



CLEARING PERMIT

Granted under section 51E of the Environmental Protection Act 1986

Purpose Permit number:	CPS 8861/1
Permit Holder:	Commissioner of Main Roads Western Australia
Duration of Permit:	22 July 2020 to 22 July 2030

ADVICE NOTE

Monetary Offset Contribution

The funds referred to in condition 12 of this permit are intended for contributing towards the purchase of 2.7 hectares of native vegetation with habitat for Carnaby's cockatoo (*Calyptorhynchus latirostris*) and 2.7 hectares of native vegetation that is representative of the 'Banksia woodlands of the Swan Coastal Plain' ecological community.

The Permit Holder is authorised to clear native vegetation subject to the following conditions of this Permit.

PART I – CLEARING AUTHORISED

1. Purpose for which clearing may be done

Clearing for the purposes of road reconstruction and associated activities.

2. Land on which clearing is to be done

Lot 705 on Deposited Plan 405359, Neerabup.

3. Area of clearing

The Permit Holder must not clear more than 0.5 hectares of native vegetation within the areas cross-hatched yellow on attached Plan 8861/1.

4. Application

This Permit allows the Permit Holder to authorise persons, including employees, contractors and agents of the Permit Holder, to clear native vegetation for the purposes of this Permit subject to compliance with the conditions of this Permit and approval from the Permit Holder.

5. Type of clearing authorised

This Permit authorises the Permit Holder to clear native vegetation for the activities described in condition 1 of this Permit to the extent that the Permit Holder has the power to carry out work involving clearing for those activities under the *Main Roads Act 1930* or any other written law.

6. Period in which clearing is authorised

The Permit Holder shall not clear any native vegetation after 22 July 2025.

PART II – MANAGEMENT CONDITIONS

7. Avoid, minimise and reduce the impacts and extent of clearing

In determining the amount of native vegetation to be cleared authorised under this Permit, the Permit Holder must have regard to the following principles, set out in order of preference:

- avoid the clearing of native vegetation
- minimise the amount of native vegetation to be cleared
- reduce the impact of clearing on any environmental value.

8. Dieback and weed control

When undertaking any clearing authorised under this Permit, the Permit Holder must take the following steps to minimise the risk of the introduction and spread of *weeds* and *dieback*:

- (a) clean machines and other vehicles 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
- (c) restrict the movement of machines and other vehicles to the limits of the areas to be cleared.

9. Fauna management - direction of clearing

The Permit Holder shall conduct clearing in a slow progressive manner from one direction to the other (e.g. north to south) to allow fauna to move into adjacent native vegetation ahead of the clearing activity.

10. Fauna management - black cockatoo nesting trees

- (a) Immediately prior to undertaking any clearing authorised under this Permit:
 - (i) the area cross-hatched yellow on attached Plan 8861/1 shall be inspected by a *fauna specialist* who shall identify *black cockatoo nesting trees*, and
 - (ii) each *black cockatoo nesting tree* identified shall be inspected by a *fauna specialist* for evidence of current or past breeding use by *black cockatoos*.
- (b) Where a *black cockatoo nesting tree(s)* with evidence of current breeding use by *black cockatoos* is identified and cannot be avoided, that tree(s) shall be monitored by a *fauna specialist* to determine when it is no longer in use for that *breeding season*.
- (c) Any *black cockatoo nesting tree(s)* with evidence of current breeding use by *black cockatoos* shall not be cleared while it is in use as determined by the *fauna specialist* under condition 10(b) of this Permit.
- (d) Where a *black cockatoo nesting tree(s)* with evidence of past breeding use by *black cockatoos* is identified and cannot be avoided, that tree(s) shall only be cleared:
 - (i) later the same day of the inspection required under condition 10(a)(ii) of this Permit if that inspection does not identify evidence of current breeding use; or
 - (ii) later the same day of a repeat inspection undertaken by a *fauna specialist* if that inspection does not identify evidence of current breeding use.

11. Fauna management - artificial black cockatoo nest hollows

- (a) Within six months of clearing of *black cockatoo nesting trees* identified under Condition 10, and before the following *breeding season*, the Permit Holder shall install at least one artificial black cockatoo nest hollows for every *black cockatoo nesting tree(s)* cleared;
- (b) The Permit Holder shall install at least one artificial black cockatoo nest hollows;
- (c) The design and placement of the artificial black cockatoo nest hollows must be determined based on the guidelines provided in Schedule 1 and must be installed on land vested with the Department of Biodiversity, Conservation and Attractions;
- (d) The Permit Holder must monitor and maintain the installed artificial black cockatoo nest hollows for a period of at least ten years; and
- (e) Monitoring and maintenance must be undertaken in accordance with the guidelines provided in Schedule 2.

12. Monetary contributions to a fund maintained for the purpose of establishing or maintaining vegetation (offset)

Prior to undertaking any clearing authorised under this Permit and no later than 22 July 2021, the Permit Holder shall provide documentary evidence to the *CEO* that funding of \$3,753 has been transferred to the Department of Water and Environmental Regulation to purchase land for the purpose of establishing or maintaining native vegetation.

PART III - RECORD KEEPING AND REPORTING

13. Records must be kept

The Permit Holder must maintain the following records for activities done pursuant to this Permit:

- (a) In relation to the clearing of native vegetation authorised under this Permit:
- (i) 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
 - (ii) the date that the area was cleared
 - (iii) the size of the area cleared (in hectares)
 - (iv) the purpose for which clearing was undertaken.
 - (v) actions taken in accordance with condition 6 of this Permit
 - (vi) actions taken to avoid, minimise and reduce the impacts and extent of clearing in accordance with condition 7 of this Permit;
 - (vii) actions taken to minimise the risk of the introduction and spread of *weeds* and *dieback* in accordance with condition 8 of this Permit;
 - (viii) activities taken in accordance with condition 9 of this Permit; and
 - (ix) activities taken in accordance with condition 12 of this Permit.
- (b) In relation to fauna management pursuant to condition 10 of this Permit:
- (i) the time(s) and date(s) of inspection(s) by the *fauna specialist*
 - (ii) a description of the *fauna specialist* inspection methods employed;
 - (iii) the location of each *black cockatoo nesting tree* identified, recorded using a GPS unit set to GDA94, expressing the geographical coordinates in Eastings and Northings or decimal degrees;
 - (iv) a description of the evidence of current or past breeding use observed for each *black cockatoo nesting tree* identified;
 - (v) a photo of each *black cockatoo nesting tree* with evidence of current or past breeding use identified;
 - (vi) for each *black cockatoo nesting tree* with evidence of current breeding use:
 - (1) the time and date it was determined to no longer be in use for that breeding season;
 - (2) the evidence by which it was determined to no longer be in use for that breeding season
 - (vii) the time and date each *black cockatoo nesting tree* with evidence of current or past breeding use was cleared.
- (c) In relation to the installation of artificial black cockatoo nest hollows pursuant to condition 11 of this Permit:
- (i) the date that each artificial black cockatoo nest hollow was installed;
 - (ii) the location where each artificial black cockatoo nest hollow was installed recorded using a GPS unit set to GDA94, expressing the geographical coordinates in Eastings and Northings or decimal degrees;
 - (iii) a photo of each installed artificial black cockatoo nest hollow;
 - (iv) the dates each artificial *black cockatoo* nest hollow installed was monitored;
 - (v) a description of the monitoring methods employed for each artificial *black cockatoo* nest hollow installed;
 - (vi) a description of the monitoring observations for each artificial *black cockatoo* nest hollow installed;
 - (vii) the date(s) each artificial *black cockatoo* nest hollow installed was maintained;
 - (viii) a description of the maintenance activities undertaken for each artificial *black cockatoo* nest hollow installed; and
 - (ix) the total number of artificial hollows installed.

14. Reporting

- (a) The Permit Holder must provide to the *CEO* on or before 30 June of each year, a written report:
- (i) of records required under condition 13 of this Permit; and
 - (ii) concerning activities done by the Permit Holder under this Permit between 1 January to 31 December of the preceding calendar year.

- (b) If no clearing authorised under this Permit has been undertaken, a written report confirming that no clearing under this Permit has been undertaken, must be provided to the *CEO* on or before 30 June of each year.
- (c) Prior to 22 April 2025, the Permit Holder must provide to the *CEO* a written report of records required under condition 13 of this Permit where these records have not already been provided under condition 14(a) of this Permit.

