



CLEARING PERMIT

Granted under section 51E of the Environmental Protection Act 1986

PERMIT DETAILS

Area Permit Number: CPS 9512/1
File Number: DWERVT9132
Duration of Permit: From 4 March 2023 to 4 March 2028

PERMIT HOLDER

Arkenstone Pty Ltd and March Bells Pty Ltd

LAND ON WHICH CLEARING IS TO BE DONE

Lot 11937 on Deposited Plan 203137, Shannon

AUTHORISED ACTIVITY

The permit holder must not clear more than 3.52 hectares of *native vegetation* within the area cross-hatched yellow in Figure 1 of Schedule 1.

CONDITIONS

1. Period during which clearing is authorized

The permit holder must not clear any native vegetation after 4 March 2025.

2. Avoid, minimise, and reduce impacts and extent of clearing

In determining the *native vegetation* authorised to be cleared under this permit, the permit holder must apply the following principles, set out in descending order of preference:

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

3. Weed and dieback management

When undertaking any clearing authorised under this permit, the permit holder must take the following measures to minimise the risk of introduction and spread of *weeds* and *dieback*:

- (a) clean earth-moving machinery of soil and vegetation prior to entering and leaving the area to be cleared;
- (b) ensure that no known *dieback*, termites 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
- (d) only move soils in *dry conditions*;
- (e) where *dieback* or *weed*-affected soil, mulch, fill, or other material is to be removed from the area to be cleared, ensure it is transferred to areas of comparable soil disease status.

4. Management of water resource

- (a) The Permit Holder is authorised to clear native vegetation in the low flow period (between December and April)
- (b) The Permit Holder must commence dam wall construction and associated works no later than two (2) months after authorised clearing.

5. Directional clearing

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

6. Vegetation management – *revegetation*

The permit holder must, within 24 months of undertaking clearing authorised under this permit:

- (a) undertake deliberate *planting* of at least seven (7) native trees with black cockatoo foraging species within the area cross-hatched red in Figure 2 of Schedule 1;
- (b) ensure only local provenance propagating material of plants are used;
- (c) ensure *planting* is undertaken at the *optimal time*;
- (d) ensure plantings are of a suitable size of at least one (1) metre in height;
- (e) undertake weed control and watering of *plantings* for at least three years post planting;
- (f) the permit holder must, within 24 months of planting the native plants in accordance with condition 6(a) of this permit;

- (i) engage an *environmental specialist* to make a determination that at least seven (7) native trees will survive; and
 - (ii) if the determination made by the *environmental specialist* under condition 6(f)(i) that at least seven (7) native species will not survive, the permit holder must plant additional native species that will result in at least seven (7) native plants persisting within the area cross-hatched red in Figure 2 of Schedule 1.
- (g) where additional *planting* of native species is undertaken in accordance with condition 6(f)(ii), the permit holder must repeat the activities required by condition 6(b), 6(c), and 6(d) of this permit.

7. Records that must be kept

The permit holder must maintain records relating to the listed relevant matters in accordance with the specifications detailed in Table 1.

Table 1: Records that must be kept

No.	Relevant matter	Specifications
1.	In relation to the authorised clearing activities generally	<ul style="list-style-type: none"> (a) the species composition, structure, and density of the cleared area; (b) the location where the clearing occurred, recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994 (GDA94), expressing the geographical coordinates in Eastings and Northings; (c) the date that the area was cleared; (d) the date that construction of dam wall was commenced; (e) the size of the area cleared (in hectares); (f) actions taken to avoid, minimise, and reduce the impacts and extent of clearing in accordance with condition 2; and (g) actions taken to minimise the risk of the introduction and spread of <i>weeds</i> and <i>dieback</i> in accordance with condition 3.
2.	In relation to vegetation management - <i>revegetation</i>	<p><i>Revegetation</i> activities undertaken in accordance with condition 6 of this permit including:</p> <ul style="list-style-type: none"> (i) the date that revegetation activities commenced; (ii) the number of trees planted; (iii) the species planted, including the number of each species planted;

No.	Relevant matter	Specifications
		(iv) weed control and watering activities undertaken; (v) determination by an <i>environmental specialist</i> ; and (vi) the date and activities undertaken where additional planting is required.

8. Reporting

The permit holder must provide to the *CEO* the records required under condition 7 of this permit when requested by the *CEO*.

DEFINITIONS

In this permit, the terms in Table 2 have the meanings defined.

Table 2: Definitions

Term	Definition
black cockatoo species	means one or more of the following species: (a) <i>Zanda lateriosis</i> (<i>Carnaby's cockatoo</i>); (b) <i>Zanda baudinii</i> (<i>Baudin's cockatoo</i>); and/or (c) <i>Calyptorhynchus banksii naso</i> (<i>forest red-tailed black cockatoo</i>).
CEO	Chief Executive Officer of the department responsible for the administration of the clearing provisions under the <i>Environmental Protection Act 1986</i> .
clearing	has the meaning given under section 3(1) of the EP Act.
condition	a condition to which this clearing permit is subject under section 51H of the EP Act.
environmental specialist	means a person who holds a tertiary qualification in environmental science or equivalent, and has a minimum of 2 years work experience relevant to the type of environmental advice that an environmental specialist is required to provide under this permit, or who is approved by the CEO as a suitable environmental specialist.
fill	means material used to increase the ground level, or to fill a depression.
dieback	means the effect of <i>Phytophthora</i> species on native vegetation.
department	means the department established under section 35 of the <i>Public Sector Management Act 1994</i> (WA) and designated as responsible for the administration of the EP Act, which includes Part V Division 3.
dry conditions	A condition when soils (not dust) do not freely adhere to rubber tires, tracks, vehicle chassis or wheel arches
EP Act	<i>Environmental Protection Act 1986</i> (WA)

Term	Definition
local provenance	means native vegetation seeds and propagating material from natural sources within 50 kilometres and the same Interim Biogeographic Regionalisation for Australia (IBRA) subregion of the area cleared.
mulch	means the use of organic matter, wood chips or rocks to slow the movement of water across the soil surface and to reduce evaporation.
native vegetation	has the meaning given under section 3(1) and section 51A of the EP Act.
optimal time	optimal time means the period from May to July for undertaking planting.
planting	means the re-establishment of vegetation by creating favourable soil conditions and planting seedlings of the desired species.
revegetate/ed/ion	means the re-establishment of a cover of local provenance native vegetation in an area using methods such as natural regeneration, direct seeding and/or planting, so that the species composition, structure and density is similar to pre-clearing vegetation types in that area.
weeds	means any plant – <ul style="list-style-type: none"> (a) that is a declared pest under section 22 of the <i>Biosecurity and Agriculture Management Act 2007</i>; or (b) published in a Department of Biodiversity, Conservation and Attractions species-led ecological impact and invasiveness ranking summary, regardless of ranking; or (c) not indigenous to the area concerned.

