GOVERNMENT OF
WESTERN AUSTRALIA

CLEARING PERMIT

Granted under section 51E of the Environmental Protection Act 1986

Purpose Permit number:	CPS 8037/1
Permit Holder:	Western Australian Land Authority TA LandCorp
Duration of Permit:	6 October 2018 – 6 October 2023

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 purpose of installation and extension of trunk services infrastructure (sewer, water and power).

2. **Land on which clearing is to be done**
   Gordon Road reserve (PIN: 1244646), Parklands
   Lakes Road reserve (PIN: 1244645, 11749414, 11749415 and 1376987), Greenfields
   Fowler Road reserve (PIN: 1376978), Stake Hill
   Osprey Link Road reserve (PIN: 11730961), Stake Hill
   Paterson Road reserve (PIN: 1346043, 1346042, 1346041, 1346040, 1346039, 1346037 and 1361813), Nambeelup and Ravenswood
   Lot 221 on Plan 2087, Nambeelup
   Lot 600 on Plan 57701, Stake Hill
   Lot 604 on Plan 59103, Stake Hill

3. **Area of Clearing**
   The Permit Holder must not clear more than 3.015 hectares of native vegetation within the combined areas hatched yellow on attached Plan 8037/1(a) and Plan 8037/1(b).

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.

PART II –MANAGEMENT CONDITIONS

5. **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.

6. **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 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.

PART III - RECORD KEEPING AND REPORTING

7. **Records must be kept**

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

(b) the date that the area was cleared;

(c) the size of the area cleared (in hectares);

(d) actions taken to avoid, minimise and reduce the impacts and extent of clearing in accordance with condition 1 of this Permit; and

(e) actions taken to minimise the risk of the introduction and spread of *dieback* and *weeds* in accordance with condition 2 of this Permit.

8. **Reporting**

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

DEFINITIONS

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

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;

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.

Abbie Crawford
MANAGER
NATIVE VEGETATION REGULATION

Officer delegated under Section 20
of the Environmental Protection Act 1986

6 September 2018

Plan 8037/1(a)

Legend

CPS areas approved to clear

Local Government Authorities

Cadastre

Roads

Wa Now

N

0 400 800 1200 1600 m

MGA 94
Geocentric Datum of Australia 1994

..... Date 6/09/18...

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

GOVERNMENT OF WESTERN AUSTRALIA

Plan 8037/1(b)

115°51.000'E

32°33.000'S

32°33.000'S

115°51.000'E

Legend

CPS areas approved to clear

Local Government Authorities

Cadastre

Roads

Wa Now

N

0 400 800 1200 1600 m

MGA 94
Geocentric Datum of Australia 1994

Date 6/09/13

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.: 8037/1
Permit type: Purpose Permit

1.2. Applicant details

Applicant's name: Western Australian Land Authority TA LandCorp
Application received date: 05 April 2018

1.3. Property details

Property:
LOT 604 ON PLAN 59103, STAKE HILL
LOT 600 ON PLAN 57701, STAKE HILL
LOT 221 ON PLAN 2087, NAMBEELUP
ROAD RESERVE - 1361813, RAVENSWOOD
ROAD RESERVE - 1346037, RAVENSWOOD
ROAD RESERVE - 1346038, RAVENSWOOD
ROAD RESERVE - 1346039, NAMBEELUP
ROAD RESERVE - 1346042, NAMBEELUP
ROAD RESERVE - 1346041, NAMBEELUP
ROAD RESERVE - 1346040, NAMBEELUP
ROAD RESERVE - 1346043, NAMBEELUP
ROAD RESERVE - 1376978, STAKE HILL
ROAD RESERVE - 1376987, STAKE HILL
ROAD RESERVE - 11749415, PARKLANDS
ROAD RESERVE - 11749414, GREENFIELDS
ROAD RESERVE - 11672200, GREENFIELDS
ROAD RESERVE - 11573088, GREENFIELDS
ROAD RESERVE - 1244645, GREENFIELDS
ROAD RESERVE - 11916263, GREENFIELDS
ROAD RESERVE - 1244646, PARKLANDS

Local Government Authority: MURRAY, SHIRE OF and MANDURAH, CITY OF
Localities: BARRAGUP, NAMBEELUP, STAKE HILL, GREENFIELDS and RAVENSWOOD

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	Purpose category:
3.015		Mechanical Removal	Water/gas/cable/pipeline/power installation

1.5. Decision on application

Decision on Permit Application: Grant
Decision Date: 6 September 2018
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 to principles (d) and (f), may be at variance to principle (h) and is not likely to be at variance to the remaining principles.

The Delegated Officer determined that the proposed clearing may increase the spread of weeds and dieback into the adjacent Goegrup Lake Nature Reserve and threatened ecolgoical community. To minimise this impact, a condition has been placed on the permit requiring the implementation of weed and dieback management measures.

