GOVERNMENT OF
WESTERN AUSTRALIA

CLEARING PERMIT

Granted under section 51E of the Environmental Protection Act 1986

PERMIT DETAILS
Area Permit Number: 8774/1
File Number: DWERVT5089
Duration of Permit: From 28 August 2020 to 28 August 2022

ADVICE NOTE
The funds referred to in condition 5 of this permit are intended for contributing towards the purchase of 153.9 hectares of native vegetation with similar environmental values and containing habitat for Carnaby's cockatoo (*Calyptorhynchus latirostris*) and vegetation representative of the '*Banksia* Woodlands of the Swan Coastal Plain' threatened ecological community.

PERMIT HOLDER
Do Huynh 1 Property Holdings Pty Ltd

LAND ON WHICH CLEARING IS TO BE DONE
Lot 130 on Deposited Plan 36979, Muckenburra.

AUTHORISED ACTIVITY
The Permit Holder shall not clear more than 24.94 hectares of native vegetation within the area cross-hatched yellow on attached Plan 8774/1.

CONDITIONS

1. **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:
   (a) avoid the clearing of native vegetation;
   (b) minimise the amount of native vegetation to be cleared; and
   (c) reduce the impact of clearing on any environmental value.

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

3. **Period in which clearing is authorised**
   The Permit Holder must ensure that the planting of crop species occurs within two months of the authorised clearing being undertaken.

4. Flora management

(a) Prior to commencing clearing, the Permit Holder shall construct a fence enclosing the area cross-hatched red on attached Plan 8774/1;

(b) Where *priority flora* have been identified within the area cross-hatched red on attached Plan 8774/1, the Permit Holder shall ensure that no clearing occurs within 50 metres of identified *priority flora.*

5. 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 28 August 2021, the Permit Holder shall provide documentary evidence to the *CEO* that funding of $213,921 has been transferred to the Department of Water and Environmental Regulation for the purpose of establishing or maintaining native vegetation.

6. Direction of Clearing

The Permit Holder shall conduct clearing in a slow, progressive manner towards remnant vegetation to allow fauna to move into adjacent native vegetation ahead of the clearing activity.

7. Records must be kept

The Permit Holder must maintain the following records for activities done pursuant to this Permit, in relation to the clearing of native vegetation authorised under this Permit:

(a) 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 or decimal degrees;
(b) the date that the area was cleared;
(c) the size of the area cleared (in hectares);
(d) the direction of the clearing;
(e) actions taken to avoid, minimise and reduce the impacts and extent of clearing in accordance with condition 1 of this Permit; and
(f) actions taken to minimise the risk of the introduction and spread of *dieback* and *weeds* in accordance with condition 2 of this Permit.
(g) the date planting of crop species commenced in accordance with condition 3 of this Permit.
(h) the date the installation of the fence is complete in accordance with condition 4

8. Reporting

The Permit Holder must provide to the *CEO* the records required under condition 7 of this Permit, when requested by the *CEO*.

DEFINITIONS

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

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;

fill means material used to increase the ground level, or fill a hollow;

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;

priority flora means those plant taxa described as priority flora classes 1, 2, 3, or 4 in the Department of Biodiversity, Conservation and Attractions Threatened and Priority Flora List for Western Australia (as amended from time to time);

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 Regional Weed Rankings Summary, regardless of ranking; or

(c) not indigenous to the area concerned.

Mathew Gannaway
MANAGER
NATIVE VEGETATION REGULATION

Officer delegated under Section 20
of the Environmental Protection Act 1986

5 August 2020

Plan 8774/1

31.335722°S 31.335722°S

115.694398°E 115.710012°E

115.694398°E 115.710012°E

31.343263°S 31.343263°S

Legend

- Clearing Instruments Conditions
- Imagery
- Clearing Instruments Activities
- Local Government Authority
- Roads

N

0 200m

1:7,871

(Approximate when reproduced at A4)

GDA 94 (Lat/Long)

Geocentric Datum of Australia 1994

..... Date 5 August 2020

Mathew Gannaway

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

GOVERNMENT OF WESTERN AUSTRALIA

Government of Western Australia
Department of Water and Environmental Regulation

Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 8774/1
Permit type: Area Permit

1.2. Applicant details

Applicant's name: Do Huynh 1 Property Holding Pty Ltd
Application received date: 20 December 2019

1.3. Property details

Property: Lot 130 on Deposited Plan 36979, Muckenburra
Local Government Authority: Shire of Gingin
Localities: Muckenburra

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	Purpose category:
24.94		Mechanical Removal	

1.5. Decision on application

Decision on Permit Application: Grant
Decision Date: 5 August 2020

Reasons for Decision:

The clearing permit application was received on 20 December 2019 and 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), (g) and is not likely to be at variance to the remaining Principles.

Through assessment, the Delegated Officer determined that the proposed clearing may cause the spread of weeds and dieback into adjacent areas of remnant vegetation. To mitigate potential impacts to adjacent remnant vegetation, a weed and dieback management condition has been placed on the permit. The weed and dieback management condition requires earth-moving machinery to be clean of weeds and dieback when entering and exiting the clearing area, ensure that no dieback or weed-affected soil, mulch, fill or other material is brought into the area to be cleared and restrict the movement of machines and other vehicles to the limits of the area to be cleared.

The Delegated Officer determined that the proposed clearing may lead to wind erosion due to the presence of sandy soils. To prevent the prolonged exposure of bare sandy soils and minimise the potential for wind erosion, a condition has been placed on the permit that requires the planting of the intended crops over the cleared areas within three months of the date of clearing. The applicant has developed a farm management plan that details mitigation measures that will minimise the potential of eutrophication.

The Delegated Officer determined that the proposed clearing may impact upon priority flora located adjacent to the application area. To mitigate impacts to priority flora, a flora management condition has been placed on the permit requiring a 50 meter buffer to all adjacent priority flora and that the area is fenced to prevent incidental clearing.