END OF CONDITIONS


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 Mincham
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Ryan Mincham
 MANAGER
 NATIVE VEGETATION REGULATION

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

9 February 2023

SCHEDULE 1

The boundary of the area authorised to be cleared is shown in the map below (Figure 1)

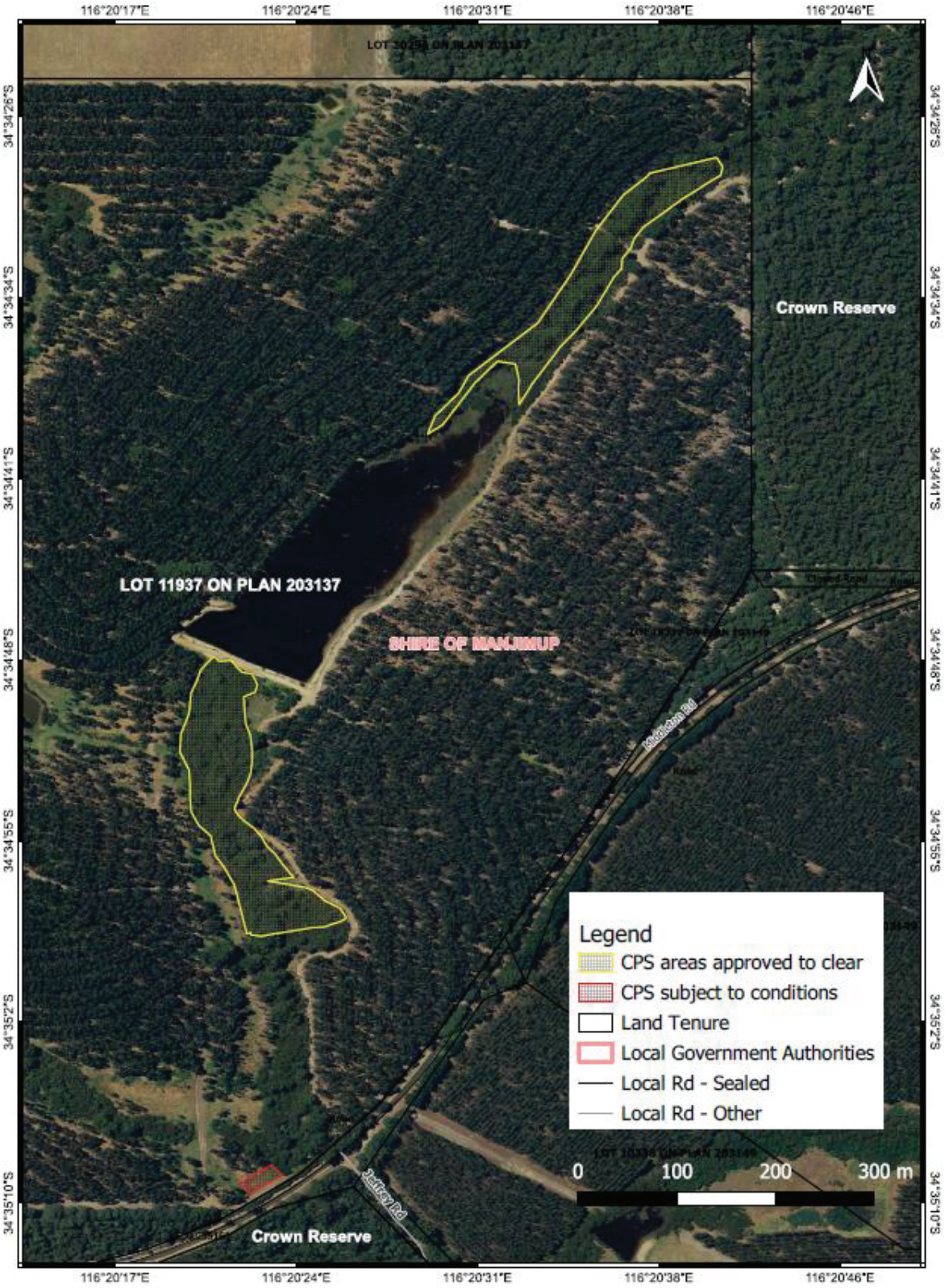


Figure 1: Map of the boundary of the area within which clearing may occur

The boundary of the area subject to conditions is shown in the map below (Figure 2).



Figure 2: Map of the boundary of the area subject to conditions



Clearing Permit Decision Report

1 Application details and outcome

1.1. Permit application details

Permit number:	CPS 9512/1
Permit type:	Area permit
Applicant name:	Arkenstone Pty Ltd and March Bells Pty Ltd
Application received:	24 December 2021
Application area:	3.52 hectares (ha) of native vegetation
Purpose of clearing:	Dam construction and maintenance
Method of clearing:	Mechanical
Property:	Lot 11937 on Deposited Plan 203137
Location (LGA area/s):	Shannon
Localities (suburb/s):	Shire of Manjimup

1.2. Description of clearing activities

Arkenstone Pty Ltd and March Bells Pty Ltd propose to expand an existing on-stream dam on a property which predominantly comprises a plantation of *Eucalyptus regnans*. The dam is situated on a non-perennial stream which drains into a minor tributary of the Shannon River, located approximately 10 km downstream. To expand the dam capacity, a new dam wall will be placed downstream of the existing wall. This will result in the inundation of native and non-native vegetation distributed within two patches of remnant native vegetation along the creek, totalling 3.52 ha in size.

The first patch is situated upstream of the current dam, and the second patch is within an area that has been mapped as an in-land flat situated between the current dam wall and the new dam wall, as depicted in Figure 1. The proposed clearing permit is required to remove some of the vegetation within the inundation area and / or to inundate the native vegetation within the application area. The native trees proposed to be cleared include approximately 46 *Eucalyptus diversicolor* (Karri), 3 *Corymbia calophylla* (Marri), and 2 *Eucalyptus patens* (Blackbutt). None of these trees contains hollows.

The property is surrounded by properties that have been previously cleared for plantation and is immediately adjacent to the Shannon National Park. The enlarged dam capacity is envisaged to support the current and future farming activities on the property. Apart from the cleared areas utilised for plantation and horticultural activities, the local area (10 km radius from the application area) is largely vegetated with approximately 92% native vegetation cover (See Figure 2). Most of the remaining vegetated areas are protected for conservation and recreation purposes.

1.3. Decision on application

Decision:	Granted
Decision date:	9 February 2023
Decision area:	3.52 hectares of native vegetation as depicted in Section 1.5, below.

1.4. Reasons for decision

This clearing permit application was submitted, accepted, assessed and determined in accordance with sections 51E and 51O of the *Environmental Protection Act 1986* (EP Act). The Department of Water and Environmental Regulation (DWER) advertised the application for 21 days and one submission was received.

In making this decision, the Delegated Officer had regard for the site characteristics (see Appendix C), relevant datasets (see Appendix G.1), the findings of a targeted flora and Black Cockatoo habitat survey; and a site inspection (see Appendix F), the clearing principles set out in Schedule 5 of the EP Act (see Appendix D), relevant planning instruments and any other matters considered relevant to the assessment (see Section 3). In particular, the Delegated Officer considered the following:

- Clearing will remove potential foraging habitat for Black cockatoos. This includes five (5) trees which provide known foraging resources for Black cockatoos, namely *Corymbia calophylla* and *Eucalyptus patens*. In the absence of any breeding or roosting sites within a 12 km radius, or any evidence of foraging by Black cockatoos on the trees within the application area, the habitat to be removed is unlikely to be significant given there is in excess of 30,000 hectares of vegetation within the local area protected within conservation estate. However, the Department has determined it appropriate that the loss of the foraging tree species is mitigated to ensure the long-term viability of black cockatoo foraging in the local area. A condition has been imposed on the permit which requires the planting of at least seven (7) native trees comprising black cockatoo foraging species.
- Clearing will remove approximately 46 karri trees. Although many of these trees have diameters at breast height (DBH) greater than 500 mm, none of the trees contain hollows that would provide current breeding habitat for black cockatoo. The removal of these trees is considered unlikely to have a significant impact on the availability of breeding habitat for black cockatoo species within the local context, given the extensive areas of native vegetation adjacent to the application area which are protected within conservation estate.
- Clearing of riparian vegetation immediately within the creek channel may potentially impact on some conservation significant fauna species which inhabit freshwater. However, given the relatively limited extent of clearing and availability of similar habitats in the local area, the impact is unlikely to be significant within the local context. Clearing during the low flow period when the creek is dry will further mitigate impacts on habitat and any individuals.
- Clearing may exacerbate the risk of sedimentation, nutrient export and wind erosion downstream of the dam. These impacts are considered unlikely to lead to appreciable land degradation. Clearing in dry conditions and outside of the high flow period can mitigate this impact and is required as a condition on the permit.
- Clearing may introduce weeds and dieback to the adjacent Shannon National Park. A stringent weed and dieback management condition has been imposed to mitigate this impact.