The Delegated Officer determined that the proposed clearing will not result in any significant residual impacts.

2. Site Information

Clearing Description

The application is to clear 3.015 hectares of native vegetation within Lot 221 on Plan 2087, Lot 600 on Plan 57701 and Lot 604 on Plan 59103 and numerous road reserves, Stake Hill for the purpose of installation and extension of trunk services infrastructure (sewer, water and power) to the Peel Business Park industrial estate (figure 1).

Vegetation Description

The application area is mapped as Heddle vegetation complex 'Bassendean Complex-Central and South' which is described as vegetation ranging from woodland of *Eucalyptus marginata* (jarrah) - *Allocasuarina fraseriana* (sheoak) - *Banksia* species to low woodland of *Melaleuca* species, and sedgelands on the moister sites. This area includes the transition of *Eucalyptus marginata* (jarrah) to *Eucalyptus todtiana* (pricklybark) in the vicinity of Perth Perth (Heddle et al., 1980);

Heddle vegetation complex 'Yoongarillup Complex' which is described as woodland to tall woodland of *Eucalyptus gomphocephala* (tuart) with *Agonis flexuosa* in the second storey. Less consistently an open forest of *Eucalyptus gomphocephala* (tuart) - *Eucalyptus marginata* (jarrah) - *Corymbia calophylla* (marri) Perth (Heddle et al., 1980); and

Heddle vegetaiton complex 'Herdsman Complex' which is described as sedgelands and fringing woodland of Eucalyptus rudis (Flooded Gum) - Melaleuca species Perth (Heddle et al., 1980).

A Reconnaissance Flora and Vegetation Survey undertaken within the application area identified nine vegetation units within the application area, being:

- **Scrub** - *Kunzea glabrescens* / *Adenanthos cygnorum* / *Jacksonia furcellata* Closed Tall Scrub to Tall Shrubland over a degraded understorey of naturalised alien (weed) herbs and grasses;
- **Planted Trees and Shrubs** - planted (non-endemic) eucalypts over emergent and planted native shrubs;
- ***Banksia* Woodland** - Scattered *Eucalyptus marginata* (Jarrah) and *Corymbia calophylla* (Marri) over *Banksia menziesii, B attenuata* and *ilicifolia* Low Open Woodland over mixed Shrubland over an exotic Closed Grassland;
- **Remnant Mixed Trees** - Scattered *Eucalyptus marginata* (Jarrah), *Corymbia calophylla* (marri), *Allocasuarina fraseriana* (Sheoak), *Banksia* spp. and *Melaleuca preissiana* trees over a degraded understorey of naturalised alien (weed) herbs and grasses;
- **Remnant *Melaleuca preissiana*** - *Melaleuca preissiana* remnant trees over a degraded understorey of exotic grasses;
- **Flooded Gum Woodland** - *Eucalyptus rudis* subsp. *rudis* Low Open Woodland over *Jacksonia sternbergiana, J furcellata* and *Kunzea glabrescens* Tall Shrubland over *Grevillea vestita* and *Regelia inops* Shrubland over a mixed Open Sedgeland / Herbland / Grassland;
- **Flooded Gum Forest over Sedgeland** - *Eucalyptus rudis* subsp. rudis and *Melaleuca rhaphiophylla* Low Open to Closed Forest over *Baumea juncea* and *Lepidosperma* sp. Closed Sedgeland;
- **Remnant Tuart** - *Eucalyptus gomphocephala* (tuart) remnant trees over a degraded understorey of annual and perennial naturalised alien (weed) herbs and grasses; and
- **Remnant Marri** - *Corymbia calophylla* (marri) remnant trees over a degraded understorey of naturalised alien (weed) herbs and grasses.

(RPS 2018a and 2018b).

Vegetation Condition

Completely Degraded; No longer intact, completely/almost completely without native species (Keighery, 1994).

To

Very Good; Vegetation structure altered; obvious signs of disturbance (Keighery, 1994).

Approximately 2.665 hectares of native vegetation is in degraded (Keighery, 1994) or worse condition, whilst 0.345 hectares of native vegetation is in good to very good (Keighery, 1994) condition (RPS 2018a and 2018b).

Isolated trees or shrubs assessed as being in completely degraded condition, are also proposed to be cleared (RPS 2018a and 2018b).

