



GOVERNMENT OF  
WESTERN AUSTRALIA

## CLEARING PERMIT

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

### PERMIT DETAILS

Area Permit Number: CPS 8878/1  
File Number: DWERVT5658  
Duration of Permit: From 21 February 2023 to 21 February 2028

### PERMIT HOLDER

Papillon Holdings Pty Ltd

### LAND ON WHICH CLEARING IS TO BE DONE

Lot 2919 on Deposited Plan 203096, Rosa Brook

### AUTHORISED ACTIVITY

The permit holder must not clear more than 2.32 hectares of *native vegetation* within the area cross-hatched yellow in Figure 1 of Schedule 1.

### CONDITIONS

#### 1. Period during which clearing is authorised

The permit holder must not clear any *native vegetation* after 21 February 2025.

#### 2. 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.

#### 3. 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.

#### 4. Directional clearing

The permit holder must conduct clearing activities in a slow, progressive manner to allow fauna to move into adjacent *native vegetation* ahead of the clearing activity.

#### 5. Fauna management – western ringtail possum and brush-tailed phascogale

- (a) In relation to the area cross-hatched yellow in Figure 1 of Schedule 1, the permit holder must engage a *fauna specialist* to inspect that area immediately prior to, and for the duration of clearing activities, for the presence of western ringtail possum(s) (*Pseudocheirus occidentalis*) or south-western brush-tailed phascogale(s) (*Phascogale tapoatafa wambenger*).
- (b) Clearing activities must cease in any area where fauna referred to in condition 5(a) are identified until either:
  - (i) the individual has moved on from that area to adjoining *suitable habitat*; or
  - (ii) the individual has been removed by a *fauna specialist* or *western ringtail possum specialist*.
- (c) Any western ringtail possum(s) individual removed in accordance with condition 5(b)(ii) must be relocated by a *western ringtail possum specialist* to a *suitable habitat*.
- (d) Any south-western brush-tailed phascogale(s) individual removed in accordance with condition 5(b)(ii) must be relocated by a *fauna specialist* to a *suitable habitat*.
- (e) Where fauna is identified under condition 5(a), the permit holder must within 14 calendar days provide the following records to the *CEO*:
  - (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 (GDA94), expressing the geographical coordinates in Eastings and Northings or decimal degrees;
  - (iv) the number of individuals removed and relocated;
  - (v) the relevant qualifications of the *western ringtail possum specialist* undertaking removal and relocation;
  - (vi) the date each individual was removed;
  - (vii) the method of removal;
  - (viii) the date each individual was relocated;
  - (ix) 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
  - (x) details pertaining to the circumstances of any death of, or injury sustained by, an individual.

## 6. Fauna management – habitat trees

- (a) Within 48 hours prior to undertaking the *clearing* of *black cockatoo habitat trees* described as having a “black cockatoo breeding likelihood” of “potential” in Table 5-1 of the ‘*Basic and Targeted Fauna Survey, Lot 2919 Rosa Brook Rd, Rosa Brook*’ prepared by SW Environmental on 17 December 2020 within the areas cross-hatched yellow in Figure 1 of Schedule 1, the permit holder must engage a *fauna specialist* to inspect the *black cockatoo habitat trees* for evidence of current breeding use by *black cockatoo species* or masked owl (*Tyto novaehollandiae novaehollandiae*).
- (b) Where *black cockatoo habitat trees* in condition 6(a) are identified with evidence of current breeding use by *black cockatoo species* or masked owl, 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.
- (c) *Clearing* of the *black cockatoo habitat trees* in condition 6(a) must only occur when they are not in use by *black cockatoo species* or masked owl.
- (d) Within two months of *clearing* authorised under this permit, the permit holder must provide the results of the fauna survey in a report to the CEO including the methodology used and whether the *black cockatoo habitat trees* identified show current or no use by *black cockatoo species* or masked owl.
- (e) Prior to undertaking any *clearing* authorised under this permit, the permit holder must install five artificial black cockatoo nest hollows.
- (f) The artificial black cockatoo nest hollows required by condition 6(e) of this permit must:
  - (i) be installed within the area cross-hatched red on Figure 2 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.

## 7. Offsets – conservation covenant

Prior to undertaking any *clearing* authorised under this permit, and no later than 21 February 2024, the permit holder shall:

- (a) give a conservation covenant under section 30B of the *Soil and Land Conservation Act 1945* setting aside the areas cross-hatched red in Figure 3 of Schedule 1, for the protection and management of vegetation in perpetuity; and
- (b) provide to the CEO a copy of the executed conservation covenant.

## 8. Offset – revegetation and rehabilitation requirements

- (a) The permit holder must within 12 months of the commencement of *clearing* authorised under this permit:
  - (i) undertake deliberate *planting* of tube stock of a minimum of 500 marri (*Corymbia calophylla*) trees within the areas cross-hatched red on Figure 2 of Schedule 1.
  - (ii) install tree guards around the plantings;
  - (iii) ensure only *local provenance* propagating material is used;
  - (iv) ensure *planting* is undertaken at the *optimal time*;

- (v) undertake *weed* control and watering of plantings, as required, for at least two years post *planting*; and
  - (vi) implement hygiene protocols by cleaning earth-moving machinery of soil and vegetation prior to entering and leaving the areas cross-hatched red on Figure 2 of Schedule 1.
- (b) The permit holder must, within 24 months of *planting* the 500 marri trees in accordance with condition 8(a) of this Permit:
- (i) engage an *environmental specialist* to make a determination on the likelihood of survival of the 500 marri (*Corymbia calophylla*) trees planted;
  - (ii) if the determination made by the *environmental specialist* under condition 8(b)(i) that the 500 marri (*Corymbia calophylla*) will not survive, plant additional marri (*Corymbia calophylla*) trees that will result in a minimum of 500 marri (*Corymbia calophylla*) plants persisting within the areas cross-hatched red on Figure 2 of Schedule 1.
  - (iii) Where additional *planting* of marri (*Corymbia calophylla*) trees is undertaken in accordance with condition 8(b)(ii), the permit holder must repeat the activities required by condition 8(a)(ii)–(vi) of this Permit.

**9. Offset – fencing**

- (a) Within 12 months of the commencement of *clearing*, the permit holder must ensure appropriate fencing separates the areas cross-hatched red in Figure 3 of Schedule 1 from human activity and allows for the movement of wildlife by being raised 15 centimetres from the ground.
- (b) Within one month of installing the fence/s required under conditions 9(a), the permit holder shall notify the *CEO* in writing that the fence/s have been erected.

**10. 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);</li> <li>(e) actions taken to avoid, minimise, and reduce the impacts and extent of clearing in accordance with condition 2; and</li> <li>(f) actions taken to minimise the risk of the introduction and spread of <i>weeds</i> and <i>dieback</i></li> </ul>

No.	Relevant matter	Specifications
		<p>in accordance with condition 3;</p> <p>(g) actions taken to undertake directional clearing in accordance with condition 4; and</p> <p>(h) actions taken to manage and mitigate impacts to western ringtail possums and south-western brush tailed phascogales in accordance with condition 5.</p>
2.	In relation to fauna management pursuant to condition 6	<p>(a) the time(s) and date(s) of inspection(s) of the <i>black cockatoo habitat trees</i> by the <i>fauna specialist</i>;</p> <p>(b) description of the inspection methodology employed by the <i>fauna specialist</i>;</p> <p>(c) the species name of any fauna determined by the fauna specialist to be occupying the <i>black cockatoo habitat trees</i>;</p> <p>(d) where a <i>black cockatoo habitat tree(s)</i> is determined by the fauna specialist to be occupied by <i>black cockatoo species</i> or masked owl:</p> <p>(i) the time and date that it was determined to be no longer occupied; and</p> <p>(ii) a description of the <i>evidence</i> by which it was determined to be no longer occupied; and</p> <p>(iii) the time and date that the <i>black cockatoo habitat tree</i> was cleared.</p> <p>(e) In relation to the installation of artificial black cockatoo nest hollow pursuant to condition 6(e) of this Permit:</p> <p>(i) the date(s) the artificial black cockatoo nest hollows were installed;</p> <p>(ii) the locations at which the artificial black cockatoo nest hollows were installed recorded using a GPS unit set to GDA94, expressing the geographical coordinates in Eastings and Northings or decimal degrees;</p> <p>(iii) photos of the installed artificial black cockatoo nest hollows;</p> <p>(iv) the date(s) the artificial black cockatoo nest hollows installed were monitored;</p> <p>(v) a description of the monitoring methods employed for the artificial black cockatoo nest hollows installed;</p>

No.	Relevant matter	Specifications
		<ul style="list-style-type: none"> <li>(vi) a description of the monitoring observations for the artificial black cockatoo nest hollows installed;</li> <li>(vii) the date(s) the artificial black cockatoo nest hollows installed were maintained; and</li> <li>(viii) a description of the maintenance activities undertaken for the artificial black cockatoo nest hollows installed.</li> </ul>
3.	In relation to the offset conditions pursuant to conditions 7, 8 and 9	<ul style="list-style-type: none"> <li>(a) actions taken to give a conservation covenant in accordance with condition 7.</li> <li>(b) a description of the <i>planting</i> activities undertaken;</li> <li>(c) the date(s) on which the <i>planting activities</i> was undertaken;</li> <li>(d) a copy of the <i>environmental specialists</i> monitoring report and determination; and</li> <li>(e) a description of any remedial actions undertaken pursuant to conditions 8(b); and</li> <li>(f) other actions taken in accordance with conditions 8(a) to 8(b).</li> <li>(g) actions taken to construct appropriate fencing in accordance with condition 9.</li> </ul>

## 11. Reporting

The permit holder must provide to the *CEO* the records required under condition 10 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 habitat tree	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.
black cockatoo species	means one or more of the following species: <ul style="list-style-type: none"> <li>(a) <i>Zanda lateriosis</i> (Carnaby's cockatoo);</li> <li>(b) <i>Zanda baudinii</i> (Baudin's cockatoo); and/or</li> <li>(c) <i>Calyptorhynchus banksii naso</i> (forest red-tailed black cockatoo).</li> </ul>
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.

Term	Definition
environmental specialist	means a person who holds a tertiary qualification in environmental science or equivalent, and has experience relevant to the type of environmental advice that an environmental specialist is required to provide under this Permit, or who is approved by the CEO as a suitable environmental specialist.
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 surveyed, or who is approved by the CEO 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.
dieback	means the effect of <i>Phytophthora</i> species on native vegetation.
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.
optimal time	means the optimal time for undertaking planting.
planting	means the re-establishment of vegetation by creating favourable soil conditions and planting seedlings of the desired species.
rehabilitate/ed/ion/ing	means actively managing an area containing native vegetation in order to improve the ecological function of that area
revegetate/ed/ion	means the re-establishment of a cover of local provenance native vegetation in an area using methods such as natural regeneration, direct seeding and/or planting, so that the species composition, structure and density is similar to pre-clearing vegetation types in that area
suitable habitat (brush-tailed phascogale)	means habitat known to support <i>Phascogale tapoatafa wambenger</i> (south-western brush-tailed phascogale), 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.
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.
weeds	means any plant –

Term	Definition
	(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> .

---

**END OF CONDITIONS**

*J. Burton*

\_\_\_\_\_  
 Jessica Burton

**A/MANAGER**

**NATIVE VEGETATION REGULATION**

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

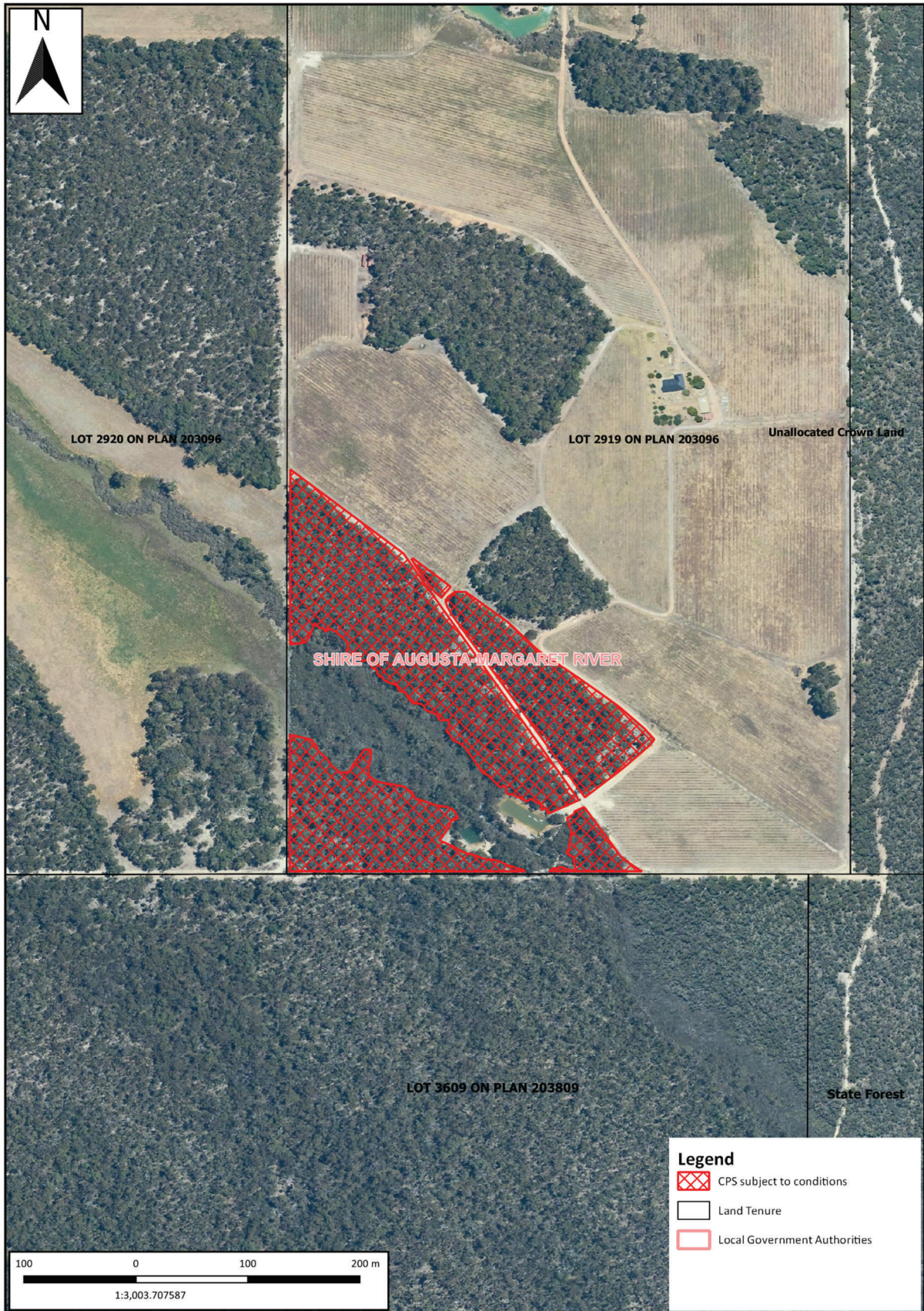
30 January 2023



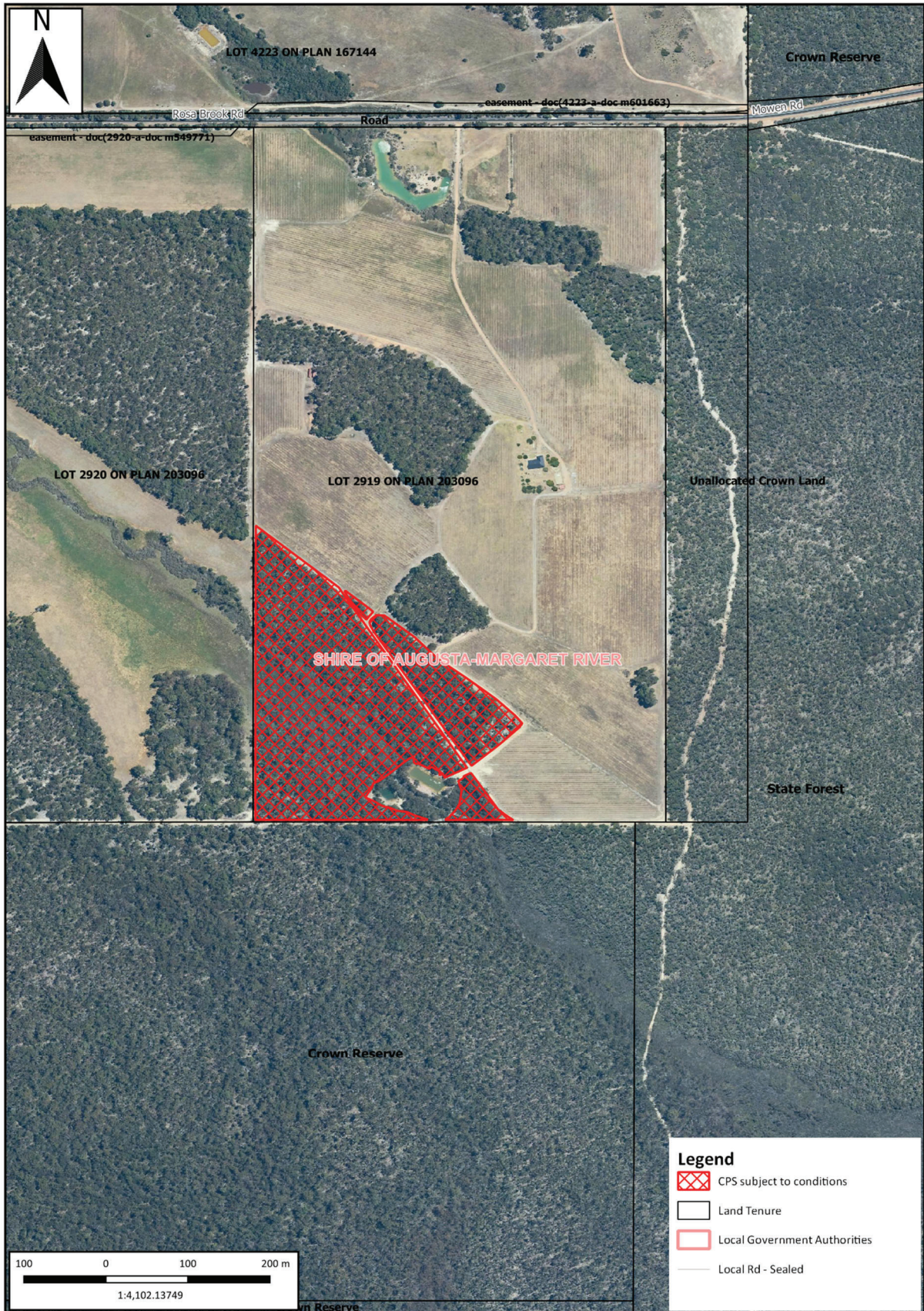
# SCCHEDULE 1



Figure 1: Map of the boundary of the area within which clearing may occur



**Figure 2: Map of the boundary of the area subject to fauna management and revegetation and rehabilitation conditions**



**Figure 3: Map of the boundary of the area subject to offset (conservation covenant and fencing) conditions**

## **SCHEDULE 2**

### **How to design and place 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.

---

## 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*

---

## 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.

---

## 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.
-

## **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.

---

## **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.

---

## **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)

*Disclaimer: This publication may be of assistance to you but the Government of Western Australia and its officers do not guarantee that the publication is without flaw of any kind or is wholly appropriate for your particular purposes and therefore disclaims all liability for any error, loss or other consequence which may arise from you relying on any information in this publication*

## **SCHEDULE 3**

### **How to monitor and maintain 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 ([wildlifelicensing@dpaw.wa.gov.au](mailto:wildlifelicensing@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.