After consideration of the available information, as well as the applicant's minimisation and mitigation measures (see Section 3.1), the Delegated Officer determined the proposed clearing is unlikely to lead to appreciable land degradation or have long-term adverse impacts on threatened Black cockatoos. The applicant has suitably demonstrated avoidance and minimisation measures, which include the planting of a minimum seven (7) trees which comprise black cockatoo foraging species, to account for the impacts to black cockatoo foraging habitat (see Section 3.2.2).

The Delegated Officer decided to grant a clearing permit subject to conditions to:

- avoid, minimise to reduce the impacts and extent of clearing
- take hygiene steps to minimise the risk of the introduction and spread of weeds
- undertake slow, progressive one directional clearing to allow terrestrial fauna to move into adjacent habitat ahead of the clearing activity
- clearing activities to be conducted in low flow periods
- undertake deliberate planting and ensure the long-term survival of at least seven trees comprised of native species that provide black cockatoo foraging value.

1.5. Site map

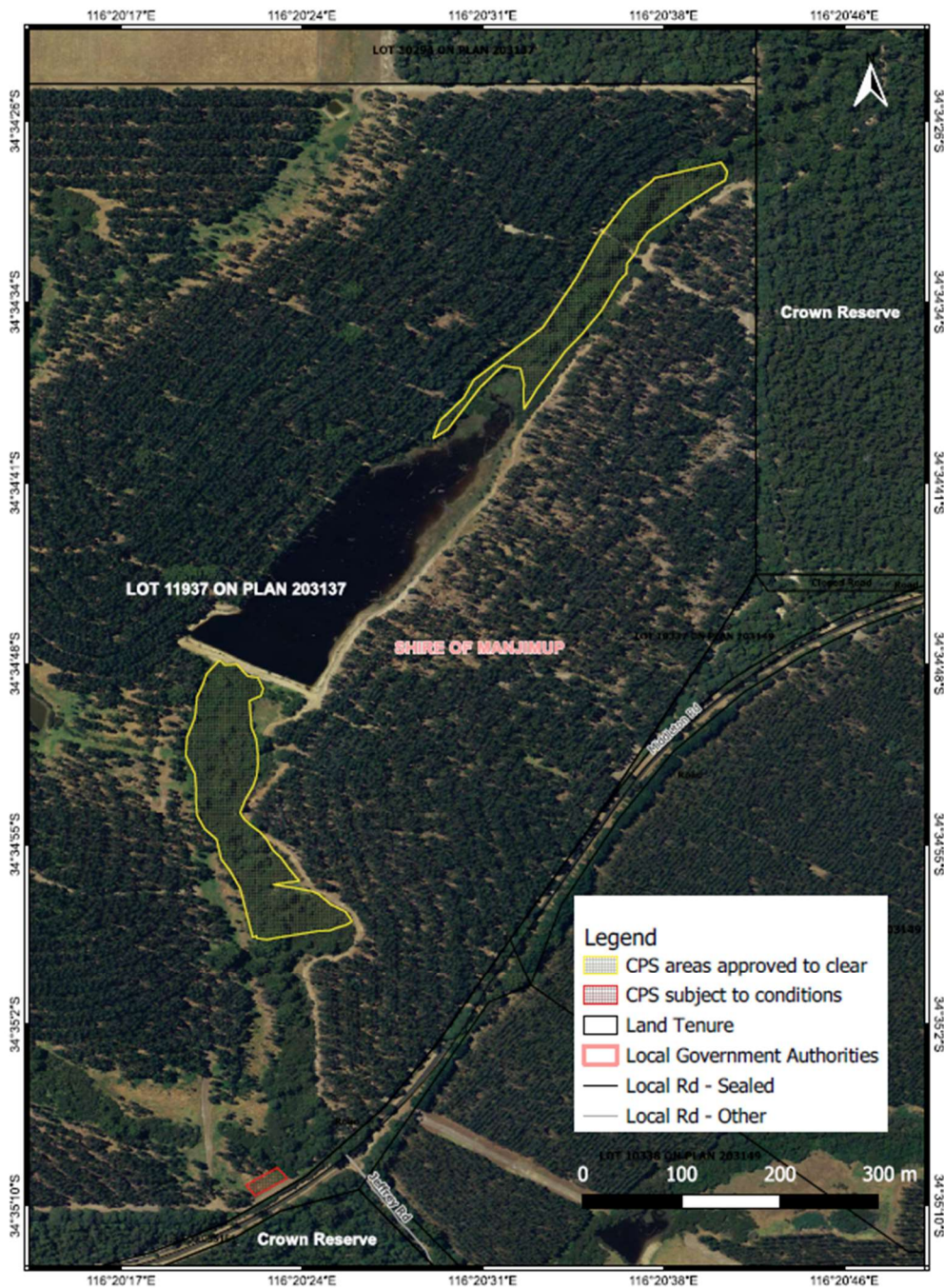


Figure 1 Map of the application area

The areas cross-hatched yellow indicate the areas authorised to be cleared under the granted clearing permit.

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

- the precautionary principle
- the principle of intergenerational equity
- the principle of the conservation of biological diversity and ecological integrity.

Other legislation of relevance for this assessment include:

- *Biodiversity Conservation Act 2016* (WA) (BC Act)
- *Biosecurity and Agriculture Management Act 2007*
- *Conservation and Land Management Act 1984* (WA) (CALM Act)
- *Country Areas Water Supply Act 1947* (WA) (CAWS Act)
- *Planning and Development Act 2005* (WA) (P&D Act)
- *Soil and Land Conservation Act 1945* (WA)

Relevant policies considered during the assessment include:

- *WA Environmental Offsets Policy (2011)*

The key guidance documents which inform this assessment are:

- *A guide to the assessment of applications to clear native vegetation* (DER, December 2013)
- *Procedure: Native vegetation clearing permits* (DWER, October 2019)
- *WA Environmental Offsets Guideline (2014)*.

3 Detailed assessment of application

3.1. Avoidance and mitigation measures

The Applicant submitted that several design options for the proposed dam expansion had been considered. The placement of the new dam wall will affect the wall footprint, dam volume and extent of native vegetation that would be inundated once the larger dam has reached capacity. The Applicant has opted for a design that requires the least amount of native vegetation to be cleared. During assessment, in response to the Department's request for further avoid and minimise measures, the applicant relocated the proposed dam wall slightly upstream to avoid clearing and impacts on a stand of 10 karri trees situated at the foot of the dam wall. Being among the oldest and tallest trees on the property, these karri trees are considered to have the greatest potential to develop into breeding and roosting habitat for the black cockatoo species in the future. The relocation of the wall also avoided the clearing of a large marri tree, thereby minimising potential impact on the availability of black cockatoo foraging within the application area. Detailed drawings and options considered are presented in Appendix E. The revision of the design resulted in a reduction in the amount of clearing from 4.7 ha to 3.52 ha.

Some of the identified trees, particularly those located near to the headwater, may potentially be retained and not be impacted by the dam wall. The exact trees that will be cleared or inundated and those to be retained / avoided will be determined during the undertaking of the works and after the flooding of the dam takes place. The applicant is committed to only clear native vegetation to the extent necessary for expansion of the dam.

