



1. Application details and outcome

1.1. Permit application details

Permit number:	CPS 8709/1
Permit type:	Purpose permit
Applicant name:	Jarrah Jacks Developments Pty Ltd
Application received:	23 October 2019
Application area:	10 hectares (ha) of native vegetation within 18.24 ha of clearing footprint
Purpose of clearing:	Silviculture and pond installation
Method of clearing:	Mechanical Removal
Property:	Lot 501 on Plan 60842 and Lot 3 on Diagram 62144 Lot 3 on Plan 62144
Location (LGA area/s):	Shire of Manjimup
Localities (suburb/s):	Pemberton

1.2. Description of clearing activities

The vegetation applied to be cleared is distributed across four areas (see Figure 1, Section 1.5).

The application is to selectively clear Karri (*Eucalyptus diversicolor*) trees within three sections of the clearing footprint up to a total of ten (10) hectares, for the purposes of fire hazard reduction and timber harvesting. All vegetation within a small section of clearing Area 4 will be removed for the purpose of installing a wetland/pond for use by the public. The proposed method of clearing involves mechanical clearing followed by heaping and burning of unsaleable trees and debris. The application area is situated immediately adjacent to the Lefroy Brook.

The original application footprint was 21.585 hectares in size. The application area was revised to 18.24 ha during the assessment process in response to a request from the Department of Water and Environmental Regulation (DWER) to amend the clearing footprint based on advice from the DWER's Urban Water branch, who regulate the *County Areas Water Supply Act 1947* (CAWS Act). The revision reflected the removal of approximately 3.3 ha of native vegetation from the clearing footprint to ensure no clearing is conducted within 50 metres of the Lefroy Brook or any other Public Drinking Water Source Area (PDWSA).

As a consequence of the modification, it was indicated that the proposed clearing would only remove approximately 10 ha of native vegetation within the 18.24 ha of clearing footprint, for which DWER sought confirmation from the applicant. As the applicant did not provide the requested confirmation, the DWER assessed the application on the assumption that 10 ha of native vegetation would be removed as a result of the clearing.

1.3. Decision on application and key considerations

Decision:	Refused
Decision date:	30 March 2023
Decision area:	10 hectares (ha) of native vegetation within an 18.24 ha footprint, as depicted in Section 1.5, below.

1.4. Reasons for decision

This clearing permit application was made in accordance with section 51E of the *Environmental Protection Act 1986* (EP Act) and was received by DWER on 23 October 2019. DWER advertised the application for public comment and no submissions were received.

In undertaking their assessment, and in accordance with section 51O of the EP Act, the Delegated Officer has given consideration to the Clearing Principles in Schedule 5 of the EP Act (see Appendix D), relevant planning instruments, and any other pertinent matters they deemed relevant to the assessment (see Sections 3 and 4). In accordance with applying the objects and principles of the EP Act found under section 4A to the decision-making process, the Delegated Officer applied a precautionary approach when assessing the application.

In particular, the Delegated Officer has determined that:

- The vegetation proposed to be cleared comprises of tree species preferred by the Carnaby's (*Zanda latirostris*, Endangered), Baudin's (*Zanda Baudini*, Endangered) and Forest Red-Tailed (FRTBC-*Calyptrorhynchus banksia naso*, Vulnerable) black cockatoo for foraging and / or breeding, including Jarrah (*Eucalyptus marginata*), Marri (*Corymbia calophylla*), Karri (*Eucalyptus diversicolor*) and Blackbutt (*Eucalyptus patens*), and a part of the application area comprises predominantly of *Agonis flexuosa* thicket, the preferred habitat species for the Western Ringtail Possum (WRP). A fauna survey of the area confirmed the presence of habitat trees and potential habitat for Black cockatoo species. Given these circumstances, the clearing may impact the availability of Black cockatoo and WRP habitats in the local area.

The application area is within the Lefroy Brook Catchment Area, within which the karri forest management unit (FMU) has been assessed as having the level 4 High Conservation Values (HCV4) (FPC, 2022). According to the Karri Silviculture Guideline (DPW, 2014) and the Karri Forest HVC Assessment (FPC, 2022), the retention of a minimum of five primary and six to eight secondary habitat trees per hectare in the clearing of a mature mixed karri stand in the area is required.

On 23 June 2023, the Department requested further information to confirm the applicant's commitment to retain the identified habitat trees as well as a proportion of habitat tree species as per the Guideline. The Department also requested a revision to the Forest Management Plan, in accordance with the Guideline. The requested information is crucial for the assessment of impacts and identification of mitigation and management strategies to ameliorate impacts on black cockatoo species, and to clarify the nature of impacts to WRP habitat. The requested information was not provided. In the absence of the required information, a risk-based assessment was undertaken based on available information and the Delegated Officer determined that the proposed clearing was likely to result in significant impacts on habitat for black cockatoo species. The Delegated Office also determined that the extent of impacts to WRP remained unclear and that in the face of this the precautionary principle should be applied.

- Clearing may impact on the local population and conservation status of conservation significant aquatic fauna species including the Mud Minnow (*Galaxiella munda*), Pouched Lamprey (*Geotria australis*), Salamanderfish (*Lepidogalaxias salamandroides*) and Carter's freshwater mussel (*Westralunio carteri*). Assessment of impacts on the fauna species required specific information regarding the proposed thinning and timber harvesting activities which may impact on the river nearby and subsequently on the above-mentioned fauna species within the river systems. The information was requested of the applicant but was not provided. In the absence of this information, the Delegated Officer determined that the impact of clearing on the populations and conservation of the aquatic fauna species is potentially significant.
- The clearing is not likely to have a significant impact on the local population or conservation status of conservation significant flora species, nor priority ecological communities. Given no clearing will occur within 50m of the Lefroy Brook and the proposed clearing will selectively remove trees through the overall clearing footprint, the clearing will not impact on any ecological functions provided by the vegetation within the application area and the linkage will not be severed.
- The application area is located immediately adjacent (>50m) to the Lefroy Brook and within the Warren River Water Reserve and Lefroy Brook Catchment Area. This area is mapped as Zone D of the *Country Area Water Supply Act 1947* (CAWS Act). Zone D is defined as a Low Salinity Risk and generally lies above 100 mm isohyet (DoW, 2010). Clearing may have direct and indirect impacts on the groundwater quality and offsite water quality due to surface water runoff over recently exposed soils, nutrient export and increased turbidity and siltation. Further information on compliance with obligations under the CAWS Act and RIWI Act pursuant to the efforts to avoid and mitigate impacts of the proposed clearing on the water resources were requested of the applicant. The information was not provided to the Department. Consequently, in the absence of the information, the Delegated Officer has determined that impacts of the proposed clearing on the water resources is potentially significant.

Given the above, the Delegated Officer concluded that the proposed clearing was likely to lead to significant impacts to the environment and that in the absence of further clarifying information, which was requested from the applicant but not provided, it was not possible to have confidence that these impacts could be mitigated and managed to an acceptable level. Noting this, and having had regard to the precautionary principle, the Delegated Officer has therefore determined to refuse to grant a clearing permit. The Delegated Officer notes that the applicant was provided with multiple time extensions to provide the required information, however, the requested information has not been provided.