DEFINITIONS

The following meanings are given to terms used in this Permit:

black cockatoo(s) means Carnaby's cockatoo (*Calyptorhynchus latirostris*), Baudin's cockatoo (*Calyptorhynchus baudini*) and forest red-tailed black cockatoo (*Calyptorhynchus banksii naso*);

black cockatoo nesting tree/s means trees that have a diameter, measured at 1.5 metres from the base of the tree, of 50 centimetres or greater (or 30 centimetres or greater for *Eucalyptus salmonophloia* or *Eucalyptus wandoo*) that contain hollows suitable for nesting by Carnaby's cockatoo, Baudin's cockatoo or forest red-tailed black cockatoo;

breeding season means the period from 1 June to 29 February of any given year;

CEO means the Chief Executive Officer of the Department responsible for the administration of the clearing provisions under the *Environmental Protection Act 1986*

dieback means the effect of *Phytophthora* species on native vegetation

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

fauna specialist means a person who holds a tertiary qualification specialising in environmental science or equivalent, and has a minimum of two 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 *Biodiversity Conservation Act 2016*.

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

weed/s means any plant -

- (a) that is a declared pest under section 22 of the *Biosecurity and Agriculture Management Act 2007*; 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.



Richard Newman
DIRECTOR
NATIVE VEGETATION PROTECTION

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

30 June 2020

Artificial hollows for Carnaby's cockatoo



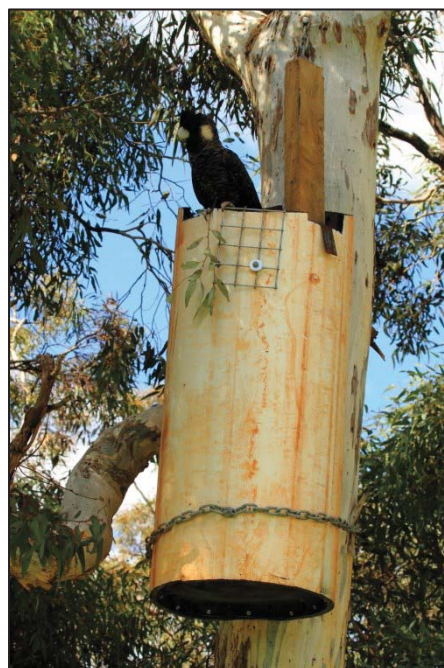
How to design and place artificial hollows for Carnaby's cockatoo

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>

Artificial hollows for Carnaby's cockatoo



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

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

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

Monitoring should be undertaken in order to detect:

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



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

How do I monitor artificial hollows?

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

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.

Parent behaviour	Approximate age/stage of young
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
To determine possible use by Carnaby's cockatoo	At least once during peak breeding season (i.e. between September and December)	<ul style="list-style-type: none"> • Observing behaviour of adults around hollow • Tapping to see if female will flush from hollow (best undertaken between 10am and 3pm when females most likely to be sitting) • Listening for nestlings • Looking for evidence of chewing • Looking inside nest
To confirm use by Carnaby's cockatoo	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"> • Breeding behaviour of adults around hollow or evidence of chewing • Female flushed from hollow • Noises from nestlings in hollow <p>Or to observe:</p> <ul style="list-style-type: none"> • Nestlings or eggs in nest
To determine nesting success by Carnaby's cockatoo	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"> • Looking inside nest to observe eggs or nestlings.
To determine use by any species	As often as possible.	<ul style="list-style-type: none"> • Inspection from ground as a minimum. • Looking inside nest for detailed observations.
To determine maintenance requirements	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"> • 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

Acknowledgements

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Plan 8861/1

115°44'2.400"

115°44'7.800"

115°44'13.200"

-31°40'10.200"

-31°40'10.200"

-31°40'15.600"

-31°40'15.600"

-31°40'21.000"

-31°40'21.000"

115°44'2.400"

115°44'7.800"

115°44'13.200"

LOT 700 ON PLAN 405358

allocated Crown Land

allocated Crown Land

LOT 300 ON PLAN 68244

Road

CITY OF WANNEROOD





LOT 301 ON PLAN 68244

LOT 705 ON PLAN 405359

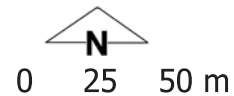
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Legend

-  CPS areas approved to clear base layers
-  Local Government Authorities
-  WA Roads
-  Roads (LGATE-012)

-  Cadastre - LGATE 218
-  Image



MGA 94
Geocentric Datum of Australia 1994

 30 June 2020

Richard Newman, Director Native Vegetation Protection

Officer with delegated authority under Section 20
of the Environmental Protection Act 1986





Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 8861/1
Permit type: Purpose Permit

1.2. Applicant details

Applicant's name: Commissioner of Main Roads WA
Application received date: 01 April 2020

1.3. Property details

Property: Lot 705 on Plan 405359, Neerabup
Local Government Authority: City of Wanneroo
Localities: Neerabup

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	Purpose category:
0.5		Mechanical Removal	Road construction or upgrades

1.5. Decision on application

Decision on Permit Application: Grant
Decision Date: 30 June 2020

Reasons for Decision

The clearing permit application has been assessed against the clearing principles, planning instruments and other matters in accordance with section 51O of the *Environmental Protection Act 1986* (EP Act). It has been concluded that the proposed clearing is at variance with principles (a), (b), (e) and (h), and is not likely to be at variance with the remaining Clearing Principles.

The applicant has implemented or committed to a number of minimisation and mitigation measures, including:

- Locating the access road as close as possible to existing access road to minimise footprint and impacts to adjacent vegetation;
- Where possible, undertaking works within previously cleared land;
- Designing the cross section in the way to reduce the width of the access road to the minimum permissible to ensure safe and efficient movement;
- minimising roundabout size as far as permissible;
- undertaking pre-clearance surveys for all areas of black cockatoo habitat proposed to be cleared within the breeding period of black cockatoo; and
- adding a combined area of 6.735 hectares into Neerabup National Park estate which is currently vested with Main Roads and as unallocated Crown land, as it is surplus to the overall Mitchell Freeway upgrade requirements.

Taking into account the above measures, the Delegated Officer considers that the following significant residual impacts remain:

- loss of 0.5 hectares of Carnaby's cockatoo significant foraging habitat;
- loss of 0.5 hectares of native vegetation that is representative of federally listed Critically Endangered Banksia Dominated Woodlands of the Swan Coastal Plain (SCP) threatened ecological community (TEC); and
- loss of suitable breeding habitat for Carnaby's cockatoo (*Calyptorhynchus latirostris*) and forest red-tailed black cockatoo (*Calyptorhynchus banksia* subsp. *naso*), comprising one tree containing a suitably sized hollow.

The Delegated Officer considers that an installation of one artificial nesting hollow within a Department of Biodiversity, Conservation and Attractions (DBCA) managed estate and the acquisition and conservation of 2.7 hectares of native vegetation containing the following values is sufficient to counterbalance the significant residual impacts:

- 2.7 hectares of foraging habitat for Carnaby's cockatoo; and
- 2.7 hectares of native vegetation representative of the Banksia Woodland TEC.

As a condition of the clearing permit, the applicant is required to provide a monetary offset contribution, which will be used to acquire 2.7 hectares of native vegetation that includes the above values. Based on a desktop analysis, it is considered that acquisition of an appropriate offset site utilising these funds is achievable.

To minimise other potential impacts, as a condition of the clearing permit the applicant will be required to undertake the following measures:

- Undertake slow, progressive one directional clearing to allow terrestrial fauna to move into adjacent habitat ahead of the clearing activity;
- Implement weed and dieback management measures to reduce the risk of spread;
- Undertake pre-clearance surveys for all areas of black cockatoo habitat proposed to be cleared within the breeding period of black cockatoo.

The Delegated Officer took into consideration that the road upgrades are required to ensure road safety, accessibility and travel times as well as enabling regional development in Perth's northern suburbs. The Delegated Officer also considered the cumulative impacts associated with this application and two other nearby Main Roads clearing permit applications related to the larger Mitchell Freeway extension project (CPS 8826/1 and CPS 8753/1), which were assessed concurrently.

In granting a clearing permit subject to the above requirements, the Delegated Officer determined that the proposed clearing is unlikely to lead to an unacceptable risk to the environment.