Although the impact of clearing on foraging habitat for black cockatoo species is not likely to be significant within the context of the availability of protected habitat nearby, during assessment the Department requested for a mitigation plan to account for the loss of 3 marri and 2 blackbutt trees which provide potential foraging habitat. Based on the WA Offset calculator, these losses could be mitigated by the planting of 7 trees which comprise foraging species for black cockatoos. The applicant has agreed to plant at least 7 trees within the area shaded red in Figure 1.

Based on the above, the Delegated Officer was satisfied that the applicant has undertaken reasonable measures to avoid, minimise and mitigate potential impacts of the proposed clearing on environmental values.

3.2. Assessment of impacts on environmental values

In assessing the application, the Delegated Officer has had regard for the site characteristics (see Appendix A) and the extent to which the impacts of the proposed clearing present a risk to biological, conservation, or land and water resource values.

The assessment against the clearing principles (see Appendix D) identified that the impacts of the proposed clearing may present a risk to the adjacent conservation areas, flora diversity, fauna, and land and water resources. The consideration of these impacts, and the extent to which they can be managed through conditions applied in line with sections 51H and 51I of the EP Act, is set out below.

3.2.1. Biological values - Flora diversity and conservation areas - Clearing Principles (a) and (h)

Assessment

The vegetation proposed to be cleared is a part of more than 38,000 hectares of native vegetation in the local area. The extent of native vegetation is approximately 92% of its original cover. Approximately 30,000 hectares of this remaining native vegetation are within protected areas, including the Shannon National Park located immediately adjacent to the application area.

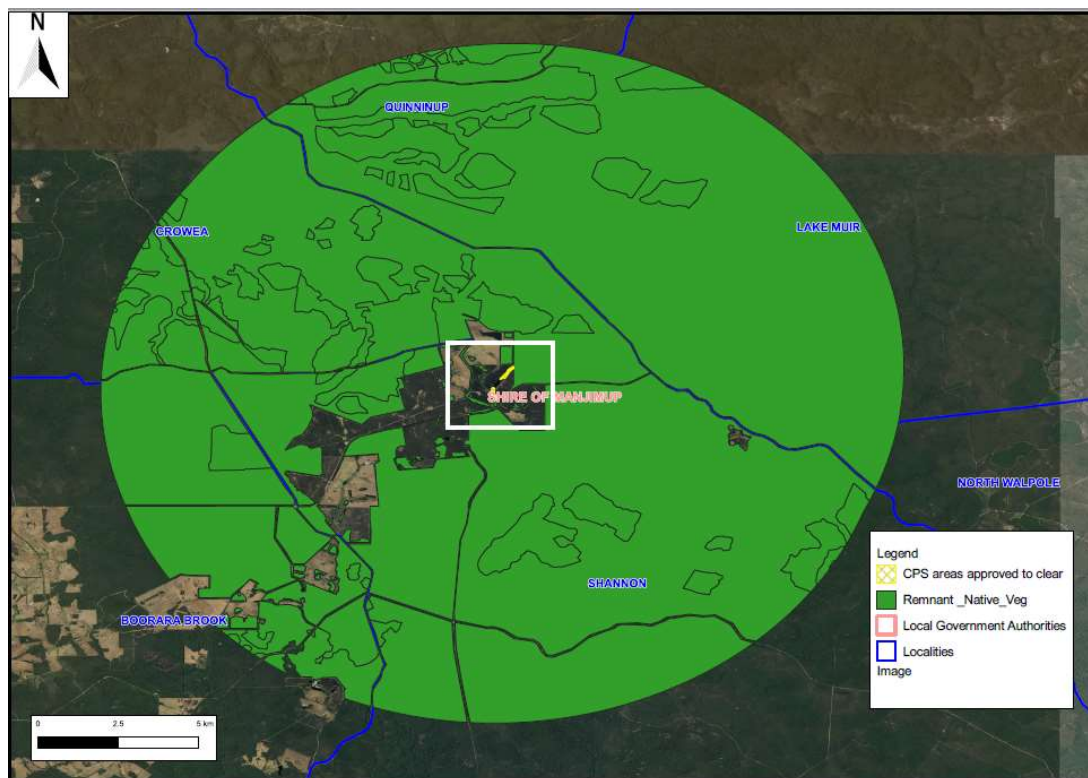


Figure 2. The extent of native vegetation in the local area (within 10 km radius from the application area) is approximately 92% of its original cover. Clearing in the local area has been carried out mainly for plantation and horticulture, including within the property within which the application area is located.

Eight (8) conservation significant flora species have been recorded in the local area; four (4) Threatened, two (2) Priority 3 and two (2) Priority 4. Most of the records are from within the conservation areas nearby, with none of the records being from within the application area. Considering its proximity to nearby conservation areas, the Department requested a targeted flora survey of the application area, which was subsequently conducted in November 2022. The survey identified the vegetation to be mostly riparian vegetation and confirmed the absence of any conservation significant flora species within the application area. It is considered that the application area is unlikely to provide habitat for these flora species (Emerge, 2022).

During a site inspection in December 2022, the Department noted the obvious infestation of weeds and termites in the area. Invasion of blackberry (*Rubus* sp.) in many parts of the application area was significant. It is noted that blackberry is a highly invasive weed that has been declared as a Declared Pest under section 22 of the *Biosecurity and Agriculture Management Act 2007* and is subject to Category 3 management under this legislation, aimed to reduce its harmful impacts, distribution or abundance, or to prevent or contain its spread. The proposed clearing may facilitate the spread of weeds and dieback and other diseases to other areas along the waterway, and into the adjacent Shannon National Park which could affect its conservation values and habitat quality. Stringent weed and dieback hygiene measures would minimise the likelihood of impacts arising from the clearing.

Conclusion

For the reasons set out above, it is considered that the impacts of the proposed clearing on the environmental values of the adjacent Shannon National Park can be managed by implementing steps to minimise the risk of the introduction and spread of weeds and dieback.

Conditions

To address the above impacts, the weed and dieback control and management condition will be required as conditions on the clearing permit:

3.2.2. Biological values -Fauna - Clearing Principles (b)

Assessment

The application area consists of two patches of riparian vegetation both upstream and downstream of the current dam wall on the property. The north-eastern tip of the northern patch is approximately 25 m from the border between the property and the Shannon National Park. The southern patch is bordering with paths that separate the creek from the plantation on the property. The riparian vegetation comprises of mostly *Eucalyptus diversicolor* (karri) *Allocasuarina decussata*, *Agonis flexuosa*, *Melaleuca lanceolata* and *Callistachys lanceolata* over dense *Lepidosperma effusum*, *Pteridium esculentum* and occasional *Rubus* sp (Emerge, 2022). Isolated stands of *Corymbia calophylla* (marri) and *Eucalyptus patens* (Blackbutt) also present. The vegetation will be inundated when the water level of the proposed enlarged dam reaches its maximum. The applicant proposed to remove the larger trees to the extent necessary before the dam reaches its full capacity.

According to available databases, fourteen (14) conservation significant fauna species are recorded from within a ten kilometre radius of the application area. Most of the records are from within the Shannon National Park. Four of the recorded fauna species are aquatic fish species recorded from streams located 5 and 6 km from the application area respectively. Two (2) of these are Vulnerable and two (2) are Endangered. Amongst the conservation significant aquatic fauna recorded locally, the mud minnow (*Galaxiella munda*, VU) has the most likelihood to be found in the Shannon River system for it is recorded most frequently (24 times) and requires freshwater ecosystems, unlike the other aquatic species. The fish is typically found in acidic but freshwater systems of undisturbed, permanent stream habitats and flowing creeks. Breeding occurs between winter and spring (July to October) (Threatened Species Scientific Committee, 2006). The proposed clearing area is occasionally void of water and the dam area contains stagnant water with limited flow, that it is unlikely to comprise significant habitat for the mud minnows, particularly during the low flow seasons. Since the proposed clearing area is located at the head of the catchment of the large river system, the limited amount of clearing is unlikely to have significant impacts on the quality of the surface water that would impact mud minnows occurring downstream. Disturbance associated with the proposed clearing would be short-term and localised. A condition requiring that clearing only be undertaken during low flow periods would mitigate potential impacts on habitat quality for the mud minnow and other aquatic fauna species.