---

### **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)

---

### **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).

---

### **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.

---

### **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.

---

### **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.

---

### **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.

---

### **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.

---

### **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.

---

**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>

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)

*Disclaimer: This publication may be of assistance to you but the Government of Western Australia and its officers do not guarantee that the publication is without flaw of any kind or is wholly appropriate for your particular purposes and therefore disclaims all liability for any error, loss or other consequence which may arise from you relying on any information in this publication*



# Clearing Permit Decision Report

## 1 Application details and outcome

### 1.1. Permit application details

<b>Permit number:</b>	CPS 8878/1
<b>Permit type:</b>	Area permit
<b>Applicant name:</b>	Papillon Holdings Pty Ltd
<b>Application received:</b>	20 April 2020
<b>Application area:</b>	2.32 hectares of native vegetation
<b>Purpose of clearing:</b>	Construction of a dam and expansion of a soak
<b>Method of clearing:</b>	Mechanical
<b>Property:</b>	Lot 2919 on Deposited Plan 203096
<b>Location (LGA area/s):</b>	Shire of Augusta Margaret River
<b>Localities (suburb/s):</b>	Rosa Brook

### 1.2. Description of clearing activities

The vegetation applied to be cleared is distributed across two separate areas (see Figure 1, Section 1.5), 1.93 hectares within a northern area and 0.39 hectares within a southern area. Clearing in the northern area is to allow for the construction of a gully wall dam, and clearing in the southern area is to allow for the creation of a larger groundwater soak by consolidating two existing soak areas. The dam and soak areas will provide irrigation water for proposed *Leptospermum* and avocado plantations within the property.

The application was reduced in size, from an original total application area of 5.22 hectares (see Figure 2, Section 1.5), during the assessment process as follows:

- Reduction in the northern application area (from the originally proposed area of 2.03 hectares); and
- Reduction in the southern application area (from the originally proposed area of 3.19 hectares) (refer to Section 3.1 for additional information).

### 1.3. Decision on application

<b>Decision:</b>	Granted
<b>Decision date:</b>	30 January 2023
<b>Decision area:</b>	2.32 hectares of native vegetation 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 21 days and one submission was received. Consideration of matters raised in the public submission is summarised in Appendix B.

In making this decision, the Delegated Officer had regard for the site characteristics (see Appendix C), relevant datasets (see Appendix H.1), the findings of flora and fauna surveys, advice provided from DBCA (2021a, b, c and

d), internal advice (DWER, 2021a and b), the clearing principles set out in Schedule 5 of the EP Act (see Appendix D), relevant planning instruments and any other matters considered relevant to the assessment (see Section 3).

The assessment identified that the proposed clearing will result in:

- Removal of 0.39 hectares of very high quality western ringtail possum habitat,
- Removal of 1.93 hectares of high quality black cockatoo foraging habitat;
- Removal of three trees containing five potentially suitable breeding hollows for black cockatoo species; and
- Removal of habitat for quokka, chuditch, masked owl, quenda, western false pipistrelle, western brush wallaby, rakali and southwestern brush-tailed phascogale.
- The loss of one *Pultenaea pinifolia* plant and a small population of 11 individuals of *Adiantum aethiopicum*.
- The removal of a local ecological linkage that may be utilised by ground dwelling fauna;
- Removal of 0.23 hectares of riparian vegetation surrounding a watercourse and within a wetland (considered to have values consistent with a conservation category wetland) within the southern application area.
- Removal of 0.28 hectares of riparian vegetation surrounding the watercourse mapped within the northern application area.
- Clearing of vegetation within areas mapped as having moderate or high risks of wind erosion, water erosion and phosphorus export.

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 long-term adverse impacts on the environmental values above subject to the permit including appropriate management conditions and a suitable offset. The applicant has suitably demonstrated avoidance and minimisation measures, and the offset provided counterbalances the impacts to black cockatoo foraging habitat and western ringtail possum habitat (see Section 4).

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
- Directional clearing to minimise impacts to fauna individuals utilising the application area
- Trees with suitable hollows to be inspected prior to clearing to avoid impacts to fauna that may be present at the time of clearing.
- Five artificial hollows to be installed within vegetation within the property.
- A fauna management condition should western ringtail possum or southwestern brush-tailed phascogale individuals be encountered
- Offset conditions:
  - placement of a conservation covenant and fencing of areas on vegetation within the southern portion of the property; and
  - rehabilitation of a marri and jarrah forest within the southern portion of the property, including the planting and maintenance of 500 marri seedlings.



## 1.5. Site maps



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

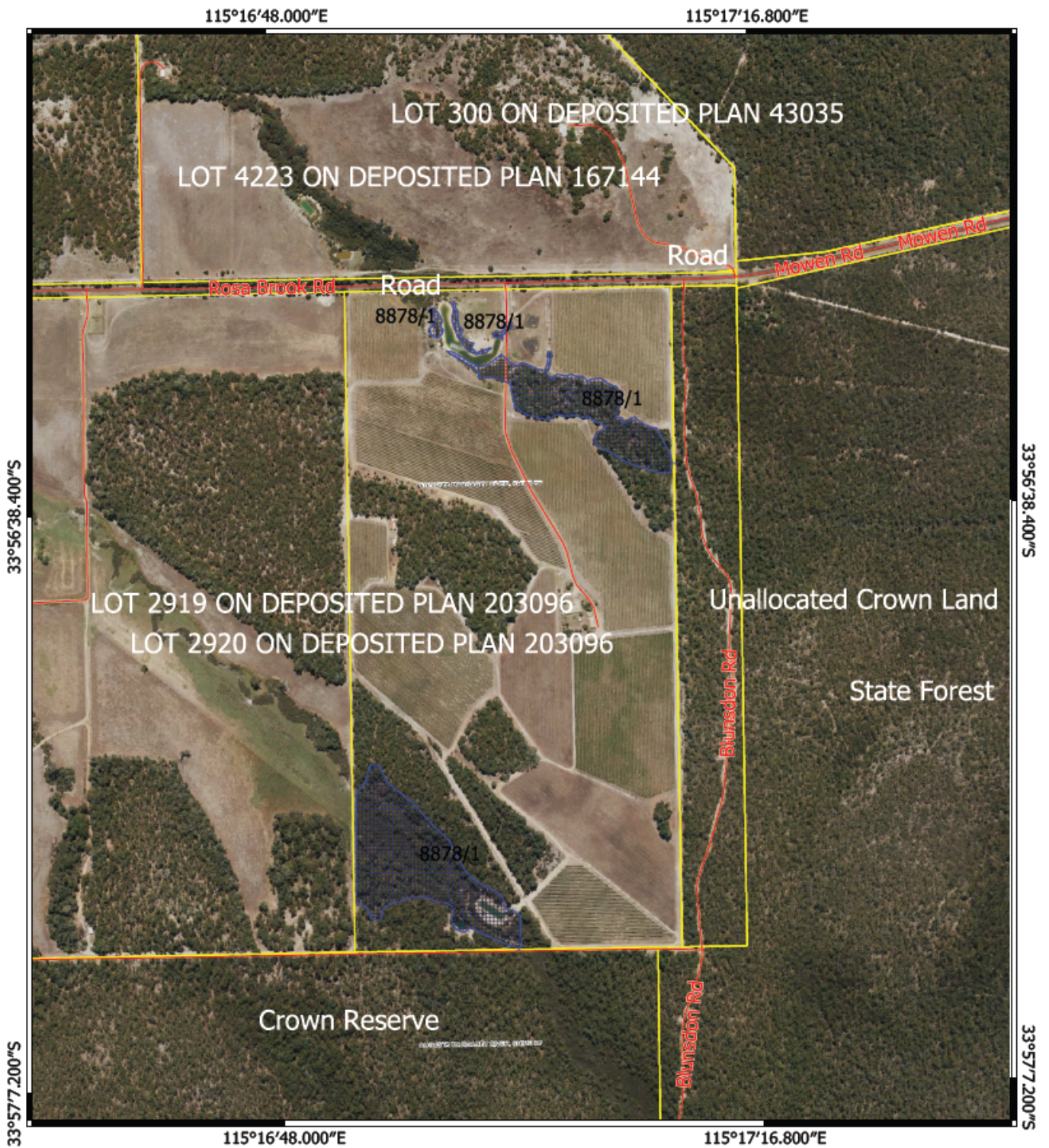


Figure 2. Map of the 5.22 hectare area (cross-hatched blue) originally proposed to be cleared.

## 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 1.3), the Delegated Officer has also had regard to the objects and principles under section 4A of the EP Act, particularly:

1. the precautionary principle;

2. the principle of intergenerational equity;
3. the principle of the conservation of biological diversity and ecological integrity; and
4. the polluter pays principle

Other legislation of relevance for this assessment include:

- *Biodiversity Conservation Act 2016* (WA) (BC Act)
- *Country Areas Water Supply Act 1947* (WA) (CAWS Act)
- *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act)
- *Planning and Development Act 2005* (WA) (P&D Act)

The key guidance documents which inform this assessment are:

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

### 3 Detailed assessment of application

#### 3.1. Avoidance and mitigation measures

As part of their application, the applicant advised that a reduced dam footprint and alternative water supplies have been assessed and would limit water availability for the proposed tea tree orchard.

During the assessment, the applicant agreed to the following revisions to the application area:

- Reduction in the northern application area (from the originally proposed area of 2.03 hectares) to avoid conservation significant flora (*Lambertia rariflora* subsp. *rariflora*, and *Netrostylis* sp. Blackwood) identified along the eastern boundary of this area (DBCA, 2021d, Stream Environment and Water, 2020); and
- Reduction in the southern application area (from the originally proposed area of 3.19 hectares), within a previously disturbed area to minimise impacts to:
  - Conservation significant flora species *Dampiera heteroptera*, *Lambertia rariflora* subsp. *rariflora* and *Pultenaea pinifolia* (DBCA, 2021d, Stream Environment and Water, 2020);
  - Conservation category wetland (CCW) consistent with the South West wetland mapping dataset;
  - Fauna species that could potentially utilise this wetland area, including quokka, rakali and western ringtail possum.

The change in extent within the southern application area required the applicant to change the water supply design from the originally proposed dam to a soak (i.e. with no walls).

It is also noted that, as a condition of the development approval granted by the Shire of Augusta Margaret River (2023) for the construction of this dam, the applicant will be required to:

- establish a 10 metre landscape buffer around the newly constructed dam in the northern application area. The applicant has advised that this buffer is likely to include the following species, devised in consultation with the Shire of Augusta Margaret River:
  - *Microlaena stipoides* - Weeping Grass
  - *Myoporum oppositifolium* - Twin-Leaf Myoporum
  - *Kunzea recurva*
  - *Kunzea spathulata*
  - *Podocarpus drouynianus* - Wild Plum
  - *Banksia sessilis* - Parrot Bush
  - *Bossiaea aquifolium* - Water Bush
  - *Melaleuca huegelii* - Chenille Honey Myrtle (Papillon Holdings Pty Ltd, 2023).
- undertake the following measures to prevent erosion and sedimentation of the water in both the gully wall dam and expanded soak:
  - prevent erosion around both dam and soak by planting a shallow-rooted vegetation cover (such as endemic species of perennial shrubs or grasses) on dam embankments
  - use settling ponds or vegetation filters to improve the quality of any released water;
  - undertake construction of the dam and soak during the dry season; and
  - prepare a Sedimentation Management Plan for the dam and soak to the satisfaction of the Shire of Augusta Margaret River.

After consideration of avoidance and mitigation measures, it was determined that an offset to counterbalance the significant residual impacts to foraging habitat for black cockatoo species and habitat for western ringtail possum was necessary. In accordance with the Government of Western Australia's *Environmental Offsets Policy* and *Environmental Offsets Guidelines*, these significant residual impacts have been addressed through the conditioning of environmental offset requirements on the permit. The nature and suitability of the offset provided are summarised in Section 4.

The applicant will also be required to undertake the following management actions to mitigate impacts to environmental values as a condition of the permit:

- Weed and dieback management;
- Directional clearing to mitigate impacts to fauna individuals;
- Inspection of trees with suitable hollows prior to clearing to avoid impacts to any nesting masked owl or black cockatoo individuals;
- Installation of five artificial hollows within vegetation to be placed under conservation covenant
- Fauna management for western ringtail possum and southwestern brush-tailed phascogale.

### 3.2. Assessment of impacts on environmental values

In assessing the application, the Delegated Officer has had regard for the site characteristics (see Appendix C) 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 risk of impacts of the proposed clearing to fauna, flora, significant remnant vegetation and land and water resources required further consideration. 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 values (fauna) - Clearing Principles (a) and (b)

Assessment: Impacts of the following conservation significant fauna species recorded within the local area required further consideration:

- **Terrestrial:**
  - *Pseudocheirus occidentalis* (western ringtail possum, ngwayir) (Critically endangered)
  - *Calyptorhynchus banksii naso* (forest red-tailed black cockatoo) (Vulnerable)
  - *Zanda baudinii* (Baudin's cockatoo) (Threatened)
  - *Calyptorhynchus latirostris* (Carnaby's cockatoo) (Threatened)
  - *Setonix brachyurus* (quokka) (Vulnerable)
  - *Dasyurus geoffroyi* (chuditch, western quoll) (Vulnerable)
  - *Trichosternus relictus* (a ground beetle (Margaret River)) (Priority 3)
  - *Tyto novaehollandiae* (southwest masked owl) (Priority 3)
  - *Falsistrellus mackenziei* (Western false pipistrelle, western falsistrelle) (Priority 4)
  - *Isodon fusciventer* (quenda, southwestern brown bandicoot) (Priority 4)
  - *Notamacropus irma* (western brush wallaby) (Priority 4)
  - *Hydromys chrysogaster* (Water-rat, rakali) (Priority 4)
  - *Phascogale tapoatafa wambenger* (south-western brush-tailed phascogale, wambenger) (Conservation dependent)
- **Aquatic**
  - *Cherax tenuimanus* (Margaret River hairy marron) (Critically endangered)
  - *Engaewa pseudoreducta* (Margaret River burrowing crayfish) (Critically endangered)
  - *Galaxiella munda* (Mud minnow, western dwarf galaxias) (Vulnerable)
  - *Nannatherina balstoni* (Balston's pygmy perch) (Vulnerable)
  - *Westralunio carteri* (Carter's freshwater mussel) (Vulnerable)
  - *Geotria australis* (Pouched lamprey) (Priority 3)

#### Western ringtail possum

The application area is between the Swan Coastal Plain Management Zone and Southern Forest Management Zone for western ringtail possum (WRP) (DPAW, 2017). Although outside these zones, WRP in the application area should be managed with the same priority as afforded to these management zones (DPAW, 2017a). Populations on the Swan Coastal Plain management zone are associated with stands of myrtaceous trees (usually peppermint trees (*Agonis flexuosa*)) growing near swamps, water courses or floodplains and populations in the southern forest

management zone (Fig. 2) occur mainly in jarrah or marri dominated forests (DPAW, 2017). A fauna survey (SW Environmental, 2020), including a diurnal reconnaissance visit, did not record the presence of WRP, however acknowledged that they may not have been detected if present. DBCA (2021a), following a site inspection conducted the site, advised that the southern area provided “much more likely WRP habitat than the northern area – particularly the patches of *Allocasuarina* and adjacent wetland vegetation”. DBCA (2021) also noted that, while although no WRP scats were found in the leaf litter, as it was quite dense this made searching quite difficult. DBCA also advised that while the northern site could possibly support a low density WRP population, especially given the linkage with the adjacent forest block, habitat was of low suitability for WRP due to limited mid storey connectivity.