1.5. Site map

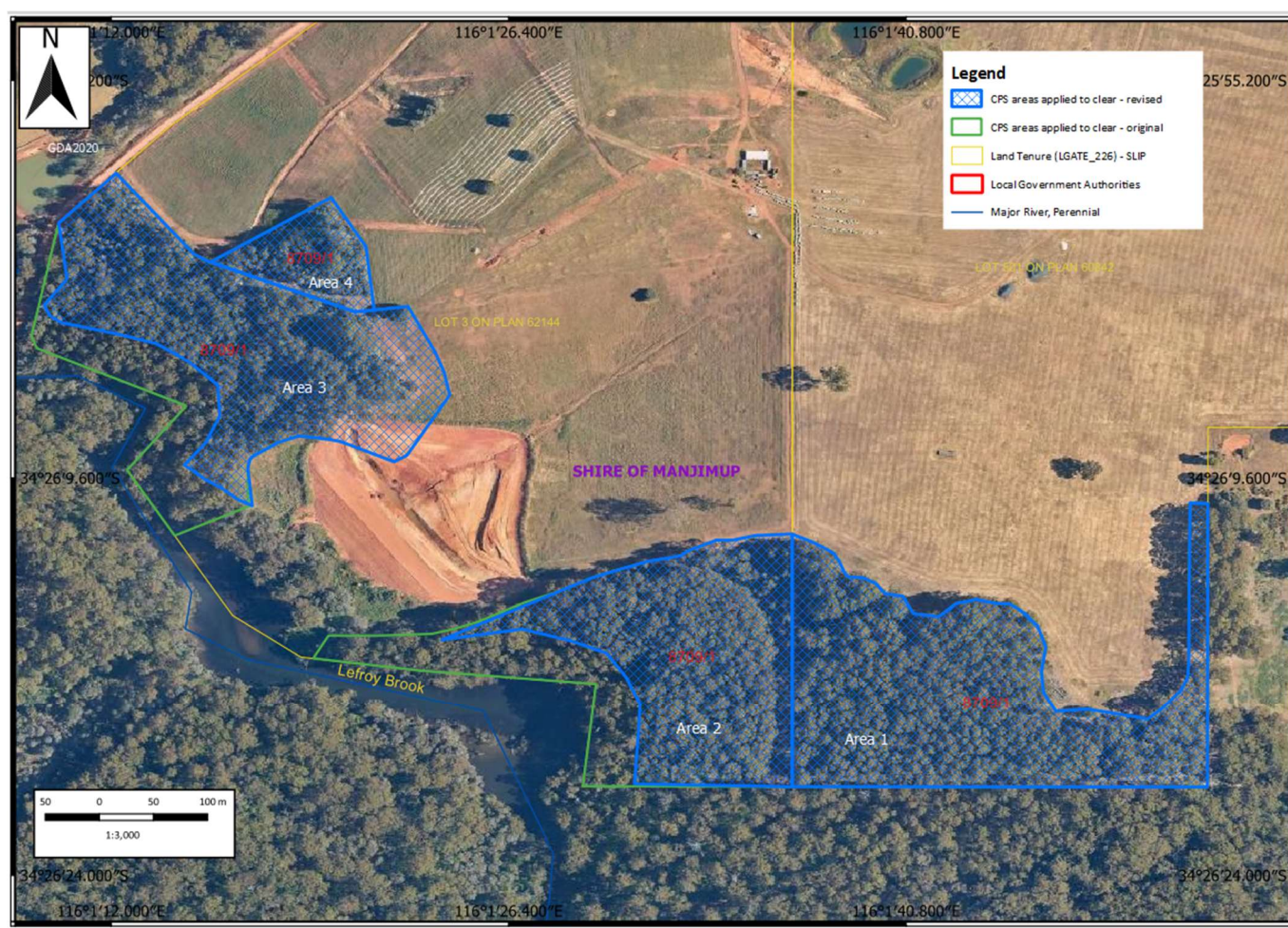


Figure 1. Map of the application area.

The areas cross-hatched blue indicates the areas applied to be cleared. The footprint of original areas applied to be cleared is indicated by the green envelopes.

2. Legislative context

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

In addition to the matters considered in accordance with section 51O of the EP Act (see Section 1.3), the Delegated Officer has also had regard to the objects and principles under section 4A of the EP Act, particularly:

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

Other legislation of relevance for this assessment include:

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

The key guidance documents which inform this assessment are:

- *A guide to the assessment of applications to clear native vegetation* (December 2013)
- *Procedure: Native vegetation clearing permits* (DWER, October 2019)
- *Environmental Offsets Guidelines* (August 2014)
- Technical guidance – *Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA, 2016)
- Technical guidance – *Terrestrial Fauna Surveys for Environmental Impact Assessment* (EPA, 2016)
- *Silviculture Guideline for Karri Forest* – FEM Guideline No. 3 (Departments of Parks and Wildlife, 2014)
- *Karri Forest Management Plan 2022* (Forest Product Commission, 2022)

3. Detailed assessment of application

3.1. Avoidance and mitigation measures

No evidence of avoidance or mitigation measures was provided to support the application.

3.2. Assessment of environmental impacts

In assessing the application in accordance with section 51O of the EP Act, the Delegated Officer has examined the application and site characteristics (Appendix C) and considered whether the clearing poses a risk to environmental values. The assessment against the Clearing Principles is contained in Appendix D.

This assessment identified that the clearing may pose a risk to the environmental values of fauna, ecological linkages and land and water resources, and that these required further consideration. The detailed consideration and assessment of the clearing impacts against the specific environmental values is provided below. Where the assessment found that the clearing presents an unacceptable risk to environmental values, conditions aimed at controlling and/or ameliorating the impacts should be imposed on any granted permit under sections 51H and 51I of the EP Act, or the application be refused as imposed under section 51E(5)(b). These are identified below.

3.2.1. Environmental value: biological values (flora) – Clearing Principles (a) to (d)

Assessment:

According to information provided by the applicant (Ketelson, 2019) the vegetation within the application area is as follows:

Area 1:

Vegetation in this area comprises of *Eucalyptus diversicolor* (karri) forest with regrowth (thinned in the mid-2000s). The understorey is in Good condition (Keighery, 1997) but Blackberry invasion is prevalent. This area has moderate fuel load.

Area 2:

This area is described as *Eucalyptus diversicolor* (karri) / *Corymbia calophylla* (marri) forest with younger marri stems. Understorey vegetation is in Very Good condition (Keighery, 1994) but Blackberry invasion is prevalent. Fuel loading in this area is high.

Area 3:

Vegetation in the area is described as mixed *Eucalyptus diversicolor* (karri) and *Corymbia calophylla* (marri) with some *Eucalyptus marginata* (jarrah) and *E. patens* (blackbutt). Understorey vegetation is in Excellent condition with existing vehicle access tracks throughout.

Area 4:

Vegetation in this area comprises of *Agonis flexuosa* (Peppermint) thicket. Grazing excluded from the forest area, and there are no stock currently on the property.

A review of the available databases from the local area (10 km radius) indicates previous records from four conservation significant flora species as listed under the state *Biodiversity Conservation Act 2016* (BC Act), commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) or as Priority species by the Department of Biodiversity, Conservation and Attractions (DBCA) in the state context (DBCA, 2007-).

These species include:

- *Commersonia apella* (CR)
- *Caladenia christineae* (EN)
- *Thomasia brachystachys* (P2)
- *Amanita kalamundae* (P3)

Based on the habitat preferences of the above species, vegetation and soil types within the application area and historical records, *Commersonia apella* was assessed as having a low likelihood of occurring in the vegetation applied to clear (TSSC, 2018a). *Caladenia christineae* was assessed as having nil likelihood of occurring due to a lack of suitable habitat within the application area (DEWHA, 2008).

Thomasia brachystachys is an open, erect shrub, to 1.5 m high, single-stemmed when occurring at ground level. This species is associated with littered, organic brown soil and high, open or dense forests (Western Australian Herbarium, 1998-). The local area indicates 1 record from 1997, located 7.7 km away. All other previous recordings are located 150 – 200 km east in the Stirling Range National Park. Given the soil types and vegetation within the application area, *T. brachystachys* was assessed as having a medium likelihood of occurring in the vegetation applied to clear. Given the local area retains > 75 % of its remnant vegetation, including heavily forested areas to the north of the application area in secure tenure (Big Brook State Forest, Gloucester National Park, Donnelly State Forest and Warren State Forest), the selective removal of karri trees is unlikely to impact on habitat significant for this species or on the conservation status.

Amanita kalamundae is a fungi that grows in association with *Eucalyptus* forests, recorded from the south coast of WA to the Darling Scarp near Perth, and an outlier recording in the Wheatbelt (Doodlakine) associated with *Eucalyptus wandoo* (Western Australian Herbarium, 1998-). This indicates a significant range (~400 km) for the species with suitable habitat throughout. Given the above, and the presence of likely suitable habitat in the vegetation in secure habitat in the local area, the applied clearing is unlikely to impact on habitat significant for this species or on the conservation status.

The south-west of Western Australia is recognised as one of the world's 25 global biodiversity hotspots with approximately 7400 species of vascular plants, half of which are endemic (Bradshaw, 2015). Overall, the karri forest supports a lower diversity of plants and animals than either the jarrah or wandoo forests, with higher rainfall areas considered as relatively species poor (Myers et al. 2000; Hopper et al. 2004). There are about 160 native vertebrate species within the forest area, comprising 24 mammals, 88 birds, 24 reptiles, 16 amphibians and 8 fish (Bradshaw, 2015). Given the application area has been affected by grazing and fire (Ketelsen, 2020a), the vegetation applied to clear is unlikely to offer a higher level of biodiversity than that of karri forest in the nearby Big Brook State Forest, Gloucester National Park, Donnelly State Forest and Warren State Forest.

A review of the available databases indicates 135 occurrences of the state listed Priority 3 Ecological Community (PEC) '*Epiphytic Cryptogams of the karri forest*'. This PEC is described as "Cryptogams associated with *Trymalium odoratissimum* subsp. *odoratissimum* and *Chorilaena quercifolia* in the karri forests of south-west WA. Comprises liverworts, mosses and lichens found on the bark of mature (plants greater than 15 years old and prior to senescence at about age 50) of *Trymalium odoratissimum* subsp. *odoratissimum* and *Chorilaena quercifolia* in the karri forest of south-west Western Australia" (DBCA, 2017). Given the application area has been previously affected by grazing and logging (Ketelsen, 2020a) and the purpose of the clearing is to selectively remove karri trees, the proposed clearing is unlikely to impact on the conservation status of this PEC. There are no other mapped occurrences of state or commonwealth listed TEC's or PEC's in the local area.

The vegetation within the application area is directly adjacent to the South West Regional Ecological Linkage line which follows the Lefroy Brook in the immediate area. Given no clearing will occur within 50m of the Lefroy Brook and the proposed clearing will selectively remove trees through the overall clearing footprint, any ecological functions provided by the vegetation within the application area will not be significantly impacted and the linkage will not be severed.

Impacts to conservation significant fauna is discussed under section 3.2.2.

Outcome: Based on the above assessment, the Delegated Officer has determined that the proposed clearing is considered acceptable in relation to this environmental value.

Conditions: Not applicable.

3.2.2. Environmental value: biological values (fauna) – Clearing Principle (b)

Assessment:

A review of the available databases from the local area (10 km radius) indicates previous records from twenty-three conservation significant fauna species, as listed under the state *Biodiversity Conservation Act 2016* (BC Act), commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) or as Priority species by the Department of Biodiversity, Conservation and Attractions (DBCA) in the state context (DBCA, 2007-).