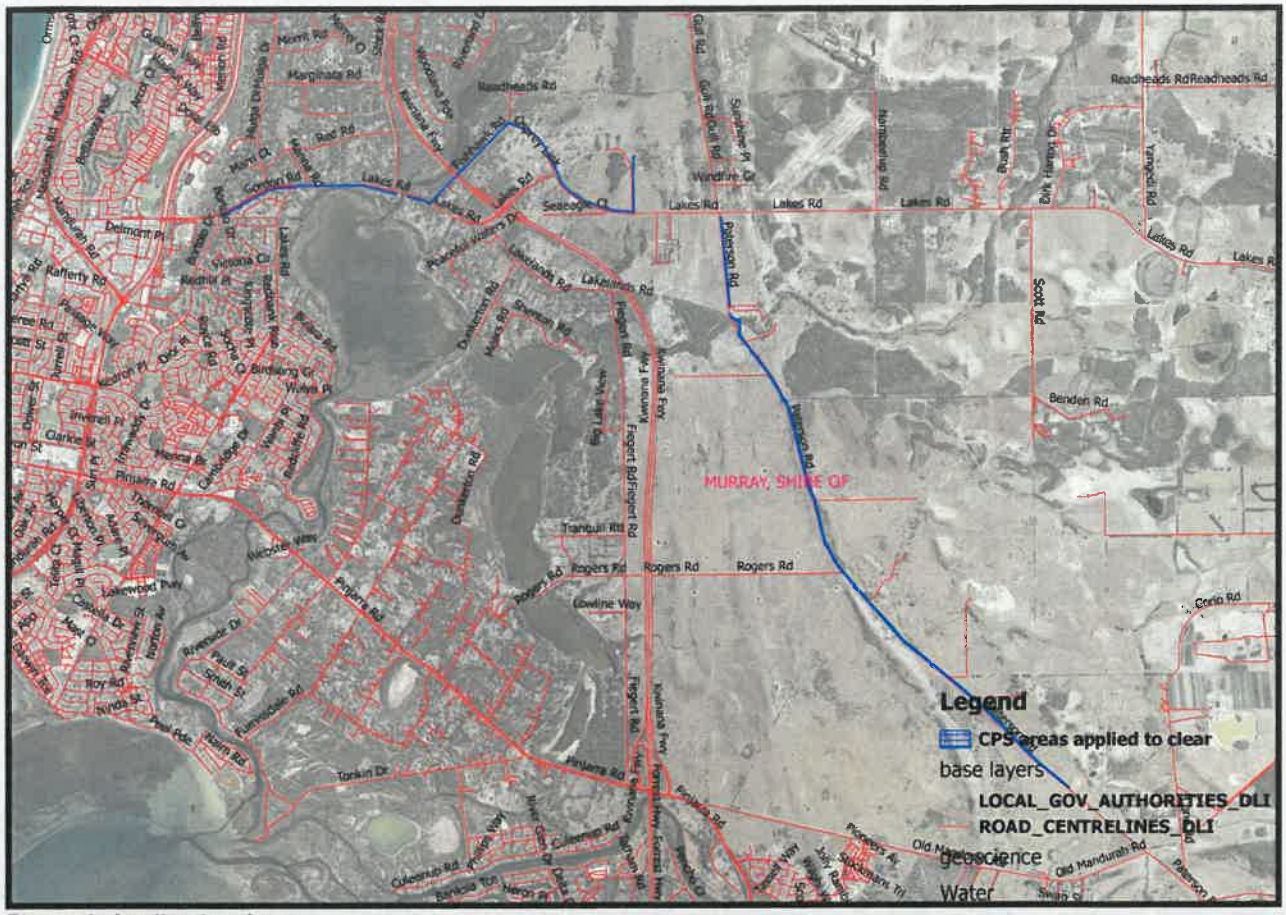

Figure 1: Application Area

3. Minimisation and mitigation measures

The proposed clearing of 3.015 hectares occurs within a larger footprint area of 17.9 hectares.

The proposed engineering design and construction methods for the installation of the trunk services infrastructure have been underpinned by the findings of the reconnaissance flora and vegetation survey. The clearing of native vegetation associated with more sensitive environmental features, such as the Serpentine River, Nambeelup Brook and stands of significant trees have been avoided through boring. No significant tuart trees are proposed to be cleared (RPS, 2018a).

Vegetation is proposed to be trimmed along Gordon Road East to maintain a vegetated buffer between existing residences and the road. A 0.67 hectare contingency clearing area ("clearing as a last resort") along Gordon Road East has been nominated to allow for the removal of individual trees or shrubs if they cannot be avoided during the implementation of trenching works. Should no vegetation be cleared within the contingency clearing area, the clearing requirements for installation of the trunk infrastructure will be reduced to 2.35 hectares (RPS, 2018a).

Trenching has been proposed to be employed in more degraded sections of the trunk services infrastructure clearing area (RPS, 2018a).

Clearing of native vegetation along the foreshore of the Serpentine River and Nambeelup Brook has been avoided. Clearing of native vegetation within the mapped extent of conservation category wetlands has been avoided (RPS, 2018a).