To mitigate the potential impacts to ground dwelling fauna individuals present at the time of clearing, the applicant will be required to undertake clearing in a slow, progressive and directional (i.e. east to west) manner.

The Delegated Officer determined that the proposed clearing is likely to have a significant residual environmental impact as a result of the loss of 24.94 hectares of native vegetation comprising of significant foraging habitat for the Carnaby's cockatoo (*Calyptorhynchus latirostris*) and a threatened ecological community (TEC).

Consistent with the WA Environmental Offset Policy (2011) and WA Environmental Offsets Guidelines (2014), and pursuant to section 51I(2)(b) of the EP Act, in order to mitigate the significant residual environment impacts described above, the Permit Holder is required to provide an offset through the provision of a monetary contribution of $213,921 to the Department of Water and Environmental Regulation (DWER) for the purchase and conservation of 153.9 hectares of remnant native vegetation. It is determined that this adequately addresses the residual impact to black cockatoo foraging habitat as a result of clearing.

In determining to grant a clearing permit subject to offset, weed and dieback, fauna management, flora management and wind erosion management conditions, the Delegated Officer found that the proposed clearing is unlikely to lead to an unacceptable risk to the environment.

2. Site Information

Clearing Description

The application is for the proposed clearing of 24.94 hectares of native vegetation within Lot 130 on Deposited Plan 36979, Muckenburra, for the purpose of irrigated horticulture (Figure 1).

Vegetation Description

The application area is mapped as Heddle vegetation Karrakatta Complex-North, which comprises predominantly low open forest and low woodland of *Banksia* species and *Eucalyptus todtiana* (pricklybark), and less consistently open forest of *Eucalyptus gomphocephala* (tuart) – *Eucalyptus todtiana* (pricklybark) and *Banksia* species (Heddle et al., 1980).

A site inspection of the application undertaken by DWER officers identified that the application area comprises low Banksia woodland (largely *Banksia menziesii* and *Banksia attenuata* with some scattered *Banksia illicifolia*) with occasional emergent *Eucalyptus todtiana* and *Allocasuarina fraseriana*, over a diverse sclerophyllous shrub layer comprising *Adenanthos cygnorum*, *Allocasuarina humilis*, *Conostephium pendulum*, *Daviesia* spp., *Hibbertia hypericoides*, *Jacksonia* sp., *Stirlingia latifolia* and *Xanthorrhoea preissii* (DWER, 2017).

Vegetation Condition

The site inspection undertaken within the application area determined that the vegetation is predominantly in a very good to excellent (Keighery, 1994) condition, described as:

- Excellent: Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species (Keighery, 1994).
- Very Good: Vegetation structure altered; obvious signs of disturbance (Keighery, 1994).

Soil type

The application area is mapped as 'Bassendean Yeal swamp complex phase' which is described as low sandy rises and small seasonal swamps on aeolian sands over alluvial deposits in the pale deep sands with wet and semi-wet soils (Commissioner of Soil and Land Conservation (CSLC), 2020).

Comment

The local area considered in the assessment of this application is defined as a 10 kilometre radius from the perimeter of the application area.

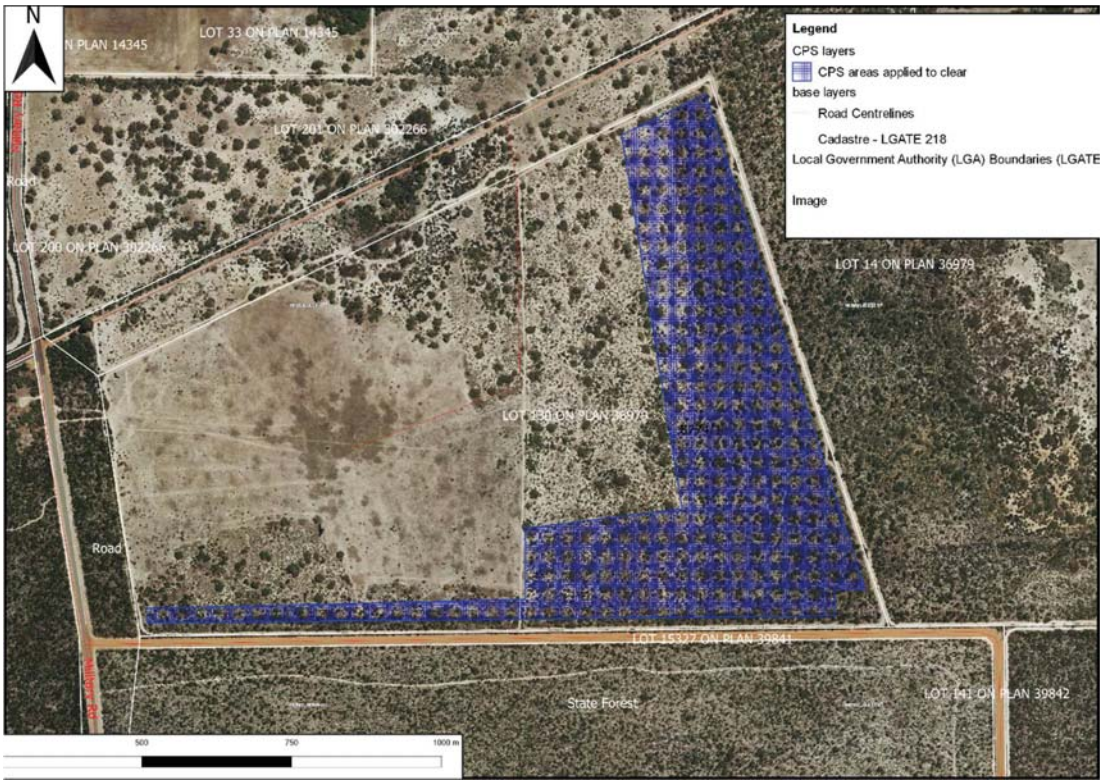

Figure 1: Application Area

3. Minimisation and mitigation measures

The applicant has reduced the application area from 27 hectares to 24.94 hectares.