Of those, two species were listed as extinct and not considered for the purposes of the assessment. Three species were listed as Critically Endangered (CR), five Endangered (EN), four Vulnerable (VU), two Conservation Dependent (CD), one Priority 2, two Priority 3, three Priority 4 and one Migratory species protected under International Agreement (IA) (DBCA, 2007-).

Based on fauna habitat preferences and the habitat currently present in the vegetation applied to clear, the application area provides suitable habitat for ten conservation significant fauna species (Section 2 of Appendix C). Based on this preliminary assessment, the Department has requested for a targeted fauna survey over the application area to identify the presence of these fauna species and / or suitable habitats for the conservation significant fauna species. A targeted fauna survey report has been submitted to the Department (Harewood, 2021). Excerpt of the survey report is presented in Appendix G and discussed below.

In addition to the species listed in Section 2 of Appendix C, the Mud Minnow (*Galaxiella munda*), Pouched Lamprey (*Geotria australis*), Salamanderfish (*Lepidogalaxias salamandroides*) and Carter's freshwater mussel (*Westralunio carteri*) are all freshwater species with records in the local area. Given the clearing is located in close proximity (> 50 metres) of the Lefroy Brook, a noted Public Drinking Water Source Area (PDWSA), the removal of vegetation and subsequent groundwater runoff towards the water source may have indirect impacts on the water quality and suitable habitat for the species listed above. This could result from increased turbidity or silt in the freshwater source, or nutrient export from recently cleared areas and exposed/disturbed soils. In addition, the applicant has indicated an intention to burn parts of the cleared area post-clearing to reduce fire hazard; this may result in the depositing of ash and burnt carbon products within the Lefroy Brook through runoff or windblow. As per CAWS advice, a 50m buffer zone has been established between the clearing and the Lefroy Brook, Pemberton Weir or any other riparian area (CAWS, 2020a). However, further information was required on the nature of the thinning operation and subsequent marketing of thinning residue and forest produce (ie. machinery used, chip or log products) as this will better allow the DWER to assess the suitability of the operations and post-treatment activities (such as burning) which may have adverse habitat impacts for the above mentioned freshwater species. This information was required of the applicant but not provided to the Department (See Appendix A). In the absence of the requested information, impacts of clearing and subsequent activities are considered unacceptable.

Black cockatoos

Carnaby's cockatoo and Baudin's cockatoo are listed as Endangered and Forest Red-Tailed (FRTBC) black cockatoo is listed as Vulnerable under the Western Australian *Biodiversity Conservation Act 2016*. All three have the same listing categories under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Black cockatoos 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 (DotEE, 2017). Breeding habitat or 'habitat tree' is defined in the EPBC Act referral guidelines as 'trees of species known to support breeding within the range of the species which either have a suitable nest hollow or are of a suitable diameter at breast height (DBH) to develop a nest hollow' (DotEE, 2017). The application area is within the predicted breeding range for Baudin's, the modelled breeding range for Carnaby's and the modelled likely to occur range for FRTBC's (DotEE, 2017). FRTBC breed all year round, in areas they are known to occur, and therefore, the application area is within the modelled breeding range for all three species of black cockatoo.

Impacts on black cockatoo habitat can be considered in terms of breeding habitat, night roosting habitat, and foraging habitat. Black cockatoos will generally forage up to 12 kilometres from an active breeding site (DSEWPac 2012; DPaW 2013). Following breeding, they will flock in search of food, usually within six kilometres of a night roost (DSEWPac 2012; DPaW 2013) but may range up to 20 kilometres (Commonwealth of Australia 2017). Black cockatoo night roosts are usually located in the tallest trees of an area, and in close proximity to both a food supply and surface water (Commonwealth of Australia 2017). Flocks will use different night roosts, often for weeks, or until the local food supply is exhausted. Flocks show some fidelity to night roosts with sites used in most years to access high-quality feeding sites. However, not all-night roosts are used in every year (DPaW 2013).

Carnaby's black cockatoos have preference for feeding 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., also insects and insect larvae; pith of kangaroo paw (*Anigozanthos flavidus*); juice of ripe persimmons; tips of *Pinus* spp. and seeds of apples and pears (DotEE, 2017). Forest red-tailed black cockatoo's have preference for seeds of jarrah and marri in woodlands and forest, and edges of karri forests, including wandoo and blackbutt, *Eucalyptus caesia*, *E. erythrocorys*, *Allocasuarina* cones, fruits of snottygobble (*Persoonia longifolia*) and mountain marri (*Corymbia haematoxylon*), and some introduced eucalypts such as river red gum (*E. camaldulensis*) and flooded or rose gum (*E. grandis*) (DotEE, 2017). Baudin's black cockatoo prefer native shrubland, kwongan heathland and woodland on seeds, flowers and nectar of native proteaceous plant species (*Banksia* spp., *Hakea* spp., *Dryandra* spp., and *Grevillea* spp.), as well as *Callistemon* spp. and marri. Also seeds of introduced species including *Pinus* spp., *Erodium* spp., wild radish, canola, almonds and pecan nuts; insects and insect larvae; occasionally flesh and juice of apples and persimmons (DotEE, 2017).

Within the local context, a review of the available databases indicates the applied clearing area is not within 12 km of any known or mapped black cockatoo roost sites. The nearest confirmed roost is located 16.3 km away on the outskirts of the Northcliffe township, adjacent to the Hawke National Park and Warren State Forest. The local area indicates a total of 51 previous records of black cockatoo species, the closest located 107 metres away, recorded in 2014. However, the vegetation within the application area contains Jarrah (*Eucalyptus marginata*), Marri (*Corymbia calophylla*), Karri (*Eucalyptus diversicolor*) and Blackbutt (*Eucalyptus patens*) (Ketelsen, 2020a) in abundance. These species are known as the preferred species for foraging and nesting by black cockatoo species. In addition, the application area is located approximately 50 m from a freshwater source. This indicates that the trees within the application area have the potential to offer breeding, roosting and foraging resources for black cockatoos in the area.

A fauna habitat survey undertaken over the application area (Harewood, 2021) identified the presence of some foraging habitat on the property, particularly due to marri trees. Despite the absence of foraging debris, a Forest Red-tailed black cockatoo was recorded by the survey's camera on the property, indicating utilisation of the vegetation by black cockatoos. The survey also identified the presence of hollows, some of which were potentially suitable for Black cockatoo nesting, although upon a closer inspection these hollows were identified as unsuitable. The Draft Referral Guidelines noted that major contributor to declines in populations of black cockatoos is the loss of breeding habitat, containing suitable breeding hollows, in proximity to sufficient foraging habitat (DotEE, 2017). Consequently, the loss of any natural hollows such as those available in the application area can be considered significant. Removal of the habitat trees is likely to have significant impact on the viability of Black cockatoo's breeding and foraging in the local area.

Noting that the proposed activity is related to forest management, the Karri Silviculture Guideline (DPW, 2014) and the Karri Forest HVC Assessment (FPC, 2022) have also been referred to with regards to the conservation of the conservation significant fauna species. According to the Guideline, impacts of clearing of forestry products can be mitigated through several mechanisms, including the application of an appropriate Forest Management Plan (FMP). For the conservation of conservation significant species such as black cockatoo, the Guideline requires the retention of minimum five primary and six to eight secondary habitat trees per hectare in the clearing of a mature mixed karri stands. A commitment to retain the habitat trees has to be a part of the FMP.

The Department has requested for a revised FMP that would provide protection of Black cockatoo habitat trees. Details of the request is presented in Appendix A. The requested information was not provided by the applicant. Given the lack of information, the Department is unable to properly assess the impacts of the proposed clearing on black cockatoo species and any mitigating conditions that would ameliorate the impacts.

Western Ringtail Possum

The *Western Ringtail Possum (Pseudocheirus occidentalis) Recovery Plan* outlines strategies to slow the decline in population size, extent and area of occupancy through managing major threatening processes affecting the subpopulations and their habitats and allowing the persistence of the species in each of the identified key management zones: Swan Coastal Plain, southern forests and south coast (DPaW, 2017). The application area is contained at the edge of the southern forests management zone and is > 160 m from the nearest wetland and > 50 m from the Freshwater Lefroy Brook.

Peppermint trees (*Agonis flexuosa*) are important habitat for Western Ringtail Possums (WRP's), listed as Critically Endangered under the *Biodiversity Conservation Act 2016* (BC Act). Populations in the southern forest management zone occur mainly in jarrah or marri dominated forests, in adjacent stands of riparian vegetation often with an overstorey of flooded gum (*Eucalyptus rudis*) and extending to wandoo (*Eucalyptus wandoo*) forests to the north-east of Manjimup and karri (*Eucalyptus diversicolor*) forests from Northcliffe to west of Manjimup (DEC 2012c). Any habitat where western ringtail possums occur naturally are considered critical and worthy of protection (DPAW, 2017). Habitat critical to survival comprises forests with limited anthropogenic disturbance (unlogged or lightly logged, and a low intensity and low frequency fire history), that are intensively fox-baited and have low indices of fragmentation (Wayne et al. 2005a, Wayne et al. 2006).