2. Site Information

Clearing Description

The application is to clear 0.5 hectares of native vegetation within a 0.69 hectare footprint within Lot 705 on Deposited Plan 405359, Neerabup, for the purpose of construction and development of a road and associated infrastructure (Figure 1). The proposed clearing will enable the realignment and construction of a two lane quarry access road connecting to Hester Avenue. The existing access road is required to be realigned due to the requirement for a new roundabout at Hester Avenue which has a larger footprint than the existing T-intersection (GHD, 2020a)

The project relates to the larger Mitchell Freeway extension project designed to support the expansion of Perth's fast growing outer northern suburbs. The majority of the larger project was considered under the MRS Amendment (992/33), which was considered by the Environmental Protection Authority (EPA), and approved under Ministerial Statement 629. The application area was not considered under the MRS amendment and has therefore been applied to clear under Part V of the EP Act.

Biological Surveys

A larger project area (2.57 hectares) encompassing the application has been subject to biological surveys undertaken by GHD (2019). The survey report (hereafter referred to as the Survey) was commissioned for the larger area south of Hester Avenue. The Survey included a detailed vegetation and flora assessment, targeted flora survey, Level 1 fauna survey and a Black Cockatoo habitat assessment. The Survey was undertaken on 23 and 25 September 2019 to identify and describe vegetation units, assess vegetation condition and identify and record vascular flora taxa present at the time of the Survey (GHD, 2019). Searches for conservation significant or other significant ecological communities and flora taxa were also undertaken. The Survey was undertaken in accordance with the Environmental Protection Authority's (EPA) *Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment* (GHD, 2019).

With regard to fauna, the Survey included (GHD, 2019):

- opportunistic fauna searches;
- targeted black cockatoo habitat assessment; and
- fauna species identification.

The Survey methodology was undertaken in accordance with the EPA *Technical Guidance – Sampling methods for terrestrial vertebrate fauna* and *Technical Guidance – Terrestrial Fauna Surveys* (GHD, 2019).

Vegetation Description

The Application area occurs within the 'SCP' Interim Biogeographic Regionalisation for Australia (IBRA) bioregion, and is mapped as the Cottesloe Complex-Central and South SCP vegetation complexes, which is described as a mosaic of woodland of *Eucalyptus gomphocephala* (Tuart) and open forest of *E. gomphocephala* – *E. marginata* (Jarrah) – *Corymbia calophylla* (Marri); closed heath on the limestone outcrops (majority of survey area) (Heddlé, 1980).

The Survey conducted by GHD (2019) mapped the Application area as comprising of Woodland of *Banksia attenuata*, *B. menziesii* and *B. grandis* with scattered *Eucalyptus marginata* and *Allocasuarina fraseriana* over a mid open shrubland of *Xanthorrhoea preissii*, *Allocasuarina humilis* and *Acacia pulchella* var. *glaberrima* over low shrubland of *Hibbertia hypericoides*, *Petrophile macrostachya* and *Leucopogon parviflorus* over open sedgeland and forbland of *Mesomelaena pseudostygia*, *Conostylis* spp. and weedy grasses and herbs (**Heliophila pusilla*, **Briza maxima* and **Ursinia anthemoides*).

Vegetation Condition

The condition of the vegetation within the application area is considered to be in good (Keighery, 1994) to degraded condition (Keighery, 1994; GHD, 2019). The vegetation along the tracks and cleared area is rated as completely degraded due to edge effects and weed invasion. The extent and description of the recorded vegetation condition is summarised below (Keighery, 1994; GHD, 2019):

Table 1 Vegetation condition recorded in the application area (GHD, 2019)

Vegetation condition	Vegetation description (Keighery, 1994)	Mapped extent [ha] (GHD, 2019)
Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species	0.25
Good	Structure significantly altered by multiple disturbance; retains basic structure/ability to regenerate	0.22
Completely degraded	No longer intact, completely/almost completely without native species	0.03

Soil type

CPS 8861/1

The Application Area is mapped as Karrakatta Sand Yellow Phase, which is described as comprising low hilly to gently undulating terrain. Yellow sand over limestone at 1-2 metre. *Banksia* spp. woodland with scattered emergent *E. gomphocephala* and *E. marginata* and a dense shrub layer (Schoknecht et al., 2004).

The Survey (GHD, 2019) described soils within the application area as deep sandy soils.

Comments

The local area is considered a 10 kilometre radius from the perimeter of the Application area (excluding ocean).



Figure 1 Application area cross-hatched blue



Figure 2a



Figure 2b



Figure 2c



Figure 2d

Figures 2a-d: Representative photos of the vegetation within the Application area (GHD, 2019).

3. Minimisation and mitigation measures

In relation to whether alternatives have been considered that would avoid or minimise the need for clearing, the applicant advised that the proposal design has commenced, and impacts will be minimised and avoided where possible to prevent the clearing of native vegetation. The following avoidance and minimisation measures have been considered (GHD, 2020a):

- The access road has been located as close as possible to existing access road to minimise footprint and impacts to adjacent vegetation;
- Where possible, works will be undertaken within previously cleared land;
- Design retains access in its current location to reduce impacts;
- Fully sealed road to eliminate potential impact of dust particles on adjacent vegetation (associated with unsealed roads);
- Implementation of typical surface water control measures along the access road including swales to prevent impacts to adjacent vegetation from surface water runoff and control 1 in 50 year flooding events;
- Early consultation with utility service providers ensuring design is optimised to minimise relocation of existing services (and associated ground disturbance and clearing);
- Early consultation with the Department of Biodiversity, Conservation and Attractions (DBCA) to ensure design acceptance and determine concerns in relation to minimising impacts to native vegetation and the National Park;
- Proposal design has reduced the cross section width of the access road to the minimum permissible to ensure safe and efficient movement;
- Ensuring the access road alignment uses as much of the existing road pavement as possible and ties into the existing pavement as soon as possible;
- Roundabout size is the minimum permissible to accommodate the design vehicles;
- Vertical design of the road closely matches existing topography where possible to minimise earthworks; and
- Impacts could be further minimised by installation of retaining walls to reduce the earthworks batters, this will be considered during detailed design.

The applicant has prepared a Construction Environmental Management Plan (CEMP) and dieback management plan (DMP) for the larger Mitchell Freeway Extension (Hester Avenue to Romeo Road) and has advised that this CEMP be utilised for the proposed works associated with this application (GHD, 2020a). The applicant notes that the CEMP includes the following measures (GHD, 2020a):

Vegetation Clearing Management

- Vegetation to be retained will be clearly marked with flagging on site
- Additional areas required for construction such as laydown areas, stockpile areas and vehicle turn around, will be located in areas cleared for permanent works.

Fauna Management

- Pre-clearance surveys will be undertaken for all areas of black cockatoo habitat proposed to be cleared within the breeding period of black cockatoos.
- Speed limits between 40-80 kilometres per hour will be applied throughout the construction site to reduce the risk of fauna strikes during construction.
- Transfer of any injured fauna found on site to an appropriate fauna rescue organisation or individual. A list of local fauna rescue organisations and individuals will be maintained on site.

Other management measures:

- Water carts and/or surface stabilization measures (e.g. hydro mulch) will be used to minimise dust generated from cleared areas.
- Topsoil will be harvested, stockpiled and reused in accordance with Main Roads Environmental Guideline Topsoil Management.
- Temporary drainage will be installed to capture and infiltrate surface runoff from construction areas and prevent runoff from entering adjacent native vegetation.

- All heavy plant and machinery will be inspected at entry and exit of the work site and be confirmed to be clean and free of vegetation and soil material.
- The proposal is in a phytosphora dieback susceptible bioregion, with conservation significant protectable vegetation adjacent to the application area. Dieback Management will be undertaken for the larger Mitchell Freeway Extension project including within the application area.
- Revegetation will be undertaken post-construction to prevent soil and wind erosion.
- Weed control will be undertaken during works as part of the CEMP, specifically targeting WoNS and Declared Pests. The application area will also be subject to the yearly Main Roads weed spraying program.

4. Assessment of application against clearing principles

(a) Native vegetation should not be cleared if it comprises a high level of biodiversity.

Proposed clearing is at variance with this Principle

Delegated Officer's Key Consideration

The proposed clearing is at variance with this Principle as the application area contains the following values, which are considered to indicate a high level of biodiversity:

- 0.5 hectares of native vegetation that is representative of the federally listed Banksia Dominated Woodlands of the SCP threatened ecological community (TEC);
- 0.5 hectares of Carnaby's cockatoo habitat; and
- regionally significant ecological linkage values contributing to north south fauna movement between existing remnants and conservation areas.