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

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

The applicant has advised that much of the 14.5 kilometres clearing area traverses cleared agricultural land and areas of road reserves that comprise of scattered native trees over an understorey of weeds. However, along Gordon Road, Lakes Road, Fowler Road and Fishhawk Road, native vegetation is generally more intact with areas of Banksia Woodland, wetland fringing *Eucalyptus rudis* subsp. *rudis* and *Melaleuca* spp. over sedgelands, either within or adjacent to the road reserve (RPS 2018a).

A reconnaissance flora and vegetation survey undertaken within the application area idenfieid the following vegetation types and their condition within the proposed clearing area:

- Approximately 0.81 hectares of scrub in degraded (Keighery, 1994) or worse condition;
- Approximately 0.54 hectares of *Banksia* woodland, which is comprised of 0.29 ha in good to very good (Keighery, 1994) condition and 0.25 hectares in degraded (Keighery, 1994) or worse condition;
- Approximately 0.44 hectares of remnant mixed trees in degraded (Keighery, 1994) or worse condition;
- Approximately 0.24 hectares of remnant *Melaleuca preissiana* in degraded (Keighery, 1994) or worse condition;
- Approximately 0.05 hectares of flooded gum woodland in "Good to Very Good (Keighery, 1994) condition;

- Approximately 0.02 hectares of planted trees and shrubs in degraded (Keighery, 1994) or worse condition;
- Approximately 0.01 hectares of flooded gum forest over sedgeland in degraded (Keighery, 1994) or worse condition;
- Approximately 0.005 hectares of remnant tuart in degraded (Keighery, 1994) or worse condition.
- Approximately 0.16 hectares of remnant marri ranging from very good to completely degraded condition including 7 alive trees with no hollows and two dead trees with no hollows.
- Approximately 0.04 hectares of remnant jarrah in degraded (Keighery, 1994) condition including four alive trees with no hollows; and
- Approximately 0.03 hectares of remnant flooded gum in completely degraded (Keighery, 1994) condition including two alive trees with no hollows (RPS, 2018a and RPS, 2018b).

According to available databases, eleven rare flora and 42 priority flora species have been recorded within the local area (10 kilometre radius). A reconnaissance flora and vegetation survey undertaken within the application area in September 2018 did not identify any rare or priority flora species within the application area (RPS, 2018b). Therefore the application area is not likely to comprise or be necessary for the maintenance of any rare or priority flora.

As assessed under principle (b), the application area contains suitable foraging and potential breeding habitat for the forest red-tailed black cockatoo (*Calyptorhynchus banksii*), Baudin's cockatoo (*Calyptorhynchus baudinii*) and Carnaby's cockatoo (*Calyptorhynchus latirostris*). However, the clearing of 0.74 hectares of potentially high quality foraging habitat within a larger footprint area of 17.9 hectares and along a 14.5 kilometre linear stretch is not likely to have an impact on significant habitat for these species. The applicant has advised that no trees with hollows suitable for breeding by the black cockatoos are proposed to be cleared.

As assessed under principle (d), a portion of the application area may comprise of the *Banksia* Woodlands of the Swan Coastal Plain threatened ecological community (TEC), which is federally listed as endangered under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) (Department of the Environment and Energy [DotEE], 2016). In addition, the proposed clearing may indirectly impact on adjacent areas of the TEC through edge effects including the spread of weeds and dieback, however it is considered that the proposed clearing is not likely to have a significant impact on the conservation values of this TEC. Weed and dieback management strategies will minimise the impact to the adjacent areas of TEC.

The South West Regional Ecological Linkage Technical Report (Molloy et al., 2009) identified one regional ecological linkage that intersects with the application area near 'Nambeelup Brook' and one ecological linkage mapped approximately 35 metres from the application area that runs along Serpentine River'. As a result of thelocation of these axis lines, portions of the application area are classed as '1a' under the report. 1a areas represent native vegetation touching or less than 100 metres from a linkage (Molloy et al., 2009). These linkages are recognised for their significance in facilitating indigenous fauna movement across the landscape (Molloy et al., 2009). 'The landscape function of an ecological linkage will be considered impaired where a proposed development causes the proximity value of a level 1 patch of remnant vegetation to change to level 2' (Molloy et al., 2009). While the proposed clearing may impact upon vegetation classified 1a, the proposed clearing is narrow, linear in shape, predominantly in a degraded (Keighery, 1994) condition and follows an existing road. Furthermore, the applicant has advised that vegetation growing in association with Serpentine River and Nambeelup Brook will be avoided. It is considered that the proposed clearing is unlikely to have a significant impact on the environmental values of this ecological linkage via fragmentation or removal of large areas of native vegetation.