The local area indicates a total of 13 previous recordings, with the closest located 3.6 km away in the Big Brook State Forest. The most recent recording was identified in 2004 indicating no individuals have been recorded in recent years. Given the application area contains approximately 1 hectare of vegetation consisting of *Agonis flexuosa*, approximately 10.3 ha of vegetation with limited previous thinning (Ketelsen, 2020a), abundant large trees with potential hollows within close proximity to a water source and mapped wetland, the application area is likely to contain suitable habitat for *P. occidentalis*.

A fauna survey undertaken over the application area (Harewood, 2021) found that despite the presence of the *A. flexuosa* thicket, the vegetation comprised marginal habitat for western ringtail possums due to a distinct lack of coherent midstorey vegetation in most areas and a lack of its favoured foraging species. The Department is of the view that clearing of the *A. flexuosa* thicket should be avoided, unless proper management measures are in place to mitigate the potential impact of clearing on the viability of the fauna species in the local context.

Other Conservation Significant fauna

The south-western brush tailed phascogale (*Phascogale tapoatafa wambenger*) is a small arboreal dasyurid. In south west Western Australia, it is often observed in dry sclerophyll forests and open woodlands that contain hollow bearing trees. Habitat clearing, fragmentation, and alteration by logging and mining are the greatest threats to this species (DEC, 2012b). With the reduced availability of trees with hollows, a subsequent increase in susceptibility to predation by foxes and cats is seen for this species. Residual habitat is often fragmented, thereby isolating populations and impeding genetic exchange (DBCA, 2012). The application area may contain suitable habitat including hollow bearing trees and a sparse understory in some areas. The local area indicates 18 previous recordings, with the closest located 421 metres away, recorded in 2016. Given the above, the vegetation applied to clear may contain suitable habitat for the species in close proximity to recent recordings within the known range of the species. The phascogale relies on tree hollows for daytime refuge. The targeted fauna survey over the area (Harewood, 2021) indicated the presence of some hollowed trees. Whilst assessed as unsuitable for black cockatoos, the hollows may be suitable for phascogale. However, the low number of hollows present and the absence of any evidence of phascogale's presence in the area, suggests that the application area may not provide habitat critical for the survival and conservation status of the species. The proposed clearing is unlikely to impact the conservation status of this species.

Isodon fusciventer or quenda prefer dense scrub (up to one metre high), with swampy vegetation but are found in a variety of other habitats (Menkhorst & Knight, 2011). The species is widely distributed near the south west coast from north of Geraldton to east of Esperance. Quenda have a patchy distribution throughout the Jarrah and Karri forest, the Swan Coastal Plain, and inland as far as Hyden (DEC, 2012a). They will often feed in adjacent forest and woodland that is burnt on a regular basis, and in areas of open grassland, pasture and crop land lying close to dense cover (DEC, 2012a). Given the broad range of the species and relative abundance throughout, the clearing proposed under this application is unlikely to impact the conservation status of this species.

Hydromys chrysogaster or water rat/rakali inhabits a great variety of aquatic environments including subalpine streams, low inland rivers, lakes, farm dams, and sheltered marine waters. The species can also occur in streams and estuaries in located in urban cities (DEC, 2012b). The local area contains 26 historical recordings, the closest located 440 m away. Given DWER has informed the applicant no clearing will occur within 50 metres of the nearby freshwater source, the application area is unlikely to have a direct impact on the habitat for this species.

The quokka (*Setonix brachyurus*) is a small wallaby listed as Vulnerable under both state and commonwealth legislation, and is the only species belonging to the genus *Setonix*. Historically, the quokka was widespread and abundant across the south-west of Western Australia. By the early 1990s the quokka's distribution on the mainland had been reduced by more than 50%. The species is best known from Rottnest Island, where it is still abundant, but it also continues to exist on Bald Island and in parts of its former range on the mainland, where it is found in isolated patches of the northern Jarrah forest, on the Swan Coastal Plain, the southern Jarrah, Marri and Karri forests and on reserves on the south coast (DBCA, 2020). Known as habitat specialist, in the south of its range quokkas are strongly linked to complex vegetation structure (minimum of three layers), low densities of woody debris and habitat patchiness (Bain et al. 2015). The most common Quokka habitat in the southern forest comprises jarrah (*E. marginata*), marri (*C. calophylla*), karri (*E. diversicolor*) or tingle (*E. jacksonii* or *E. guilfoylei*) forest and riparian habitats with a sedge dominated understorey (DEC, 2013). The quokka also has relatively high water requirements, which necessitates close proximity to fresh water throughout the year, hence, the species is often present in riparian and swamp habitat (Hayward et al. 2005). The local area indicates 25 previous recordings, the closest located 3.6 km away and recorded four times between 13-29 January 2018. According to the FMP supplied by the applicant (Ketelsen, 2020a), the understory across the majority of the site is in good to excellent (Keighery, 1994) condition with a mix of dense and open areas in close proximity to a freshwater source. Given the application area is adjacent to water source, with a mixed density understory in good or better condition, much of the application area may contain suitable habitat for this species. A fauna survey undertaken over the area (Harewood, 2021), however found that the vegetation is unlikely to represent habitat of any value to quokkas due to the sparseness of understory/groundcover vegetation. The fauna survey also did not record any quokka individual

at the time of survey. The commitment of a 50 m buffer from the Lefroy Brook and selective removal of Karri trees will minimise impacts to any riparian habitat for this species.

Muir's corella (*Cacatua pastinator pastinator*) and the masked owl (*Tyto novaehollandiae novaehollandiae*) are both avian species who share nesting habitat requirements with the black cockatoo species mentioned above. Both *C. pastinator pastinator* and *T. novaehollandiae novaehollandiae* indicate 2 historical recordings in the local area, with *C. pastinator pastinator*'s coming from 1995 and 1998, and *T. novaehollandiae novaehollandiae* indicating no dates in the databases. Given the records are > 22 years old, minimal recordings in the local area and the clearing proposes to selectively remove trees, the applied clearing is unlikely to remove habitat that is significant for either species.

Outcome: Based on the above assessment, the Delegated Officer has determined that significant impacts are likely to occur for significant fauna species as a result of the clearing, and that in the absence of further clarifying information it is not possible to have confidence that these impacts can be mitigated and managed to an acceptable level.

Conditions: Not applicable.

3.2.3. Environmental value: land and water resources – Clearing Principles (f) and (i)

Assessment:

The application area is located immediately adjacent (>50m) to the Lefroy Brook and within the Warren River Water Reserve and Lefroy Brook Catchment Area. The karri forest management unit (FMU) over a significant proportion of the Lefroy Brook Catchment Area provides basic ecosystem services for critical situations, such as clean water and irrigation systems. The karri FMU has been assessed as having the level 4 High Conservation Values (HCV4) (FPC, 2022a). Conservation and management of HCV4 karri forest include risk assessments to monitor soil damage and contamination of watercourses, and protection of water values through implementation of informal reserves around all watercourses.

The catchment area is mapped as Zone D of the *Country Area Water Supply Act 1947 (CAWS Act)*. Zone D is defined as a Low Salinity Risk and generally lies above 100 mm isohyet (DoW, 2010). The purpose of clearing controls under the CAWS is to protect valuable and sensitive public water supplies from the risks of salinity and detrimental impacts to water quality. In order to maintain this, Zone D is subject to a minimum basal area of 10 square metres per hectare in healthy trees spread uniformly over the approved forest management area. Also, given understory species play a crucial role in the control of groundwater salinity and quality, and are necessary components of a healthy forest structure, the exclusion of livestock will be considered mandatory after any vegetation is harvested (DoW, 2010). This was backed by advice received from the Salinity and Land Use Impacts branch at DWER, indicating all riparian areas and associated buffers should be excluded, the implementation of a 50m buffer from the Lefroy Brook, Pemberton Weir and any other riparian area, the area should be excluded from grazing post harvesting, the retention of 10 m² uniformly distributed across the site is mandatory and the clearing must be done in accordance with an approved and suitable Forest Management Plan.

On 8 January 2020, the Department provided the applicant with a Request for Information including:

- Evidence that Jarrah Jacks Developments Pty Ltd is compliant with obligations under the CAWS Act, part of which included the provision of a Forest Management Plan;
- Demonstrate that Jarrah Jacks Developments Pty Ltd has been issued with (or has submitted an application for) any licences or permits required under the *Rights in Water and Irrigation Act 1914* (RIWI Act); and
- Demonstrate that Jarrah Jacks Developments Pty Ltd has been issued with a 'Private Land Supplier's Licence' (Pursuant to Regulation 63 of the *Biodiversity Conservation Regulations 2018*).

In response to the request, the applicant provided DWER with a Forest Management Plan (FMP) (Jarrah Jacks, 2020a). The applicant also agreed to implement a 50 m buffer from the Lefroy Brook where no clearing will occur. This will act to limit the direct impacts of the clearing on vegetation associated with the watercourse. Given the application will selectively remove karri trees from the area, the overall condition of the vegetation associated with the watercourse may be impacted through the invasion of weeds or dieback into adjacent vegetation. Therefore, the clearing may impact on vegetation growing in association with a watercourse. If a clearing permit was to be granted, a weed and dieback management condition would be placed on any granted permit to minimise the adverse impacts.

Ground cover vegetation will also be indirectly impacted by the proposed clearing throughout the thinning process and large machinery is used and logs are transported from the site. It is expected that the impacts of the clearing are to be managed through the implementation of an approved FMP. The FMP provided to the Department, however, lacks information regarding these aspects. A revised FMP that would sufficiently detail this activity was requested of the applicant, however, was not provided to the Department.