The applicant has undertaken a targeted flora survey to determine the presence of priority flora within the application area. The applicant has removed an area of approximately 0.4 hectares in size in the south west corner of Lot 130 which comprised approximately 20 individuals of priority flora, *Leucopogon squarrosus* subsp. *trigynus* (Priority 2). The applicant has advised that a 50 metre vegetated buffer has been provided to this population and that this area will be pegged and fenced.

A 20 metre vegetate buffer has been provided to the adjacent properties.

The applicant has developed a farm management plan that will mitigate the risk of eutrophication and wind erosion resulting in land degradation. These mitigation measures are discussed further under Principle (g).

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

A site inspection of the application undertaken by DWER officers identified that the application area comprises low Banksia woodland (largely *Banksia menziesii* and *Banksia attenuata* with some scattered *Banksia illicifolia*) with occasional emergent *Eucalyptus todtiana* and *Allocasuarina fraseriana*, over a diverse sclerophyllous shrub layer (DWER, 2017). The site inspection undertaken within the application area determined that the vegetation is predominantly in a very good to excellent (Keighery, 1994) condition.

According to available databases, there are records of 16 priority flora species within the local area. Suitable habitat for two priority flora *Grevillea evanescens* (Priority 1) and *Leucopogon squarrosus* subsp. *trigynus* (Priority 2) may be present within the application area.

A targeted flora survey for *Grevillea evanescens* (Priority 1) and *Leucopogon squarrosus* subsp. *trigynus* (Priority 2) was undertaken on 27 July 2019 within the application area. The timing was deemed appropriate as both target species were in flower at previously recorded nearby sites. No Grevillea species were present onsite. Approximately 21 individuals of *Leucopogon squarrosus* subsp. *trigynus* (Priority 2) were identified within the survey area (Woodgis, 2019). The applicant has removed the population comprising of approximately 20 individuals within the south east corner of Lot 130. A 50 metre vegetated buffer has been provided to this population. The applicant has advised this area will be pegged and fenced. The flora survey noted that this species was abundant to the south and east of the application area in the adjacent property, however this area was not surveyed to give accurate numbers (Woodgis, 2019).

One individual of *Leucopogon squarrosus* subsp. *trigynus* is proposed to be cleared. However given the population of 20 individual is proposed to be retained, the proposed clearing is not likely to have a significant impact on the conservation status of this priority flora species or its occurrence in the local landscape.

As discussed under Principle (c), the application area does not provide suitable habitat for any species of threatened flora

As discussed under Principle (d), the vegetation proposed to be cleared does not comprise or is necessary for the maintenance for any state listed TECs.

The majority of the application area is mapped by the Commonwealth Department of Agriculture, Water and the Environment (DAWE) as a 'likely to occur' area for the '*Banksia* Woodlands of the Swan Coastal Plain ecological community', listed as Endangered TEC under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and listed as Priority 3(iii) Priority Ecological Community (PEC) by Department of Biodiversity Conservation and Attractions (DBCA). DAWE's mapping provides an indicative distribution of the ecological community, defining areas mapped as 'likely to occur' and 'may occur'. The approved conservation advice for this community states that "Ground-truthing (e.g. an on-ground survey) is required to verify if a particular site meets the required key diagnostic characteristics and minimum condition thresholds to be the described ecological community" (Threatened Species Scientific Committee (TSSC), 2016).

The canopy of the ecological community is most commonly dominated or co-dominated by *Banksia attenuata* and/or *Banksia menziesii* (Threatened Species Scientific Committee (TSSC), 2016). If present, the emergent tree layer often includes *Corymbia calophylla*, *Eucalyptus marginata*, or *Eucalyptus gomphocephala*. Other trees that may be present include *Eucalyptus todtiana*, *Nuytsia floribunda*, *Allocasuarina fraseriana*, *Callitris arenaria*, *Callitris pyramidalis* and *Xylomelum occidentale* (TSSC, 2016). The understorey of the community typically contains a high to very high diversity of shrub and herb species that often vary from patch to patch (TSSC, 2016).

A site inspection undertaken by DWER officers (DWER, 2017) identified that the vegetation present within the application is likely to meet the key diagnostic characteristics and condition threshold to be the described ecological community and therefore the application area is considered to comprise the '*Banksia* Woodlands of the Swan Coastal Plain' commonwealth listed TEC.

The proposed clearing may indirectly impact the adjacent vegetation through the spread of weeds and dieback. Weed and dieback management practices will help mitigate this risk.

As discussed under Principle (b), the application area provides significant foraging habitat for Carnaby's cockatoo (*Calyptorhynchus latirostris*).

The application area comprises of vegetation in excellent and very good (Keighery, 1994) condition, comprises significant habitat for fauna, a commonwealth listed TEC and one individual of priority flora. Therefore, the application area is considered to comprise a high biodiversity.

Taking into account the applicant's avoidance and minimisation measures, it is considered that a suitable offset will counterbalance the loss of 24.935 hectares of foraging habitat for Carnaby's cockatoo and the *Banksia* Woodlands of the Swan Coastal Plain' commonwealth listed TEC. Section 6 provides further information on the offset provided.

Flora management practices will ensure no impacts to priority flora located adjacent to the application area occurs.

(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

According to available databases, there are records of 13 conservation significant fauna species within the local area, being Carnaby's cockatoo, curlew sandpiper *(Calidris ferruginea)*, Balston's pygmy perch *(Nannatherina balstoni)*, western brush wallaby *(Macropus irma),* quenda *(Isoodon obesulus* subsp. *Fusciventer*), blue-billed duck (*Oxyura australis*), black-striped snake (*Neelaps calonotos*), sharp-tailed sandpiper *(Calidris acuminata),* red-necked stint *(Calidris ruficollis),* caspian tern *(Hydroprogne caspia),* wood sandpiper *(Tringa glareola),* and the common greenshank (*Tringa nebularia*) (DBCA, 2007-).