The applicant has agreed to provide an offset to address the remaining residual impacts to Carnaby's cockatoo and Banksia Woodland PEC/TEC (see Section 5).

In considering impacts to biodiversity, the Delegated Officer took into account that the road upgrades are required to ensure road safety and form part of the larger Mitchell Freeway extension upgrades.

Threatened and Priority Flora

According to available databases, three treated and 27 priority flora species have been recorded within the local area. Threatened flora are further discussed under Principle (c). Based on the similarities shared between the soil and vegetation types in habitats for these flora taxa and within the application area, it was determined that the flora species as described in the table below may occur within the application area:

Table 2 Priority flora with potential to occur in the application area

Taxon	Conservation Status	Total Number of Known Records in the local area	Closest record [km]
<i>Acacia benthamii</i>	Priority (P)2	3	0.36
<i>Baeckea</i> sp. Limestone (N. Gibson & M.N. Lyons 1425)	P1	4	3.7
<i>Hibbertia spicata</i> subsp. <i>leptotheca</i> (now <i>Hibbertia leptotheca</i>)	P3	7	7.1
<i>Pimelea calcicola</i>	P3	2	2.3
<i>Stylidium maritimum</i>	P3	6	3.5
<i>Leucopogon</i> sp. Yanchep (M. Hislop 1986)	P3	1	3.7
<i>Fabronia hampeana</i>	P2	6	3.2
<i>Jacksonia sericea</i>	P4	12	1.7
<i>Sarcozona bicarinata</i>	P3	4	3.1

The Survey (GHD, 2019) did not record any priority flora taxa within the application area. A likelihood of occurrence assessment was conducted post-field survey for all priority flora taxa identified in the desktop assessment. This assessment took into account previous records, habitat requirements, efficacy of the Survey, intensity of the Survey, appropriate flowering times and the cryptic nature of species. The likelihood of occurrence assessment for the survey area concluded that no priority flora species are considered likely to occur within the survey area (GHD, 2019).

Threatened and Priority Ecological Communities

According to available databases, two federally listed TECs and one state listed priority ecological community (PEC) have been mapped within the local area. These are shown in Table 3 below:

Table 3 TECs and PECs recorded in the local area (GHD, 2019).

TEC/PEC name	Conservation status	Distance from the application area [km]

<p><u>PEC listing:</u> 'Banksia dominated woodlands of the SCP IBRA region'</p> <p><u>TEC listing:</u> 'Banksia woodlands of the SCP'</p> <p>(Herein collectively referred to as Banksia Woodland PEC/TEC)</p>	<p><u>PEC listing:</u> P3 classified by DBCA</p> <p><u>TEC listing:</u> Endangered under the EPBC Act</p>	5.6
<p><u>PEC listing:</u> 'Tuart (<i>Eucalyptus gomphocephala</i>) woodlands of the SCP'</p> <p><u>TEC listing:</u> 'Tuart (<i>Eucalyptus gomphocephala</i>) woodlands and forests of the SCP'</p> <p>(Herein collectively referred to as Tuart Woodland PEC/TEC)</p>	<p><u>PEC listing:</u> P3 classified by DBCA</p> <p><u>TEC listing:</u> Endangered under the EPBC Act</p>	0.52
<p>Northern Spearwood shrublands and woodlands (floristic community type 24) (Northern Spearwood Shrublands)</p>	<p>P3 listed by DBCA</p>	0.46

The Survey (GHD, 2019) identified that the vegetation within the application area is representative of Banksia Woodland PEC/TEC.

The conservation advice for this TEC notes that it comprises a dominant tree layer of *Banksia*, including at least one of four key species; *Banksia attenuata*, *Banksia menziesii*, *Banksia prionotes* and/or *Banksia ilicifolia* (Threatened Species Scientific Community (TSSC), 2016). The tree layer often includes scattered eucalypts and other tree species within or above the *Banksia* canopy. The understorey is species rich, including sclerophyllous shrubs, sedges and herbs (TSSC, 2016).

This extent of this community has declined significantly, and it is estimated that up to 60 percent has been lost, with most remaining patches of small size (TSSC, 2016). Clearing for development has been identified as a key threatening process for this community, and conservation efforts are focused on protecting, managing and restoring the best surviving remnants (TSSC, 2016).

An assessment using the key diagnostic characteristics, which include minimum patch size and condition thresholds, identified that all vegetation proposed to be cleared is representative of Banksia woodland PEC/TEC (GHD, 2019).

Threatened and Priority Fauna

As further discussed under Principle (b), the application area provides significant habitat for Carnaby's cockatoo and is suitable habitat for forest red-tailed black cockatoo, Southern Brown Bandicoot, Western Brush Wallaby, Peregrine Falcon, Black-striped Snake and Jewelled southwest Ctenotus.

Ecological Linkages

The application area forms part of a north south regionally significant ecological linkage (Conceptual Linkage) (ID 53) defined by the Gngangara Sustainability Strategy (2009). Conceptual linkages are proposed ecological linkages based on past studies and new linkages across the landscapes with less than 60 percent native vegetation retained or on core landscapes that are predominantly over private property (Brown et al., 2009). This linkage provides value as a north-south ecological linkage within a highly fragmented landscape, particularly between Neerabup National Park (Bush Forever Site No. 383) and Lake Joondalup (Bush Forever Site No. 299); and therefore, is likely to facilitate the movement of fauna and ecological processes between these areas.

The application area is immediately adjacent to Hester Avenue which fragments two sections of Neerabup National Park (ID 1307 and ID 2139). Noting this, the proposed clearing will not fragment the Conceptual Linkage but will create a wider barrier for fauna movement. It was noted that a portion of the application area is immediately adjacent to the existing fauna underpass. Taking into account a minimal extent of native vegetation that is proposed to be cleared in this area, the impacts on the underpass are not likely to be significant.

Conservation Areas

As further discussed under Principle (h), the whole application area occurs within Neerabup National Park (Class A) (R27575). This area falls within the mapped Bush Forever Site No. 383. This area is the subject of a historical Scheme Amendment which includes a rezoning process involving the excision of an approximately 0.29 hectare portion of land which is included in the application area from the National Park. As part of a number of agreed excisions and additions from the National Park, the applicant has committed to adding 6.735 hectares of land surplus to the Mitchell Freeway upgrade requirements into Neerabup National Park estate.

Weeds and Dieback

The Survey (GHD, 2019) identified three weed species listed as Declared Pests under the *Biosecurity and Agricultural Management Act 2007*, with one of these species also listed as Weeds of National Significance (WoNS). The Survey notes that Dieback is also likely to be present within the application area (GHD, 2019).

The applicant will be required to undertake weed and dieback management measures to minimise the risk of spread into adjacent native vegetation and nearby conservation areas.

The applicant has also advised that this risk will be managed as part of the CEMP for the larger project, which includes the following measures GHD, 2020a):

- All heavy plant and machinery will be inspected at entry and exit of the work site and be confirmed to be clean and free of vegetation and soil material; and

- Weed control will be undertaken during works as part of the CEMP, specifically targeting WoNS and Declared Pests. The application area will also be subject to the yearly Main Roads weed spraying program.

(b) 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.

Proposed clearing is at variance with this Principle

Delegated Officer's Key Consideration

The proposed clearing comprises significant habitat for fauna as it contains the following values:

- 0.5 hectares of Carnaby's cockatoo significant foraging habitat;
- a tree containing a suitably sized nesting hollow for black cockatoos; and
- regionally significant ecological linkage values contributing to north south fauna movement between existing remnants and conservation areas.

The applicant has agreed to provide and offset to address the remaining impacts to Carnaby's cockatoo habitat (see Section 5).

As a condition of the permit, the applicant will be required to undertake the following measures:

- install artificial nesting hollows at a 1:1 ratio which will result in the installation of at least one hollow within land managed by DBCA;
- engage a fauna specialist to check habitat trees for the presence of Carnaby's cockatoos and forest red-tailed black cockatoos prior to clearing. The applicant will not be permitted to clear trees where these species have been identified, until a fauna specialist has verified that any hollows are no longer being utilised for nesting.
- slow progressive one directional clearing to allow terrestrial fauna to disperse ahead of the clearing activity should they occur on site at the time of clearing.