Noting the above, it was considered that the 0.39 hectares of vegetation (including both marri and karrah forest and blackbutt and bullich woodland areas) within the southern clearing area provide significant very high quality habitat for western ringtail possum, and therefore the proposed clearing of this would require an offset. To mitigate the impacts of the clearing of 0.39 hectares of western ringtail possum habitat, the applicant agreed to provide an offset, encompassing rehabilitation, fencing and placement of a conservation covenant surrounding the southern application area (refer to Section 4 for further details). The permit also includes WRP management conditions to mitigate impacts to any WRP that may be present.

Clearing of the northern area will impact upon an ecological linkage present between vegetation to the north of Rosa Brook road and the Blackwood State Forest to the east of the application area. Although this linkage is not ideal for use by WRP (noting its poor connectivity in areas, as well as the presence of Rosa Brook Road), it is possible that this may be utilised by WRP. As a condition of the development approval from Shire of Augusta Margaret River (2022) required for the construction of this dam, the applicant will be required to establish a 10 metre landscape buffer around the newly constructed dam (refer to Section 3.1 for species proposed to be planted). Noting that WRP in the Swan Coastal Plain have been known to utilise fringing vegetation around wetlands with dense *Melaleuca* and *Kunzea* species (Shedley and Williams, 2014), it is considered that the planting of these species would likely re-establish a corridor of vegetation able to be utilised by WRP.

### **Black cockatoo species**

The marri and jarrah forest and bullich and blackbutt woodland mapped within the application area (Stream Environmental and Water, 2020) are considered to provide foraging habitat for black cockatoo species. Marri is a preferred foraging species for all three black cockatoo species (DAWE, 2022), and jarrah (as well as *Banksia grandis* and *Allocasuarina fraseriana* also found within this vegetation unit) are also foraged by all three black cockatoo species to different extent (DAWE, 2022 and Groom, 2011). Forest red-tailed black cockatoos also forage upon blackbutt and bullich, and Carnaby’s cockatoos have also been known to forage upon blackbutt (Groom, 2011). The following factors (derived from DAWE, 2022) also increase the likelihood that the application provides foraging habitat for black cockatoo species:

- A known breeding site is present within 12 km;
- Known roost sites are present within 20 km;
- Foraging habitat is present within 12 km of the site;
- Feed residue (chewed Marri cones) was observed broadly over both sites for all three black cockatoo species (SW Environmental, 2020);
- Drinking water sources are present within 1 km;
- Carnaby’s cockatoo and forest red-tailed black cockatoo were observed within the surveyed area (SW Environmental, 2020)

Noting the above, the vegetation types within the application area are considered to provide very high (1.41 hectares of marri and jarrah forest) to moderate (0.52 hectares of bullich and blackbutt woodland) quality foraging habitat for black cockatoo species. It is noted that the local area is extensively vegetated (73.3% of remnant vegetation remaining within 10km, and mapped vegetation types retaining 53% and 92% respectively) with large areas of DBCA managed land likely to contain suitable foraging habitat present within the local area. Nonetheless, noting that habitat loss is increasingly causing the scarcity of black cockatoo foraging resources and that cumulative impacts to foraging habitat across the ranges of these species should be considered, the clearing of any remaining good quality foraging habitat is considered to have a significant impact upon black cockatoo species. To mitigate the impacts of the clearing of 1.93 ha of high quality black cockatoo foraging habitat, the applicant has agreed to provide an offset, encompassing rehabilitation of an area of marri and jarrah forest, and fencing and placement of a conservation covenant over this area and adjoining blackbutt and bullich woodland areas (refer to Section 4 for further details).

The Jarrah Forest region is the main area used for breeding by Baudin’s cockatoo and the forest red-tailed black-cockatoo, and the application area is within the likely breeding ranges of these species (DAWE, 2022 and DEC, 2008). These species breed in suitable hollows in live or dead trees with a diameter at breast (DBH) height of greater than 50 cm at breast height, including marri, jarrah trees, bullich and blackbutt (DAWE, 2022). Trees with a suitable DBH but no suitable nesting hollows, are considered potential nesting trees (DAWE, 2022). The application area

contains 61 trees with a DBH of greater than 50 cm (i.e. potential nesting trees), three of which (tree IDs 42, 45 and 46 present within the northern application area) were described as having “some potential to be used by black cockatoos for breeding based on typical black cockatoo breeding hollow attributes such as orientation, access, chamber size or use by other animals”, although no evidence of use was found within these trees (SW Environmental, 2020). These trees had five suitable nesting hollows between them (SW Environmental, 2020).

The loss of any suitable nesting tree within the application area is considered likely to have a significant impact upon Baudin’s cockatoo and the forest Red-tailed black-cockatoo. To mitigate the loss of the five suitable nesting hollows, as a condition of this permit the applicant is required to place five artificial hollows within vegetated areas of the property that will be placed under a conservation covenant (refer to Section 4 for further details). Trees with suitable hollows will also be required to be inspected prior to clearing to avoid impacts to any nesting individuals. The loss of 58 potential nesting trees may also have a significant impact upon these species. An offset to mitigate impacts to black cockatoo foraging habitat (refer to Section 4 for further details) will mitigate impacts to potential nesting habitat, as it will provide for nesting trees to be present in the future.

All three black cockatoo species are considered likely to utilise the marri and *Eucalyptus* species present within the application area as roosting habitat (DAWE, 2022). While no black cockatoo roosting was recorded by SW Environmental (2020), given the proximity to evidence of foraging and suitable roosting species present, it is considered likely to occur. However, noting the extensive remnant vegetation within the local area that is also likely to contain suitable and better-quality roosting habitat, the proposed clearing is not considered likely to have a significant impact on black cockatoo roosting habitat. An offset to mitigate impacts to black cockatoo foraging habitat (refer to Section 4 for further details) is also mitigate impacts to potential roosting habitat, as it will provide for roosting trees.

### **Quokka**

Quokka most commonly inhabit jarrah, marri and karri forests or riparian habitats with sedge understorey in the southwest of Western Australia (DEC, 2013). The quokka also has relatively high water requirements, which necessitates close proximity to fresh water throughout the year, hence, the species is often present in riparian and swamp habitat (Hayward et al. 2005). However, the feeding ecology of quokkas frequently results in their use of habitat beyond the densely vegetated riparian zone, and therefore they require wide buffers of vegetation surrounding this riparian habitat (DBCA, 2022). SW Environmental (2020) recorded possible quokka runnels and scat within the southern dam location, although the species was not identified through the use of camera traps. Noting the above, it is likely that the application area contains suitable habitat for the quokka, particularly the Very Good/Excellent quality blackbutt and bullich vegetation in the southern application area (SW Environmental, 2020). While quokka may utilise vegetation within the northern application area as a corridor, it is noted that this vegetation is quite sparse in areas and is therefore not likely to be a significant corridor.

DBCA (2021a) advised that it is unlikely that the proposed clearing would have significant impacts at a species level on quokka. It is also noted that the southern application area is relatively small, has been historically disturbed when creating the two existing soak areas (DBCA, 2021c) and is surrounded by significant native vegetation. Furthermore, the following will further reduce or mitigate impacts to quokka:

- A permit condition requiring directional clearing will mitigate impacts to quokka individuals;
- A permit condition requiring placement of a conservation covenant over and fencing surrounding the wetland area surrounding the southern application area will conserve habitat for quokka in the future;
- A condition on the development approval requiring the applicant to establish a 10 metre landscape buffer around the newly constructed dam in the northern application area will reinstate an ecological corridor possibly utilised by quokka.

### ***Trichosternus relictus* (a ground beetle (Margaret River))**

Limited information is available for *Trichosternus relictus*, a species with only five previous records in Western Australia, two of which are within in the local area, the most recent from 1992. It has been found under logs in Eucalyptus woods (Bennelongia Pty Ltd, 2013). It is considered possible that the species could occur within the application area, however given the presence of extensive suitable habitat for these species within the local area, it is considered unlikely that the proposed clearing would significantly impact this species.

### **Other terrestrial species:**

Vegetation within the application area may provide habitat for the chuditch, masked owl, western false pipistrelle, quenda and southwestern brush-tailed phascogale, noting the habitat requirements and distributions of these species:

- **Chuditch** use a range of habitats including forest, mallee shrublands, woodland and desert, with the most dense populations found in riparian jarrah forest. Most chuditch are now found in varying densities throughout the jarrah forest and south coast of Western Australia (DEC, 2012a).

- **Masked owl** inhabit forests, woodlands, timbered waterways and open country on the fringe of these areas and usually roosts in vertical hollows in large trees. The main requirements are tall trees with suitable hollows for nesting and roosting and adjacent areas for foraging (Birdlife International, 2023).
- **Quenda** inhabit dense scrubby, often swampy, vegetation with dense cover and adjacent forest and woodland (DPAW, 2018).
- **Western false pipistrelle** inhabit high rainfall forests dominated by jarrah, karri, marri, and tuart trees and roost in colonies of up to 30 animals in hollows in old trees, branches and stumps (Australian Museum, 2020a). This species is a specialist of tall, mature forest (Start and McKenzie, 2008).
- **Western brush wallaby** inhabit open forest or woodland, particularly favouring open, seasonally-wet flats with low grasses and open scrubby thickets, also found in some areas of mallee and heath-land, and is uncommon in karri forest (DEC, 2012c)
- **Rakali** live in burrows on low banks of rivers, lakes, wetlands, estuaries and coast (DWER, 2023a). Intact riparian vegetation and associated bank stability is critical to their survival. A possible feed midden for this species was observed within the northern application area ( SW Environmental, 2020)
- **Southwestern brush-tailed phascogale** inhabit dry sclerophyll forests and open woodlands that contain hollow bearing trees but a sparse groundcover. In the south-west, this species is typically found in jarrah forest (DEC, 2012d). While understorey vegetation within application area is not sparse, it is considered possible that the southwestern brush-tailed phascogale may still inhabit the application area.

Although the application area contains suitable habitat for the above species, the proposed clearing is not likely to result in significant impacts to habitat for these species, noting the extent of the proposed clearing relative to the surrounding native vegetation and the abundance of native vegetation in the vicinity of the application area within lands managed by DBCA for conservation, which are likely to comprise vegetation in similar or better condition than that present within the application area.

The following will also reduce and mitigate impacts to these fauna species:

- A permit condition requiring directional clearing will mitigate impacts to individuals;
- A permit condition requiring placement of a conservation covenant over and fencing surrounding the wetland area surrounding the southern application area will conserve habitat for these species in the future;
- A permit condition requiring rehabilitation of an area of marri jarrah forest, including the planting of 500 marri seedlings, which will improve habitat for the above species, particularly masked owl, western false pipistrelle and southwestern brush-tailed phascogale
- A condition on the development approval requiring the applicant to establish a 10 metre landscape buffer around the newly constructed dam in the northern application area will reinstate an ecological corridor possibly utilised by these species
- A permit condition requiring that trees with suitable hollows are inspected prior to clearing to avoid impacts to any nesting masked owl individuals
- A fauna management condition for southwestern brush-tailed phascogale.

### **Margaret River hairy marron**

The hairy marron prefers fresh, highly oxygenated, clear-water habitats of the Margaret River, with complex shelter including large woody debris which it also utilises as a food source (DWER, 2023b). The hairy marron is currently only left in 3 main river pools in the upper reach, living alongside the introduced smooth marron (DWER, 2023b). Although some permanent water sources (i.e. constructed dams and soaks) are present within the application area, noting that these areas were constructed along non-perennial watercourses (which are themselves unsuitable for the survival of this species) and not the Margaret River proper, it is considered unlikely that the hairy marron would be present within the application area.

### **Margaret River burrowing crayfish**

Habitat for the Margaret River Burrowing Crayfish is in the narrow creek tributaries of the Margaret River which are densely vegetated on heavy grey/yellow clay soils (Burnham et al, 2007). Associated vegetation includes tall tea-trees (*Melaleuca* sp.) and eucalypts (*Eucalyptus* spp.) (Department of the Environment, Water, Heritage and the Arts (DEWHA, 2009). Only several subpopulations of the Margaret River burrowing crayfish are known, the closest of which is approximately 8.3 kilometres away from the application area. Noting the distance to the nearest known area, and that no burrowing crayfish mounds were observed during the fauna survey (SW Environmental, 2020) or DBCA site inspection (2021a), it is considered unlikely that this species is present within the application area.

### **Mud minnow and Balston's pygmy perch**

Mud minnow prefer relatively undisturbed, permanent stream habitats, particularly small, gently flowing creeks and streams, and have been found within the upper reaches of the Margaret River (DWER, 2023c). Balston's pygmy perch are restricted to near-coastal streams, lakes and wetlands between upper Margaret River and the Goodga

River, associated with slow-flowing, low salinity, acidic and tannin-stained waters, and complex instream habitat (DWER, 2023d). DBCA (2021a) advised that both of these species had the potential to utilise the watercourses within the application area when they contain water, although noting the watercourses are both non-perennial they could not support permanent populations. DBCA (2021a) also advised that if these fish are present then the loss of this particular population/habitat alone may not have a significant effect on the species, however the cumulative effect of this and similar developments could be considerable.

However, based upon aerial imagery and the findings of a site inspection of the watercourse within the northern application area conducted to assess connectivity of aquatic habitats, DWER (2021a) concluded that there are numerous potential existing barriers to native fish migration downstream of the proposed dam and limited in-stream habitat above the proposed dam. As such, it is considered unlikely that these fish species would be able to enter the northern application area to utilise habitat. It is also noted that the length of natural watercourse being disturbed by the proposed clearing within the southern application area is small due to the previous construction of one the existing soaks along the watercourse. Considering the above, it is considered unlikely that the proposed clearing would significantly impact these fish species. The conservation covenant to be placed over the remainder of the southern wetland area within the property (refer to Section 4) will allow for the retention of potentially suitable habitat for these species.

### **Carter's freshwater mussel**

Carter's freshwater mussel occurs in greatest abundance in slower flowing waters (DWER, 2023e). DBCA (2021) advised that Carters freshwater mussel is unlikely to occur within the natural watercourses within the application area, as their creek beds dry out over summer, and as such there is unlikely to be sufficient moist soil depth for individuals to burrow in and survive over summer. While Carter's freshwater mussel can also occupy lentic systems, including on-stream farm dams (DWER, 2023d), the dam areas themselves are not included within the application area. As such the proposed clearing is unlikely to impact upon this species.

### **Pouched lamprey**

The pouched lamprey enters rivers from the ocean to spawn (DWER, 2023f). However, as noted by DBCA (2021a), this species requires permanent freshwater headwaters for spawning, and is therefore unlikely to be present within the application area noting the creek beds of the watercourses present within the application area dry out during summer.

### Conclusion

Based on the above assessment, the proposed clearing will result in:

- Removal of 0.39 hectares of very high quality western ringtail possum habitat,
- Removal of 1.93 hectares of high quality black cockatoo foraging habitat;
- Removal of three trees containing five potentially suitable breeding hollows for black cockatoo species; and
- Removal of habitat for quokka, chuditch, masked owl, quenda, western false pipistrelle, western brush wallaby, rakali and southwestern brush-tailed phascogale.

For the reasons set out above, it is considered that the impacts to quokka, chuditch, masked owl, quenda, western false pipistrelle, western brush wallaby, rakali and southwestern brush-tailed phascogale can be managed through the conditions described below. Impacts of the proposed clearing on black cockatoo and western ringtail possum habitat cannot be managed to be environmentally acceptable through conditions alone, and as such the applicant has agreed to offset these impacts as described in Section 4.

The applicant may have notification responsibilities under the EPBC Act for impacts to Baudin's black cockatoo, Carnaby's cockatoo, forest red-tailed black cockatoo, western ringtail possum, chuditch and quokka and their habitats. The applicant has been advised to contact the federal Department of Water, Agriculture and the Environment (DAWE) to discuss EPBC Act referral requirements.

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

- Directional clearing to minimise impacts to fauna individuals utilising the application area
- Trees with suitable hollows to be inspected prior to clearing to avoid impacts to any nesting masked owl individuals
- Five artificial hollows to be installed on vegetation within the property
- A fauna management condition should western ringtail possum or southwestern brush-tailed phascogale individuals be encountered
- Offset conditions:



- placement of a conservation covenant and fencing of areas on vegetation within the southern portion of the property;
- rehabilitation of a marri and jarrah forest within the southern portion of the property, including the planting and maintenance of 500 marri seedlings.