The Vulnerable Chuditch (*Dasyurus geoffroii*) prefers large unfragmented habitats, including dense riparian jarrah forests. Chuditch are prone to predation by feral cats and foxes (Department of Environment and Conservation, 2012). Within the local area, three records of the Chuditch are known from within the Shannon National Park approximately 5.77 km southeast of the application area. Given its location in a general farming and plantation area and the availability of intact vegetation within the adjacent National Park, the application area is unlikely to comprise significant habitat for Chuditch.

The most recent record of brush-tailed phascogale (*Phascogale tapoatafa wambergeri*) in the local area was made in 1999 from within the Shannon National Park. Brush tailed phascogale inhabits dry sclerophyll forest and open woodlands with hollow bearing trees. Whilst brush-tailed phascogale may forage into the application area and its vicinity, given the absence of hollow bearing trees within the application area, the mostly disturbed environment of the property for plantation, and the presence of an intact forest immediately adjacent to it, the proposed clearing area is unlikely to comprise significant habitat for this species.

The Priority 4 Quenda (*Isoodon fusciventer*) has been recorded in the local area with the most recent record made in 1998. The closest record is approximately 4 km from the application area. Quenda may occur in the local area as it contains tall and dense vegetation. Although Quenda may use the habitat, the availability of the more densely vegetated areas within the adjacent National Park indicates Quenda are not likely to rely on habitat within application area.

Of the vertebrate fauna species of conservation significance identified, the fauna species most likely to occur over the application area are the Endangered Baudin's cockatoo (*Zanda baudinii*, previously *Calyptorhynchus baudinii*), Endangered Carnaby's cockatoo (*Zanda latirostris*, previously *Calyptorhynchus latirostris*) and the Vulnerable Forest red-tailed Black cockatoo (*Calyptorhynchus banksii naso*), together referred to as Black cockatoos. The application area is within the mapped distribution area of all three Black cockatoo species.

A black cockatoo survey of the application area (Harewood, 2022) indicated the absence of hollows from the emergent karri, marri and blackbutt trees. A hollow was found in a dead tree, which upon investigation using a drone was confirmed as unsuitable for black cockatoo without any signs of use. The survey asserted that the trees were too young to develop hollows and were of low foraging quality for black cockatoos. The Department followed the black cockatoo survey up with an inspection of the site in December 2022. The inspection identified that approximately 46 karri trees would be affected by the dam expansion, in addition to two *E. patens*, three *C.*

calophylla, and five *Allocasuarina decussata* scattered over the application area. The majority of the trees, except 10 karri and four of the *A. decussata* have a diameter measured at breast height (DBH) of more than 50 cm. The inspection confirmed the absence of hollows from the trees proposed to be cleared.

Black cockatoo species

Breeding and roosting

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).

Within the local context, while several black cockatoos records are known from the local area, no breeding site is recorded within a 12 km radius of the application area. The nearest breeding site of Carnaby's or Baudin's black cockatoo is situated 14.5 km northwest of the application area within the Dorganup National Park, whilst the nearest Forest Red-tailed black cockatoo known breeding site is approximately 46 km east of the application area, within the Mount Roe National Park. No roosting site is recorded within 12 km radius of the application area. The nearest active roosting site is situated 20 km west of the application area, near to the Hawke National Park.

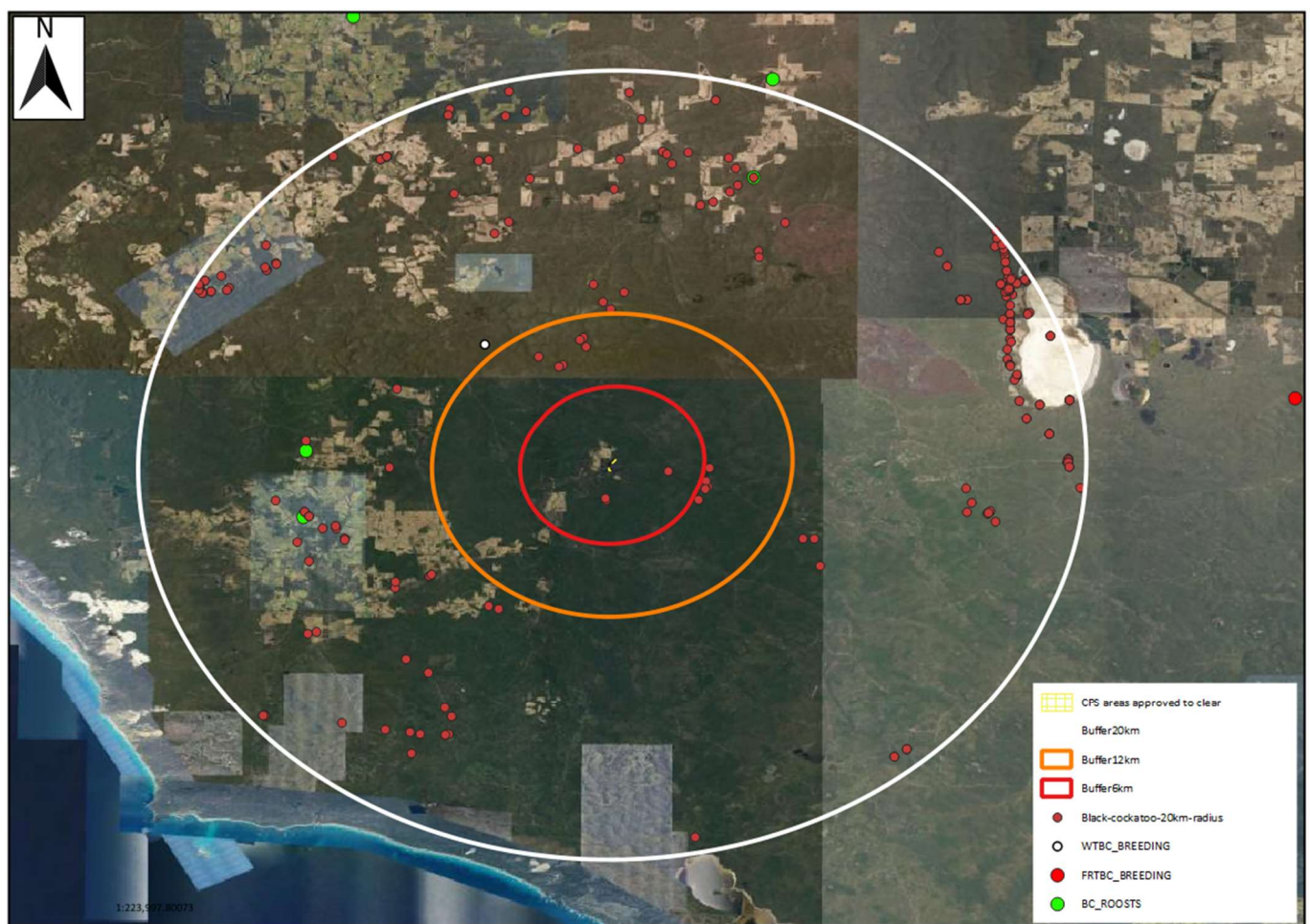


Figure 3. Records of black cockatoos within 20 km radius of the application area and beyond. No breeding or roosting sites is recorded within 12 km of the application area.