The application area comprises a small portion of a TEC, however the application area is predominantly in a completely degraded to degraded (Keighery, 1994) condition and the proposed clearing is not likely to impact upon any rare or priority flora, significant habitat for fauna or significantly impact an ecological linkage. Therefore the application area is not likely to comprise of high biological diversity. The proposed clearing is not likely to be at variance to this Principle.

(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 indigenous to Western Australia.

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

According to available databases, nine terrestrial fauna species listed as specially protected under the *Wildlife Conservation Act 1950* (WC Act) have been recorded within the local area, being: woylie (*Bettongia penicillata* subsp. *ogilbyi*), forest red-tailed black-cockatoo, Baudin's cockatoo, Carnaby's cockatoo, chuditch (*Dasyurus geoffroii*), shield-backed trapdoor Spider (*Idiosoma nigrum*), malleefowl (*Leipoa ocellata*), numbat (*Myrmecobius fasciatus*) and quokka (*Setonix brachyurus*). (Department of Biodiversity, Conservation and Attractions [DBCA], 2007-).

Carnaby's cockatoo and Baudin's cockatoo are listed as endangered and forest red-tailed cockatoo is listed as vulnerable under the EPBC Act. Black cockatoos breed in large hollow-bearing trees, generally within woodlands or forests or in isolated trees (Commonwealth of Australia, 2012). These species nest in hollows in live or dead trees of karri, marri, wandoo, tuart, salmon gum, jarrah, flooded gum, York gum, powder bark, bullich and blackbutt (Commonwealth of Australia, 2012).

A reconnaissance flora and vegetation survey, inclusive of a targeted black cockatoo tree assessment, identified 74 remnant trees within the footprint area with a diameter at breast height (DBH) greater than 500 millimetres (mm). These native trees are considered potential breeding and roosting habitat for black cockatoo species. Of the 74 remnant trees only one tree contained a hollow. That applicant has advised that 59 habitat trees will be retained whilst 15 have been proposed to be cleared. The 15 trees proposed to be cleared include:

- nine remnant marri (*Corymbia calophylla*), of which seven are alive, two are dead and none have hollows.
- four remnant jarrah (*Eucalyptus marginata*) which are all alive with no hollows; and
- two remnant flooded gum (*Eucalyptus rudis*) which are alive with no hollows (RPS, 2018a and 2018b).

Given that none of the habitat trees proposed to be cleared contain hollows suitable for breeding by the black cockatoo species and that 59 habitat trees will remain within the footprint area the proposed clearing is not likely to impact on significant breeding habitat for these species.

Black cockatoos have a preference for foraging habitat that includes jarrah and marri woodlands and forest heathland and woodland dominated by proteaceous plant species such as *Banksia* sp., *Hakea* sp. and *Grevillea* sp. (Commonwealth of Australia, 2012).

A reconnaissance flora and vegetation survey identified approximately 1.189 hectares of potential black cockatoo foraging habitat within the application area and represents a small stand of foraging plants or individual trees within the 17.9 hectare footprint area. Approximately 0.891 hectares of the potential black cockatoos habitat is considered to be in a degraded (Keighery, 1994) or worse condition, whilst the extent of potential foraging habitat in good (Keighery, 1994) or better condition comprises 0.298 hectares of vegetation within the footprint area (RPS 2018a). Potential black cockatoo habitat was identified as:

- Banksia woodland (0.54 hectares)
- Remnant Mixed Trees (0.44 hectares)
- Remnant Marri (0.158 hectares)
- Remnant Jarrah (0.042 hectares); and
- Remnant Tuart (0.005 hectares) (RPS, 2018a and RPS 2018b)).

Of the abovementioned vegetation types the Banksia woodland, remnant jarrah and marri vegetation types may comprise of high quality foraging habitat for the black cockatoo species (0.74 hectares), approximately 0.44 hectares of this high quality foraging habitat is in a degraded to completely degraded (Keighery, 1994) condition. The applicant has advised that no tuart trees are proposed to be cleared. The clearing of 0.74 hectares of potentially high quality foraging habitat within a larger footprint of 17.9 hectares and along a 14.5 kilometre linear stretch is not likely to have an impact on significant habitat for these species. Furthermore, the entire clearing footprint area is not proposed to be cleared and foraging habitat including banksia woodland, jarrah and marri will remain within the clearing footprint area.

The chuditch is listed as vulnerable under the EPBC Act. Chuditch are now only present in approximately five per cent of their pre-European range. Most chuditch are now found in varying densities throughout the jarrah forest and south coast of Western Australia. Chuditch use a range of habitats including forest, mallee shrublands, woodland and desert. The densest populations have been found in riparian jarrah forest (DEC, 2012a). Given the present range of this species it is unlikely to be present within the application area.

The woylie's current habitat includes tall eucalypt forest and woodland, dense myrtaceous shrubland, kwongan (proteaceous) or mallee heath. The last four remaining indigenous populations are all in south west Western Australia. These are Perup, Kingston, Dryandra woodland and Tutanning nature reserve (DEC, 2012b). Given this species restricted distribution the application area is not likely to provide significant habitat for this species.