### 3.2.2. Biological (flora) - Clearing Principles (a) and (c)

**Assessment:** Based on information from previous records, the soil and vegetation types present within the application and DBCA advice (2022a and 2022b), the following conservation significant flora species were identified as potentially occurring within the application area:

- *Banksia squarrosa* subsp. *argillacea* (Threatened)
- *Stylidium hygrophilum* (Priority 1)
- *Netrostylis* sp. Nannup (P.A. Jurjevich 1133) (Priority 1)
- *Hybanthus volubilis* (Priority 2)
- *Leucopogon* sp. Gingilup (N. Gibson & M. Lyons 590) (Priority 2)
- *Acacia inops* (Priority 3)
- *Chordifex jacksonii* (Priority 3)
- *Dampiera heteroptera* (Priority 3)
- *Gastrobium formosum* (Priority 3)
- *Grevillea brachystylis* subsp. *brachystylis* (Priority 3)
- *Hakea oldfieldii* (Priority 3)
- *Isopogon formosus* subsp. *dasylepis* (Priority 3)
- *Lepyrodia heleocharoides* (Priority 3)
- *Netrostylis* sp. Blackwood River (Priority 3)
- *Pultenaea pinifolia* (Priority 3)
- *Synaphea petiolaris* subsp. *simplex* (Priority 3)
- *Acacia semitrullata* (Priority 4)
- *Acacia tayloriana* (Priority 4)
- *Chamelaucium erythrochlorum* (Priority 4)
- *Lambertia rariflora* subsp. *rariflora* (Priority 4)
- *Melaleuca basicephala* (Priority 4)
- *Pultenaea skinneri* (Priority 4)

A flora survey (Stream Environment and Water, 2020, and updated in 2021) did not record any of the above listed conservation significant flora within the application area. However, a site inspection conducted by DBCA (2021b) recorded one *Pultenaea pinifolia* plant within the southern proposed clearing area. This species occurs over a range of 320 EW by 120 NS and is known from approximately 16 locations, and while the total number of plants is unknown; some locations have recorded hundreds of plants (DBCA, 2021a). Stream Environment and Water (2020) also found 30 *Pultenaea pinifolia* plants elsewhere within the property. DBCA (2021a) advised that the potential impact to this species from the proposed clearing is unlikely to be significant.

The flora survey (Stream Environment and Water, 2020) and DBCA site inspection (2021b) also found *Lambertia rariflora*, *Netrostylis* sp. Blackwood and *Dampiera heteroptera* plants within 50 metres of the application areas, as well as elsewhere within the property. DBCA (2021b) also advised that *Netrostylis* sp. Nannup may also be present within the property, although no individuals were noted during the site inspection. As such it possible that the proposed clearing may result in inadvertent take of seed of these species. Noting the number of records of these species both within and outside (Western Australian Herbarium, 1998-) of the property, the proposed clearing is considered unlikely to result in significant impacts to these species.

A site inspection conducted by DBCA also noted that a small population of 11 individuals of *Adiantum aethiopicum* was also observed in the tributary in the Northern cell. While this species does not have any formal conservation listing, DBCA (2022a) have advised that this species is becoming increasingly rare due to creekline degradation and has previously only been known from the Karri Forest within the Margaret River townsite. DBCA (2022a) advised that this is the first record of this species east of the townsite and the loss of the sub-population within the area of proposed clearing will consequently result in a significant reduction in the range of this species. However, it is noted that there are 15,455 records of this species nationwide (Atlas of Living Australia, 2022), including 48 records within Western Australia (Western Australian Herbarium, 1998-). As such, it is considered that the clearing of one population of this species is unlikely to result in significant impacts to the conservation status of this species.

Conclusion: Based on the above assessment, the proposed clearing will result in the loss of several one *Pultenaea pinifolia* plant and a small population of 11 individuals of *Adiantum aethiopicum*.

Conditions: Weed and dieback management conditions to minimise impacts to flora remaining on the property.

### **3.2.3. Significant remnant vegetation - Clearing Principle (e)**

Aerial imagery indicates that the northern proposed clearing area contains a thin strip of vegetation which joins the forested areas to the east (Blackwood State Forest) and the forested areas to the north (Rapids Conservation Park), following the watercourse present. Part of this strip of vegetation has been previously cleared and contains a farm dam and part of this vegetation is also broken by Rosa Brook Road. This strip of vegetation may be offering a minor local linkage for small terrestrial fauna such as western ringtail possum, quokka, chuditch, rakali, western brush wallaby and quenda (refer to Section 3.2.1) however the abundant remnant vegetation in the forest to the east would offer a far more efficient and safer linkage route. As such the clearing of this vegetation is not considered likely to comprise a significant ecological linkage. A 10 metre buffer area is required to be planted around the newly constructed dam as a condition of the development approval from the Shire of Augusta Margaret River (refer to Section 3.1) which would likely reinstate the function of this linkage.

Conclusion: While the proposed clearing may result in the removal of a weak ecological linkage that may be utilised by ground dwelling fauna, noting the extensive remnant vegetation to the north and east of the property, this linkage is unlikely to be significant.

Conditions: Nil.

### **3.2.4. Land and water resources - Clearing Principles (f), (g) and (i)**

#### Assessment:

A 0.2 hectare area within the southern application area intersects a conservation category floodplain wetland mapped within the 'Geomorphic Wetlands South West – Unreviewed' dataset (Site ID 110). This wetland area encompasses the mapped non-perennial Mowen River (a tributary of the Margaret River) and surrounding riparian vegetation running in a south-east to north-west direction through the southern portion of the property. The mapped wetland area approximately concords with a 0.23 hectare area of bullich and blackbutt open woodland over shrubland of *Taxandria linearifolia* over mixed sedgeland mapped in this area by Stream Environment and Water (2020). A report provided to DWER by V & C Semeniuk Research Group (2006) indicates the wetland is within the Rosa Brook consanguineous suite, described as 'a new wetland type - the palusvale - which only occurs in settings where annual rainfall is relatively high and underlying porous sediments occur'.

It is noted that DBCA and DWER are currently undertaking a project to consolidate and update wetland mapping for the southwest, including reviewing the evaluation/management categories (DWER, 2021b). Until this is completed, the 'Geomorphic Wetlands South West – Unreviewed' layer is a valid indicator of the presence of a wetland to determine when a proposal may impact on a wetland, but the type, boundary and management category are subject to confirmation by the relevant advisory agency (DWER, 2021b). Noting the status of wetland mapping in this region, DBCA conducted a site inspection to evaluate this wetland, and following this concluded that 'although subject to partial clearing and alteration of the morphology and hydrology (construction of two deep retention basins-mid stream and a cleared track across the channel), the wetland maintains values consistent with South West wetland mapping (DBCA, 2021c). DBCA (2021c) advised that the area appears to largely be consistent with a floodplain wetland type surrounding the Mowen River, with seasonal flooding outwards from the main channel, and while the transition into possible palusvale hydrology (seasonal waterlogging) is recognised over some of the mapped wetland area, the majority fits more closely with the current floodplain classification.

DBCA (2021c) advised that the southern application area between the two existing dams has been subject to historical disturbance, with the river channel in this location dug out and enlarged, and that the wetland extent immediately west of this area appears to be of Pristine condition with no signs of historical disturbance. DBCA (2021c) advised that if any clearing is to be considered within the southern application area, it should only be within the area of historical disturbance, between the two existing soaks.

It is acknowledged that protection of riparian vegetation along waterways is important for the maintenance of their values including by stabilising banks and preventing erosion, maintaining of water quality and lower water temperatures, providing habitat, food resources and nest sites and for maintaining ecological connectivity (DWER,

2021b). The proposed clearing of 0.23 hectares of riparian vegetation may result in short term impacts to water quality within this wetland and watercourse during construction of the expanded soak. It is also noted that soils within the southern application area have moderate risks of wind and water erosion and phosphorus export. Erosion and phosphorus export from soils on embankments can result in sedimentation, turbidity and eutrophication. However, it is considered that the effects of this clearing to the wetland and watercourse are unlikely to result in significant impacts to water quality or the function of this wetland in the long term, noting the following:

- the proposed clearing only minimally intersects with undisturbed portions of the river channel, with the river channel already cleared to create the existing northernmost soak in this location;
- the proposed clearing is mainly comprised of riparian vegetation that has been previously disturbed;
- extensive remnant vegetation will also remain around the newly constructed groundwater soak, and will be placed under a conservation covenant (refer to Section 4), allowing ecological connectivity for species such as quokka and rakali to be maintained;
- extensive riparian vegetation will be retained within the wetland downstream of the newly constructed soak, and this vegetation will be placed under a conservation covenant;
- conservation significant aquatic and wetland flora and fauna are unlikely to be significantly impacted by this proposed clearing (refer to Sections 3.2.1 and 3.2.2 above);
- the expanded soak will be surrounded by native vegetation (which will be placed under a conservation covenant (refer to Section 4)), and therefore is unlikely to experience high phosphorus loads;
- the risk of land degradation through wind and water erosion and phosphorus export is moderate and not high, and these risks are only applicable to the extent of the soak embankments; and
- the applicant will be required, as a condition of the development approval provided by the Shire of Augusta Margaret River to undertake measures (described in Section 3.1) to prevent erosion and sedimentation of the soak water. This includes planting of dam embankments, which will improve phosphorus retention.

The northern application area is not within a mapped wetland, but also intersects a mapped non-perennial watercourse within the Margaret River catchment. DBCA (2021c) agreed that the watercourse in this area was non-perennial, and noted that 'it has areas where flooding out from the main channel may have occurred, although less likely to be in recent times as vegetation is dominated by terrestrial species and it appears that the channel morphology may have been altered by excavation'. DBCA (2021c) also noted that 'clearing downstream from the application area is extensive and the very deep excavated soak/dam is likely to capture much of the creek flow and lead to a highly altered hydrology, ecological linkage, and habitat value downstream'. Furthermore, based upon aerial imagery and the findings of a site inspection of the watercourse within the northern application area conducted to assess connectivity of aquatic habitats, DWER (2021a) concluded that there are numerous potential existing barriers to native fish migration downstream of the proposed dam and limited in-stream habitat above the proposed dam, and as such it is unlikely that the undisturbed portion of the watercourse within the application area provides a significant habitat for native fish species.

The 0.28 hectares of vegetation mapped as bullich and blackbutt open woodland within the northern application area is considered to constitute riparian vegetation. Clearing of this vegetation may result in short term impacts to water quality within this wetland and watercourse during construction of the dam. It is also noted that soils within the northern application area have a high risk of wind erosion and a moderate risk of phosphorus export. However, it is considered that the effects of this clearing to this watercourse are unlikely to result in significant impacts to water quality or ecological function downstream, noting the following:

- the gully wall will ensure that dam water is retained onsite;
- the existing dam has already altered habitat value and ecological linkage value of this watercourse;
- the risk of land degradation through wind erosion and phosphorus export are only applicable to the extent of the dam embankments; and
- the applicant will be required, as a condition of the development approval provided by the Shire of Augusta Margaret River to undertake measures (described in Section 3.1) to prevent erosion and sedimentation of the soak water. This includes planting of dam embankments, which will improve phosphorus retention.

#### Conclusion:

Based on the above assessment, the proposed clearing will result in:

- Removal of 0.23 hectares of riparian vegetation surrounding a watercourse and within a wetland (considered to have values consistent with a conservation category wetland) within the southern application area. While this clearing may result in short term impacts to water quality, this clearing is considered unlikely to have significant impacts upon this watercourse or wetland in the long term.

- Removal of 0.28 hectares of riparian vegetation surrounding the watercourse mapped within the northern application area. While this clearing may result in short term impacts to water quality, this clearing is considered unlikely to have significant impacts downstream in the long term.
- Clearing of vegetation within areas mapped as having moderate or high risks of wind erosion, water erosion and phosphorus export. This clearing is considered unlikely to result in significant land degradation impacts.

Conditions:

- An offset condition requiring the applicant to place a conservation covenant and fence areas of vegetation (including the area encompassing the remaining areas of the mapped wetland) within the southern portion of the property.

### 3.3. Relevant planning instruments and other matters

Other relevant authorisations required for the proposed land use include:

- Development approval under the *Planning and Development Act 2005* (issued by the Shire of Augusta-Margaret River)
- Section 5C Licence to abstract water under the *Rights in Water and Irrigation Act 1914*
- Section 11/17/21A Permit to interfere with bed and banks under the *Rights in Water and Irrigation Act 1914*.

The Shire of Augusta-Margaret River advised DWER that local government approvals are required, and that the clearing is consistent with the Shire's Local Planning Scheme (Shire of Augusta Margaret River, 2020). The Shire registered a number of objections to the originally proposed clearing area, namely the location of the dam, preference for the siting to be in already cleared areas to preserve remnant vegetation, and the purpose of the increased water allocation (Shire of Augusta Margaret River, 2020). Since this advice was issued, the applicant has amended both the northern and southern proposed clearing areas (refer to Section 1.1 for further details) and received a development approval from the Shire of Augusta Margaret River (Shire of Augusta Margaret River, 2023).

DWER has advised that the required Section 5C licence and Section 11/17/21A Permit are proposed to be approved subject to confirmation of the development approval being granted by the Shire of Augusta Margaret River and confirmation of a clearing permit for the proposed northern dam footprint being granted (DWER, 2022).

The application area is mapped within a Priority 3 Protection zone of a Public Drinking Water Source area. This is due to the application area location being less than 1500 metres from the Margaret River. The objective of Priority 3 areas is to manage water quality contamination risks (Department of Water, 2016). The proposed land use is permitted within Priority 3 areas (DWER, 2019b).

No Aboriginal Sites of Significance 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.

DBCA (2021c) advised that 'both bushland areas within the two proposed clearing applications have been fenced to exclude stock access, it is possible that this fencing was undertaken with conservation funding sourced by the Cape to Cape Catchment group (now Nature Conservation Margaret River) for riverine protection measures'. If removal or alteration of these fences is proposed to facilitate the proposed development, the applicant should liaise with Nature Conservation Margaret River.

## 4 Suitability of offsets

Through the detailed assessment outlined in Section 3.2 above, the Delegated Officer has determined that the following significant residual impacts remain after the application of the avoidance and mitigation measures summarised in Section 3.1:

- Removal of 0.39 hectares of western ringtail possum habitat,
- Removal of 1.93 hectares of high quality black cockatoo foraging habitat;

The applicant agreed to an environmental offset consisting of:

- placement of a conservation covenant and fencing of 8.03 hectares of native vegetation within the southern portion of the property (refer to Figure 3 below);
- rehabilitation, including planting and maintenance of 500 marri seedlings, within areas of marri and jarrah forest within the southern portion of the property (refer to Figure 4 below).

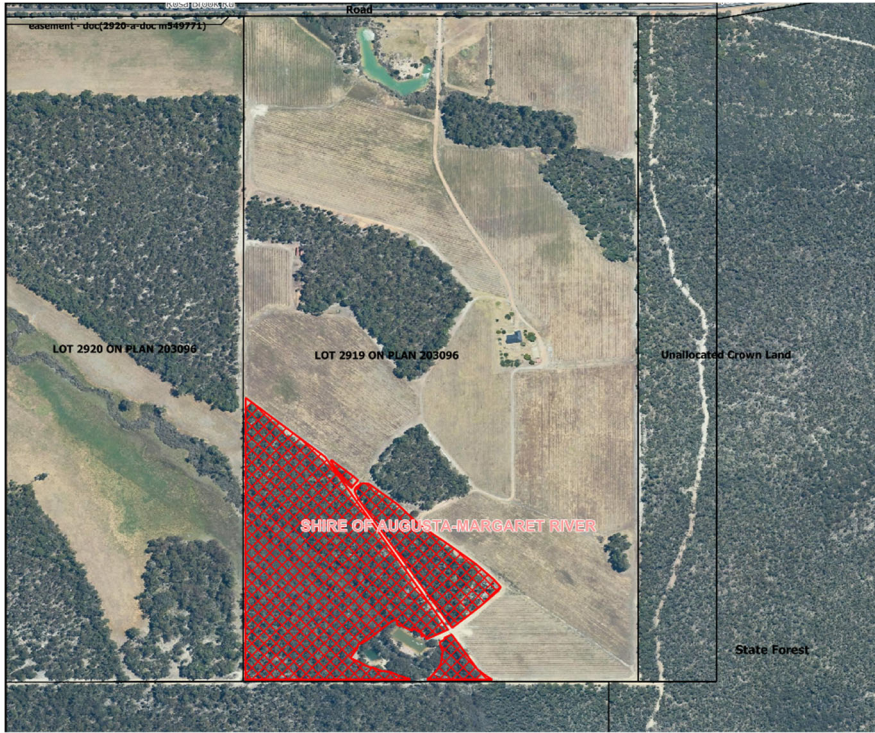


Figure 3. Area to be placed under conservation covenant and fenced.