The assessment has identified that the application area is not likely to provide suitable breeding habitat. Baudin's cockatoo, Carnaby's cockatoo and the forest red-tailed black cockatoo are known to nest in hollows of live and dead trees, including marri, jarrah (*Eucalyptus marginata*), karri (*Eucalyptus diversicolor*), wandoo (*Eucalyptus wandoo*), tuart (*Eucalyptus gomocephala*), flooded gum (*Eucalyptus rudis*), and other *Eucalyptus* spp (Commonwealth of Australia, 2012). Suitable breeding habitat for black cockatoos includes trees which either have a suitable nest hollow or are of a suitable diameter at breast height (DBH) to develop a nest hollow. For most tree species, a suitable DBH is 500 millimetres (Commonwealth of Australia, 2012). Although the majority of the karri and all of marri and blackbutt trees in the application area have DBH greater than 500 millimetres, a site inspection by the Department and a black cockatoo survey of the area (Harewood, 2022) identified that none of the trees contain hollows suitable for breeding. One dead tree with a hollow was investigated using a drone and it was confirmed that the hollow was unsuitable for black cockatoos and without any sign of use by black cockatoos (Harewood, 2022).

While it is acknowledged that the application area may provide breeding habitat in the future, it is not considered to represent critical breeding habitat at present. It is acknowledged that a stand of 10 older and taller karri trees within the property will be retained and avoided from impact, which may contribute to future breeding or roosting habitat in the local area. It is also noted that there is more than 30,000 hectares of protected remnant vegetation within the Shannon National Park nearby, which is likely to provide current and future breeding habitat for black cockatoo species. Given the above, the proposed clearing is not considered likely to comprise significant breeding and roosting habitat for black cockatoo species and is not considered likely to significantly impact breeding by black cockatoo species in the local area.

Foraging habitat

Food resources within the range of breeding sites and roost sites are important to sustain populations, and foraging resources are therefore viewed in the context of known breeding and night roosting sites, particularly within 12 kilometres of an impact area (Commonwealth of Australia 2017). Overlapping foraging ranges within 12 km also support roosting sites and maintain habitat connectivity and movement across the landscape (EPA, 2019). Forest red-tailed black cockatoo forages within jarrah and marri woodlands and forest, and edges of karri forests including wandoo and blackbutt, within the range of the subspecies. The species largely feeds on seeds of marri and jarrah, as well as other *Eucalyptus* species and *Allocasuarina* cones (Commonwealth of Australia, 2012; Department of Environment and Conservation, 2008). Baudin's cockatoo prefers foraging within Eucalypt woodlands and forest, and proteaceous woodland and heath. During the breeding season (October to late January/early February) this species has a preference for marri seeds. Outside the breeding season the species may feed in fruit orchards and tips of *Pinus* spp. (Commonwealth of Australia, 2012; Department of Environment and Conservation, 2008). Carnaby's cockatoo feeds on the seeds, nuts and flowers of a large variety of plants including Proteaceous species (*Banksia*, *Hakea* and *Grevillea*), as well as *Allocasuarina* and *Eucalyptus* species, *Corymbia calophylla* and a range of introduced species (Valentine and Stock, 2008).

While *E. diversicolor* (karri) can develop hollows suitable for breeding and roosting by black cockatoos, it is not the preferred species for feeding (Department of Environment and Conservation, 2008; Commonwealth of Australia, 2012; Valentine and Stock, 2008). Removal of the karri trees from the application area, therefore, is not considered likely to significantly impact the availability of high-quality foraging habitat for black cockatoo species in the local area.

The three individual marri and two blackbutt trees scattered within the application area may provide foraging resources for black cockatoos. However, the assessment has identified that these trees are not likely to provide significant foraging habitat. Significant habitat refers to the resources (breeding, roosting and feeding), connectivity or habitat area for a species or community that is critical for its survival. Given the distance between the application area and the known breeding or roosting sites, the application area is outside of the feeding range for the known breeding and roosting sites. Noting the location of the application area with regards to the Shannon National Park located nearby and the extent of remnant vegetation in the local area, the five trees are unlikely to provide significant foraging habitat for black cockatoos. Removal of these five trees is considered unlikely to significantly reduce the amount of food available to black cockatoo species within the local area, nor impact on the survival of chicks from the nearest confirmed breeding sites.

Although the removal five trees does not represent a significant residual impact on foraging resources at a local and regional scale, the assessment acknowledged that within the context of long-term viability and availability of food sources for black cockatoos, measures should be taken to mitigate the impact. A mitigation planting was proposed and calculation undertaken using the WA Environmental Offsets Metric Calculator to determine the ratio required to mitigate the loss of 5 trees. Based on this calculation, it was determined that 7 trees are required to be

planted as a suitable mitigation measure. A revegetation condition has been placed on the permit in support of the applicant's commitment to undertake revegetation as a mitigation measure.

Ecological linkage

The application area is not within a mapped ecological linkage. The proposed clearing will not result in the severance of ecological linkage function, particularly given the presence of an existing dam between the two areas which comprise the application area. Taking into account the relatively limited size of the application area compared to the extent of native vegetation in the local area, it is not considered likely that the proposed clearing will restrict the movement of fauna or the ability of black cockatoos to migrate across the landscape.

Conclusion

Based on the above assessment, the proposed clearing will result in the loss of five trees which may be used as foraging habitat for all three black cockatoo species. For the reasons set out above, it is considered that the impacts of the proposed clearing on black cockatoo foraging habitat are unlikely to be significant in the context of the broader landscape and that the proposed clearing does not constitute a significant residual impact. It is considered that potential direct impacts to ground-dwelling or arboreal fauna resulting from the proposed clearing can be managed through the application of a directional clearing condition. Potential direct impacts to conservation significant riverine fauna species, in the event they occur, can be managed through a condition which requires clearing only be conducted in low flow periods.

Conditions

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

- undertake planting of a minimum of 7 trees which comprise black cockatoo foraging species including *Corymbia calophylla* and *Eucalyptus patens* within the property
- undertake slow, progressive one directional clearing to allow terrestrial fauna to move into adjacent habitat ahead of the clearing activity
- undertake clearing during low flow periods to avoid impacts to riverine fauna.

3.2.3. Land and water resources - Clearing Principles (f), (g) and (i)

Assessment

The proposed clearing is located on the headwater of a non-perennial, minor tributary to a tertiary tributary of the Shannon River. It is located approximately 10 km upstream of the Shannon River's main channel. The Shannon River catchment discharges into Broke Inlet and is part of a larger catchment measuring 3295 km² in total area located in a region that has the highest rainfall in Southwest Western Australia. Only small areas of the Shannon River are cleared for agriculture, with the majority of the catchment being covered in dense remnant vegetation is protected by conservation estates. Most of the inland waters of the Shannon River area are fresh (Storer, T. et.al., 2011).

The vegetation within the application area has the characteristics of riparian vegetation, comprises mainly of *Melaleuca lanceolata* and *Callistachys lanceolata* over dense *Lepidosperma effusum*, *Pteridium esculentum* and occasional **Rubus* sp with emergent *Eucalyptus diversicolor* (karri) *Allocasuarina decussata*, and *Corymbia calophylla* (marri) and *Eucalyptus patens* (Blackbutt). The channel and immediate margins support vegetation in Good to Very Good condition, whilst the margins and exterior of the site are cleared and comprise of native and non-native herbs, weed species including *Rubus* sp. (blackberry), grasses, and bare ground in Degraded to completely Degraded condition (Emerge, 2022). Invasion of blackberry was visible in the southern part of the application area (DWER, 2022).