Fauna Habitat Types

The Survey (GHD, 2019) identified one fauna habitat type within the application area; being *Banksia* Woodland on grey/brown sand. The vegetation was generally in excellent condition and contains good structural diversity and a variety of microhabitat types including leaf litter, fallen logs and branches, deep sandy soil and hollows. The vegetation appeared to be long unburnt.

The Survey (GHD, 2019) recorded two conservation significant fauna species within the larger survey area with an additional 5 species considered likely to occur. The application area provides suitable habitat for all seven of these species.

Recorded

- Carnaby's cockatoo (*Calyptorhynchus latirostris*) (Endangered under the BC Act and EPBC Act)
- Forest red-tailed black cockatoo (*Calyptorhynchus banksii naso*) (Vulnerable under the BC Act and EPBC Act)

Likely to Occur

- Peregrine falcon (*Falco peregrinus*) (Other Specially Protected under the BC Act and EPBC Act)
- Southern brown bandicoot (*Isodon fusciventer*) (state listed as Priority 4)
- Western brush wallaby (*Notamacropus Irma*) (state listed as Priority 4)
- Black-striped snake (*Neelaps calonotos*) (State listed as Priority 3)
- Jewelled south west Ctenotus (*Ctenotus gemmula*) (SCP population) (state listed as Priority 3)

Carnaby's cockatoo

Carnaby's cockatoo generally breeds in flat-topped yate, salmon gum, wandoo, marri, karri, blackbutt, tuart, introduced eucalypts (for example blue gum) and introduced pines (Commonwealth of Australia, 2012). To be suitable as a breeding site, trees require a suitable nest hollow or be of a suitable diameter at breast height (DBH) to develop a nest hollow. For most tree species, a suitable DBH is 500 millimetres (Commonwealth of Australia, 2012). The Survey identified a total of eight potential breeding trees within the application area, of which one (*Eucalyptus marginata*) have a hollow of a suitable size for nesting. No current nesting use was identified (GHD, 2019).

The closest confirmed breeding site is approximately 15.3 kilometres north of the application area and there are several confirmed roost sites within the local area.

Carnaby's cockatoo forages on the seeds, nuts and flowers of a large variety of plants including Proteaceous species (*Banksia*, *Hakea* and *Grevillea*), as well as *Allocasuarina* and *Eucalyptus* species, *Corymbia calophylla* and a range of introduced species (Valentine and Stock, 2008). The records of foraging activity for Carnaby's cockatoo on the SCP show that *Banksia* species account for nearly 50 percent of the diet for this species (Shah, 2006).

The Survey (GHD, 2019) identified 0.5 hectares of *Banksia attenuata*, *B. menziesii*, *B. grandis*, *B. sessilis*, *Allocasuarina fraseriana*, and *Eucalyptus marginata* that provide high quality foraging habitat for Carnaby's cockatoo. The EPA technical advice for Carnaby's cockatoo notes that *Banksia* species (predominantly *Banksia attenuata*, *Banksia menziesii* and *Banksia sessilis*) provide the most important natural food resource on the SCP (EPA, 2019). The significance of *Banksia* woodland habitat has

been confirmed through foraging studies, which determined that Carnaby's cockatoo exploit all areas of available Banksia food resources on the SCP (EPA, 2019). Banksia woodland in the Perth metropolitan area has been reduced to one third of its pre-European extent. The remaining portions are fragmented, with the majority (82 percent) of remnant patches under 10 hectares (EPA, 2019). Carnaby's cockatoo foraging evidence was recorded within the application area (GHD, 2019).

Noting the above, the application area provides significant habitat for Carnaby's cockatoo as it contains a tree with suitably sized nesting hollow and 0.5 hectares of Banksia woodland on the SCP in good or better condition which is a preferred foraging habitat for this species.

Forest red-tailed black cockatoo

The forest red-tailed black cockatoo commonly inhabits dense jarrah, karri, and marri forests receiving more than 600 millimetres annual average rainfall (Commonwealth of Australia, 2012). This species also occurs in a range of other forest and woodland types, including blackbutt (*E. patens*), wandoo (*E. wandoo*), tuart (*E. gomphocephala*), Albany blackbutt (*E. staeri*), yate (*E. cornuta*), and flooded gum (*E. rudis*). This species mostly feeds on the seeds of marri and jarrah which comprise around 90 percent of its diet (Commonwealth of Australia, 2012). This species was identified flying over and foraging on flora species identified within the application area (GHD, 2019).

Forest red-tailed black cockatoo breeds within tall jarrah, marri, blackbutt, tuart and introduced eucalypt trees within or on the edges of forests. As for Carnaby's cockatoo, the Survey identified eight potential breeding trees within the application area of which one *Eucalyptus marginata* have hollows of a suitable size for nesting. No current nesting use was identified (GHD, 2019b).

The application area provides up to 0.5 hectares of suitable habitat for this species, however preferred foraging habitat for this species is not present. Noting this, the application area is unlikely to provide significant foraging habitat for this species.

Peregrine falcon

Peregrine falcon is found on and near cliffs, gorges, timbered watercourses, riverine environments, wetlands, plains, open woodlands, and pylons and spires of buildings, though less frequently in desert regions (Morcombe, 2004). They are not common but can be found almost anywhere throughout WA and in the southwest, including particularly at Fitzgerald River, Stirling Range, Porongurup National Parks, Kondinin, and Peak Charles, with many more locations north of Perth (Nevill, 2013). According to available databases, the closest record of this species has been recorded approximately 7.9 kilometres southeast of the application area.

The applicant's supporting information notes that all vegetation in the application area provides suitable foraging habitat for this species, however it is not considered to provide core breeding habitat (GHD, 2019).

Noting that this species is a highly mobile species with a large home range that doesn't rely on specialist niche habitats, the proposed clearing is not likely to impact on significant habitat for this species.

Quenda

Quenda prefers dense scrubby, often swampy, vegetation with dense cover up to one metre high. However, it also occurs in woodlands, and may use less ideal habitat where this habitat occurs adjacent to the thicker, more desirable vegetation. On the SCP, Quenda are often associated with wetlands. The species often feeds in Jarrah and Wandoo forest and woodland that is burnt on a regular basis and in areas of pasture and cropland lying close to dense cover (Van Dyck and Strahan 2008).

According to available databases, Quenda is known from 69 records within the local area. The application area contains woodland and heathland vegetation types that provide suitable habitat for this species and the supporting information notes that the application area comprises 0.5 hectares of suitable habitat for this fauna species (GHD, 2019).

The application area is unlikely to provide significant habitat for this species given the presence of higher quality dense riparian vegetation immediately east and south surrounding Carabooda and Nowergup Lakes, within areas further removed from surrounding development.

This species may be subject to individual harm should they be present at the time of clearing. Slow progressive one directional clearing will help to allow this species to disperse ahead of the clearing activity should it occur on site at the time of clearing.

Western brush wallaby

The Western Brush Wallaby inhabits open forest or woodland, particularly favouring open, seasonally wet flats with low grasses and open scrubby thickets. The application area contains woodland habitat (GHD, 2019) and therefore provides suitable habitat for this species. This species is known from eight records within the local area.

Noting that this species is highly mobile and doesn't rely on specialist niche habitats, the proposed clearing is not likely to impact on significant habitat for this species, particular given that Neerabup National Park (comprises around 950 hectares) is adjacent to the majority of the application area.

As noted for the quenda, this species may be subject to individual harm should they be present at the time of clearing. Slow progressive one directional clearing will help to allow this species to disperse ahead of the clearing activity should it occur on site at the time of clearing.

Black-striped snake and Jewelled south west Ctenotus (*Ctenotus gemmula*) (SCP population)

Both species are known to occur on areas of deep sands with Banksia woodland habitat, which is considered the preferred habitat for these species (GHD, 2019). Based on this, the application area provides 0.5 hectares of suitable habitat for these species.

Higher quality habitat for these species exists in the nearby Neerabup (comprises around 950 hectares) and Yanchep National Park (comprises around 2900 hectares). Therefore, the proposed clearing is not likely to impact on significant habitat for these species.

As noted for the quenda and western brush wallaby, these species may be subject to individual harm should they be present at the time of clearing. Slow progressive one directional clearing will help to allow these species to disperse ahead of the clearing activity should they occur on site at the time of clearing.