Given the application proposes to selectively remove karri trees, the clearing may have indirect impacts on offsite water quality due to surface water runoff over recently exposed soils, nutrient export and increased turbidity and siltation. The applicants FMP also proposed that a post-harvesting burn may be required to remove some of the debris resulting from harvesting (Ketelsen, 2019). This may result in the deposition of ash and burnt carbon products

within the Lefroy Brook through runoff or windblow and have adverse effects on the water quality of the drinking water supply. Given the above, the proposed clearing may impact on vegetation growing in association with a watercourse. Detailed information on a post-harvesting burn and other post-clearing activities including utilisation of debris, if applicable, is required to assess the impacts of the clearing and end land use of the proposal on the adjacent highly valuable watercourse. This information was supposed to be a part of the revised FMP that was requested by DWER. The requested information, however, has not been provided to the Department. In the absence of such information, impacts of clearing on the valuable watercourse is deemed unacceptable.

Outcome: Based on the above assessment, the Delegated Officer has determined that the proposed clearing may result in significant impacts in relation to this environmental value, and that in the absence of further clarifying information it is not possible to have confidence that these impacts can be mitigated and managed to an acceptable level.

Conditions: Not applicable.

3.3. Relevant planning instruments and other matters

The Shire of Manjimup advised DWER that local government approvals are not required, and that the clearing is consistent with the Shire's Local Planning Scheme. The Shire did not have any objections to the clearing.

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

Appendix A – Additional information provided by applicant

During assessment, DWER provided the applicant with the results of a preliminary assessment on the potential impacts of the proposed clearing. Additional information was requested of the applicant to address a number of concerns arising from the preliminary assessment in three occasions:

- 8 January 2020
- 7 January 2020
- 21 June 2021

On each occasion, the department requested that the information be provided within 30 calendar days from the date of the correspondence. Upon request by the applicant, the Department extended the due dates for response on each occasion.

The information requested of the applicant and received by the Department is as follows:

Information requirements	Rationale	Information provided by applicant and DWER comments:
8 January 2020 – RFI letter (1) (DWER, 2020a)		
<p>Demonstrate that Jarrah Jacks Developments Pty Ltd is compliant with obligations under the <i>Country Areas Water Supply Act 1947</i> (CAWS Act).</p> <p>A Forest Management Plan (FMP) detailing the proposed works required including, but not limited to:</p> <ul style="list-style-type: none"> • Objectives • Stocking densities and species composition, structure and density of areas subject to clearing or thinning • Targeted species/size and areas for: Clearing (e.g. understorey only), Thinning (e.g. tree species and size), Culling (e.g. unsaleable trees), Growth promotion • Final stocking densities and areas, including of Species and composition, minimum basal areas / tree cover (m²/ha), diameter at breast height • Methods of: <ul style="list-style-type: none"> ○ Clearing (machine used, size and species targeted) ○ Thinning (machine used, size and trees targeted) • Habitat tree retention (species, size, and number per hectare retained) • Retention zones or buffers (e.g. avoidance of riparian vegetation) • Erosion and sedimentation control • Dieback control • Weed control 	<p>The application area is located within the Lefroy Brook Catchment Area; a Public Drinking Water Source Area (PDWSA) proclaimed under the CAWS Act. The application area is also located within Zone D of the Warren River Water Reserve Catchment (a CAWS Act catchment).</p> <p>Riparian vegetation and the banks of a major river, the Lefroy Brook, is located within the application area and the water resource of the Pemberton Weir is immediately adjacent. The preliminary assessment has identified the need for a Forest Management Plan. It would be unnecessarily harmful to the environment for DWER to authorise native vegetation clearing when requirements under the Country Areas Water Supply Act 1947 are not complied with.</p>	<p>On 14 April 2020 the applicant provided an FMP to the Department.</p> <p>The Department assessed the FMP as inadequate. However, the FMP is in compliance with the CAWS Act requirements to protect the nearby Lefroy Brook, including:</p> <ul style="list-style-type: none"> • Adherence to a suitable Forest Management Plan • The retention of at least 10m² basal area uniformly distributed over the silvicultural area • The exclusion of any riparian areas and associated buffers, and • The exclusion of grazing by livestock from the forest management area.

Information requirements	Rationale	Information provided by applicant and DWER comments:
<ul style="list-style-type: none"> Long term management / silviculture strategies, including fire management, coppice and regrowth control, weed and dieback control. 		
<p>Demonstrate that Jarrah Jacks Developments Pty Ltd has been issued with (or has submitted an application for) any licences or permits required under the <i>Rights in Water and Irrigation Act 1914</i> (RIWI Act).</p> <p>The application area is located within the Warren River and Tributaries Surface Water Area/Irrigation District, as proclaimed under the RIWI Act.</p>	<p>Any interference of a watercourse (such as the excavation of a watercourse) may require a permit to interfere with the bed or banks from DWER. In addition, any diversion of surface water in this proclaimed area may be subject to licensing.</p> <p>If Jarrah Jacks Developments Pty Ltd intends to impact beds and banks of a watercourse (including Lefroy Brook), or interfere with a watercourse and cannot obtain relevant licences, it would be unnecessarily harmful to the environment for DWER to authorise native vegetation clearing when requirements under RIWI Act are not complied with.</p>	<p>It is understood that no other permits or licences from DWER or Council is required (Jarrah Jacks Development, 2020)</p> <p>However, DWER further requested that the proposed clearing footprint be amended to provide a minimum of 50 m buffer from Lefroy Brook.</p>
<p>Demonstrate that Jarrah Jacks Developments Pty Ltd has been issued with a 'Private Land Supplier's Licence' (Pursuant to Regulation 63 of the Biodiversity Conservation Regulations 2018).</p>	<p>If Jarrah Jacks Developments Pty Ltd intends to supply (and possess for the purpose of supply) flora taken lawfully from private property, a 'Private Land Supplier's Licence' may be required from the Department of Biodiversity, Conservation and Attractions (DBCA).</p>	<p>'Private Land Supplier's Licence' is being applied for.</p>
7 September 2020 - RFI letter (2) (DWER, 2020b)		
<p>A black cockatoo habitat tree assessment / survey is required for the area proposed to be cleared.</p>	<p>The application area may contain suitable breeding, roosting and/or foraging habitat for Carnaby's cockatoo (<i>Calyptorhynchus latirostris</i>), Baudin's cockatoo (<i>Calyptorhynchus baudinii</i>) and forest red-tailed black cockatoo (<i>Calyptorhynchus banksii naso</i>), which are listed as rare or likely to become extinct under the <i>Biodiversity Conservation Act 2016</i> and have been given the status of endangered and vulnerable under the Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i>.</p> <p>The proposed clearing could result in significant impacts to these species, particularly if suitable breeding hollows are present.</p>	<p>Targeted Fauna Survey including Black cockatoo tree assessment Report (Harewood, 2021) with IBSA numbers was provided to the Department on 4 February 2021. Excerpts of the Report is provided in Appendix B.</p>
<p>A fauna survey is required for the area proposed to be cleared.</p>	<p>A number of declared threatened and conservation dependent fauna are known to occur within the local area and there is a reasonable probability that these may occur in the application area. The fauna species include:</p> <ul style="list-style-type: none"> Quokka (<i>Setonix brachyurus</i>) Western Ringtail Possum (WRP) (<i>Pseudocheirus occidentalis</i>) 	<p>Targeted Fauna Survey Report (Harewood, 2021) with IBSA numbers was provided to the Department on 4 February 2021</p>

Information requirements	Rationale	Information provided by applicant and DWER comments:
	<ul style="list-style-type: none"> South-Western brush-tailed phascogale (<i>Phascogale tapoatafa wambenger</i>) <p>This presumption is based on vegetation within the application area offering habitat similar to that known to support phascogale individuals and populations.</p>	
Further information on the purpose of the clearing located within Area 4	DWER has determined that the clearing proposed in Area 4 differs in purpose and scale to the rest of the clearing. Given the purpose of the clearing in Areas 1, 2 and 3 is for 'fire hazard reduction', and the clearing in Area 4 for is for recreation purposes, further information is required to assess the impacts of the clearing proposed for the vegetation within Area 4. This area may provide significant habitat for conservation significant fauna.	<p>Information was provided by the applicant on 2 June 2021. The applicant stated that clearing on the area was for the creation of a wetland pond. Based on the fauna survey (Harewood, 2021), the applicant believed that the area did not contain significant habitat for conservation significant fauna.</p> <p>The applicant agreed to modify the application area by providing a 50 m buffer zone along the water course to protect the watercourse and wildlife habitat.</p>
An update to the Forest Management Plan supplied to DWER, which provides further detail on the proposed promotion of growth of trees and fire hazard reduction management activities is required in order for a thorough assessment of the impacts of the clearing.	The preliminary assessment has identified the need for an updated Forest Management Plan. The FMP supplied to DWER has some deficiencies in the information provided and requires updating.	<p>Addendum to the FMP is provided on 2 June 2021.</p> <p>The addendum specified the qualification of the FMP's author. Whilst the addendum provided some of the required information, the Department is of the view that the addendum is inadequate. The information provided remains insufficient to support a thorough assessment of the environmental risks posed by the proposed clearing.</p>
23 June 2021 – RFI Letter (3) (DWER, 2021)		
Clarification from Jarrah Jacks of the application area, and the size of clearing proposed in hectares.	On 24 July 2020, a draft revised application area was sent to Jarrah Jacks revising the original 21.59 ha application area down to 18.24 ha, to support a 50-metre buffer to Lefroy Brook, Pemberton Weir and other	No written confirmation regarding the extent of clearing within the