The Balston's pygmy perch (listed as Vulnerable under the *Biodiversity Conservation Act 2016* (BC Act)) is aquatic fauna and the blue-billed duck (listed as Priority 4 by DBCA) occupies permanent deep water-bodies in southern Australia. Given that the application area does not contain any permanent water bodies (DWER, 2017), it is unlikely to contain suitable habitat for these species.

The sharp-tailed sandpiper, curlew sandpiper, red-necked stint, wood sandpiper, caspian tern and common greenshank are migratory avian fauna protected under international agreement. Noting the mobility and large home ranges of these avian species, it is unlikely that the application area provides significant habitat for these species.

Quenda is found in scrubby, often swampy vegetation with dense cover up to one metre high. Quenda will thrive in more open habitat subject to introduced predator control. On the Swan Coastal Plain Quenda are often associated with wetlands. Given the lack of wetlands present within the application area, significant habitat for this is not likely to be present within the application area (DEC, 2012).

Western brush wallaby optimum habitat is open forest or woodland, particularly favouring open, seasonally wet flats with low grasses and open scrubby thickets. It is also found in some areas of mallee and heathland, and is uncommon in karri forest (DBCA, 2020). Significant habitat for this species is not likely to be present within the application area.

The black striped snake is listed as Priority 3 by DBCA and is known to occur in Banksia woodlands and sand areas of the Perth region. Suitable habitat for this species is present within the application area. However, given that similar vegetation in the same

or better condition is located adjacent to the application including within Gnangara-Moore River State Forest, no loss of significant habitat for this species is expected. Directional clearing will assist in mitigating impacts to this species.

Carnaby's cockatoo is listed as Endangered fauna under the under the EPBC Act and BC Act. This species 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 Swan Coastal Plain reveal that *Banksia* species account for nearly 50 per cent of the diet for this species. *Banksia* species are therefore considered an essential native food source for Carnaby's cockatoo (Shah, 2006).

As discussed under section 2, a site inspection identified that the application area largely comprises low Banksia woodland (largely *Banksia menziesii* and *Banksia attenuata* with some scattered *Banksia illicifolia*) (DWER, 2017), and therefore provides suitable foraging habitat for Carnaby's cockatoo. The site inspection identified Carnaby's cockatoo foraging evidence on several *Banksia* cones (DWER, 2017).

The threats and impacts to Carnaby's cockatoo are well known. The species is primarily threatened by the loss and fragmentation of breeding and foraging habitat as a result of vegetation clearing. This is particularly so on the Swan Coastal Plain and Avon-Wheatbelt regions where extensive historical clearing has occurred. Habitat fragmentation increases the distances cockatoos need to travel between resources. Proximity of foraging habitat and water has been demonstrated to be critical to support roosting and breeding sites. Foraging habitat within seven kilometres of a breeding site is important to adequately support breeding cockatoos. In the Perth-Peel region, individual night roosts need food and water within six kilometres, with overlapping foraging ranges within 12 kilometres, to support roosting sites and maintain habitat connectivity and movement across the landscape (EPA, 2019).

According to available databases the application area is mapped approximately 13.7 kilometres from a known Carnaby cockatoo breeding area and within two kilometres of two confirmed black cockatoo roost sites. A conservation category wetland is located approximately 100 metres east of the application area. Given the close proximity of known roosting sites and water sources to the proposed clearing, the foraging habitat located within the application area is considered to be significant foraging source for the threatened black cockatoo species.

DBCA provided comment on the potential impacts of the proposed clearing on Carnaby's cockatoo and advised that (DBCA, 2017):

> "the application area is within an important breeding region for Carnaby's cockatoo. The regional area surrounding the application area contains numerous confirmed breeding areas and roost sites. The proximity to breeding areas and roost sites increases the significance of foraging habitat. The application area is also in close proximity to water sources, the Gingin Brook and Quin Brook, which are important resources for cockatoos, particularly in the vicinity to breeding and roosting sites.
>
> The application area is 1.6km east of a confirmed breeding area buffer, [and] there [are] many other confirmed breeding areas at increasingly greater distances in all directions. The mapped confirmed breeding areas are based on a known nesting tree plus a 12km radial buffer, which is considered to be the core foraging habitat used while breeding/nesting is occurring. Although…cockatoos may forage at further distances if required. It is likely that there are other nesting trees that are not yet known within the surrounding regional area. Outside of the breeding season cockatoos are known to opportunistically use any areas of foraging habitat within the vicinity of a roost site, including isolated trees, and may move between roost sites depending on resource availability. There are three confirmed roosts in close proximity to the application area; 11km to the west, 12km to the south and 18km to the east. Carnaby's cockatoos are known to travel 20km from a roost site for foraging however this distance may be greater depending on the available resources in the surrounding region. It should also be noted that, as with nesting trees, not all roost sites are known, and cockatoos are known to move between roost sites.
>
> The banksia and eucalypt species present (based on the desktop assessment and photographs) are known food plants for Carnaby's cockatoo. The cockatoos will move between the areas of foraging habitat depending on the available food and may alternate/vary areas between years. The cumulative impact of the physical loss of foraging habitat combined with variation in productivity of the remaining areas needs to be considered. Maintaining sufficient areas of viable food sources in the regional area surrounding known roosting and breeding sites is important for the long-term survival of the species".

The application area is located adjacent to Gnangara-Moore River State Forest that also adjoins Yanchep National Park, Yeal Nature reserve and a Conservation Commission of WA conservation area which is likely to comprise of vegetation in similar or better condition that will provide foraging habitat for the Carnaby's cockatoo (Figure 2).