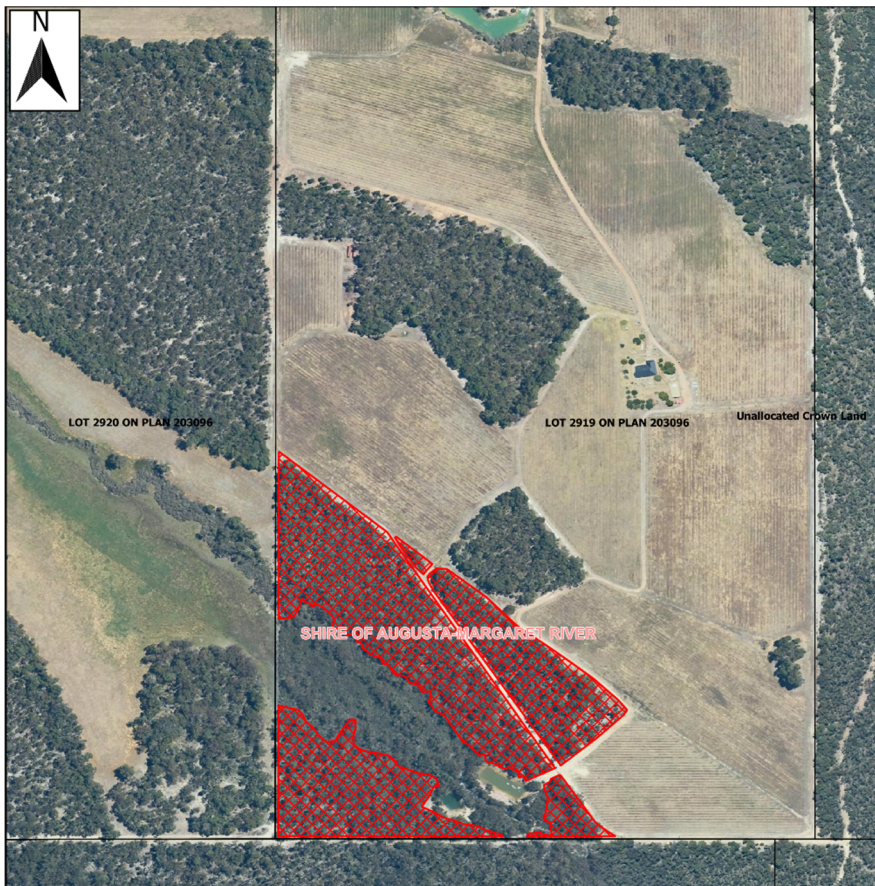


Figure 4. Area in which rehabilitation will occur, including the planting and maintenance of 500 marri seedlings.

The Delegated Officer considers that this adequately counterbalances the significant residual impacts listed above. The justification for the values used in the offset calculation is provided in Appendix G.

**End**

## Appendix A. Additional information provided by applicant

Summary of comments	Consideration of comment
Photos of application area provided (SW Hydrology, 2020)	Photos included in Appendix F
Flora and vegetation survey provided Stream Environment and Water (2020)	Considered in Section 3.2.1
Fauna survey provided (SW Environmental, 2020)	Considered in Section 3.2.2
Applicant provided list of species proposed to be planted around dams as a condition of the development approval (Papillon Holdings, 2023)	Considered in Section 3.1

## Appendix B. Details of public submissions

One submission was received. The points raised in this submission are summarised in Table B.1 below.

### B.1. Summary of submission received

Summary of comments	Consideration of comment
Any remaining foraging habitat is important for the persistence of black cockatoos and any habitat cleared should be replaced with at least the same area through revegetation	Comments were considered in the assessment of the application in section 3.2.1. A revegetation offset to mitigate impacts to black cockatoo foraging habitat is required as a condition of this permit.
Importance of retaining night roosts and breeding habitat	Comments were considered in the assessment of the application in section 3.2.1. Artificial hollows are required to be installed to replace trees with suitable nesting hollows that are proposed to be cleared.
Importance of considering cumulative impacts	The Delegated Officer acknowledges that exempt clearing contributes to the cumulative loss of native vegetation in an area, which may extend to suitable habitat for black cockatoo species. However, consideration of the impacts of the clearing allowed under exemption, where near this project or in the local area, cannot be quantified and is therefore not a matter to be considered in the assessment of this application. The potential for impacts to foraging habitat was considered in the context of the broader landscape in the detailed assessment of the application under Biological values (fauna) (see Section 3.2.1).
It is unclear whether the applicant is planning to refer these clearing actions federally, noting that referral guidelines for Western Australia's black cockatoos advise that removal of >1ha of foraging habitat, or a single nesting tree, may represent a significant impact for these MNES, and should be referred federally.	The applicant has been advised that any action that has, will have or is likely to have a significant impact on any MNES or other protected matters, will require approval from DAWE. It is the proponent's responsibility to ensure that they comply with the EPBC Act and refer any actions that may impact MNES.

## Appendix C. Site characteristics

### C.1. Site characteristics

Characteristic	Details
Local context	<p>The northern proposed clearing areas include isolated patches of remnant vegetation surrounded by land cleared for agriculture. The southern proposed clearing areas are surrounded by native vegetation. The application areas are located within the intensive land use zone of Western Australia.</p> <p>Spatial data indicates the local area (10 km radius of the proposed clearing area) retains approximately 73% of the original native vegetation cover.</p>
Ecological linkage	<p>The northern and southern clearing areas are both mapped approximately 150 m east respectively of a mapped South West Regional Ecological Linkage axis line. However, vegetation within Blackwood State Forest to the east is likely to play a more significant role in that linkage than vegetation within the application area due to its undisturbed nature.</p> <p>The northern proposed clearing area is part of a strip of vegetation located between forested areas to the north (Rapids Conservation Park) and east (Blackwood State Forest) associated with a watercourse flowing from south-east to northwest. However, noting that Rosa Brook Road is located between this strip of vegetation and Rapids Conservation Park as well as the sparsity and absence of this vegetation in areas, this vegetation is unlikely to play a significant role as an ecological linkage. It is also noted that fish are unlikely to be able to migrate through this watercourse from upstream of the application area to downstream, noting the number of road crossings/floodways and erosion or natural steps (falls &gt;20cm) evident in the creek bathymetry (DWER, 2021).</p> <p>Vegetation within the southern proposed clearing area is part of a local ecological linkage between areas of remnant vegetation, however the proposed clearing is unlikely to sever this ecological linkage noting the remnant vegetation immediately surrounding it.</p>
Conservation areas	<p>The northern and southern proposed clearing areas are located approximately 120 m and 220 m west respectively of the Blackwood State Forest. The northern clearing area is approximately 270 m southwest of Rapids Conservation Park.</p> <p>A reserve with the purposes of timber and government requirements is located immediately south of the southern proposed clearing area.</p>
Vegetation description	<p>A flora survey (Stream Environment and Water, 2020) indicates the vegetation within the proposed clearing area consists of the following vegetation types:</p> <ul style="list-style-type: none"> <li>• Northern area: <ul style="list-style-type: none"> <li>○ 1.28 ha - Open forest <i>Corymbia calophylla</i>, <i>Eucalyptus marginata</i> over open woodland <i>Banksia grandis</i>, <i>Allocasuarina fraseriana</i> over shrubland <i>Hovea elliptica</i>, <i>Taxandria parviceps</i> over shrubland/sedgeland <i>Hibbertia commutata</i>, <i>Tetraria capillaris</i>, <i>Patersonia umbrosa</i></li> <li>○ 0.28 ha - Open woodland of <i>Eucalyptus megacarpa</i> and <i>Eucalyptus patens</i> over (closed) shrubland of <i>Taxandria linearifolia</i> over mixed sedgeland.</li> <li>○ 0.26 ha - Revegetated shrubland</li> <li>○ 0.09 ha - Cleared</li> <li>○ 0.02 ha - Water</li> </ul> </li> <li>• Southern area: <ul style="list-style-type: none"> <li>○ 0.27 ha - Open woodland of <i>Eucalyptus megacarpa</i> and <i>Eucalyptus patens</i> over (closed) shrubland of <i>Taxandria linearifolia</i> over mixed sedgeland.</li> <li>○ 0.05 ha - Open forest <i>Corymbia calophylla</i>, <i>Eucalyptus marginata</i> over open woodland <i>Banksia grandis</i>, <i>Allocasuarina fraseriana</i> over shrubland <i>Hovea elliptica</i>, <i>Taxandria parviceps</i> over shrubland/sedgeland <i>Hibbertia commutata</i>, <i>Tetraria capillaris</i>, <i>Patersonia umbrosa</i></li> <li>○ 0.03 ha – Cleared</li> </ul> </li> </ul> <p>A 0.08 ha portion of the southern application area is not mapped, however aerial imagery indicates this is likely to also be open forest of <i>Corymbia calophylla</i> and <i>Eucalyptus marginata</i>.</p>



Characteristic	Details						
	<p>Representative photos and mapping are available in Appendix F.</p> <p>This is broadly consistent with the mapped vegetation types (Mattiske &amp; Havel 1998):</p> <ul style="list-style-type: none"> <li>• Northern portion - Bidella (12) - Low woodland of <i>Melaleuca preissiana</i>-<i>Banksia littoralis</i>-<i>Hakea lasianthoides</i> on valley floors and open forest to woodland of <i>Eucalyptus marginata subsp. marginata</i>-<i>Corymbia calophylla</i>-<i>Eucalyptus patens</i> on slopes in perhumid and humid zones; and</li> <li>• Southern portion - Preston (226) - Woodland of <i>Eucalyptus rudis</i>-<i>Agonis flexuosa</i>-<i>Banksia seminuda</i> along streams, open forest of <i>Corymbia calophylla</i>-<i>Eucalyptus patens</i> on slopes in the humid zone.</li> </ul> <p>The mapped vegetation types above retain approximately 92 per cent and 53 per cent of their original extents respectively (Government of Western Australia, 2019).</p>						
Vegetation condition	<p>A flora survey (Stream Environment and Water, 2020) indicate the vegetation within the proposed clearing area ranges from Completely Degraded to Excellent (Keighery, 1994) condition, described as:</p> <ul style="list-style-type: none"> <li>• 0.1 ha - Cleared</li> <li>• 0.12 ha - 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> <li>• 0.19 ha - 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.</li> <li>• 0.29 ha - 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.</li> <li>• 1.47 ha - 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>• 0.05 ha – Very Good/Excellent</li> <li>• 0.02 ha - Excellent - Vegetation structure intact, with disturbance affecting individual species; weeds are non-aggressive species.</li> </ul> <p>The full Keighery condition rating scale is provided in Appendix E, below. Representative photos and mapping are available in Appendix F.</p>						
Climate	<p>Rainfall: 1100 mm</p> <p>Evapotranspiration: 800 mm</p>						
Topography	<p>The elevation of the southern proposed clearing area is approximately 95 m AHD and the northern proposed clearing area is approximately 100 m AHD.</p>						
Soil description	<p>The application area is mapped as the following soil types (DPIRD, 2017):</p> <ul style="list-style-type: none"> <li>• Northern proposed clearing area - Treeton valley Phase: Narrow V-shaped drainage depressions (Schoknecht et al., 2004); and</li> <li>• Southern proposed clearing area - Treeton wet valley Phase: Broad U-shaped drainage depressions with swampy floors.</li> </ul>						
Land degradation risk	<p>The land degradation risks for the applied clearing area and associated soil types are outlined in the table below:</p> <table border="1" data-bbox="395 1973 1417 2007"> <thead> <tr> <th data-bbox="395 1973 619 2007">Risk categories</th> <th data-bbox="619 1973 1015 2007">Treeton Valley Phase</th> <th data-bbox="1015 1973 1417 2007">Treeton Wet Valley Phase</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	Risk categories	Treeton Valley Phase	Treeton Wet Valley Phase			
Risk categories	Treeton Valley Phase	Treeton Wet Valley Phase					

Characteristic	Details		
	Wind erosion	H1: 50-70% of map unit has a high to extreme wind erosion risk	M1: 10-30% of map unit has a high to extreme wind erosion risk
	Water erosion	L1: <3% of map unit has a high to extreme water erosion risk	M1: 10-30% of map unit has a high to extreme water erosion risk
	Salinity	L1: <3% of map unit has a moderate to high salinity risk or is presently saline	L1: <3% of map unit has a moderate to high salinity risk or is presently saline
	Subsurface Acidification	H2: >70% of map unit has a high subsurface acidification risk or is presently acid	H2: >70% of map unit has a high subsurface acidification risk or is presently acid
	Flood risk	L2: 3-10% of the map unit has a moderate to high flood risk	M2: 30-50% of the map unit has a moderate to high flood risk
	Water logging	M1: 10-30% of map unit has a moderate to very high waterlogging risk	H2: >70% of map unit has a moderate to very high waterlogging risk
	Phosphorus export risk	M1: 10-30% of map unit has a high to extreme phosphorus export risk	M2: 30-50% of map unit has a high to extreme phosphorus export risk
Waterbodies	<p>A non-perennial tributary of the Margaret River flows through the northern application areas in a southeast to northwest direction. The northern application areas surround a man-made dam within this watercourse.</p> <p>The southern application area intersects a floodplain wetland (ID 110) which is classed as a Conservation wetland within the unreviewed Geomorphic Wetlands South West dataset. This wetland is associated with a minor non-perennial tributary of the Margaret River (Mowen River) which flows from southeast to northwest. The southern application areas surround two man-made soaks, one of which is along this watercourse.</p>		
Hydrogeography	<p>The application area is within the Margaret River Catchment Area Public Drinking Water Source Area, classed as Priority 3, proclaimed under the <i>Country Areas Water Supply Act 1947</i> (CAWS Act).</p> <p>The application is within the Busselton-Capel Groundwater Area proclaimed under the <i>Rights in Water and Irrigation Act 1914</i> (RIWI Act).</p> <p>Hydrogeology within the application area is described as sedimentary rocks - extensive and deep aquifers, with sand and sandstone lithology.</p> <p>Groundwater salinity is &lt;500 mg/L TDS.</p>		
Flora	<p>According to available databases 24 conservation significant flora species have been recorded within the local area, including 21 priority and 3 threatened flora species. The closest recorded species to the application area is <i>Pultenaea pinifolia</i> (P3) mapped within the southern proposed clearing area.</p> <p>A flora survey (Stream Environment and Water, 2020) did not record any conservation significant flora within the application area. However, a site inspection conducted by DBCA (2021b) recorded one <i>Pultenaea pinifolia</i> plant within the southern proposed clearing area. The flora survey (Stream Environment and Water, 2020) and DBCA site inspection (2021b) also found <i>Lambertia rariflora</i>, <i>Netrostylis</i> sp. Blackwood and <i>Dampiera heteroptera</i> plants within 50 metres of the application areas, as well as elsewhere within the property.</p>		
Ecological communities	<p>No threatened or priority ecological communities are mapped within the local area.</p> <p>A flora survey (Stream Environment and Water, 2020) did not record any conservation significant ecological communities within the application area.</p>		
Fauna	<p>According to available databases, 13 threatened, six priority and one conservation dependent flora species have been recorded within the local area, the closest of which was <i>Dasyurus geoffroii</i> (Chuditch, western quoll) recorded approximately 60 metres from the application area in 2008.</p> <p>A fauna survey (SW Environmental, 2020) observed Carnaby's cockatoo and forest red-tailed black cockatoo within the surveyed area, and found foraging evidence of Baudin's cockatoo. The survey recorded 61 trees with a DBH of greater than 50 centimetres within the application area, of which three jarrah trees were considered to contain hollows (a combined total of 5 hollows) that may provide suitable breeding habitat for black cockatoo species (SW Environmental, 2020). The survey also recorded possible indirect evidence of possible</p>		