The enlarged dam will inundate riparian vegetation. However, it is acknowledged that only a portion of the application area is contained within the main channel in good condition and that the vegetation along the non-perennial tributary has been modified due to the existing dam and plantation. It is also noted that the southern part of the application area is mapped as an inland flat which is naturally inundated by water from time to time (DPRID, 2019), therefore, inundation of this area by the dam is unlikely to result in significant changes to local ecosystems. Given the above, within the context of a much larger area of the Shannon River catchment, the vegetation within the application area is unlikely to contribute significantly to the function of riparian communities associated with the Shannon River systems or in the local area. The assessment has identified that the proposed removal or inundation of the riparian vegetation proposed clearing is unlikely to result in any significant or long-term impacts to the ecological values of the mapped non-perennial tributary within the application area.

Clearing activity may disturb the soils on the banks and beds of the watercourse, which may result in increased transport of sediment and nutrients and degrade the river water quality downstream. However, since the proposed

clearing area is located at the head of the catchment of the large river system, limited clearing is unlikely to have significant impacts on the quality of the surface water. Given the relatively small area of clearing within the context of the large catchment, the disturbance would likely be localised and short term. The likelihood of possible detrimental impacts on water quality due to sediment and nutrient exports, if present, could be ameliorated further by conducting clearing only during dry conditions. These risks could be further mitigated through a permit condition requiring that construction of the dam wall commences within 2 months of the clearing being conducted.

The soils within the banks of the stream where clearing is proposed, fall within the Minor Valleys S1 (Pimelia) soil system. The mapped soils are highly susceptible to wind erosion, with medium risks associated with waterlogging and nutrient export (DPIRD, 2019). Given the proposed clearing location on the banks of the watercourse which will likely be inundated by water after the dam is built, risks posed by wind erosion are likely to be low. The relatively small extent of the application area within the context of the densely vegetated area immediately adjacent, indicates that the proposed clearing is not likely to have an appreciable impact on land degradation due to wind erosion. Waterlogging within the dam is the intended result of building the dam, for which the clearing is proposed. Therefore, clearing of the riparian vegetation is unlikely to exacerbate any waterlogging present.

Conclusion

Based on the above assessment, clearing activities may have short term impact on the quality of the surface water. However, the proposed clearing is unlikely to have significant impact on the quality and quantity of water in the watercourse, particularly if clearing is conducted in dry conditions and in stages to minimise disturbances and possible transport of sediment and nutrient (phosphorus). Clearing will also unlikely increase the risks of land degradation due to wind erosion in the surrounding area. Management conditions placed against the permit could minimise and mitigate the potential impacts.

Conditions

To address the above impacts, conducting clearing only in dry conditions outside of the high flow period and construction of the dam wall no later than 2 months after the authorised clearing will be required as a condition on the clearing permit.

3.3. Relevant planning instruments and other matters

The Warren-Donnelly District's Natural Resources Management Office advised NVR that the application area is within the Shannon River catchment. The catchment is not proclaimed under the *Rights in Water and Irrigation Act 1914*. As such, the proposed enlarged dam does not require a S17 permit to interfere the stream or S5C licence to take water. The application area is also outside of the areas stipulated by the *Country Areas Water Supply Act 1947* (CAWS Ac).

The Shire of Manjimup advised the Department that the Shire does not have objection to the proposed dam enlargement. The Shire confirmed that there are no planning or other matters that would affect the proposal. The property is zoned under Local Planning Scheme No. 4 as "Priority Agriculture". Given the proposed dam is an on-stream dam for horticultural purposes, and that the dam is within the property with edges of the dam being more than 20 m from the lot boundaries, Shire planning approval is not required.

The dam development works should be conducted in a manner consistent with the Water Quality Protection Note 53 "Dam construction in rural areas", whereby disturbance during typical high flow period is to be avoided. In the area, the high flow period runs between 1 May to 30 November (Government of Western Australia Department of Water, 2006).

No Aboriginal sites of significance has been mapped within the application area. The permit holder is responsible to comply with the *Aboriginal Heritage Act 1972* (WA) and ensure that no Aboriginal Sites of Significance are damaged through the clearing process.

End

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 and a public submission. The applicant has addressed the concerns by providing reports from the requested surveys over the application area. Summary of the survey reports are presented in Appendix D.

Appendix B. Details of public submission

Summary of comments	Consideration of comment
<p>The application and supporting information do not indicate if any of the trees to be cleared are suitable for the endangered Black cockatoos for foraging, breeding or roosting.</p>	<p>DWER requested further information regarding the suitability of the trees for Black cockatoo habitat. A Black cockatoo survey was requested to be performed over the application area (DWER, 2022. DWER Ref A2072332).</p> <p>A Black cockatoo survey (Harewood, 2022) identified that the proposed clearing area contains young karri and marri trees among sedges. All trees, except for a dead one, do not contain any hollows. An inspection of the hollow using a drone indicated that the dead tree was not suitable for roosting or breeding by black cockatoos, and any signs of usage by Black cockatoo were absent. Signs of foraging by black cockatoo were also absent.</p> <p>A site inspection by DWER in December 2022 confirmed that although the vegetation may be suitable for black cockatoos, no hollows were evident in any of the trees proposed to be cleared. Signs of foraging or roosting were also absent from the site.</p>
<p>The application area is within the range for Baudin's, Carnaby's and Forest Red-tailed black cockatoos. Records show the presence of all three Black cockatoos in the vicinity. Black cockatoos are now considered to be critically endangered (CSIRO, 2020) and faces the highly likely possibilities of extinction unless destruction of their habitat stops. The main cause for their decline is habitat destruction that it is important to ensure their survival rate rather than their extinction. Therefore, any habitat present, whether for breeding, roosting or foraging has to be protected and conserved at all costs.</p>	<p>It is acknowledged that the application area is within the mapped distribution area for Baudin's, Carnaby's and Forest Red-tailed black cockatoos. Breeding and roosting habitat for black cockatoos is absent from the application area. The nearest confirmed breeding and roosting sites for all black cockatoo species are greater than 12 km from the application area, and the vegetation within the application area would not provide foraging resources for any cockatoos utilising those sites.</p> <p>Three marri and two blackbutt trees within the application area may provide feeding habitat to black cockatoos foraging in the area. Noting the distance of the application area to the nearest confirmed breeding or roosting sites, in addition to the abundance of protected native vegetation assumed to provide similar or better quality habitat within the local area, the removal of these five trees is unlikely to result in a significant reduction to the amount of food available to breeding birds.</p>
<p>The clearing/dam should not be permitted at all, or be altered accordingly to retain suitable trees i.e. jarrah, marri and other foraging flora sources etc. Flora species for Black cockatoos foraging, including marri and jarrah are also considered near threatened</p>	<p>A Black cockatoo survey (Harewood, 2022) and site inspection by DWER indicated that the vegetation contains emerging marri (3 trees), karri (approximately 46 trees) and blackbutt (2 trees). No jarrah trees were identified in the application area. Marri and blackbutts</p>

Summary of comments	Consideration of comment
(and or endangered). With more frequent prescribed burns, wildfire and climate change, trees will not grow as fast as they once did. Jarrah trees will only flower every 2 – 3 years that it will not provide yearly foraging food for Black cockatoos. In combination, this will result in more pressure to the survival of Black cockatoos. Small number of felling here and there adds up to the total loss of foraging, breeding and roosting trees. It is imperative that trees which are crucial to their survival are retained.	<p>are preferred feeding species for Black cockatoos, whilst karri is known to be a preferred species for breeding and nesting. Whilst most of the identified trees have a DBH > 50 cm, none of the trees contained any observable hollows, with the exception of one dead tree. However, the hollow within this was determined to not be suitable for Black cockatoos.</p> <p>During assessment, the applicant agreed to modify the dam design to preserve and avoid impacts on a stand of 10 mature karri trees, as well as one mature marri tree. Being among the tallest and oldest trees on the property, the trees have the greatest potential as future breeding and roosting habitat.</p> <p>The emerging marri, karri and blackbutt trees are considered of poor quality for foraging by Black cockatoos (Harewood, 2022). Although the application area currently comprises limited feeding resources, a mitigation measure is required to further minimise impact on BC populations in the area. The applicant is required to plant a minimum of 7 foraging tree species to counterbalance the loss of 2 blackbutt and 3 marri trees to ensure long term viability of black cockatoo feeding resources in the local area.</p>