The numbat is also listed as vulnerable under the EPBC Act. Numbats build nests in hollow logs or trees, or dig burrows. Only two isolated populations of this species remains at Dryandra and Perup in the southwest of Western Australia, approximately 160 kilometres apart (DotE, 2014). Given the distance to the two known remaining populations the proposed clearing is not likely to impact them.

The quokka occurs on two offshore islands (Rottnest Island and Bald Island) and a number of mainland sites in south-west Western Australia, ranging from just south of Perth to the Hunter River. The distribution of this species is severely fragmented and there is little to no migration between populations (DotEE, 2018b). Given this species limited distribution the application area is not likely to provide significant habitat for this species.

The application area is outside the known distribution for the shield-backed trapdoor spider (DotEE, 2018b) and therefore suitable habitat for this species is not likely to be located within the application area.

The malleefowl is found in semi-arid to arid shrublands and low woodlands, especially those dominated by mallee and/or acacias. A sandy substrate and abundance of leaf litter are required for breeding (Benshemesh, 2007). Suitable habitat for this species was not identified during the reconnaissance flora and vegetation survey (RPS, 2018b).

As assessed under Principle (a), the South West Regional Ecological Linkage Technical Report (Molloy et al., 2009) identified one regional ecological linkage that intersects with the application area near 'Nambeelup Brook' and one ecological linkage mapped approximately 35 metres from the application area that runs along Serpentine River'. While the proposed clearing may impact upon vegetation associated within this linkage, the proposed clearing is narrow, linear in shape, predominantly in a degraded (Keighery, 1994) condition and follows an existing road. Furthermore, the applicant has advised that vegetation growing in association with Serpentine River and Nambeelup Brook will be avoided. It is considered that the proposed clearing is unlikely to have a significant impact on the environmental values of this ecological linkage via fragmentation or removal of large areas of native vegetation.

Given the above the proposed clearing is not likely to impact upon significant habitat for fauna indigenous to Western Australia.

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

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

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

According to available databases, eleven rare flora species have been recorded within the local area (10 kilometre radius). The closest being *Drakaea elastica* located approximately 400 metres from the application area. This species grows in deep sandy soil in banksia woodland, in low lying areas alongside winter wet swamps (Brown et al., 1998). Given the presence of wetlands within the application area and that approximately 0.29 hectares of native vegetation is mapped as banksia woodland, suitable habitat for this species may be present within the application area.

A reconnaissance flora and vegetation survey, inclusive of a targeted search for rare and priority flora, undertaken within the application area in September 2018 did not identify any rare flora species (RPS, 2018b). Therefore the application area is not likely to include or be necessary for the continued existence of rare flora.

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

Portions of the application area are located within and adjacent to DotEE's mapping of the threatened ecological community (TEC), Banksia Woodlands of the Swan Coastal Plain. The Banksia Woodlands of the Swan Coastal Plain TEC is listed as endangered under the EPBC Act. The Banksia Woodlands ecological community is restricted to areas in and immediately adjacent to the Swan Coastal Plain IBRA bioregion, including the Dandaragan plateau. This coastal plain stretches from around Jurien Bay in the north, to Dunsborough in the south (DotEE, 2016).

The principal structural features of the ecological community are:

- A distinctive upper sclerophyllous layer of low trees (occasionally large shrubs more than 2 metres tall), typically dominated or co-dominated by one or more of the *Banksia* species.
- An emergent tree layer of medium or tall (>10 metre) height *Eucalyptus* or *Allocasuarina* species may sometimes be present above the *Banksia* canopy.
- An understory that is often highly species-rich consists of:
    - A layer of sclerophyllous shrubs of various heights; and,
    - A herbaceous ground layer of cord rushes, sedges and perennial and ephemeral forbs, that sometimes includes grasses. The development of a ground layer may vary depending on the density of the shrub layer and disturbance history (DotEE, 2016).

Minimum patch sizes apply for consideration of a patch as part of the listed TEC, where patches meet different levels of condition, different minimum patch size apply:

- Pristine (Keighery, 1994) condition – no patch size applies
- Excellent (Keighery, 1994) condition – minimum 0.5 hectares patch
- Very good (Keighery, 1994) condition – minimum one hectare patch
- Good (Keighery, 1994) condition – minimum two hectares patch (DotEE, 2016).

To be considered part of the TEC a patch should meet at least good (Keighery, 1994) condition (DotEE, 2016). A reconnaissance flora and vegetation survey identified 0.54 hectares of vegetation within the application area as 'Banksia Woodland' which is considered to meet the diagnostic characteristics for the TEC (RPS, 2018b). Approximately 0.25 hectares of the identified 'Banksia Woodland' vegetation type has been identified as being in a degraded (Keighery, 1994) or worse condition and therefore is not considered representative of this TEC.