Ecological linkage

As discussed under Principle (a), the application area forms part of north south regionally significant ecological linkage (Conceptual Linkage) (ID 53) defined by the Gngangara Sustainability Strategy (2009). This linkage provides value as a north-south ecological linkage within a highly fragmented landscape, particularly between Neerabup National Park (Bush Forever Site No. 383) and Lake Joondalup (Bush Forever Site No. 299); and therefore, is likely to facilitate the movement of fauna and ecological processes between these areas. Noting the location of the application area and the Conceptual Linkage, the proposed clearing will not fragment this ecological linkage but will create a wider barrier for fauna movement.

The application area is immediately adjacent to Hester Avenue which fragments two sections of Neerabup National Park (ID 1307 and ID 2139). Noting this, the proposed clearing will not fragment the Conceptual Linkage but will create a wider barrier for fauna movement. It was noted that a portion of the application area is immediately adjacent to the existing fauna underpass. Taking into account a minimal extent of native vegetation that is proposed to be cleared near the underpass, the impacts on the underpass are not likely to be significant.

(c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora.

The proposed clearing is not likely to be at variance with this principle

According to available databases, there are records of three threatened flora species (under the BC Act) in the local area, being *Eucalyptus argutifolia*, *Marianthus paralius* and *Melaleuca* sp. Wanneroo (G.J. Keighery 16705).

The Survey (GHD, 2019) did not record any threatened flora taxa within the application area.

A likelihood of occurrence assessment was conducted post-field survey for all threatened flora taxa identified in the desktop assessment. This assessment took into account previous records, habitat requirements, efficacy of the Survey, intensity of the Survey, flowering times and the cryptic nature of species. The likelihood of occurrence assessment for the survey area concluded that no conservation significant flora are considered likely to occur within the survey area.

(d) 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.

Proposed clearing is not likely to be at variance with this Principle

According to available databases, one state listed TEC is recorded approximately 1.7 kilometres within the local area, known as *Melaleuca huegelii* - *Melaleuca systema* shrublands on limestone ridges (floristic community type 26a as originally described in Gibson et al. (1994)).

The Survey undertaken by GHD (2019) did not identify the presence of this TEC within the application area. The only ecological community identified within the application area was Banksia Woodland PEC/TEC. Given that this community is not a state listed TEC, impacts to these community have been described under Principle (a).

The vegetation within the application area is unlikely to represent any known state listed TEC's, and given the distance from the application area, the proposed clearing is unlikely to impact on the *Melaleuca huegelii* - *Melaleuca systema* shrublands on limestone ridges TEC.

(e) Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.

Proposed clearing is at variance with this Principle

Delegated Officer's Key Consideration

It is considered that the application area is a significant remnant in an extensively cleared area, as it contains the following values:

- 0.5 hectares of native vegetation within a highly cleared landscape which is subject to multiple known large scale future road upgrade developments;
- 0.5 hectares of significant habitat for Carnaby's cockatoo;
- 0.5 hectares of native vegetation that is representative of Banksia Woodlands PEC/TEC; and
- ecological linkage values contributing to north south fauna movement between existing remnants.

While it is acknowledged that the proposed clearing is at variance with this Principle, noting that the application area is within a constrained area, an offset is not warranted.

To address the residual impacts to Carnaby's cockatoo habitat and Banksia Woodland PEC/TEC, the applicant has agreed to provide an offset (see Section 5).

The national objectives and targets for biodiversity conservation in Australia has a target to prevent clearance of ecological communities with an extent below 30 percent of that present pre-1750, below which species loss appears to accelerate exponentially at an ecosystem level (Commonwealth of Australia, 2001). Within constrained areas (areas of urban development in cities and major towns) on the SCP, the threshold for representation of the pre-clearing extent of a particular native vegetation complex is 10 percent (EPA, 2008). The application area is classified as a constrained area.

As indicated in Table 4, the SCP IBRA bioregion and the Hedde vegetation complexes mapped within the application area all retain greater than the abovementioned 10 percent vegetation threshold for constrained areas (Government of Western Australia, 2019a; Government of Western Australia, 2019b).

Table 4 Remnant vegetation statistics (Government of Western Australia, 2019a; Government of Western Australia, 2019b)

	Pre-European (ha)	Current Extent (ha)	Remaining (%)	Extent in DBCA Managed Lands (%)
IBRA Bioregion*				
Swan Coastal Plain	850,785.09	276,461.42	32.49	13.25
Swan Coastal Plain vegetation complex **				
Cottesloe Complex-Central And South	45,299.61	14,567.87	32.16	14.58

The local area (taking into account the coastal watermark) retains approximately 35 percent native vegetation cover (approximately 8,568.68 hectares). The application area represents approximately 0.006 percent of the remaining native vegetation within the local area and the proposed clearing would reduce the extent of native vegetation within the local area to 8,568.18 hectares.

While the remnant vegetation extents for the local area and mapped vegetation complexes is above the 10 and 30 percent vegetation thresholds outlined above, the application area is bordered by significant urban development to the west (extending to the coast) and significant agricultural land uses to the east and is generally considered to occur within an area that has undergone extensive clearing.

Furthermore, the cumulative impact of multiple proposals associated with the larger Mitchell Freeway Extension Project need to be considered. It is estimated that the project will involve the loss of around 165 hectares of native vegetation from this portion of the SCP (including the proposed clearing for this application), further contributing to the already extensively cleared landscape.

The application area contributes to the corridor of remnant native vegetation recognised as a regionally significant ecological linkage (as described under Principles (a) and (b)) within this highly cleared landscape. It also provides habitat for conservation significant fauna species and includes occurrences of a federally listed TEC. Therefore, the application area is considered to be a significant remnant within an extensively cleared area.

(f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.

Proposed clearing is not likely to be at variance with this Principle

According to available databases, no watercourses or wetlands are located within close proximity to the application area. The closest waterbody to the application area is Neerabup Lake Resource Enhancement sumpland that is located approximately 830 metres northeast of the application area.

Noting the description of the vegetation within the application area (GHD, 2019) and the distance from any known watercourses or wetlands, it is considered that the vegetation within the application area is not growing in association with a watercourse or wetlands.

(g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.

Proposed clearing is not likely to be at variance with this Principle

Primary soils within the application area are mapped as Karrakatta Sand Yellow Phase by the Department of Primary Industries and Regional Development (DPIRD) (2020).

The application area has relatively flat topography, and average rainfall of 800 millimetres per annum and marginal groundwater salinity (Mayer, Ruprecht & Bari, 2005) mapped between 500 – 1000 total dissolved solids (milligrams per litre). Noting this, the porous nature of sandy soils within the application area, the linear shape and size of the application area, and relatively low rainfall, the proposed clearing is unlikely to cause appreciable land degradation through water erosion, waterlogging or salinity.

According to the DPIRD (2020) land degradation summary described in Table 7, more than 70 percent of the mapped soil type has high to extreme wind erosion risk. However, considering the minimal size of the proposed clearing and the extent of the native vegetation immediately adjacent to the application area, the proposed clearing is not likely to cause appreciable land degradation in form of wind erosion.

Table 7 Risk degradation summary

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

As part of a CEMP associated with the larger proposed Mitchell Freeway upgrades, which this application area is associated with, the applicant has noted that water carts and/or surface stabilisation measures (e.g. hydro mulch) will be used to minimise dust generated from cleared areas, and in turn reduce the potential for wind erosion (GHD, 2020a).

(h) 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.

Proposed clearing is at variance with this Principle

Delegated Officer's Key Consideration

The proposed clearing will impact on the environmental values of a conservation area, as it will result in the following:

- loss of 0.5 hectares of native vegetation within Neerabup National Park;
- loss of 0.5 hectares of native vegetation within Bush Forever Site 383; and
- increase the risk of weeds and dieback spreading into conservation areas.

As a condition of the clearing permit, the applicant will be required to undertake weed and dieback management measures to reduce their risk of spread into surrounding conservation areas.

It is also acknowledged that as part of a number of agreed excisions and additions from Neerabup National Park, the applicant has agreed to excise 0.29 hectares from the application area and has committed to adding 6.735 hectares of land surplus to the Mitchell Freeway upgrade requirements into Neerabup National Park estate.

The application area includes 0.5 hectares of Neerabup National Park (Class A Reserve, R 27575) and 0.5 hectares of native vegetation (which overlaps with the Neerabup National Park) within Bush Forever Site 383 known as 'Neerabup National Park, Lake Nowergup Nature Reserve and adjacent bushland'.