Characteristic	Details																							
	<p>indirect evidence of quokka (possible scat, runnels) within the vicinity of the southern application area and water rat (possible feed residue) within the northern application area (SW Environmental, 2020). Camera traps set for quokka did not record this species (SW Environmental, 2020).</p> <p>The following information pertaining to black cockatoos was also obtained from databases available to DWER:</p> <table border="1"> <thead> <tr> <th>Species name</th> <th>Number of records within 10 km of application area<sup>1</sup></th> <th>Within range of species<sup>2</sup></th> <th>Within breeding range</th> <th>Number of known roost sites within 20 kilometres<sup>4**</sup></th> <th>Number of breeding sites within 12 km<sup>4***</sup></th> </tr> </thead> <tbody> <tr> <td><i>Calyptorhynchus banksii naso</i> (forest red-tailed black cockatoo)</td> <td>6</td> <td>Yes</td> <td>Likely<sup>3</sup></td> <td> <ul style="list-style-type: none"> <li>• 5 sites with confirmed WTBC roosts (closest 9.2 km SW)</li> </ul> </td> <td>None recorded</td> </tr> <tr> <td><i>Zanda baudinii</i> (Baudin's cockatoo)</td> <td>18*</td> <td>Yes</td> <td>Predicted range<sup>2</sup></td> <td> <ul style="list-style-type: none"> <li>• 2 sites with confirmed RTBC roosts (closest 14.3 km)</li> </ul> </td> <td rowspan="2">1 (2.2 km SSE of application area)</td> </tr> <tr> <td><i>Zanda latirostris</i> (Carnaby's cockatoo)</td> <td>6*</td> <td>Yes</td> <td>No<sup>2</sup></td> <td> <ul style="list-style-type: none"> <li>• 3 sites with confirmed roosts from both RTBC and WTBC (closest 13.2 km)</li> <li>• 8 other roost sites (closest 6.7 km)</li> </ul> </td> </tr> </tbody> </table> <p><sup>1</sup> From DBCA's Threatened and Priority Fauna (DBCA-037) database (restricted database)</p> <p><sup>2</sup> As mapped in Department of Agriculture, Water and the Environment (2022)</p> <p><sup>3</sup> Department of Environment and Conservation (2008)</p> <p><sup>4</sup> From restricted data provided to DWER from DBCA</p> <p>* Plus an additional 8 records of <i>Calyptorhynchus</i> sp. 'white-tailed black cockatoo' (White-tailed black cockatoo) which may comprise either of these species</p> <p>** 20 kilometres being the range within which black cockatoos may forage from their night roost site (DAWE, 2022)</p> <p>*** 12 kilometres being the range within which black cockatoos may forage from their breeding site (DAWE, 2022)</p>	Species name	Number of records within 10 km of application area <sup>1</sup>	Within range of species <sup>2</sup>	Within breeding range	Number of known roost sites within 20 kilometres <sup>4**</sup>	Number of breeding sites within 12 km <sup>4***</sup>	<i>Calyptorhynchus banksii naso</i> (forest red-tailed black cockatoo)	6	Yes	Likely <sup>3</sup>	<ul style="list-style-type: none"> <li>• 5 sites with confirmed WTBC roosts (closest 9.2 km SW)</li> </ul>	None recorded	<i>Zanda baudinii</i> (Baudin's cockatoo)	18*	Yes	Predicted range <sup>2</sup>	<ul style="list-style-type: none"> <li>• 2 sites with confirmed RTBC roosts (closest 14.3 km)</li> </ul>	1 (2.2 km SSE of application area)	<i>Zanda latirostris</i> (Carnaby's cockatoo)	6*	Yes	No <sup>2</sup>	<ul style="list-style-type: none"> <li>• 3 sites with confirmed roosts from both RTBC and WTBC (closest 13.2 km)</li> <li>• 8 other roost sites (closest 6.7 km)</li> </ul>
Species name	Number of records within 10 km of application area <sup>1</sup>	Within range of species <sup>2</sup>	Within breeding range	Number of known roost sites within 20 kilometres <sup>4**</sup>	Number of breeding sites within 12 km <sup>4***</sup>																			
<i>Calyptorhynchus banksii naso</i> (forest red-tailed black cockatoo)	6	Yes	Likely <sup>3</sup>	<ul style="list-style-type: none"> <li>• 5 sites with confirmed WTBC roosts (closest 9.2 km SW)</li> </ul>	None recorded																			
<i>Zanda baudinii</i> (Baudin's cockatoo)	18*	Yes	Predicted range <sup>2</sup>	<ul style="list-style-type: none"> <li>• 2 sites with confirmed RTBC roosts (closest 14.3 km)</li> </ul>	1 (2.2 km SSE of application area)																			
<i>Zanda latirostris</i> (Carnaby's cockatoo)	6*	Yes	No <sup>2</sup>	<ul style="list-style-type: none"> <li>• 3 sites with confirmed roosts from both RTBC and WTBC (closest 13.2 km)</li> <li>• 8 other roost sites (closest 6.7 km)</li> </ul>																				

## C.2. Vegetation extent

	Pre-European extent (ha)	Current extent (ha)	Extent remaining (%)	Current extent in all DBCA managed lands (ha)	Extent remaining in all DBCA managed lands (proportion of Pre-European extent) (%)
<b>IBRA bioregion*</b>					
Jarrah Forest	4,506,660.25	2,399,838.15	53.25	1,673,614.25	37.14
<b>Mattiske vegetation association**</b>					
Preston (226)	9,834.96	5,209.58	52.97	4,382.54	43.41

Bidella (12)	47,784.70	44,068.92	92.22	45,791.96	91.22
<b>Local area</b>					
10 km	33 896.70	24 844.99	73.29	-	-

### C.3. Flora analysis table

With consideration for the site characteristics set out above, relevant datasets (see Appendix H.1), and biological survey information, impacts to the following conservation significant flora required further consideration.

Species	Conservation code	Records in Florabase	Closest record (km)	Same soil type	Same vegetation type	Suitable habitat features	Are survey efforts suitable for identification
<i>Acacia inops</i>	3	16	9.1	similar	N	Y	Y
<i>Acacia semitrullata</i>	4	88	5.3	similar	Y	Y	Y
<i>Acacia tayloriana</i>	4	28	9.4	N	Y	Y	Y
<i>Banksia squarrosa</i> subsp. <i>argillacea</i>	T	34	8.8	N	N	Y	Y
<i>Chamelaucium erythrochlorum</i>	4	25	9.1	Y	Y	Y	Y
<i>Chordifex jacksonii</i>	3	30	8.7	similar	Y	Y	Y
<i>Dampiera heteroptera</i>	3	17	10.0	Y	N	Y	Y
<i>Gastrolobium formosum</i>	3	39	3.9	similar	Y	Y	Y
<i>Grevillea brachystylis</i> subsp. <i>brachystylis</i>	3	32	8.8	similar	Y	Y	Y
<i>Hakea oldfieldii</i>	3	58	6.6	Y	Y	Y	Y
<i>Hybanthus volubilis</i>	2	15	7.5	similar	Y	Y	Y
<i>Isopogon formosus</i> subsp. <i>dasylepis</i>	3	47	9.4	N	N	Y	Y
<i>Lambertia rariflora</i> subsp. <i>rariflora</i>	4	48	1.8	Y	Y	Y	Y
<i>Lepyrodia heleocharoides</i>	3	20	7.3	similar	N	Y	Y
<i>Leucopogon</i> sp. <i>Gingilup</i> (N. Gibson & M. Lyons 590)	2	7	8.7	similar	Y	Y	Y
<i>Melaleuca basicephala</i>	4	30	5.4	similar	Y	Y	Y
<i>Pultenaea pinifolia</i>	3	44	0.012	Y	Y	Y	Y
<i>Pultenaea skinneri</i>	4	38	6.0	similar	Y	Y	Y
<i>Stylidium hygrophilum</i>	1	4	3.5	similar	Y	Y	Y
<i>Synaphea petiolaris</i> subsp. <i>simplex</i>	3	27	8.8	similar	Y	Y	Y

<i>Netrostylis</i> sp. <i>Nannup</i> (P.A. Jurjevich 1133)	1	6	7.0	similar	Y	Y	Y
---	---	---	-----	---------	---	---	---

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

#### C.4. Fauna analysis table

With consideration for the site characteristics set out above, relevant datasets (see Appendix H.1), and biological survey information, impacts to the following conservation significant fauna required further consideration.

Species	Conservation code	Number of records in local area	Distance of closest record to application area (km)	Most recent record	Suitable habitat features	Are surveys adequate to identify?
<i>Calyptorhynchus banksii naso</i> (forest red-tailed black cockatoo)	T (VU)	6	2.4	2019	Y	Y
<i>Zanda baudinii</i> (Baudin's cockatoo)	T (EN)	18*	2.5	2017	Y	Y
<i>Zanda latirostris</i> (Carnaby's cockatoo)	T (EN)	6*	4.0	2019	Y	Y
<i>Cherax tenuimanus</i> (Margaret River hairy marron)	T (CR)	54	6.6	2017	N	N
<i>Dasyurus geoffroyi</i> (chuditch)	T (VU)	4	3.4	2017	Y	Y
<i>Engaewa pseudoreducta</i> (Margaret River burrowing crayfish)	CR	4	8.4	2007	possible	Y
<i>Falsistrellus mackenziei</i> (western false pipistrelle)	P4	1	7.8	2018	Y	Y
<i>Galaxiella munda</i> (Mud minnow, western dwarf galaxias)	T (VU)	10	3.1	2019	possible	N
<i>Geotria australis</i> (Pouched lamprey)	P3	1	9.3	2013	N	N
<i>Hydromys chrysogaster</i> (water rat, rakali)	P4	4	6.7	2015	Y	Y
<i>Isodon fusciventer</i> (quenda)	P4	4	4.3	2015	Y	Y
<i>Nannatherina balstoni</i> (Balston's pygmy perch)	T (VU)	6	6.5	2018	possible	N
<i>Notamacropus irma</i> (western brush wallaby)	P4	3	0.061	2006	Y	Y
<i>Phascogale tapoatafa wambenger</i> (south-western brush-tailed phascogale, wambenger)	CD	2	8.3	2018	Y	Y
<i>Pseudocheirus occidentalis</i> (western ringtail possum, ngwayir)	T (CR)	3	1.3	2018	Y	Y
<i>Setonix brachyurus</i> (quokka)	T (VU)	1	8977.9	2008	Y	Y
<i>Trichosternus relictus</i> (a ground beetle Margaret River)	P3	2	5.2	1992	Y	Y
<i>Westralunio carteri</i> (Carter's freshwater mussel)	T (VU)	2	6.9	1992	N	N

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

\*An additional 4 records of *Calyptorhynchus* sp. 'white-tailed black cockatoo' were recorded within the local area, which could comprise either of these species

## Appendix D. 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> The area proposed to be cleared contains priority flora species, a wetland considered by DBCA to contain values consistent with a conservation category wetland, and habitat for conservation significant fauna species including western ringtail possum, black cockatoo species, quokka and others.</p>	At variance	Yes <i>Refer to Sections 3.2.1, 3.2.2 and 3.2.4 above.</i>
<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> The area proposed to be cleared contain foraging habitat significant for black cockatoo species and habitat significant for western ringtail possums.</p>	At variance	Yes <i>Refer to Section 3.2.1, above.</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> The area proposed to be cleared is unlikely to contain flora species listed under the BC Act.</p>	Not likely to be at variance	Yes <i>Refer to Section 3.2.2, above.</i>
<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> The area proposed to be cleared does not species indicative of the presence of 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> The extents of the mapped vegetation type and native vegetation in the local area are consistent with the national objectives and targets for biodiversity conservation in Australia. Although the northern application area may provide a weak ecological linkage, In the context of the local area this linkage is not considered to be significant.</p>	Not likely to be at variance	Yes <i>Refer to Section 3.2.3, above.</i>
<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> Given the distances to the nearest conservation areas, the proposed clearing is not likely to have an impact on the environmental values of nearby conservation areas.</p>	Not likely to be at variance	No
<b>Environmental value: land and water resources</b>		
<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>	At variance	Yes <i>Refer to Section 3.2.4, above.</i>

Assessment against the clearing principles	Variance level	Is further consideration required?
<p><b>Assessment:</b> Non-perennial watercourses are mapped within both the northern and southern application areas, and a wetland is mapped within the southern application area.</p>		
<p><b>Principle (g):</b> <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.”</i></p> <p><b>Assessment:</b> The mapped soils are highly susceptible to wind erosion and subsurface acidification and moderately susceptible to water erosion and phosphorus export. Given the end land use and management actions required as a condition of the applicant’s development approval, the proposed clearing is considered unlikely to result in significant land degradation impacts from wind erosion, water erosion or phosphorus export. Subsurface acidification risks are not relevant to the proposed development.</p>	Not likely to be at variance	Yes <i>Refer to Section 3.2.4, above.</i>
<p><b>Principle (i):</b> <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><b>Assessment:</b> The proposed clearing of riparian vegetation surrounding the northern and southern watercourses and wetland may result in short term impacts to water quality within these watercourses and wetland during construction of the dam and expanded soak. However, it is considered that the effects of this clearing to these watercourses and wetland are unlikely to result in significant impacts to water quality or the function of this wetland in the long term, noting the end land use, extent of the clearing, remaining vegetation surrounding the southern application area and management actions required as a condition of the applicant’s development approval.</p>	May be at variance	Yes <i>Refer to Section 3.2.4, above.</i>
<p><b>Principle (j):</b> <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><b>Assessment:</b> Although mapped soils have a high risk of waterlogging within the southern clearing area, noting the final land use is for an inundated area, the proposed clearing is unlikely to result in detrimental waterlogging or flooding.</p>	Not likely to be at variance	No

## Appendix E. 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 (1994).

### 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.

Condition	Description
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 F. Biological survey information excerpts and photographs of the vegetation**

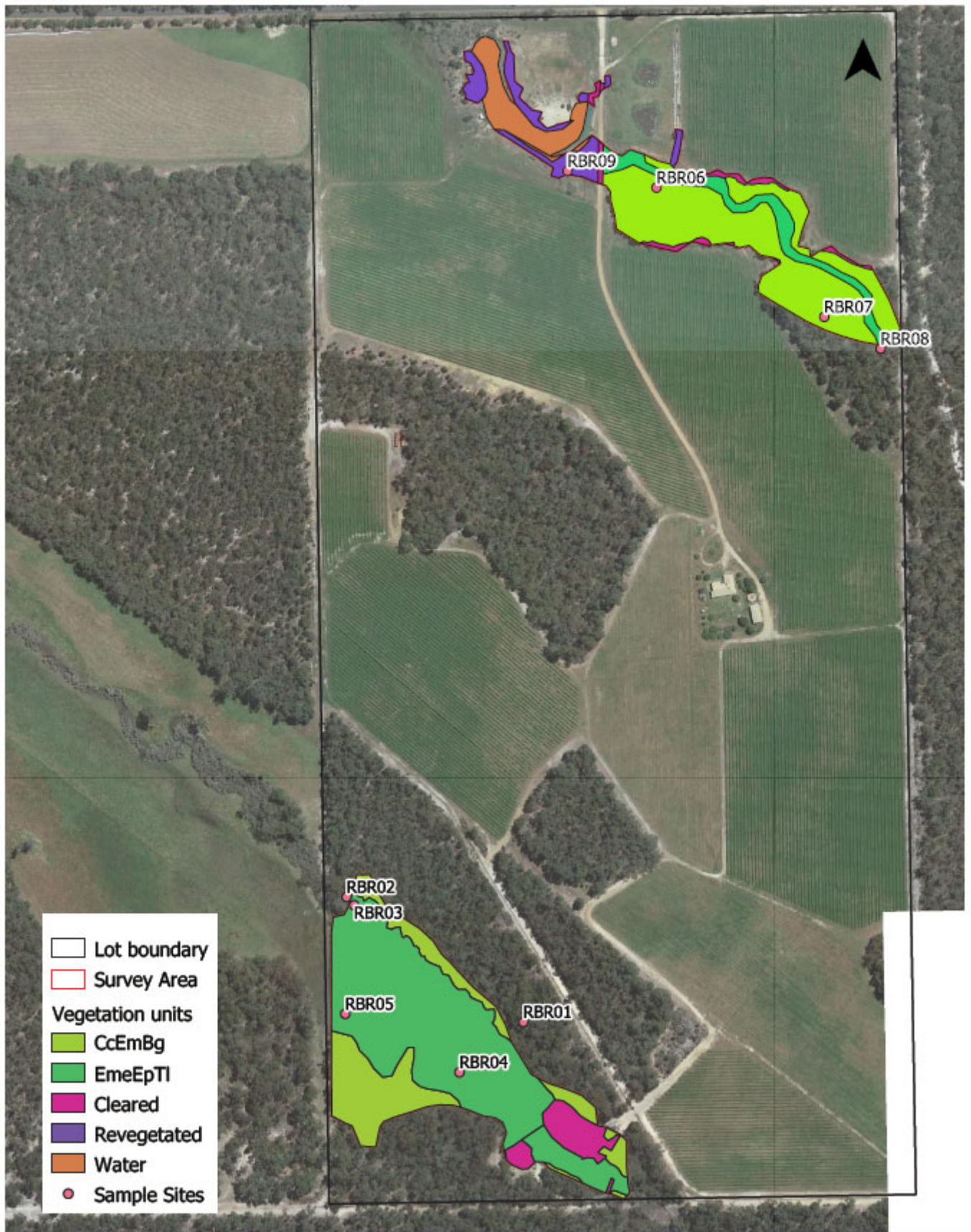


Figure F-1. Vegetation units within the application area (Stream Environment and Water, 2020)