Of the 0.29 hectares of vegetation considered to be in a good (Keighery, 1994) or better condition approximately 50 per cent (0.14 hectares) maybe considered to meet the minimum patch size described above, given that the vegetation is considered continuous with vegetation mapped as 'likely to be' the Banksia Woodlands of the Swan Coastal Plain TEC.

The Subtropical and Temperate Coastal Saltmarsh TEC, listed as vulnerable under the EPBC Act has been mapped approximately 36 metres from the application area. A reconnaissance flora and vegetation survey identified an occurrence of this TEC within the survey area near Preston River (RPS, 2018b), however this occurrence is located outside of the application area (approximately 90 metres south) and the proposed clearing is not likely to have impact on the TEC.

Given the above the proposed clearing may directly impact on approximately 0.14 hectares of native vegetation representative of the Banksia Woodlands of the Swan Coastal Plain TEC and may indirectly impact the adjacent TEC through the spread of weeds and dieback. Weed and dieback management practices will help mitigate impacts to the adjacent TEC.

The proposed clearing is at variance with this Principle. However, it is considered that the clearing of 0.14 hectares of native vegetation representative of the TEC is not likely to have a significant impact on the conservation status of this TEC. The applicant has avoided clearing of the vegetation type Banksia Woodland where possible including only clearing along the northern portion of Fishhawk Road reserve. The proposed clearing will not result in significant residual impacts to the Banksia Woodland 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 not likely to be at variance to 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 application area is located within the Swan Coastal Plain Interim Biogeographic Regionalisation of Australia (IBRA) bioregion which retains approximately 39 per cent of its pre-European vegetation extent (Government of Western Australia, 2018a).

The vegetation within the application area is mapped as Heddle vegetation complexes 'Herdsman Complex', 'Bassendean Complex' and 'Yoongarillup Complex' which retain approximately 32, 27 and 36 per cent of their pre-European vegetation extent within the Swan Coastal Plain IBRA bioregion respectively (Government of Western Australia, 2018b).

The local area retains approximately 20 per cent of its pre-European vegetation extent.

Given the vegetation representations outlined above the application area is considered to be located within an extensively cleared area.

However, the proposed clearing is not likely to impact upon rare or priority flora or have an impact on significant habitat for fauna or significantly impact on the environmental values of any threatened ecological communities and therefore the proposed clearing is not likely to be considered a significant remnant.

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

Table 1: 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	578,997	39	222,766	38
Heddle Vegetation complex:					
Herdsman Complex	9,665	3,081	32	1,060	11
Bassendean Complex-Central And South	87,476	23,533	27	4,364	5
Yoongarillup Complex	27, 978	9,946	36	5,131	18

(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 at variance to this Principle

One watercourse 'Nambeelup Brook' intersects the application area. A second major watercourse 'Serpentine River' is mapped approximately 15 metres from the application area.

These watercourses are also mapped as conservation category wetlands. Conservation category wetlands are considered to be highest priority wetlands that support a high level of ecological attributes and functions (Water and Rivers Commission, 2001). A minimum 50 metre buffer is recommended to conservation category wetlands (Water and Rivers Commission, 2001).

The applicant has advised that clearing of native vegetation along the foreshore of the Serpentine River and Nambeelup Brook will be avoided. However, clearing within the 50 metre buffer of each of these wetlands is proposed.

Portions of the application area are mapped within a large palusplain multiple use wetland. Multiple use wetlands are considered wetlands with few important ecological attributes and functions remaining (Water and Rivers Commission, 2001). Furthermore, the reconnaissance flora and vegetation survey determined that the vegetation proposed to be cleared within this mapped wetland is predominantly in a degraded (Keighery, 1994) or worse condition.

Given the above the application area is growing in association with a watercourse and wetland. The proposed clearing is at variance to this Principle.

However, given that only a small portion of the application area occurs within Nambeelup Brook and that buffers are proposed around both conservation category wetlands, the proposed clearing is not likely to have a significant impact on the environmental values of the mapped watercourses and wetlands.

The applicant has advised that clearing of native vegetation within the mapped extent of Conservation Category wetlands has been avoided, however some minor clearing has been proposed within the mapped buffers of the wetlands. However, minor extents of native vegetation proposed to be cleared within the buffers of the conservation category wetlands is generally in degraded (Keighery, 1994) or worse condition (RPS, 2018a).