The overlapping portions with Neerabup National Park and Bush Forever Site 383 are largely in a good (Keighery, 1994) and excellent (Keighery, 1994) condition, and it is therefore considered that the proposed clearing will impact on the environmental values of these areas.

GHD (2020b) advised that a combined area of approximately 4.39 hectares is required to excise parcels of land from the Neerabup National Park and to add approximately 6.735 hectares of surplus land from Neerabup Road to Neerabup National Park for the purpose of extending the Mitchell Freeway and the widening of Hester Avenue. The proposed excision/addition strategy has been supported by DBCA (2020).

The proposed clearing may result in the spread of weeds and dieback into adjacent native vegetation within Neerabup National Park and Bush Forever Site 383.

As described under Section 2, the applicant has advised that it will undertake the following measures to reduce the risk of spreading weeds and dieback into adjacent native vegetation in line with a CEMP for the larger Mitchell Freeway upgrades (GHD, 2020a):

- heavy plant and machinery will be inspected at entry and exit of the work site and be confirmed to be clean and free of vegetation and soil material.
- weed control will be undertaken during works as part of the CEMP, specifically targeting WoNS and Declared Pests.
- the application area will be subject to the annual Main Roads weed spraying program.

As a condition of the Clearing Permit, the applicant will be required to adhere to weed and dieback management measures.

GHD (2020b) advised that a combined area of approximately 4.39 hectares is required to excise parcels of land from the Neerabup National Park and to add approximately 6.735 hectares of surplus land from Neerabup Road to Neerabup National Park for the purpose of extending the Mitchell Freeway and the widening of Hester Avenue. The proposed excision/addition strategy has been supported by DBCA (2020).

(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.

Proposed clearing is not likely to be at variance with this Principle

According to available databases, no watercourse or wetlands are mapped in the application area.

Noting the extent of the proposed clearing and that the application area is adjacent to the existing Hester Avenue, the proposed clearing is not likely to cause deterioration to the surface water quality of this wetland. As part of the overarching CEMP for the Mitchell Freeway Extension Project, that applicant has advised that temporary drainage will be installed to capture and infiltrate surface runoff from construction areas and prevent runoff from entering adjacent native vegetation, which would minimise the risk of increased sedimentation.

Groundwater salinity within the application is mapped between 500 – 1000 milligrams per litre total dissolved solids which is considered to be marginal (Mayer, Ruprecht & Bari, 2005). Between 30-50 percent of the mapped soil type has a moderate to high salinity risk or is presently saline (DPIRD, 2020). Noting the marginal salinity level and the extent of the proposed clearing, the proposed clearing is not likely to cause deterioration in the quality of underground water in the form of salinity.

(j) Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.

Proposed clearing is not likely to be at variance with this Principle

According to available databases, less than 3 percent of the Karrakatta Sand Yellow Phase map units have a moderate to high flood risk (DPIRD, 2020). Noting this, the extent of the proposed clearing, the proposed clearing is not likely to cause, or exacerbate, the incidence or intensity of flooding.

Planning instruments and other relevant matters.

Submissions

The clearing permit application was advertised on the DWER website on 29 April 2020 with a 21 day submission period. One public submission was received. The submission noted the following concerns (Submission, 2020):

- Clearing of native vegetation under applications CPS 8753/1, CPS 8826/1 and CPS 8861/1 poses a significant impact on Neerabup National Park;
- Supporting documents do not justify the need to clear native vegetation;
- the proposed clearing will have detrimental impact on the existing fauna underpass;
- the proposal to build fencing, carpark and access tracks within Neerabup National Park and the Neerabup Nature Reserve is an unacceptable as offset for the proposed clearing activities.

In relation to the cumulative impact on the environment resulting from the proposed clearing and inadequate offset proposal, the applicant has provided an offset for the applications related to applications associated with the larger Mitchell Freeway Extension that comprises both land acquisition and rehabilitation elements. As considered under Section 5, these offset measures are considered adequately to address the impacts to the Carnaby's cockatoo habitat and the Banksia Woodlands and Tuart Woodlands TEC's.

With respect to an absence of justification for the proposal, the Department has not assessed whether engineering solutions for reducing clearing have been applied. The Department has assessed the potential environmental impacts of the proposed clearing, and it is the applicant who has the expertise to determine suitable engineering controls.

Impacts to ecological linkage are addressed under Principle (a) and (b).

Planning

Mitchell Freeway Extension Project

This proposed works relating to this clearing permit application are required as part of Main Roads larger Mitchell Freeway extension project, which has been designed to support the expansion of Perth's outer northern suburbs. The applicant has advised

that the greater project will alleviate pressure on the local road network, reduce travel times and ensure safety and connectivity for people living and working in the region (GHD, 2020a). The larger project includes a development footprint of around 250 hectares, of which around 165 hectares requires the clearing of native vegetation. The majority of the project was previously assessed by the EPA under a Metropolitan Regional Scheme Amendment (see 'Other Approvals' section below).

City of Wanneroo Comment

The City of Wanneroo (the City) (2020) provided the following comments on the proposed clearing:

- the mapped vegetation complex within the application Cottesloe Central and South is a high priority for further protection according to the City's Local Biodiversity Strategy 2011-16;
- the area proposed to be cleared is located on land reserved as 'Parks and Recreation' under the MRS. Any development application on this site is to be determined by the Western Australian Planning Commission (WAPC) as the City is not the relevant determining authority; and
- the site occurs within Bush Forever Site No. 383. The City is not aware of any development applications lodged on the site relating to the clearing of vegetation. As such, it is highly recommended you refer this application to the Department of Planning, Lands and Heritage for comment on whether a development application is required and the potential issues of clearing within a Bush Forever site.

The applicant has acknowledged that some of the clearing permit application areas are inconsistent with the current MRS zoning. The applicant has advised that an MRS amendment that will incorporate the clearing permit application areas will follow construction and will likely be part of an omnibus amendment considered by the Western Australian Planning Commission in the future. The applicant notes that it is common practice for the MRS to be amended following construction (MRWA, 2020a).

The applicant also acknowledges that Development Approval will be required from the City of Wanneroo where the road works extend outside of the MRS road reservation, with Development Application to be progressed once the land is acquired by MRWA (MRWA, 2020b).

Other Matters

The application area is located in the Perth Groundwater Area proclaimed under the *Rights in Water and Irrigation Act 1914* and a Priority 3 public drinking water source area (PDWSA), proclaimed under the *Metropolitan Water Supply, Sewerage and Drainage Act 1909*. Development for road infrastructure is considered to be a compatible land use within Priority 3 PDWSA's.

No Aboriginal sites of significance have been mapped within the application area.

Other Approvals

EPA Metropolitan Region Scheme amendment 992/33 Assessment

The majority of the Mitchell Freeway extension was previously assessed by the EPA, as part of Metropolitan Region Scheme amendment 992/33, approved under Ministerial Statement 629 on 8 July 2003. Under MS 629, large parcels of land (170 hectare development footprint) were rezoned as Primary Regional Road or Other Regional Roads to facilitate the expansion.

The application area forms part of additional works required to facilitate the larger Mitchell Freeway extensions, with these works not considered under Ministerial Statement 629. Therefore, the applicant has applied to clear the application area under Part V of the *Environmental Protection Act 1986*.

The applicant advised that Wanneroo Road was zoned "Primary Regional Road" under the MRS at the time the MRS Amendment was assessed, while Romeo Road was zoned "Other Regional Road" under the MRS. The applicant notes that as Wanneroo Road and Romeo Road were already in the MRS it is assumed that the WAPC did not include them in the MRS Amendment 992/33 (MRWA, 2020a).

Related Clearing Permit Applications

The applicant has also applied to clear under Part V of the EP Act for two other projects associated with the larger Mitchell Freeway Extension, being CPS 8753/1 and CPS 8826/1, which were not considered under Ministerial Statement 629. These applications comprise the following:

- CPS 8753/1 – application to clear 32.86 hectares of native vegetation for road upgrade works at Romeo Road and Wanneroo Road in the City of Wanneroo
- CPS 8826/1 – application to clear 1.91 hectares of native vegetation for the 'Nowergup Depot Access' project

DWER has considered the cumulative impact of these applications through the assessment and decision-making process.