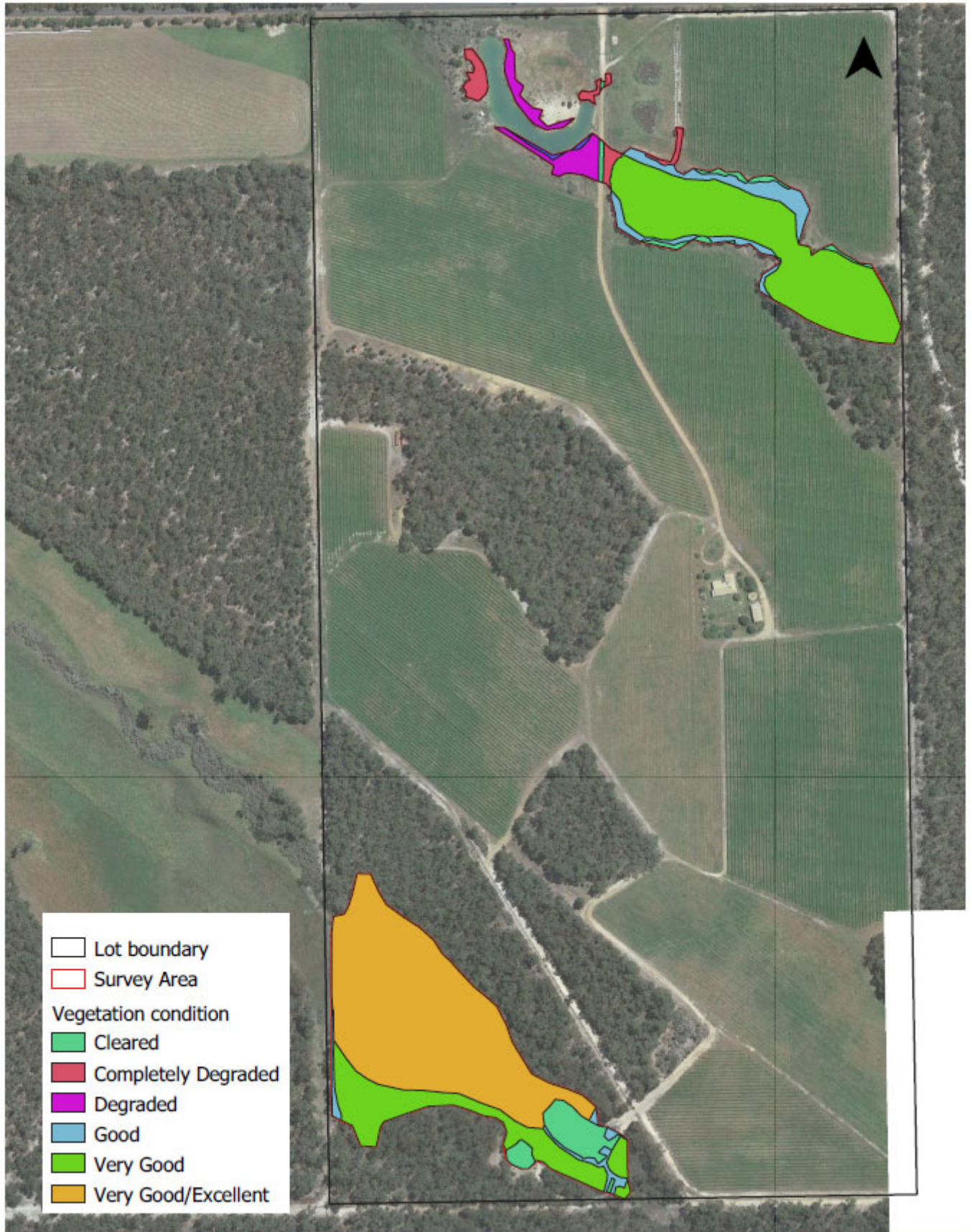


Figure F-2. Vegetation condition within the application area (Stream Environment and Water, 2020)



341416E 6242063N – looking SW

Figure F-3. Photograph of vegetation along south-eastern border of southern application area – looking southwest (SW Hydrology, 2020)



341416E 6242063N – looking NW

Figure F-4. Photograph of vegetation along south-eastern border of southern application area – looking northwest (SW Hydrology, 2020)



341348E 6242092N – Looking NW

Figure F-5. Photograph taken between two existing soaks in southern application area – looking northwest at smaller soak (SW Hydrology, 2020)



341410E 6242886N – Looking ESE

Figure F-6. Photograph taken along southern border of northern application area, looking east-southeast into area of marri and jarrah open forest (SW Hydrology, 2020)



341483E 6242874N – Looking NNE

Figure F-7. Photograph taken along southern border of northern application area, looking north-northeast into area of marri and jarrah open forest (SW Hydrology, 2020)



341537E 6242870N – Looking N

Figure F-7. Photograph taken along southern border of northern application area, looking north into area of marri and jarrah open forest (SW Hydrology, 2020)



341563E 6242870N – Looking SE

Figure F-8. Photograph taken within northern application area, looking southeast into area of marri and jarrah open forest (SW Hydrology, 2020)

## Appendix G. Offset calculator value justification

### Western ringtail possum – rehabilitation and conservation covenant over marri and jarrah forest areas in south of property

Environmental value to be offset		
Calculation	Score (Area)	Rationale
<b>Conservation significance</b>		
Description	<i>Pseudocheirus occidentalis</i> (western ringtail possum,	The proposed clearing will impact 0.39 hectares of very high habitat for western ringtail possum (WRP).
Type of environmental value	Species (flora/fauna)	WRP is listed as threatened fauna species under the Commonwealth EPBC Act and state BC Act (Critically Endangered).
Conservation significance of environmental value	Rare/threatened species - critically endangered	
Landscape-level value impacted	yes/no	
<b>Significant impact</b>		
Description	Removal of 0.39 hectares of very good quality habitat for western ringtail possum	The proposed clearing will impact 0.39 hectares of very high habitat for western ringtail possum (WRP).
Significant impact (hectares) / Type of feature	0.39	The southern application area (excluding cleared areas) are considered to provide significant western ringtail possum habitat based upon the proximity of WRP records, advice provided by DBCA and the presence of suitable vegetation ( <i>Corymbia calophylla</i> (marri) and <i>Eucalyptus marginata</i> (jarrah) open forest and <i>Eucalyptus megacarpa</i> (bullich) and <i>Eucalyptus patens</i> (blackbutt)
Quality (scale) / Number	8.00	The southern application area is considered high quality habitat for WRP because: • Contains vegetation suitable for WRP (jarrah marri forest and blackbutt bullich woodland areas closer to watercourse, with appropriate midstorey) as considered by DBCA following a site inspection
<b>Rehabilitation credit</b>		
Description	0	None proposed
Proposed rehabilitation (area in hectares)	0.00	
Current quality of rehabilitation site / Start number (of type of feature)	0.00	
Future quality WITHOUT rehabilitation (scale) / Future number WITHOUT	0.00	
Future quality WITH rehabilitation (scale) / Future number WITH rehabilitation	0.00	
Time until ecological benefit (years)	0.00	
Confidence in rehabilitation result (%)	0	
<b>Offset</b>		
Description	Place conservation covenant over southern area of vegetation (this calculation for marri/jarrah vegetation part of this only) and rehabilitate area of marri/jarrah vegetation by planting 500 marri	Place conservation covenant over southern area of vegetation on property containing habitat for WRP to conserve this habitat in perpetuity, and improve WRP habitat by planting within marri/jarrah areas.
Proposed offset (area in hectares)	6.23	Area of marri/jarrah veg in south of property in which marri plantings can occur comprise a total of 6.23 ha. Conservation covenant will also be placed over this area (together with the blackbutt bullich area).
Current quality of offset site / Start number (of type of feature)	6.00	While these areas contain suitable vegetation (marri/jarrah) for WRP, as part of this area has been historically thinned it is likely to comprise only good quality WRP habitat.
Future quality WITHOUT offset (scale) / Future number WITHOUT offset	6.00	It is not expected that the quality of the site will significantly change over time without management.
Future quality WITH offset (scale) / Future number WITH offset	8.00	It is assumed that, with planting of 500 marri trees, fencing and placing a conservation covenant, a significant improvement in the quality of WRP habitat within these areas will result.
Time until ecological benefit (years)	15.00	It is assumed that the benefits of rehabilitation resulting in improved WRP habitat will be available after 15 years.
Confidence in offset result (%)	0.8	There is a moderate level of confidence that the proposed mitigation will achieve the predicted result, given rehabilitation will be undertaken in accordance with specified completion criteria, site preparation, monitoring and reporting.
Duration of offset implementation (maximum 20 years)	20.00	It is assumed the rehabilitated areas will remain uncleared. The maximum of 20 years is applied.
Time until offset site secured (years)	1.00	As the property is already known, it is assumed that the conservation covenant will be placed within one year of clearing
Risk of future loss WITHOUT offset (%)	15.0%	The rehabilitation areas are currently zoned rural and are not subject to any existing planning approvals.
Risk of future loss WITH offset (%)	5.0%	The future conservation (in perpetuity) of the offset site would result in a substantial increased security and substantially reduce the risk of loss.
Offset ratio (Conservation area only)	N/A	
Landscape level values of offset?	N/A	N/A

**Western ringtail possum habitat –conservation covenant over remaining areas (blackbutt and bullich woodland) in south of property**

<b>Environmental value to be offset</b>		
<i>Calculation</i>	<i>Score (Area)</i>	<i>Rationale</i>
<b>Conservation significance</b>		
Description	Pseudocheirus occidentalis (western ringtail possum,	The proposed clearing will impact 0.39 hectares of very high habitat for western ringtail possum (WRP).
Type of environmental value	Species (flora/fauna)	WRP is listed as threatened fauna species under the Commonwealth EPBC Act and state BC Act (Critically Endangered).
Conservation significance of environmental value	Rare/threatened species - critically endangered	
Landscape-level value impacted	yes/no	
<b>Significant impact</b>		
Description	Removal of 1.85 hectares of Excellent foraging habitat (marri/jarraah forest) and Good foraging habitat (bullich/blackbutt forest) for all three	The proposed clearing will impact 0.39 hectares of very high habitat for western ringtail possum (WRP).
Significant impact (hectares) / Type of feature	0.39	The southern application area (excluding cleared areas) are considered to provide significant western ringtail possum habitat based upon the proximity of WRP records, advice provided by DBCA and the presence of suitable vegetation (Corymbia calophylla (marri) and Eucalyptus marginata (jarrah) open forest and Eucalyptus megacarpa (bullich) and Eucalyptus patens
Quality (scale) / Number	8.00	The southern application area is considered high quality habitat for WRP because: • Contains vegetation suitable for WRP (jarrah marri forest and blackbutt bullich woodland areas closer to watercourse, with appropriate midstorey) as considered by DBCA following a site inspection
<b>Rehabilitation credit</b>		
Description	0	None proposed
Proposed rehabilitation (area in hectares)	0.00	
Current quality of rehabilitation site / Start number (of type of feature)	0.00	
Future quality WITHOUT rehabilitation (scale) / Future number WITHOUT rehabilitation	0.00	
Future quality WITH rehabilitation (scale) / Future number WITH rehabilitation	0.00	
Time until ecological benefit (years)	0.00	
Confidence in rehabilitation result (%)	0	
<b>Offset</b>		
Description	Place conservation covenant over southern area of vegetation (this calculation for blackbutt bullich	Place conservation covenant over southern area of vegetation on property containing habitat for WRP to conserve this habitat in perpetuity.
Proposed offset (area in hectares)	1.82	Areas of blackbutt bullich vegetation in south of property which are to be conserved comprise a total of 1.82 ha.
Current quality of offset site / Start number (of type of feature)	8.00	Blackbutt and bullich are likely to comprise very good quality habitat for WRP.
Future quality WITHOUT offset (scale) / Future number WITHOUT offset	8.00	It is not expected that the quality of the site will significantly change over time.
Future quality WITH offset (scale) / Future number WITH offset	8.00	Noting that no planting will occur in these areas with this offset, habitat quality is not expected to change.
Time until ecological benefit (years)	1.00	Conservation covenant will be established within one year.
Confidence in offset result (%)	0.9	There is a high level of confidence that the conservation covenant will be placed.
Duration of offset implementation (maximum 20 years)	20.00	It is assumed the conserved areas will remain uncleared. The maximum of 20 years is applied.
Time until offset site secured (years)	1.00	It is assumed that the conservation covenant will be placed within one year of clearing.
Risk of future loss WITHOUT offset (%)	15.0%	The areas are currently zoned rural and are not subject to any existing planning approvals.
Risk of future loss WITH offset (%)	5.0%	The future conservation (in perpetuity) of the offset site would result in a substantial increased security and substantially reduce the risk of loss.
Offset ratio (Conservation area only)	N/A	
Landscape level values of offset?	N/A	N/A



**Black cockatoo foraging habitat – rehabilitation and conservation covenant over marri and jarrah forest areas in south of property**

<b>Environmental value to be offset</b>		
<b>Calculation</b>	<b>Score (Area)</b>	<b>Rationale</b>
<b>Conservation significance</b>		
Description	Baudin's scrubwren, Carnaby's scrubwren and Ferral red-tailed black scrubwren	
Type of environmental value	Species (Flora/Fauna)	Carnaby's and Baudin's scrubwren - threatened under EPBC Act and DC Act. Ferral red-tailed scrubwren - vulnerable under under EPBC Act and DC Act.
Conservation significance of environmental value	Rare/threatened species - redangered	The proposed clearing will impact 1.85 hectares of high-quality foraging habitat for Carnaby's scrubwren, Baudin's scrubwren and Ferral red-tailed black scrubwren, including the clearing of 64 potential habitat trees, with five suitable oval hollows.
Landscape-level value impacted	grass	
<b>Significant impact</b>		
Description	Removal of 1.85 ha of Essential foraging habitat and Good foraging habitat for three black scrubwren species	The proposed clearing will impact 1.85 hectares of high-quality foraging habitat for Carnaby's scrubwren, Baudin's scrubwren and Ferral red-tailed black scrubwren, including the clearing of 64 potential habitat trees, with five suitable oval hollows.
Significant impact (hectares) / Type of feature	1.85	The following vegetation types mapped within the application area are considered to provide foraging habitat for black scrubwren species: * Cornubia subsp. (marri) and Eucalyptus marginata (jarrah) open ferral - 1.33 ha mapped within application area (plus an additional 0.88 ha not covered by mapping in southern oak area also likely to be this vegetation type); and * Eucalyptus marginata (hulliah) and Eucalyptus patens (blackball) open woodland - 0.52 ha.
Quality (scale) / Number	7.00	The application area is considered significant foraging habitat for black scrubwren because: * A known breeding site is present within 12 km * Known roost sites (multiple) are present within 20 km * Drinking water sources are present within 1 km * Carnaby's scrubwren and Ferral red-tailed black scrubwren were observed within the surveyed area. An assessment of the foraging value against the minimum daily foraging survey tool gave foraging value of 10, this was revised to 7 using variously unrelated landscape and historical disturbance within sections of application area.
<b>Rehabilitation credit</b>		
Description	0	None proposed
Prepared rehabilitation (area in hectares)	0.00	
Current quality of rehabilitation site / Start number (of type of feature)	0.00	
Future quality WITHOUT rehabilitation (scale) / Future number WITHOUT rehabilitation	0.00	
Future quality WITH rehabilitation (scale) / Future number WITH rehabilitation	0.00	
Time until ecological benefit (years)	0.00	
Confidence in rehabilitation result (%)	0	
<b>Offset</b>		
Description	Conservation covenant over marri/jarrah vegetation and rehab by planting 500 marri trees	Place conservation covenant over southern area of vegetation to properly maintain foraging habitat for black scrubwren to conserve this habitat in perpetuity, and improve black scrubwren habitat by planting within marri/jarrah areas.
Prepared offset (area in hectares)	6.25	Area of marri/jarrah veg in south of property in which marri planting can occur comprises a total of 6.25 ha. Conservation covenant will also be placed over this area (together with the blackball hulliah area).
Current quality of offset site / Start number (of type of feature)	6.00	While these areas maintain good foraging species (marri/jarrah) as the area has been historically thinned it is likely to comprise good quality foraging habitat.
Future quality WITHOUT offset (scale) / Future number WITHOUT offset	6.00	It is not expected that the quality of the site will significantly change over time without management.
Future quality WITH offset (scale) / Future number WITH offset	8.00	It is assumed that, with planting of 500 marri trees, fencing and placing a conservation covenant, a significant improvement in the quality of foraging habitat for black scrubwren within these areas will result.
Time until ecological benefit (years)	15.00	It is assumed that the benefits of rehabilitation resulting in improved foraging habitat will be available after 15 years.
Confidence in offset result (%)	8.0	There is a moderate level of confidence that the proposed mitigation will achieve the predicted result, given rehabilitation will be undertaken in accordance with specified completion criteria, site preparation, monitoring and evaluation.
Duration of offset implementation (maximum 20 years)	20.00	It is assumed the rehabilitated areas will remain uncultured. The maximum of 20 years is applied.
Time until offset site secured (years)	1.00	As the property is already known, it is assumed that the conservation covenant will be placed within one year of clearing.
Risk of future loss WITHOUT offset (%)	15.0X	The rehabilitation areas are currently used rural and are not subject to any existing planning controls.
Risk of future loss WITH offset (%)	5.0X	The future conservation (in perpetuity) of the offset site would result in a substantial increased security and substantially reduce the risk of loss.
Offset ratio (Conservation area only)	N/A	
Landscape level value of offset?	N/A	N/A

**Black cockatoo foraging habitat –conservation covenant over remaining areas (blackbutt and bullich woodland) in south of property**