Information requirements	Rationale	Information provided by applicant and DWER comments:
<p>A Purpose Permit has been applied for by Jarrah Jacks whereby the total amount of clearing is required to be stipulated within the same, or a larger, application area. The application area needs defining, as does the total amount of clearing proposed within the application area.</p>	<p>riparian areas. It is understood that verbal acknowledgement of this area has been received by DWER, however, written confirmation of the revised area is required. The revised area previously considered was appended to the letter.</p> <p>Verbal acknowledgement of up to 10 hectares of clearing has been discussed previously, and the survey report of Harewood (2020) states that clearing of up to 10 ha (from a total area of 18 ha) is required.</p> <p>Written confirmation that 10 ha of clearing is proposed within the revised 18.24 ha application area is required.</p>	<p>footprint has been received.</p> <p>The applicant confirmed agreement to reduce the clearing footprint to provide a 50-m buffer along the river.</p>
<p>Demonstrate that Jarrah Jacks has been issued with a 'Private Land Supplier's Licence' (Pursuant to Regulation 63 of the Biodiversity Conservation Regulations 2018).</p>	<p>If Jarrah Jacks intends to supply (and possess for the purpose of supply) flora taken lawfully from private property a 'Private Land Supplier's Licence' may be required from the Department of Biodiversity, Conservation and Attractions (DBCA).</p> <p>Confirmation has been received by DWER that an application for a 'Private Land Supplier's Licence' has been made to DBCA by Jarrah Jacks on 14 April 2020.</p> <p>Confirmation that a 'Private Land Supplier's Licence' has been received by Jarrah Jacks is required.</p>	<p>DBCA confirmed that a 'Private Land Supplier's Licence' has been applied for the proposed activity. However, the applicant has not provided a written statement as to whether the Licence has been acquired.</p>
<p>An updated Forest Management Plan is required.</p>	<p>A Forest Management Plan (FMP) was provided to DWER on 14 April 2020, with an 'Update to FMP' provided on 2 June 2021. The Department viewed that there are discrepancies between the two reports, and they should be combined to ensure that actions and statements are consistent between the two documents so that reference to one consistent document can be made.</p> <p>Additional information required is summarised in the dot points below:</p> <ul style="list-style-type: none"> • Confirmation of the area in hectares of proposed clearing. • A commitment that the thinned area will be protected from grazing, with fencing against livestock if required. • Confirmation that basal areas quoted are calculated from a diameter at breast height (DBH) measured at 1.3 metres above ground level. • Correcting some typographical errors within the 'Update to FMP' and provide consistency with the initial FMP. For example: "approximately 100 per tonne hectare". It is assumed this is to read; 100 tonnes per hectare. 	<p>The applicant has not provided the requested information.</p>

Information requirements	Rationale	Information provided by applicant and DWER comments:
	<ul style="list-style-type: none"> • Clarification of the quantum of understorey clearing proposed • Considering that a rubber-tyred Forestry Harvester will be utilised; information on the quantum of clearing of native vegetation to mineral earth is required. Information on whether tracks and drainage features be required, be permanent or revegetated is required. • Clarification is required that the culling is required only to obtain the objective of a basal area above 16m²/ha. • The numbers and size of habitat trees proposed to be retained needs clarification. • A firm commitment to habitat tree retention is required in terms of the number per hectare and size (that is, DBH or primary / secondary habitat trees as defined in FPC (2021b). • Commitment to retain two large habitat trees identified during the survey of Harewood (2021) which should be classified as habitat trees. • The FMP should aim to retain: <ul style="list-style-type: none"> • at least two primary habitat trees (trees attractive to wildlife, such as hollows), and 5 two secondary habitat trees (younger individuals earmarked to become future primary habitat trees) per hectare for areas of pure Karri forest (that is, 8 mature Karri stems or stumps per hectare, with a minimum patch size of 2 hectares) (FPC 2022a; FPC 2022b); and • at least five primary habitat trees and six secondary habitat trees per hectare for areas of mixed Karri-Marri forest (that is, between 2 to 8 mature Karri stems or stumps per hectare, with a minimum patch size of two hectares) (FPC 2022a; FPC 2022b). • Additional secondary habitat trees should be retained for every primary tree that is not present (FPC 2022a and b). 	

Appendix B – Details of public submissions

No public submissions were received in relation to this application.

Appendix C – Site characteristics

The information provided below describes the key characteristics of the area proposed to be cleared and is based on the best information available to DWER at the time of this assessment. This information was used to inform the assessment of the clearing against the Clearing Principles, contained in Appendix D.

1. Site characteristics

Site characteristic	Details
Local context	The proposed clearing area is part of the vegetated strip that follows the Lefroy Brook and surrounds part of the Township of Pemberton. It is adjacent to the main township

Site characteristic	Details
	of Pemberton, the mountain bike park contained in the adjacent remnant patch of vegetation and the Pemberton Pool. The proposed clearing area contributes to an important linkage that joins the bushland around Pemberton to the expansive remnant vegetation to the south and north. Spatial data indicates the local area (10 km radius of the proposed clearing area) retains approximately 70% of the original native vegetation cover.
Vegetation description	<p>Photographs supplied by the applicant indicate the vegetation within the proposed clearing area consists of large Karri trees with some mixed Marri, Jarrah, Sheoak and Peppermint trees and ground cover vegetation. Representative photos are available in Appendix G.</p> <p>This is generally consistent with the Heddle (1980) mapped vegetation type:</p> <ul style="list-style-type: none"> Lefroy (167) - Tall open forest of <i>Eucalyptus diversicolor</i>-<i>Corymbia calophylla</i> on slopes and low woodland of <i>Agonis juniperina</i>-<i>Callistachys lanceolata</i> on lower slopes in hyperhumid and perhumid zones.
Vegetation condition	<p>Photographs supplied by the applicant indicate the vegetation within the proposed clearing area ranges from degraded to excellent (Keighery, 1994) condition, described as:</p> <ul style="list-style-type: none"> Excellent - Vegetation structure intact, with disturbance affecting individual species; weeds are non-aggressive species. Very Good - Vegetation structure altered, with obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and/or grazing. Good - Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and/or grazing. Degraded - Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and/or grazing. <p>The full Keighery condition rating scale is provided in Appendix E, below. Representative photos are available in Appendix G.</p>
Soil description	<p>The soil is mapped as:</p> <ul style="list-style-type: none"> Lefroy Subsystem (Pimelia) (254PvLF): Valleys 40 to 60 m deep. Slopes smooth, 10 to 20 deg. Narrow terrace. Red gradational soils, not calcareous with some red and brown duplex profiles; and Crowea (Pimelia), brown duplex Phase (254PvCRb): Brown gravelly duplex soils and red earths; karri-marri forest.
Land degradation risk	<p>Lefroy Subsystem (Pimelia) (254PvLF) is moderately to highly susceptible to water and wind erosion and not susceptible to salinity, flooding, water logging, nutrient export and acidification.</p> <p>Crowea (Pimelia), brown duplex Phase (254PvCRb) is moderately to highly susceptible to wind erosion and not susceptible to water erosion, salinity, flooding, water logging, nutrient export and acidification.</p>
Waterbodies	<p>The desktop assessment and aerial imagery indicated that no mapped waterbodies or watercourses are present in the application area. The nearest wetland is 166 metres to the west, mapped as a Palusvale Wetland. A Palusvale wetland is a vale (flat bottom valley) landform that is seasonally waterlogged (Semeniuk & Semeniuk, 2004).</p>

Site characteristic	Details
Conservation areas	There are no mapped conservation areas within the area applied to clear. The nearest conservation area is 700 metres to the north and mapped as the Big Brook State Forest.
Climate and landform	<p>The application area is mapped within the Pimelia Valleys System, described as Valleys, rises and low hills, in the west of the Warren-Denmark Southland. Loamy gravel, loamy earth and loamy duplex. Karri-marri-jarrah forest (DPIRD, 2017).</p> <p>The application area is immediately adjacent to the Pemberton Townsite, which has mean annual maximum and minimum temperatures of 20.4°C and 10.1°C (1941 - 2020) and annual mean rainfall of 1184.2mm (1941-2020) (BOM, 2020).</p>

2. Flora, fauna and ecosystem analysis

With consideration for the site characteristics set out above, relevant datasets (see Appendix H), the following conservation significant flora and fauna species, and ecological communities may be impacted by the clearing.