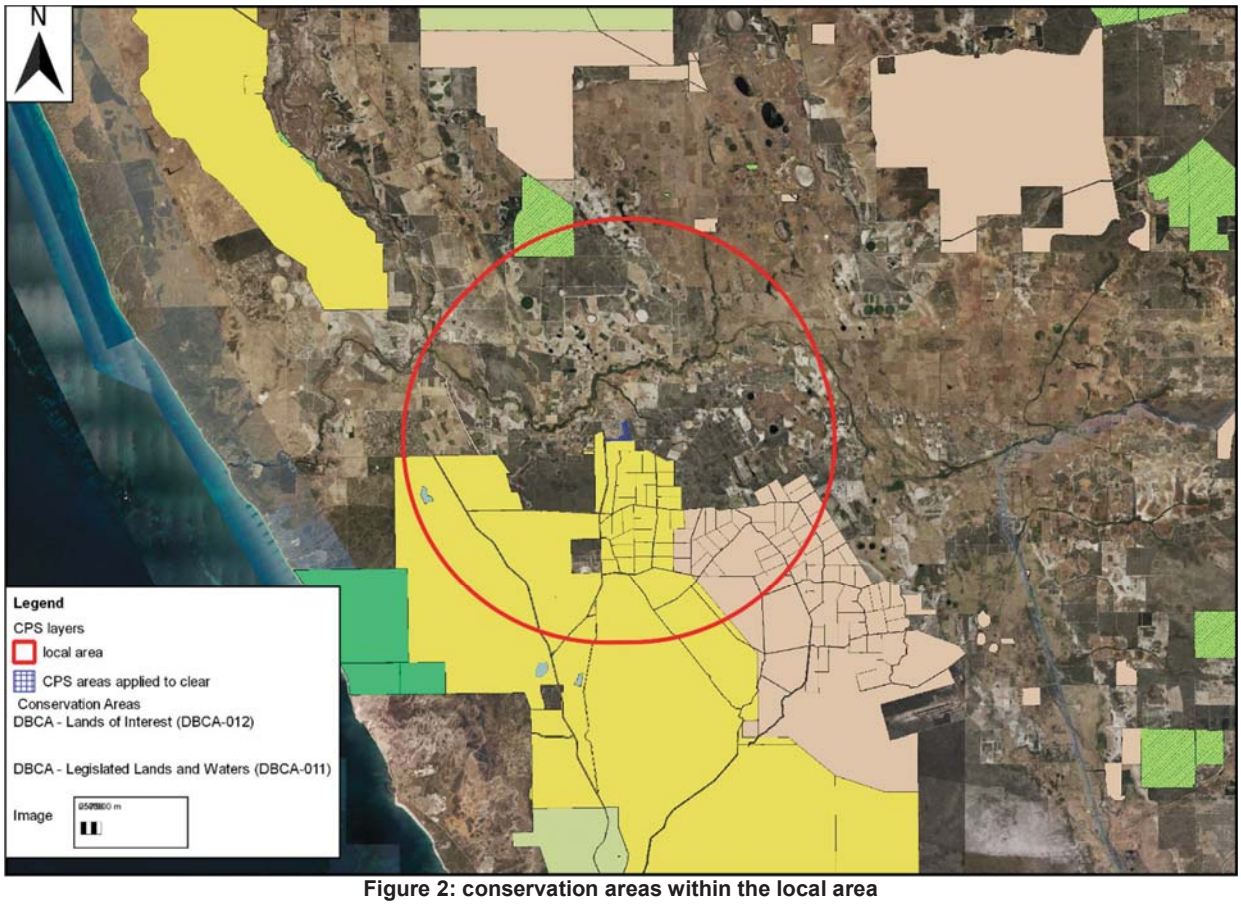

Figure 2: conservation areas within the local area

The extent of nearby suitable foraging habitat for Carnaby's cockatoo within the nearby conservation areas is acknowledged. However, noting that the application area provides Carnaby's cockatoo preferred foraging habitat on the Swan Coastal Plain, is relatively close to known roosting and breeding sites, and contained evidence of foraging (DWER, 2017), the application area is considered to provide significant foraging habitat for Carnaby's cockatoo.

The closest mapped ecological linkage is approximately 1.3 kilometres north west of the application area and the application area is not considered to significantly contribute towards ecological linkage values within the landscape.

Noting that the application area provides significant foraging habitat for Carnaby's cockatoo, the proposed clearing is at variance with this Principle.

Taking into account the applicant's avoidance and minimisation measures, it is considered that a suitable offset will counterbalance the loss of 24.935 hectares of foraging habitat for Carnaby's cockatoo. Section 6 provides further information on the offset provided.

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

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

According to available datasets there are three species of threatened flora that have been mapped within the local area being, *Drakaea elastica*, *Eucalyptus argutifolia* and *Melaleuca* sp. Wanneroo (G.J. Keighery 16705).

The closest of these is *Drakaea elastica* which has been recorded approximately 1.5 kilometres from the application area. This species is a tuberous perennial herb that grows between 0.12 and 0.3 metres high (Western Australian Herbarium, 1998-). This species grows on bare patches of sand within otherwise dense vegetation in low-lying areas alongside winter-wet swamps, typically in banksia (*Banksia menziesii*, *B. attenuata* and *B. ilicifolia*) woodland or spearwood (*Kunzea glabrescens*) thicket vegetation (Department of Environment and Conservation, 2009). A site inspection undertaken within the application area did not identify any wetlands or riparian vegetation within the application area (DWER, 2017). Noting this, the application area is unlikely to provide suitable habitat for this species.

Eucalyptus argutifolia is a mallee that grows to between 1.5 to 4 metres high within shallow soils over limestone on the slopes or gullies of limestone ridges and outcrops (Western Australian Herbarium, 1998-). Noting the absence of slopes or gullies of limestone ridges and outcrops (DWER, 2017), the application area is not likely to provide suitable habitat for this species.

Melaleuca sp. Wanneroo is known to co-occur often as a dominant, in dense patches with other *Melaleuca* species. Predominantly *M. systena*, when growing on very shallow soils over limestone 'caprock' on ridges (Threatened Species Scientific

Committee, 2019). Noting the vegetation and soil type present within the application area, suitable habitat for this species is unlikely to be present.

No threatened flora were identified within the application area (Woodgis, 2019).

Given the above, the application area is not likely to include, or be necessary for the continued existence of threatened flora, and the proposed clearing is not likely to be at variance with this Principle.