Department of Agriculture, Water and the Environment (DoAWE)

The Mitchell Freeway Extension Project is also currently being assessed separately by the Commonwealth Department of Agriculture, Water and the Environment (DoAWE) under the EPBC Act (reference 2018/8367). On 5 April 2019 DoAWE determined that the development is a controlled action that requires assessment and approval under the EPBC Act. DoAWE is currently assessing the referral, pending additional information from the MRWA.

Neerabup National Park Excision Strategy

Some areas of MRS Amendment 992/33, which was approved under Ministerial Statement 629, included the excision of land from the Neerabup National Park and Nature Reserve and addition of land to the "Parks and Recreation" reservation adjacent to the Park. To document the areas, the MRWA commissioned GHD (2020b) to prepare a mitigation strategy which includes excision or addition of a number of small land parcels to the national park.

It is noted that under MRS 992/33, the combined excisions and additions undertaken following MRS Amendment 992/33 and from previous MRS Amendments has resulted in a net increase in the "Parks and Recreation" zoned land adjacent to the Park of approximately 432 hectares.

It is noted that the proposal involves the excision of approximately 0.29 hectares from Neerabup National Park that is located within the application area (Figure 3). On 14 April 2020, MRWA (2020b) advised that the Excision Strategy for Mitchel Freeway Extension (GHD, 2020b) has been approved by DBCA, the Conservation and Parks Commission and is now pending the Minister for Environment endorsement.

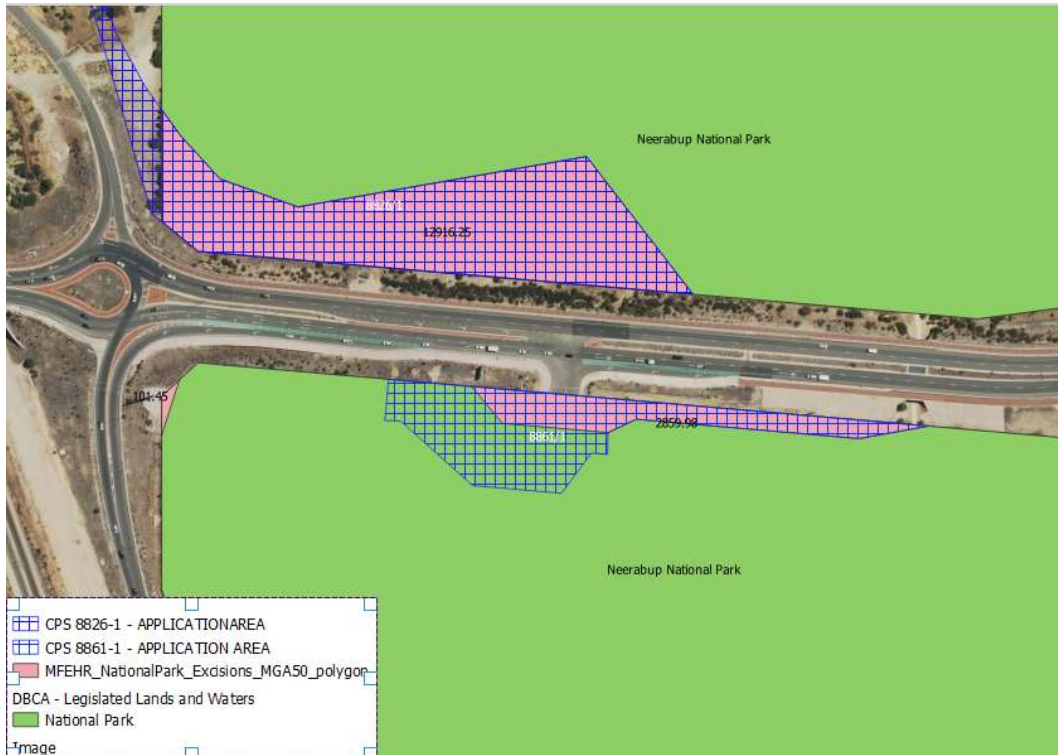


Figure 2 Proposed excision areas from the Neerabup National Park

5. Offset Consideration

Offset Proposal

After avoidance, minimisation and mitigation actions, it is considered that the proposed clearing will result in the following significant residual impacts:

- loss of 0.5 hectares of significant foraging habitat for Carnaby's cockatoo;
- loss of 0.5 hectares of vegetation representative of Banksia Woodland PEC/TEC;
- loss of 0.5 hectares of native vegetation within Neerabup National Park and Bush Forever Site 383; and
- loss of native vegetation that forms part of a regionally significant ecological linkage.

To counterbalance the above impacts, the applicant has committed to provide monetary offset contribution for purchase of 2.7 hectares of land within the Shire of Gingin to address impacts specific to Banksia Woodland PEC/TEC and Carnaby's cockatoo habitat.

Offset Adequacy

In assessing whether the proposed offset is adequately proportionate to the significance of the habitat values being impacted, DWER undertook a calculation using the Commonwealth Offset Assessment Guide. The calculation determined that the allocation of the following areas of native vegetation to be placed to conservation estate is adequate to counterbalance the significant residual impacts:

- 2.7 hectares of native vegetation in a good to excellent condition that provides suitable foraging habitat for Carnaby's cockatoo;
- 2.7 hectares of native vegetation in a good to excellent condition that is representative of the Banksia Woodland PEC/TEC.

The cost of acquiring a 2.7 hectare parcel of land (to acquire land with the Banksia Woodland PEC/TEC and Carnaby's cockatoo habitat) equates to a monetary contribution of \$3,753 determined based on the estimated value per hectare of a 200 hectare vegetated parcel of land in the Shire of Gingin.

Given the above and consistent with the *WA Environmental Offsets Policy September 2011*, a monetary contribution of \$3,753 for the acquisition of 2.7 hectares of native vegetation that contains Banksia Woodland PEC/TEC and Carnaby's cockatoo habitat is considered adequate to counterbalance the significant residual impacts of clearing.

Related Applications and Cumulative Offsets

In the assessment of the proposed offset, the impacts of two other Main Roads clearing permit applications associated with the larger Mitchell Freeway Extension Project have also been considered. Through the assessment of those applications, which were undertaken concurrently with this assessment, the following significant residual impacts were determined to result:

- Romeo Road and Wanneroo Road Upgrade Project (CPS 8753/1) – impacts to 29.39 hectares of critical habitat for Carnaby's cockatoo, 19.31 hectares representative of the Banksia Woodland PEC/TEC and 8.27 hectares representative of Tuart (*Eucalyptus gomphocephala*) woodlands of the SCP (Tuart Woodlands) TEC; and
- Nowergup Depot Access Project (CPS 8826/1) – impacts to 1.91 hectares of Carnaby's cockatoo habitat and 1.30 hectares representative of the Banksia Woodland TEC.

At the time of the assessment it is considered that the following offsets, as committed to by the applicant, are adequate to address the above impacts:

- Romeo Road and Wanneroo Road Upgrade Project (CPS 8753/1) – the rehabilitation of 8 hectares within Neerabup Nature Reserve and 10 hectares adjacent to DBCA managed land, the allocation of 30.5 hectares of a banked offset site representative of the Tuart Woodlands TEC and a monetary contribution for the acquisition of 140 hectares of native vegetation in excellent condition that contains Banksia Woodland TEC and Carnaby's cockatoo habitat,
- Quins Quarry Access Project (CPS 8826/1) – a monetary offset contribution for the purchase of 8.4 hectares of native vegetation in excellent condition that provides habitat for Carnaby's cockatoo and is representative of the Banksia Woodlands PEC/TEC.

Taking into account the above, a summary of the total offset required to counterbalance impacts to Banksia Woodland TEC and Carnaby's cockatoo habitat is as follows:

- A monetary contribution of \$210,029 for the purchase of 151.1 hectares of native vegetation in an excellent condition that provides habitat for Carnaby's cockatoo, including 101.43 hectares representative of the Banksia Woodlands TEC.

6. References

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GIS databases:

- CPS Areas applied to clear
- NatureMap (conservation significant fauna)
- DAFWA Subsystems V5
- Soils of WA
- Vegetation Complexes – Swan Coastal Plain
- Managed Tenure
- Environmentally Sensitive Areas
- TPFL Data June 2020
- WAHerb Data June 2020
- Aboriginal Sites Register
- IBRA Vegetation WA
- WA TECPEC
- Land Degradation Hazards