(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 to this Principle
Two soils types have been mapped within the application area which are described as (Northcote et al., 1960 – 1968):

- JK9: undulating dune landscape with some steep dune slopes and underlain by aeolianite at depth: chief soils are brown sands.
- Cb39: subdued dune-swale terrain: chief soils are leached sands

The sandy soils mapped within the application area may be prone to wind erosion, however the proposed clearing of 3.015 hectares along a 14.5 kilometre linear stretch predominantly in a degraded to completely degraded (Keighery, 1994) condition and along an existing road, is not likely to cause appreciable land degradation through water erosion, water logging, wind erosion, salinity or eutrophication.

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

(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 may be at variance to this principle to this Principle
Ten conservations areas have been recorded within the local area. The application area is located adjacent to Goegrup Lake Nature Reserve and 40 metres from an unnamed nature reserve. No clearing within the nature reserve is proposed, however clearing of minor extents of native vegetation with the road reserve adjacent to the nature reserve is proposed.

Given the close proximity of Geogrup Lake Nature Reserve, the proposed clearing may indirectly impact this conservation area through the spread of weeds and dieback. Weed and dieback management practices will help mitigate this risk.

As assessed under Principles (a) and (b), the South West Regional Ecological Linkage Technical Report (Molloy et al., 2009) identified one regional ecological linkage that intersects with the application area near 'Nambeelup Brook' and one ecological linkage mapped approximately 35 metres from the application area that runs along Serpentine River'. While the proposed clearing may impact upon vegetation associated within this linkage, the proposed clearing is narrow, linear in shape, predominantly in a degraded to completely degraded (Keighery, 1994) condition and follows an existing road. Furthermore, the applicant has advised that vegetation growing in association with Serpentine River and Nambeelup Brook will be avoided. It is considered that the proposed clearing is unlikely to have a significant impact on the environmental values of this ecological linkage via fragmentation or removal of large areas of native vegetation.

Given the above the proposed clearing may be at variance to 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 likey to be at variance to this Principle
One watercourse 'Nambeelup Brook' intersects the application area. A second major watercourse 'Serpentine River' is mapped approximately 15 metres from the application area. These watercourses are also mapped as conservation category wetlands.

The applicant has advised that clearing of native vegetation along the foreshore of the Serpentine River and Nambeelup Brook will be avoided. However, clearing within the 50 metre buffer of each of these wetlands is proposed.

Portions of the application area are mapped within a large palusplain multiple use wetland. Furthermore, the reconnaissance flora and vegetation survey determined that the vegetation proposed to be cleared within this mapped wetland is predominantly in a degraded (Keighery, 1994) or worse condition.

Given the close proximity of the Serpentine River and associated conservation category wetland and the presence of the multiple use wetland within the application area, the proposed clearing is likely to increase sedimentation and run off into these watercourses and wetlands. However, given the linear nature of the proposed clearing area that is predominantly in a degraded (Keighery, 1994) condition impacts area likely to be minimal and short term and the proposed clearing is not likely cause long term deterioration in the quality of surface water.

Groundwater salinity is mapped between 1,000-3,000 milligrams per litre total dissolved solids which is considered to be brackish to moderately saline. Due to the linear nature of the proposed clearing located along an existing road and that the vegetation proposed to be cleared is predominantly in a degraded to completely degraded (Keighery, 1994) condition, the proposed clearing is not likely to cause deterioration in the quality of underground water.

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

Given the; mapped soil types present, size and linear shape of the proposed clearing and that the applicant has avoided clearing vegetation within known watercourses, the proposed clearing is not likely to cause, or exacerbate, the incidence or intensity of flooding.

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

Planning instruments and other relevant matters.

The application area is located within Murray Groundwater Area and Murray River System Surface Water Area proclaimed under the *Rights in Water and Irrigation Act 1914* (RIWI Act).

The proponent is unlikely to require a bore licence, however dewatering may be necessary as part of construction to temporarily lower groundwater, which will require a licence under the RIWI Act. It will be the expectation that groundwater is recharged nearby to abstraction sites.

A licence to interfere with bed and banks of watercourse will be required if the applicant intends to clear native vegetation associated with the Serpentine River. The applicant has advised that no clearing is required within the Serpentine Rive and has removed this area from the application area.

The Shire of Murray has requested that the following measures be taken/noted:

- The proponent uses directional drilling technology to protect significant vegetation;
- The alignment of the proposed electrical works considers the future Paterson Road widening;
- Notify the Shire when the powerlines are in for potential future revegetation works; and
- The Shire supports boring beneath tuarts and Nambeelup Brook (Shire of Murray, 2018).

The Shire has further advised that it is currently revegetating Patterson road and don't want to see the revegetation affected by the change in alignment (Shire of Murray, 2018).

Three Aboriginal sites of significance have been mapped within the application area. The applicant will be notified of their obligations under the *Aboriginal Heritage Act 1972*.

The clearing permit application was advertised on the DWER website on 26 April 2018 with a 21 day submission period. No public submissions have been received in relation to this application.

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