Environmental value to be offset		
<i>Calculation</i>	<i>Score (Area)</i>	<i>Rationale</i>
<b>Conservation significance</b>		
Description	Calyptorhynchus baudinii (Baudin's cockatoo) and Calyptorhynchus latirostris (Carnaby's cockatoo) (as well as Calyptorhynchus banksii nana (far west red-tailed black cockatoo)	The proposed clearing will impact 1.85 hectares of high-quality foraging habitat for Carnaby's cockatoo, Baudin's cockatoo and far west red-tailed black cockatoo, including the clearing of 61 potential habitat trees, with five suitable nest hollows.
Type of environmental value	Species (flora/fauna)	Carnaby's and Baudin's cockatoo is listed as threatened fauna species under the Commonwealth EPBC Act and state BC Act. Far west red-tailed black cockatoo is listed as vulnerable fauna under the Commonwealth EPBC Act and state BC Act.
Conservation significance of environmental value	Rare/threatened species and endangered	
Landscape-level value impacted	yes/no	
<b>Significant impact</b>		
Description	Removal of 1.85 hectares of Excellent foraging habitat (marrif Jarrah forest) and Good foraging habitat (bullich/blackbutt forest) for all three black cockatoo species	The proposed clearing will impact 1.85 hectares of high-quality foraging habitat for Carnaby's cockatoo, Baudin's cockatoo and far west red-tailed black cockatoo, including the clearing of 61 potential habitat trees, with five suitable nest hollows.
Significant impact (hectares) / Type of feature	1.85	The following vegetation types mapped within the application area (Stream Environmental and Water, 2020) are considered to provide foraging habitat for black cockatoo species: • Corymbia calophylla (marrif) and Eucalyptus marginata (jarrah) open forest – 1.33 ha mapped within application area (plus an additional 0.08 ha not covered by mapping in southern oak area are likely to be this vegetation type); and • Eucalyptus moquecupa (bullich) and Eucalyptus patens (blackbutt) open woodland – 0.52 ha.
Quality (scale) / Number	7.00	The application area is considered a significant foraging habitat for black cockatoo because: • Mapped vegetation types include preferred foraging species • A known breeding site is present within 12 km • Known roosting (multiple) are present within 20 km • Foraging habitat is present within 12 km of the site • The fauna survey (SW Environmental, 2020) observed that food residue (chewed Marrif cones) were observed broadly over both sites for all three black cockatoo species • Drinking water sources are present within 1 km • Carnaby's cockatoo and far west red-tailed black cockatoo were observed within the surveyed area (SW Environmental, 2020). An assessment of the foraging value against the Commonwealth foraging scoring tool gave a foraging value of 10, but this was revised to a 7 noting the extensively vegetated landscape and the historical disturbance within part of the application area.
<b>Rehabilitation credit</b>		
Description	0	None proposed
Proposed rehabilitation (area in hectares)	0.00	
Current quality of rehabilitation site / Start number (of type of feature)	0.00	
Future quality WITHOUT rehabilitation (scale) / Future number WITHOUT	0.00	
Future quality WITH rehabilitation (scale) / Future number WITH rehabilitation	0.00	
Time until ecological benefit (years)	0.00	
Confidence in rehabilitation result (%)	0	
<b>Offset</b>		
Description	Place conservation covenant over southern area of vegetation (this calculation for blackbutt bullich vegetation part of this only)	Place conservation covenant over southern area of vegetation on property containing foraging habitat for black cockatoo to conserve this habitat in perpetuity.
Proposed offset (area in hectares)	1.82	Area of blackbutt bullich vegetation in south of property which are to be conserved comprise a total of 1.82 ha.
Current quality of offset site / Start number (of type of feature)	5.00	Blackbutt and bullich are likely to comprise moderate-quality foraging habitat for black cockatoo species.
Future quality WITHOUT offset (scale) / Future number WITHOUT offset	5.00	It is not expected that the quality of the site will significantly change over time.
Future quality WITH offset (scale) / Future number WITH offset	5.00	Noting that no planting will occur in these areas with this offset, habitat quality is not expected to change.
Time until ecological benefit (years)	1.00	Conservation covenant will be established within one year.
Confidence in offset result (%)	0.9	There is a high level of confidence that the conservation covenant will be placed.
Duration of offset implementation (maximum 20 years)	20.00	It is assumed the conserved areas will remain uncleared. The maximum of 20 years is applied.
Time until offset site secured (years)	1.00	It is assumed that the conservation covenant will be placed within one year of clearing.
Risk of future loss WITHOUT offset (%)	15.0%	The areas are currently zoned rural and are not subject to any existing planning approvals.
Risk of future loss WITH offset (%)	5.0%	The future conservation (in perpetuity) of the offset site would result in a substantial increase in security and substantially reduce the risk of loss.
Offset ratio (Conservation area only)	N/A	
Landscape level values of offset?	N/A	N/A

## Appendix H. Sources of information

### H.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)
- Geomorphic Wetlands South West – Unreviewed
- 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

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)

### H.2. References

Australian Museum (2020a). Western False Pipistrelle. Retrieved from:

<https://australian.museum/learn/animals/bats/western-falsepipistrelle/#:~:text=Western%20False%20Pipistrelles%20roost%20in,of%205%20to%2030%20bats.>

Bennalongia Pty Ltd (2013). *Cooljarloo West Proposal: Short Range Endemic Fauna, Pilot and Targeted Surveys*

- BirdLife International (2023). Species factsheet: *Tyto novaehollandiae*. Retrieved from <http://datazone.birdlife.org/species/factsheet/australian-masked-owl-tyto-novaehollandiae>
- Burnham, Q.F., Koenders, A. and Horwitz, P. (2007). *Field studies into the biology and conservation requirements of Engaewa species in the South-West and Warren DEC Regions*. Final Report Prepared for Department of Environment and Conservation 30 November 2007.
- Commonwealth of Australia (2001) *National Objectives and Targets for Biodiversity Conservation 2001-2005*, Canberra.
- Department of Agriculture, Water and the Environment (DAWE) (2022). *Referral guideline for 3 WA threatened black cockatoo species: Carnaby's Cockatoo, Baudin's Cockatoo and the Forest Red-tailed Black cockatoo*. Department of Agriculture, Water and the Environment, Canberra, February
- Department of Biodiversity, Conservation and Attractions (2012c). *Fauna profiles – Brush-tailed Phascogale, Phascogale tapoatafa* (Meyer, 1793). Retrieved from <https://library.dbca.wa.gov.au/static/FullTextFiles/925273.pdf>
- Department of Biodiversity, Conservation and Attractions (2018). *Fauna notes – Living with quenda*. Retrieved from [https://www.dpaw.wa.gov.au/images/documents/plants-animals/animals/living-with-wildlife/quenda\\_fauna\\_note\\_2018.pdf](https://www.dpaw.wa.gov.au/images/documents/plants-animals/animals/living-with-wildlife/quenda_fauna_note_2018.pdf)
- Department of Biodiversity, Conservation and Attractions (DBCA) (2021a) *Species and Communities Branch fauna advice for clearing permit application CPS 8878/1*, received 21 June 2021. Department of Biodiversity, Conservation and Attractions, Western Australia (DWER Ref: A2109048).
- Department of Biodiversity, Conservation and Attractions (DBCA) (2021b) *Species and Communities Branch flora advice for clearing permit application CPS 8878/1*, received 21 June 2021. Department of Biodiversity, Conservation and Attractions, Western Australia (DWER Ref: A2109048).
- Department of Biodiversity, Conservation and Attractions (DBCA) (2021c) *Species and Communities Branch wetlands advice for clearing permit application CPS 8878/1*, received 21 June 2021. Department of Biodiversity, Conservation and Attractions, Western Australia (DWER Ref: A2019050).
- Department of Biodiversity, Conservation and Attractions (DBCA) (2021d) *Species and Communities Branch additional flora advice from site inspection for clearing permit application CPS 8878/1*, received 19 August 2021. Department of Biodiversity, Conservation and Attractions, Western Australia (DWER Ref: A2041903).
- Department of Biodiversity, Conservation and Attractions (DBCA) (2022). *Species and Communities Branch fauna advice for clearing permit application CPS 7542/2*, received 26 July 2022. Department of Biodiversity, Conservation and Attractions, Western Australia (DWER Ref: DWERDT643858).
- Department of Environment and Conservation. (2012a). *Fauna Profiles. Chuditch Dasyurus geoffroii*. Government of Western Australia. Accessed 25 June 2020.
- Department of Environment and Conservation (DEC) (2012b). *Fauna profiles - Western Brush Wallaby - Macropus irma*. Department of Environment and Conservation, Western Australia.
- Department of Environment and Conservation (DEC) (2012a). *Fauna profiles - Quenda Isodon obesulus (Shaw, 1797)*. Department of Environment and Conservation, Western Australia.
- Department of Environment and Conservation. (DEC) (2012b). *Fauna profiles. Brush-tailed Phascogale. Phascogale tapoatafa (Meyer, 1793)*. Retrieved from <https://library.dbca.wa.gov.au/static/FullTextFiles/925273.pdf>
- Department of Environment and Conservation (DEC) (2013). *Quokka Setonix brachyurus Recovery Plan*. Wildlife Management Program No. 56. Department of Environment and Conservation, Perth, WA.
- Department of Environment Regulation (DER) (2013). *A guide to the assessment of applications to clear native vegetation*. Perth. Available from: [https://www.der.wa.gov.au/images/documents/your-environment/native-vegetation/Guidelines/Guide2\\_assessment\\_native\\_veg.pdf](https://www.der.wa.gov.au/images/documents/your-environment/native-vegetation/Guidelines/Guide2_assessment_native_veg.pdf).
- Department of the Environment, Water, Heritage and the Arts (2009). *Approved Conservation Advice for Engaewa pseudoreducta (Margaret River Burrowing Crayfish)*. Canberra: Department of the Environment, Water, Heritage and the Arts. Available from: <http://www.environment.gov.au/biodiversity/threatened/species/pubs/82674-conservation-advice.pdf>.
- Department of Primary Industries and Regional Development (DPIRD) (2019). *NRInfo Digital Mapping. Department of Primary Industries and Regional Development*. Government of Western Australia. URL: <https://maps.agric.wa.gov.au/nrm-info/> (accessed 30 June 2020).

- Department of Water and Environmental Regulation (DWER) (2019a). *Procedure: Native vegetation clearing permits*. Joondalup. Available from:  
[https://dwer.wa.gov.au/sites/default/files/Procedure\\_Native\\_vegetation\\_clearing\\_permits\\_v1.PDF](https://dwer.wa.gov.au/sites/default/files/Procedure_Native_vegetation_clearing_permits_v1.PDF).
- Department of Water and Environmental Regulation (DWER) (2019b). Land use compatibility tables for public drinking water source areas. Water quality protection note 25. Department of Water and Environmental Regulation, Western Australia.
- Department of Water and Environmental Regulation (DWER) (2021a). *Findings of site inspection undertaken by DWER water licencing relating to northern area of CPS 8878/1*, 6 August 2021. (DWER Ref: DWERDT488416).
- Department of Water and Environmental Regulation (DWER) (2021b). *Advice provided by River Science section regarding wetlands mapped within CPS 8878/1*, received 11 February 2021. (DWER Ref: A1981203).
- Department of Water and Environmental Regulation (DWER) (2022). *Proposed approval of licence to take water and permit to interfere with watercourse* (DWER ref: DWERDT681977).
- Department of Water and Environmental Regulation (DWER) (2023e). *Rakali - water rat - Hydromys chrysogaster*. Retrieved from <https://rivers.dwer.wa.gov.au/species/hydromys-chrysogaster/>
- Department of Water and Environmental Regulation (DWER) (2023b). *Hairy marron - Cherax tenuimanus*. Retrieved from <https://rivers.dwer.wa.gov.au/species/cherax-tenuimanus/>
- Department of Water and Environmental Regulation (DWER) (2023c). *Western mud minnow - Galaxiella munda*. Retrieved from <https://rivers.dwer.wa.gov.au/species/galaxiella-munda/>
- Department of Water and Environmental Regulation (DWER) (2023d). *Balston's pygmy perch - Nannatherina balstoni*. Retrieved from <https://rivers.dwer.wa.gov.au/species/nannatherina-balstoni/>
- Department of Water and Environmental Regulation (DWER) (2023e). *Pouched lamprey - Geotria australis*. Retrieved from <https://rivers.dwer.wa.gov.au/species/geotria-australis/>
- Environmental Protection Authority (EPA) (2016). *Technical Guidance - Flora and Vegetation Surveys for Environmental Impact Assessment*. Available from:  
[http://www.epa.wa.gov.au/sites/default/files/Policies\\_and\\_Guidance/EPA%20Technical%20Guidance%20-%20Flora%20and%20Vegetation%20survey\\_Dec13.pdf](http://www.epa.wa.gov.au/sites/default/files/Policies_and_Guidance/EPA%20Technical%20Guidance%20-%20Flora%20and%20Vegetation%20survey_Dec13.pdf)
- Environmental Protection Authority (EPA) (2016). *Technical Guidance – Terrestrial Fauna Surveys*. Available from:  
[https://www.epa.wa.gov.au/sites/default/files/Policies\\_and\\_Guidance/Tech%20guidance-%20Terrestrial%20Fauna%20Surveys-Dec-2016.pdf](https://www.epa.wa.gov.au/sites/default/files/Policies_and_Guidance/Tech%20guidance-%20Terrestrial%20Fauna%20Surveys-Dec-2016.pdf)
- Government of Western Australia (2019). *2018 South West Vegetation Complex Statistics. Current as of March 2019*. WA Department of Biodiversity, Conservation and Attractions, Perth,  
<https://catalogue.data.wa.gov.au/dataset/dbca>
- Government of Western Australia. (2019). *2018 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full Report). Current as of March 2019*. WA Department of Biodiversity, Conservation and Attractions. <https://catalogue.data.wa.gov.au/dataset/dbca-statewide-vegetation-statistics>
- Hayward, M.W., P.J. de Tores & P.B. Banks (2005). Habitat use of the Quokka, *Setonix brachyurus* (Macropodidae: Marsupalia), in the Northern Jarrah Forest of Australia. *Journal of Mammalogy*. 86(4):683-688
- Keighery, B.J. (1994) *Bushland Plant Survey: A Guide to Plant Community Survey for the Community*. Wildflower Society of WA (Inc). Nedlands, Western Australia.
- Mattiske, E.M. and Havel, J.J. (1998) *Vegetation Complexes of the South-west Forest Region of Western Australia*. Maps and report prepared as part of the Regional Forest Agreement, Western Australia for the Department of Conservation and Land Management and Environment Australia.
- Molloy, S., Wood, J., Hall, S., Wallrodt, S. and Whisson, G. (2009) *South West Regional Ecological Linkages Technical Report*, Western Australian Local Government Association and Department of Environment and Conservation, Perth.
- Northcote, K. H. with Beckmann G G, Bettenay E., Churchward H. M., van Dijk D. C., Dimmock G. M., Hubble G. D., Isbell R. F., McArthur W. M., Murtha G. G., Nicolls K. D., Paton T. R., Thompson C. H., Webb A. A. and Wright M. J. (1960-68) *Atlas of Australian Soils*, Sheets 1 to 10, with explanatory data. CSIRO and Melbourne University Press: Melbourne.

- Papillon Holdings Pty Ltd (2020). *Clearing permit application CPS 8878/1*, received 11 March 2020 (DWER Ref: A1885962).
- Papillon Holdings Pty Ltd (2023). *List of flora species proposed to be planted around dam*, received 17 January 2023 (DWER ref: DWERDT717774)
- Schoknecht, N., Tille, P. and Purdie, B. (2004) *Soil-landscape mapping in South-Western Australia – Overview of Methodology and outputs* Resource Management Technical Report No. 280. Department of Agriculture.
- Shedley, E. And Williams, K. (2014). *An assessment of habitat for Western Ringtail Possum (Pseudocheirus occidentalis) on the southern Swan Coastal Plain (Binningup to Dunsborough)*. Unpublished report for the Department of Parks and Wildlife, Bunbury, Western Australia
- Shepherd, D.P., Beeston, G.R. and Hopkins, A.J.M. (2001) *Native Vegetation in Western Australia, Extent, Type and Status*. Resource Management Technical Report 249. Department of Agriculture, Western Australia.
- Shire of Augusta Margaret River (2020). *Advice for clearing permit application CPS 8878/1*, received 18 May 2020 (DWER Ref: A1894644).
- Shire of Augusta Margaret River (2023). *Development approval for dam and soak expansion*, received 10 January 2023 (DWER Ref: DWEDT10956).
- Start, A.N. and McKenzie, N.L. (2008). Western False Pipistrelle, *Falsistrellus mckenziei*. In: S. Van Dyck and R. Strahan (eds), *The mammals of Australia*. Third Edition, pp. 541-542. Reed New Holland, Sydney, Australia.
- Stream Environment and Water (2020). *Reconnaissance and Targeted Flora and Vegetation Survey: Lot 2919 Rosa Brook Road* (DWER ref: A1964589)
- SW Hydrology (2020). *Photos provided of CPS 8878/1 application area, received 22 June 2020* (DWER ref: A1905508)
- SW Environmental (2020). *Basic and Targeted Fauna Survey, Lot 2919 Rosa Brook Rd, Rosa Brook, December 2020* (data updated May 2022)
- Submission (2020). *Public submission in relation to clearing permit application CPS 8878/1*, received 2 June 2020 (DWER Ref: A1899126).
- V & C Semeniuk Research Group (2006). *Wetlands mapping, classification and evaluation - southwest region*. Unpublished Report to the Department of Environment and Conservation. Perth
- Western Australian Herbarium (1998-). *FloraBase - the Western Australian Flora*. Department of Biodiversity, Conservation and Attractions, Western Australia. <https://florabase.dpaw.wa.gov.au/> (Accessed 27 January 2023)