Species / Ecological Community	Conservation Status	Count in local area	Distance of closest record to application area (metres)	Suitable soil type? (flora, ecological community)	Suitable vegetation type? (flora, ecological community)	Suitable habitat features (fauna)	Are surveys adequate to identify? (Y, N, N/A)
Flora							
<i>Commersonia apella</i>	CR	2	650	Y	Y	N/A	N/A – no survey
<i>Caladenia christineae</i>	EN	1	4775	Y	Y	N/A	N/A – no survey
<i>Thomasia brachystachys</i>	P2	1	7750	Y	Y	N/A	N/A – no survey
<i>Amanita kalamundae</i> (Fungi)	P3	1	8890	Y	Y	N/A	N/A – no survey
Fauna							
Muir's Corella (<i>Cacatua pastinator pastinator</i>)	CD	2	6802.3	N/A	N/A	Y	Y
South-western brush-tailed phascogale (<i>Phascogale tapoatafa wambenger</i>)	CD	18	421.3	N/A	N/A	Y	Y
Masked Owl (<i>Tyto novaehollandiae novaehollandiae</i>)	P3	2	1223.3	N/A	N/A	Y	Y
Quenda (<i>Isodon fusciventer</i>)	P4	16	1475.7	N/A	N/A	Y	Y
Water Rat – Rakali (<i>Hydromys chrysogaster</i>)	P4	26	440.6	N/A	N/A	Y	Y

Species / Ecological Community	Conservation Status	Count in local area	Distance of closest record to application area (metres)	Suitable soil type? (flora, ecological community)	Suitable vegetation type? (flora, ecological community)	Suitable habitat features (fauna)	Are surveys adequate to identify? (Y, N, N/A)
Western Ringtail Possum (<i>Pseudocheirus occidentalis</i>)	T - CR	13	1223.3	N/A	N/A	Y	Y
Baudin's black cockatoo (<i>Calyptorhynchus baudinii</i>)	T - EN	37	108.8	N/A	N/A	Y	Y
Carnaby's black cockatoo (<i>Calyptorhynchus latirostris</i>)	T - EN	5	693.8	N/A	N/A	Y	Y
Forest red-tailed black cockatoo (<i>Calyptorhynchus banksii naso</i>)	T - VU	8	833.2	N/A	N/A	Y	Y
Quokka (<i>Setonix brachyurus</i>)	T - VU	25	3616.7	N/A	N/A	Y	Y

3. Vegetation extent

	Pre-European extent (ha)	Current extent (ha)	% remaining	Current extent in all DBCA managed land (ha)	% current extent in all DBCA managed land (proportion of pre-European extent)
IBRA bioregion					
Warren	833,985.56	659,432.21	79.07	558,485.38	66.97
Vegetation complex					
Lefroy (167)	20,125.52	16,460.26	81.79	14,736.69	73.22

Appendix D – Assessment against the Clearing Principles

Assessment against the Clearing Principles	Variance level	Is further consideration required?
Environmental value: biological values		
<p><u>Principle (a):</u> "Native vegetation should not be cleared if it comprises a high level of biodiversity."</p> <p><u>Assessment:</u></p> <p>The proposed clearing area contains habitat for three conservation significant flora, ten conservation significant fauna, mapped occurrences of a Priority Ecological Community in close proximity and the vegetation may assist in the ecological linkage for flora and fauna along the Lefroy Brook.</p>	May be at variance	Yes Refer to Section 3.2.1 above.

Assessment against the Clearing Principles	Variance level	Is further consideration required?
<p><u>Principle (b):</u> <i>"Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna."</i></p> <p><u>Assessment:</u></p> <p>The proposed clearing area contains habitat which is potentially significant for conservation significant fauna.</p>	May be at variance	Yes Refer to Section 3.2.2 above.
<p><u>Principle (c):</u> <i>"Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora."</i></p> <p><u>Assessment:</u></p> <p>The proposed clearing area is unlikely to contain vegetation known to support any flora species listed as Threatened under the BC Act or EPBC Act.</p>	Not likely to be at variance	No
<p><u>Principle (d):</u> <i>"Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a threatened ecological community."</i></p> <p><u>Assessment:</u></p> <p>The proposed clearing area does not contain vegetation that is representative of any mapped or known state listed threatened ecological community (TEC).</p>	Not likely to be at variance	No
Environmental values: significant remnant vegetation and conservation areas		
<p><u>Principle (e):</u> <i>"Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared."</i></p> <p><u>Assessment:</u></p> <p>The extent of the mapped vegetation type and the native vegetation in the local area is consistent with the national objectives and targets for biodiversity conservation in Australia. Vegetation in the proposed clearing area is considered to be part of a significant ecological linkage in the local area.</p>	Not likely to be at variance	Yes Refer to Section 3.2.1 above.
<p><u>Principle (h):</u> <i>"Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area."</i></p> <p><u>Assessment:</u></p> <p>Given the distance to the nearest conservation area (670 metres), the proposed clearing is not likely to have an impact on the environmental values of nearby conservation areas.</p>	Not likely to be at variance	No
Environmental values: land and water resources		
<p><u>Principle (f):</u> <i>"Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland."</i></p> <p><u>Assessment:</u></p> <p>Given the proximity to the Public Drinking Water Source Area (PDWSA) of the Lefroy Brook (> 50m) and associated vegetation, the clearing may impact on the adjacent vegetation through the spread of weeds and dieback and overall lowering of the vegetation condition.</p>	Is at variance	Yes Refer to Section 3.2.3 above.

Assessment against the Clearing Principles	Variance level	Is further consideration required?
<p><u>Principle (g):</u> <i>"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation."</i></p> <p><u>Assessment:</u></p> <p>The mapped soils present a moderate to high susceptibility to wind erosion and moderate to nil susceptibility to water erosion, nutrient export, salinity, flooding and Acid Sulfate Soils (ASS). Noting the purpose of the clearing is to selectively remove trees throughout the majority of the application area, the proposed clearing is not likely to have an appreciable impact on land degradation through wind erosion.</p>	Not likely to be at variance	No
<p><u>Principle (i):</u> <i>"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water."</i></p> <p><u>Assessment:</u></p> <p>Given the proximity to the Public Drinking Water Source Area (PDWSA) of the Lefroy Brook (> 50m), the removal of vegetation and potential runoff of groundwater may impact on the water quality of the sensitive drinking water source.</p>	May be at variance	Yes Refer to Section 3.2.3 above.
<p><u>Principle (j):</u> <i>"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding."</i></p> <p><u>Assessment:</u></p> <p>The mapped soils and topographic contours in the surrounding area do not indicate the proposed clearing is likely to contribute to increased incidence or intensity of flooding.</p> <p>Given no watercourses or wetlands are recorded within the proposed clearing area, the clearing is unlikely to contribute to waterlogging.</p>	Not likely to be at variance	No

Appendix E – Vegetation condition rating scale

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

Measuring Vegetation Condition for the South West and Interzone Botanical Province (Keighery, 1994)

Condition	Description
Pristine	Pristine or nearly so, no obvious signs of disturbance.
Excellent	Vegetation structure intact, with disturbance affecting individual species; weeds are non-aggressive species.
Very Good	Vegetation structure altered, with obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and/or grazing.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and/or grazing.

Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and/or grazing.
Completely Degraded	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees or shrubs.

Appendix G – Biological survey information excerpts / photographs of the vegetation (Ketelson, 2019 and Harewood, 2021)

At the request by the Department, the applicant submitted a Forest Management Plan (Ketelson, 2019) and commissioned a qualified Zoologist to perform a targeted fauna survey over the application area (Harewood, 2021). Both documents contain information regarding the environmental values of the area proposed to be cleared.

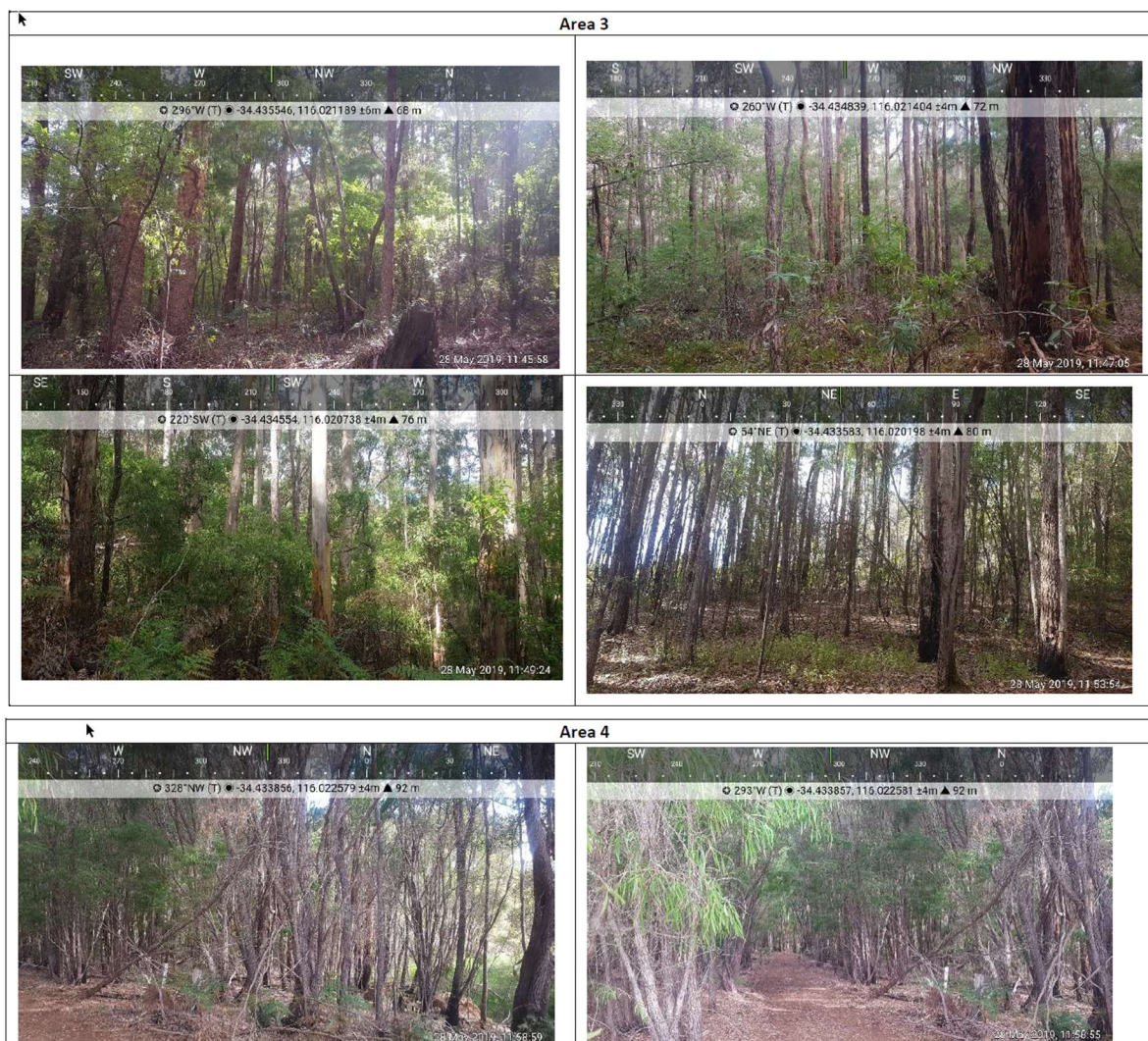
(1) *Forest Management Plan (Ketelson 2019):*