(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 datasets, three state listed TECs have been recorded within the local area being 'Herb rich saline shrublands in clay pans', '*Melaleuca huegelii - Melaleuca systena* shrublands on limestone ridges' and 'Shrublands and woodlands on Muchea Limestone of the Swan Coastal Plain'.

Noting the vegetation types present within the application area, it is not considered to be representative of any state listed TECs, or be necessary for the maintenance of a TEC.

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

(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 not likely to be at variance with this Principle
The national objectives and targets for biodiversity conservation in Australia has a target to prevent clearance of ecological communities with an extent below 30 per cent of that present pre-1750, below which species loss appears to accelerate exponentially at an ecosystem level (Commonwealth of Australia, 2001).

The Swan Coastal Plain IBRA bioregion retains approximately 38.6 per cent of its pre-European vegetation extent (Government of Western Australia, 2019a). The application area is mapped as Heddle vegetation Karrakatta Complex-North, which retains approximately 45 per cent of its pre-European vegetation extent (Government of Western Australia, 2019b). These remnant vegetation extents are all greater than the above mentioned 30 per cent threshold.

The local area retains approximately 60.8 per cent native vegetation (21,270 hectares). The application area represents approximately 0.12 per cent 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 approximately 60.68 per cent (21,245.06 hectares).

The application area contains significant foraging habitat for Carnaby's cockatoo and vegetation likely to be representative of a TEC, and is therefore considered to be a significant remnant. However, given the abovementioned remnant vegetation extents for the bioregion, local area and mapped vegetation type, the application area is not considered to be in an extensively cleared area, and the proposed clearing is not likely to be at variance with this Principle.

Table 1. Remnant Vegetation Extents

	Pre-European extent (ha)	Current extent (ha)	Extent remaining (%)	Current extent in all DBCA managed lands (ha)	Extent remaining in all DBCA managed lands (proportion of Pre-European extent) (%)
IBRA bioregion:					
Swan Coastal Plain	1,501,222	579,813	38.6	222,917	18
Vegetation complex:					
Karrakatta Complex-North	44,273	19,976	45	12,500	28

(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
Two conservation category wetlands are mapped approximately 100 and 180 metres east of the application area. A resource enhancement wetland is mapped approximately 320 metres west of the application area.

A site inspection undertaken by DWER Officers did not identify any wetlands or riparian vegetation within the application area (DWER, 2017).

Given the distance to the closest wetland, the application area is not considered to be growing in association with a watercourse or wetland.

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

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

Proposed clearing is at variance with this Principle

The Commissioner of Soil and Land Conservation (CSLC) advised that the soils and landscape systems of the application area have been mapped by Department of Primary Industries and Regional Development as soil type: Bassendean Yeal Swamp Complex Phase Map Unit212Bs_Wy. The application area is considered to maintain a mid to upper slope position in the landscape (CSLC, 2020).

The Bassendean Yeal Swamp Complex Phase is described as low sandy rises and small seasonal swamps on aeolian sands over alluvial deposits with pale deep sand and wet and semi-wet soils (CSLC, 2020).

The Land Degradation Assessment provided by the CSLC noted the soil types present, and position of the application area within the landscape to advise that the risk of flooding, water erosion and waterlogging is low (CSLC, 2020). Similarly, the CSLC advised that the risk of salinity causing land degradation is low, noting the lack of salinity observed on the property (CSLC, 2020).

The CSLC advised that there is some risk of wind erosion as a result of clearing, which could be managed by using best practice measures and the fixed sprinkler system currently employed. Current management practices include cover crops to stabilise the areas after each crop is harvested (CSLC, 2020).

DPIRD's soil-landscape and mapping data indicate that the majority of the application is unsuitable for irrigated horticulture. DPIRD's risk assessment indicated that Map Uni 212Bs_Wy has a high risk of eutrophication from nutrients leaching below the root zone with the use of high volume irrigation systems. Irrigating bare cultivated soil between crops may contribute to leaching any remaining nutrients below the root zone.

The CSLC advised that the risk of eutrophication could increase due to the soil types present. The risk of eutrophication causing land degradation ranges from low to very high. Nutrient management and testing programs are employed on this property and can be extended to the proposed areas to be cleared (CSLC, 2020).

Given the above the proposed clearing is at variance with this Principle.

The applicant has developed a farm management plan and has advised that the following measures will mitigate the risk of eutrophication:

- Irrigation Monitoring and scheduling techniques: A monitoring site will be installed and the soil moisture content logged every 30 minutes at depths of 100, 200, 300, 400 and 600mm. The intention will be to maintain adequate water to meet crop demand within the top 40cm of soil and not to let water continually pass beyond the 600mm sensor. The readings from this instrument will show management when to irrigate and for how long. It will also show how deep the irrigations have penetrated and are therefore a useful tool to control leaching potential;
- Monitoring for Eutrophication: The site will be monitored using a tension lysimeter placed at 50cm below the soil surface. Fortnightly monitoring for specific nutrients has been taking place on this farm now for the last 4 years. An identical monitoring programme will be introduced on Lot 130. Soil solutions extracted from this instrument will be analysed on a fortnightly basis to ensure there is no build-up of environmentally harmful nutrients at depth. Furthermore, the technique links nutrient movement and concentration to irrigation management or rainfall patterns enabling both management and legislative authorities to monitor potential problems;
- All fertilizer applications will be band placed i.e. dropped near the plants using an accurately calibrated fertilizer applicator. This 'strip-dropping' type offers the following advantages:
  - fertiliser is more accurately placed in close contact to plant roots at a time when the crop has a rapidly increasing demand for nutrients;
  - less fertiliser on a per hectare basis is required;
  - fertlisers are less soluble in water can be used; and
  - no fertilisers fall into the 'wheel ruts'. This reduces the potential for run-off into adjacent areas.
- Fertilisers will be applied via the irrigation system allowing for smaller and more frequent applications;
- Correct irrigation system design will ensure that the system has a high coefficient of uniformity and low spray drift.
- Correct irrigation scheduling will limit water applications to the effective root zone thereby limiting the risk of fertiliser movement deeper down into the soil
- Only the absolute minimum amounts of fertiliser will be applied to achieve target crop yields and quality. They will be made frequently and in the smallest doses possible.
- Rates of nitrogen will not exceed 70kg/ha in any single application. Smaller, more frequent applications will be applied during autumn/winter when rainfall is common and the risk of leaching is higher.
- Fertigation type applications will not be undertaken under the following conditions:
  - There is chance of backflow of nutrients into the water source;
  - When there is a high chance of drift – when prevailing winds exceed 10 km/hr
  - When temperature inversions exist.
- Nitrogen catch crops will be sown, following harvest, on land not being used or replanted to vegetables. These crops also provide a valuable for minimising the risk of wind erosion.
- Weather conditions will be taken into account prior to any applications i.e. no applications will be scheduled during periods of intensive rainfall (Western Agronomy, 2018).

