consistent with the flora of the area and the location in the landscape of the survey area.

#### *Threatened species*

*Caladenia excelsa*, a state listed declared rare flora species and federally listed threatened flora species was recorded within the survey area (Figure 6). Two individual plants were confirmed as *C. excelsa* and one identified as potential *C. excelsa* (not confirmed due to unopened flower). These individuals were found in the same location as previous records (Figure 5) within a vegetation community described and mapped as Low open woodland of *Eucalyptus marginata* and *Corymbia calophylla* over shrubland of *Xanthorrhoea preissii* over shrubland of *Hibbertia hypericoides* (Community EmCcXp; Table 4).

Three individuals of *Boronia anceps* (P3) were recorded approximately 1.5 km east of a previously recorded population. All individuals of *B. anceps* recorded in this survey were recorded within vegetation community EmCcXp (Figure 6).

An additional priority species *Banksia sessilis* var. *cordata* (P4) was found scattered at low density through three vegetation communities mapped and described at the western end of the survey area closest to the coast (refer to area defined in Figure 6). The vegetation communities (community codes MIMsMs, DcMsSg and BaAfMf) are described in the following section (Table 4). This species had previously been recorded approximately 1.2m south of the survey area.

No species of other conservation significance (e.g. range extensions) were recorded.

#### *Declared weeds*

None of the nineteen introduced flora species are listed as declared pest plants under the *Biosecurity and Agriculture Management Act 2007*.

The introduced species recorded were predominantly weedy grasses and herbs common in agricultural setting. These are considered environmental weeds and potentially require management during any earth works. In particular, *Watsonia meriana* subsp. *bulbillifera* which was recorded at several locations within the survey area. This species has the potential to spread through transfer of bulbs in soil and is a potentially invasive weed species. Weedy grasses and herbs occurred predominantly at the edges of intact native vegetation and were more common at the road intersections and east of caves road.

### 4.2.2 Vegetation communities

Nine native vegetation units were identified within the survey area (Figure 7a-c). Cleared (predominantly pasture) and areas of planted (combination of exotic and native flora species) vegetation also occurred. Community descriptions (Table 4) are based on the results of relevés surveyed in each, supplemented by opportunistic recording of additional species during targeted searches.

The vegetation communities described for the survey area are consistent with the broader vegetation complex descriptions of Matisse and Havel (1998) identified as occurring within the desktop survey area.

The condition of vegetation was mapped during the field survey and ranged from completely degraded to excellent (Figure 8a-c). Vegetation condition was generally better to the west of Caves Road and comparatively poorer between Caves Road and Bussell Highway. The poorer condition of the native vegetation east of Caves Road is likely due to the impact of historical clearing and adjoining agricultural land use resulting in greater ingress of weed species.

The community DcMsSg (Low closed shrubland of *Dodonaea caratocarpa*, *Melaleuca systema* and *Spyridium globulosum*) was considered to be representative of the priority two ecological community *Low Shrublands on acidic grey-brown sands of the Gracetown soil-landscape system*. The PEC has previously been mapped at this location.

Figure 10: The excerpt above notes a P3 species located during the survey, this is outside of the application area (Stream Environmental and Water (2020)),

## Appendix F. Sources of information

### F.1. GIS databases

Publicly available GIS Databases used (sourced from [www.data.wa.gov.au](http://www.data.wa.gov.au)):

- 10 Metre Contours (DPIRD-073)
- Aboriginal Heritage Places (DPLH-001)
- Aboriginal Heritage Places (DPLH-001)
- Cadastre (LGATE-218)
- Cadastre Address (LGATE-002)
- Contours (DPIRD-073)
- DBCA – Lands of Interest (DBCA-012)
- DBCA Legislated Lands and Waters (DBCA-011)
- Directory of Important Wetlands in Australia – Western Australia (DBCA-045)
- Environmentally Sensitive Areas (DWER-046)
- Flood Risk (DPIRD-007)
- Groundwater Salinity Statewide (DWER-026)
- Hydrography – Inland Waters – Waterlines
- Hydrological Zones of Western Australia (DPIRD-069)
- IBRA Vegetation Statistics
- Imagery
- Local Planning Scheme – Zones and Reserves (DPLH-071)
- Native Title (ILUA) (LGATE-067)
- Offsets Register – Offsets (DWER-078)
- Pre-European Vegetation Statistics
- Public Drinking Water Source Areas (DWER-033)
- Ramsar Sites (DBCA-010)
- Regional Parks (DBCA-026)
- Remnant Vegetation, All Areas
- RIWI Act, Groundwater Areas (DWER-034)
- RIWI Act, Surface Water Areas and Irrigation Districts (DWER-037)
- Soil Landscape Land Quality – Flood Risk (DPIRD-007)
- Soil Landscape Land Quality – Phosphorus Export Risk (DPIRD-010)
- Soil Landscape Land Quality – Subsurface Acidification Risk (DPIRD-011)
- Soil Landscape Land Quality – Water Erosion Risk (DPIRD-013)
- Soil Landscape Land Quality – Water Repellence Risk (DPIRD-014)
- Soil Landscape Land Quality – Waterlogging Risk (DPIRD-015)
- Soil Landscape Land Quality – Wind Erosion Risk (DPIRD-016)
- Soil Landscape Mapping – Best Available
- Soil Landscape Mapping – Systems
- Wheatbelt Wetlands Stage 1 (DBCA-021)

Restricted GIS Databases used:

- ICMS (Incident Complaints Management System) – Points and Polygons
- Threatened Flora (TPFL)
- Threatened Flora (WAHerb)
- Threatened Fauna
- Threatened Ecological Communities and Priority Ecological Communities
- Threatened Ecological Communities and Priority Ecological Communities (Buffers)

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