Vegetation description and conditions:

Area	Vegetation / Site Description	Habitat Condition**
1	Previously partially thinned Karri, some evidence of grazing in upper slopes. Understory regeneration good, evidence of previous harvesting activity. Weed invasion of blackberry.	Good
2	Karri dominated stand with some marri throughout, mix of mature and immature karri. Good understorey species condition and diversity, weed invasion of blackberry, evidence of grazing (cattle).	Very Good
3	Karri marri mixed forest with some blackbutt. Understory in excellent condition.	Excellent
4	Peppermint thicket on edge of bluegums with grassy understory.	Degraded I

Photographs of the vegetation (Ketelson, 2019)





(2) Targeted fauna survey and habitat assessment (Harewood, 2021)

The survey was targeting the following fauna species and their habitats:

- Quokka (*Setonix brachyurus*);
- Western Ringtail Possum (WRP) (*Pseudocheirus occidentalis*);
- South-Western brush-tailed phascogale (*Phascogale tapoatafa wambenger*);
- Carnaby's Cockatoo (*Calyptorhynchus latirostris*);
- Baudin's Cockatoo (*Calyptorhynchus baudinii*); and
- Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*).

Methods employed included:

- Habitat assessment
- Camera traps
- Day and night surveys
- The use of a drone and pole camera to inspect hollows.

Daytime survey was performed on 26 November 2020; and a nocturnal survey was carried out on 15 January 2021.

Results:

Vegetation over the application area comprises of:

- Karri (*Eucalyptus diversicolor*) regrowth over a shrubland/tall shrubland of varying density. Midstory vegetation is generally absent with a few small areas of sheoak (*Allocasuarina* spp.) and to a lesser extent peppermint (*Agonis flexuosa*) in Area 1 and 2.

- mixed Karri (*E. diversicolor*)/marri (*Corymbia calophylla*) woodland which also appears to be largely regrowth from an historical clearing event. Midstorey and understory vegetation is variable in density but is generally sparse in Area 3
- peppermint low woodland in Area 4.

Black cockatoo habitat assessment


- One forest red-tailed black cockatoo was captured on a camera trap
 - No foraging debris was identified
 - Quality foraging habitat is limited to marri trees
 - Two trees were identified as containing one or more hollows possibly suitable for black cockatoo nesting. Upon closer inspection using a drone the hollows were found to be unsuitable.
- Summary of the habitat trees and hollows conditions are as follow:



Tree ID	Number of Hollows	Status	Justification
1	4+	Unsuitable Hollows/No Hollows	This large karri tree contains several upward facing spouts and a side entry hollow. The drone inspection suggested that the upward facing spouts are either not actual hollows or don't have a suitable depth. The side entry hollows appear to be too small (entrance and internally). All hollows inspected were deemed unsuitable for black cockatoos to use for nesting purposes.
2	1	Unsuitable Hollows	The marri tree appeared to have a possible chimney style hollow but upon inspection with a drone was found to be horizontal with only a small entrance too small for black cockatoos.


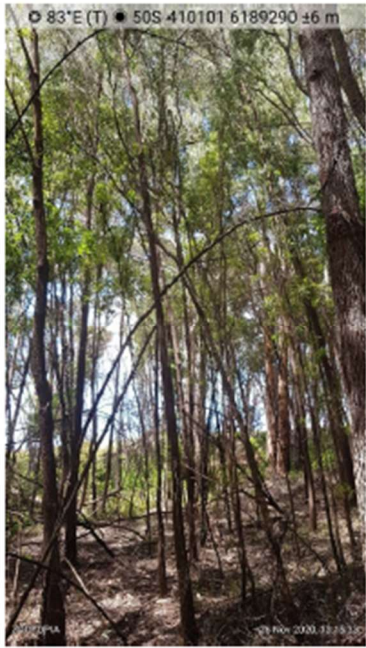
Other conservation significant fauna habitat assessment:

- Habitat for western ringtail possums appears to be marginal at best with a distinct lack of coherent midstorey vegetation in most areas and a lack of its favoured foraging species.
- The vegetation is unlikely to represent habitat of any value to quokkas given the sparseness of understory/groundcover vegetation.
- The almost complete lack of hollow bearing trees makes most of the application area unfavourable for the South-Western brush-tailed phascogale which relies on tree hollows for daytime refuge.

Photographs of vegetation and summary of habitat assessment are provided below (Harewood, 2021):

Fauna Habitat Description/Value	Example Image
Grassland – mapped as part of application area due to overlapping canopy cover from adjoining property.	
Black Cockatoo Habitat Value: Negligible/Low value given dominance of grassland and absence of other vegetation. Some possible minor foraging habitat value.	
Western Ringtail Possum Habitat Value: No value given absence of vegetation other than grassland.	
Quokka Habitat Value: No value given absence of vegetation other than grassland.	
South-Western Brush-tailed Phascogale: No value given absence of vegetation other than grassland.	

Fauna Habitat Description/Value	Example Image
Karri Woodland – regrowth karri woodland with generally sparse ground cover and midstorey vegetation.	
Black Cockatoo Habitat Value: Low value – total absence of trees harbouring large hollows, limited foraging value given karri dominant. Some value as roosting habitat but no evidence seen.	
Western Ringtail Possum Habitat Value: Very low value given absence of coherent midstorey vegetation.	
Quokka Habitat Value: Very low value given absence of coherent dense understory vegetation.	
South-Western Brush-tailed Phascogale: Low value given absence of hollow bearing trees.	
Karri Woodland – regrowth karri woodland with patchy dense ground cover and limited midstorey vegetation.	
Black Cockatoo Habitat Value: Low value – total absence of trees harbouring large hollows, limited foraging value given karri dominant. Some value as roosting habitat but no evidence seen.	
Western Ringtail Possum Habitat Value: Very low value given absence of coherent midstorey vegetation.	
Quokka Habitat Value: Low value given absence of coherent dense understory vegetation.	
South-Western Brush-tailed Phascogale: Low value given almost total absence of hollow bearing trees.	

Fauna Habitat Description/Value	Example Image
<p>Karri, Marri Woodland – regrowth karri/marri woodland with patchy dense ground cover and limited midstorey vegetation – occasional small peppermint .</p> <p>Black Cockatoo Habitat Value: moderate value – total absence of trees harbouring large hollows, some foraging value given presence of marri. Some value as roosting habitat but no evidence seen.</p> <p>Western Ringtail Possum Habitat Value: Low/moderate value given presence of some coherent midstorey vegetation.</p> <p>Quokka Habitat Value: Low value given absence of coherent dense understory vegetation.</p> <p>South-Western Brush-tailed Phascogale: Low/moderate value given almost total absence of hollow bearing trees.</p>	
<p>Peppermint Low Woodland – regrowth peppermint low woodland with patchy dense ground cover.</p> <p>Black Cockatoo Habitat Value: Low value – total absence of trees harbouring large hollows, some foraging value given presence of small number of marri. Low value as roosting habitat given large tree absent.</p> <p>Western Ringtail Possum Habitat Value: Low/moderate value given presence of some coherent midstorey vegetation dominated by peppermint.</p> <p>Quokka Habitat Value: Negligible value given absence of coherent dense understory vegetation.</p> <p>South-Western Brush-tailed Phascogale: Low value given total absence of hollow bearing trees.</p>	
	

Appendix H – References and databases

H.1 GIS datasets

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

- Aboriginal Heritage Places (DPLH-001)
- Cadastre Address (LGATE-002)
- Contours (DPIRD-073)
- DBCA – Lands of Interest (DBCA-012)
- DBCA Legislated Lands and Waters (DBCA-011)
- Directory of Important Wetlands in Australia – Western Australia (DBCA-045)
- Environmentally Sensitive Areas (DWER-046)
- Flood Risk (DPIRD-007)
- Groundwater Salinity Statewide (DWER-026)
- IBRA Vegetation Statistics
- Local Planning Scheme – Zones and Reserves (DPLH-071)

- Regional Parks (DBCA-026)
- Soil and Landscape Mapping – Best Available

Restricted GIS Databases used:

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