As part of the Development Approval from the Shire of Gingin for the proposed works, the applicant is required to maintain a 20 metre buffer of native vegetation around the entirety of the property, which will also help to minimise wind erosion.

In addition to the measures outlined in the Farm Management Plan, the applicant will be required to plant the intended crops over the cleared areas within two months of the date of clearing, which will prevent the prolonged exposure of bare sandy soils and minimise the potential for wind erosion.

(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 not likely to be at variance with this Principle

The closest conservation area to the application area is Gnangara-Moore River State Forest (the State Forest), which occurs approximately 50 metres south of the application area at its closest point, separated from the application area by an access track and a 20 metre buffer strip of native vegetation on the southern boundary of Lot 130.

The State Forest also includes a large remnant of native vegetation approximately 120 metres west of the western boundary of the application area. The application area is separated from this portion of the State Forest by Military Road and a 90 metre wide remnant of native vegetation.

While the application area is within close proximity to the State Forest, noting that the vegetation between the application area and the State Forest is separated by access tracks/roads and strips of native vegetation, and that the application area is not considered to provide ecological linkage values, the proposed clearing is unlikely to impact on the environmental values of the State Forest.

Given the above, the proposed clearing is not likely to be at variance with this Principle.

(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

As discussed under Principle (f), two conservation category wetlands are mapped approximately 100 and 180 metres east of the application area. The closest major watercourse to the application area Quin Brook and Gingin Brook, which are located approximately 0.7 kilometres and 1.8 kilometres from the application area respectively. Due to the absence of surface water connection to these bodies, the proposed clearing is not likely to impact on the water quality of these brooks.

The Land Degradation Assessment provided by the CSLC advised that given the soil types present, and position of the application area within the landscape, the risk of flooding, water erosion and waterlogging is low (CSLC, 2020).

Mapped groundwater salinity within the application area is low (500 to 1000 milligrams per litre total dissolved solids). Given this, and the advice provided by the CSLC, which noted that there was no salinity observed on the property and the risk of salinity causing land degradation is low (CSLC, 2020), the proposed clearing is unlikely to cause deterioration in the quality of surface and/or underground water via increased salinity.

Given the above, the proposed clearing is not likely to be at variance with this Principle.

(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

The CSLC, considered the soil type and position of the application area in the landscape, to conclude that the risk of flooding is low (CSLC, 2020). Noting this advice, and the moderate rainfall experienced by the region (700 millimetres per annum), the proposed clearing is considered unlikely to cause or exacerbate the incidence or intensity of flooding.

Given the above, the proposed clearing is not likely to be at variance with this Principle.

Planning instruments and other relevant matters.

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

The clearing permit application was advertised on the DWER website on 20 December 2019 with a 21 day submission period. Two public submissions have been received in relation to this application.

The submissions received raised concerns regarding the proposed clearing including:

- The targeted flora survey did not assess the presence of the threatened ecological community or fauna habitat.
- The degraded condition of the adjacent CPS 8774/1 compared with the more intact condition of the current application area.
- The size and good to very good condition of the application area that represents the threatened *Banksia* Woodlands of the Swan Coastal Plain TEC should be protected and not allowed to be cleared.
- Presence of priority flora.
- Lack of information provided regarding offsets
- Impacts to a fauna corridor along Quin Road.

In regards to the abovementioned submission DWER notes the following:

- As referred to under principle (a) and (b), although the flora survey did not assess the presence of TECor fauna habitat, information obtained from the site inspection determined that the application area comprises the '*Banksia* Woodlands of the Swan Coastal Plain' TEC and significant foraging habitat for Carnaby's cockatoo. The assessment has been based on their occurrence within the application area.
- The applicant has provided a 50 metre buffer to the 20 priority flora identified within the application area. Only one priority flora individual will be cleared.
- An offset was provided by the applicant on 10 June 2020. The suitability of this offset is discussed in Section 6.
- As referred to under principle (b), the proposed clearing is not likely to impact upon any ecological linkages. A 20 metre vegetated buffer will be maintained on the boundary of Lot 30 which will provide a corridor for fauna movement along Quin Road.

The applicant has received development approval within the application area from the Shire of Gingin for the proposed end land use, subject to conditions. The development area specified within the development approval includes the application area. Condition 9 of the development approval states that the development approval "authorise[s] the Chief Executive Officer in the event a clearing permit is granted, to amend the development area to be in accordance with the clearing permit issued by the Department of Water and Environmental Regulation" (Shire of Gingin, 2017).

The Shire of Gingin (2020), has advised that 'the development has been substantially commenced and reading the comments in provided reports and the conditions of approval the Shire supports Agriculture Intensive for the entire lot subject to setbacks and the extent of clearing supported by DWER. Accordingly, the Shire has no objection to clearing on the subject lot.'

The applicant has a licence to take water for the proposed horticulture, with an annual water entitlement of 448,000 kilolitres (GWL167118(4).

5. Suitability of Proposed Offset

After avoidance, minimisation and mitigation measures (outlined in Section 3 of this report), it is considered that the proposed clearing will result in significant residual impacts comprising of 24.94 hectares of native vegetation that comprises of significant foraging habitat for Carnaby's Cockatoo and considered representative of the '*Banksia* Woodlands of the Swan Coastal Plain' TEC.

The applicant proposed an offset consisting of providing a monetary contribution for the purchase and conservation of 153.9 hectares of native vegetation that comprises of black cockatoo foraging habitat and that is representative of the '*Banksia* Woodlands of the Swan Coastal Plain' TEC. In assessing whether the proposed offset is adequately proportionate to the significant environmental values listed above, DWER undertook a calculation using the Commonwealth Offsets Assessment Guide calculator. DWER's calculation determined that the conservation of 153.9 hectares of suitable foraging habitat and the TEC is required to adequately offset the significant residual impacts associated with the clearing of 24.94 hectares of native vegetation within the application area.

In determining the offset adequacy through use of the Commonwealth Offsets Assessment Guide, consideration was given to the following:

- The presence of suitable foraging habitat for black cockatoos to be purchased;
- The presence of vegetation representative of the '*Banksia* Woodlands of the Swan Coastal Plain' TEC'
- The excellent (Keighery, 1994) condition of the vegetation likely to be within the proposed offset area;
- The excellent to very good (Keighery, 1994) condition of the application area;
- The historical zoning of the likely proposed offset area prior to being within DBCA conservation estate;
- The long term and immediate conservation of the proposed offset area, and confidence in long term security given that it will form part of DBCA's conservation estate.

Table 2 located within Appendix 1 refers to the values used and the justification for the values determined in DWER's offset calculation further.

Given the above, a monetary contribution of $213,921 for the purchase and conservation of 153.9 hectares of native vegetation is considered adequate to counterbalance the significant residual impacts to black cockatoo habitat and a TEC, consistent with the Environmental Offsets Policy October 2012 and WA Environmental Offsets Policy September 2011.

6. References

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GIS Databases:

- Aboriginal Sites of Significance
- DBCA Managed Estate
- Directory of Important Wetlands
- Geomorphic Wetlands Swan Coastal Plain
- Groundwater salinity
- Hydrography, hierarchy
- Hydrography, linear
- Land Degradation datasets
- SAC Bio Datasets
- Soils, Statewide
- Topographic contours
- Vegetation Complexes Swan Coastal Plain

Appendix 1: Suitability of Proposed Offset

Justification table for the Commonwealth Offset Calculator

Field Name	Description	Justification for value used
IUCN Criteria	The IUCN criteria for the value being impacted	1.2% - Afforded to Carnaby's cockatoo habitat as this species is listed as Endangered under *Biodiversity Conservation Act 2016* and the *Environment Protection and Biodiversity Conservation Act 1999*. The *Banksia* woodlands of the Swan Coastal Plain *TEC is also listed as endagered under EPBC Act.*
Area of impact (habitat/community) or Quantum of impact (features/individua	The area of habitat/community impacted or number of features/individuals impacted	24.9 hectares - Comprises the portion of the application area that provides significant foraging habitat for Carnaby's cockato and vegetation representative of a TEC.
Quality of impacted area (habitat/community)	The quality score for area of habitat/community being impacted - a measure of how well a particular site supports a particular threatened species or ecological community and contributes to its ongoing viability	7 - The vegetation is predominantly in a very good to excellent (Keighery, 1994) condition.
Time over which loss is averted (habitat/community)	This describes the timeframe over which changes in the level of risk to the proposed offset site can be considered and quantified	20 - The offset site would be conserved in perpetuity under conservation estate. 20 years is the maximum value associated with this field.
Time until ecological benefit (habitat/community) or Time horizon (features/	This describes the estimated time (in years) that it will take for the main benefit of the quality (habitat/community) or value (features/individuals) improvement of the proposed offset to be realised	1 - The process for incorporating a land parcel into conservation estate is expected to occur within one year.
Start area (habitat/community) or Start value (features/individuals)	The area of habitat/community or number of features/individuals proposed to offset the impacts	153.9 - Required to offset the significant residual impacts.
Start quality (habitat/community)	The quality score for the area of habitat/community proposed as an offset - a measure of how well a particular site supports a particular threatened species or ecological community and contributes to its ongoing viability	8 - It is assumed that vegetation of a start value of 8 (very good to excellent condition) could be sourced within the Shire of Gingin.
Future quality without offset (habitat/community) or Future value without offs	The predicted future quality score (habitat/community) or value (features/individuals) of the proposed offset site without the offset	8 - It is assumed that the vegetation would remain at this quality without the offset.
Future quality with offset (habitat/community) or Future value with offset (fea	The predicted future quality score (habitat/community) or value (features/individuals) of the proposed offset site with the offset	8 - It is assumed that the vegetation would be maintained at its current quality should it be protected as conservation estate.
Risk of loss (%) without offset (habitat/community)	This describes the chance that the habitat/community on the proposed offset site will be completely lost (i.e. no longer hold any value for the protected matter of concern) over the foreseeable future without an offset	30% - Assuming that the proposed offset area is not zoned for conservation and has no other previous approvals that may increase the risk of it being cleared without the offset.
Risk of loss (%) with offset (habitat/community)	This describes the chance that the habitat/community on the proposed offset site will be completely lost (i.e. no longer hold any value for the protected matter of concern) over the foreseeable future with an offset	10% - Securing the land parcel within conservation estate should reduce the risk of loss to 10%. The risk of catastrophic events (fire, dieback etc.) remain.
Confidence in result (%) – risk of loss (habitat/community)	The capacity of measures to mitigate risk of loss of the proposed offset site	90% - there is a high level of confidence that securing in conservation estate would mitigate the risk of loss.
Confidence in result (%) – Change in quality (habitat/community) or Change	The level of certainty about the successful achievement of the proposed change in quality (habitat/community) or value (features/individuals)	80% - there is a high level of confidence that the offset site would remain at its current quality if entered into conservation estate.
% of impact offset	% of the significant residual impact that would be offset by the proposed offset (note: the offset calculations combined should equate to 100% for each residual impact)	100.00% - Obtained through the input of variables explained above.