Appendix C. Site characteristics

C.1. Site characteristics

Characteristic	Details
Local context	<p>The area proposed to be cleared is part of a strip of remnant native vegetation along a stream that transects a property previously cleared and utilised for the purposes of a plantation. The application area is bordered by the Shannon National Park on the eastern boundary, with and expansive areas of conservation reserve within close proximity.</p> <p>The local area (10 km radius from the application area) largely comprises of the catchment areas for the Shannon River to the east and south, the Warren River to the north and west, and the Gardner River to the southwest.</p> <p>The local area retains more than 90% native vegetation. Within the local context, there is limited development within the Shannon River Basin. An area southwest of the application area within the Gardner River catchment has been cleared and utilised for plantation and perennial horticultural activities.</p>
Ecological linkage	The application area is not a part of any formal ecological linkages. However, being riparian vegetation, the vegetation in the application area may provide a corridor for fauna movement along the stream.
Conservation areas	The property within which the clearing is proposed is surrounded by several conservation areas reserved for national parks, fauna conservation and camping / recreation purposes. The application area borders with the Shannon National Park (class A reserve) immediately east of the property.
Vegetation description	The vegetation to be cleared is contained along a waterway that runs through a minor valley in an upland setting. Vegetation in the channel and immediate margins comprises of dense remnant native and/or native regrowth riparian vegetation with a canopy dominated by <i>Eucalyptus diversicolor</i> , <i>Allocasuarina decussata</i> , <i>Agonis flexuosa</i> , <i>Melaleuca lanceolata</i> and <i>Callistachys lanceolata</i> over dense <i>Lepidosperma</i>

Characteristic	Details
	<p><i>effusum</i>, <i>Pteridium esculentum</i> and occasional *<i>Rubus</i> sp. The vegetation in the margins and exterior of the channel comprises native and non-native herbs, grasses and bare ground (Emerge, 2022).</p> <p>A report from the Black cockatoo survey (Harewood, 2022) indicated that the vegetation present is generally represented by a tall dense shrubland over sedges with scattered emergent karri (<i>E. diversicolor</i>), occasional marri (<i>Corymbia calophylla</i>) and blackbutt (<i>E. patens</i>).</p> <p>The vegetation, as described above, is consistent with the Granite Valley S1 (245) type of vegetation which is described as tall open forest of <i>Eucalyptus diversicolor</i>-<i>Corymbia calophylla</i> on slopes with some <i>Eucalyptus patens</i> and <i>Eucalyptus megacarpa</i> on valley floors in hyperhumid and perhumid zones.</p> <p>The mapped vegetation type retains approximately 84.6 percent of the original extent (Government of Western Australia, 2019)</p>
Vegetation condition	<p>According to the flora survey, vegetation in the immediate margins and channel is Good to Very Good condition (Keighery, 1994). The area in the margins and exterior site are cleared and comprises native and non-native herbs and grasses in Degraded to Completely Degraded condition (Keighery, 1994).</p> <p>The full Keighery (1994) condition rating scale is provided in Appendix E. Representative photos are available in Appendix F.</p>
Climate and landform	<p>The application area contains portions of waterway that runs through a minor valley in an upland setting (Emerge, 2022).</p> <p>The topography of the local area is characterised by gentle undulating landscape with perennial and non-perennial streams at the bottom of the valley.</p> <p>Climate of the area is characterised by a high rainfall (between 1200 to 1300 mm rainfall isohyets) and evapotranspiration of 1200 mm (Isopleth).</p>
Soil description	<p>The soils in the channel are heavy and generally inundated / ponded (Emerge, 2022). The soil unit is mapped as Minor Valleys S1 (Pimelia) (254PvS1) characterised by valleys in granitic terrain, narrow swampy floor; <20 m relief, with gravelly yellow duplex soils on smooth flanks; Jarrah-Marri-Karri forest; Peaty soils on narrow floor; and Wattle low forest.</p>
Land degradation risk	<p>The soils within the application area are susceptible to wind and water erosion, nutrient export and subsurface acidification.</p>
Waterbodies	<p>The watercourses in the local area drain into the Shannon River, Warren River and the Gardner River. The application area is located near to the head water of a minor, non-perennial stream which is a minor tributary to the Shannon River system. The southern part of the application area is situated at the confluence between two minor non perennial streams. The water in the Shannon River and its tributaries is fresh.</p>
Hydrogeography	<p>The application area is within the Shannon River catchment / basin. The non-perennial watercourse within which the application area is situated, drains into a tributary of the Shannon River.</p> <p>The local area has three major perennial rivers, namely the Shannon River, the Canterbury River and the Boora Brook. The perennial and non-perennial streams and rivers within the local area are parts of the Shannon, Warren and Gardner River Basins. The local area is the Warren-Denmark hydrological zone which is characterised by a topography that rises in a series of broad benches from the Southern Ocean.</p>

Characteristic	Details
	The application area is outside of any groundwater or surface water areas proclaimed under the RIWI Act or the CAWSA Part 2 Clearing Control Catchments.
Flora	<p>Eight conservation significant flora species have been recorded from the local area, four of them are classified as Threatened, two Priority 3 and two Priority 4. None of the records occur within the application area.</p> <p>A targeted flora survey was performed in October 2022 (Emerge, 2022). The survey did not identify any of the conservation significant flora species in the application area.</p>
Ecological communities	<p>No TEC or PEC is mapped within a 10 km radius of the application area.</p> <p>The nearest significant ecological community is that of Aquatic invertebrate assemblages of granite outcrops associated with Burnside Batholith (formerly Southern granite pool community (Muirillup Rock - Northcliffe) – P2), located approximately 13 km southwest of the application area.</p>
Fauna	Several conservation significant fauna species have been recorded from the local area. These records include threatened Black cockatoo species, <i>Galaxiella</i> taxa (strip minnows) and quokkas. Many of these records are historical records, none of which occur within the application area. The closest Black cockatoo record is 350 metres from the application area. The local area is within the mapped distribution area of the Baudin's, Carnaby's and Forest Red-tail Black cockatoos.

C.2. Vegetation extent

	Pre-European extent (ha)	Current extent (ha)	Extent remaining (%)	Current extent in all DBCA managed land (ha)	Current proportion (%) of pre-European extent in all DBCA managed land
IBRA bioregion*					
Warren	833,981.98	667,164.84	79.99	550,362.11	82.49
Vegetation complex					
Southwest Forrest (Mattiske) vegetation complex					
Granite Valley S1 (245)	25,606.64	21,661.73	84.60	19,515.81	76.21
Local area					
10km radius	41,639.3	38,514.47	92.49		

*Government of Western Australia (2019a)

**Government of Western Australia (2019b)

C.3. Flora analysis table

Species name	Conservation status	Suitable habitat features? [Y/N]	Suitable vegetation type? [Y/N]	Suitable soil type? [Y/N]	Distance of closest record to application area (km)	Number of known records (total)	Are surveys adequate to identify? [Y, N, N/A]
<i>Actinotus repens</i>	3	Y	Y	Y	9.33	1	Y
<i>Brachyscias verecundus</i>	T	Y	Y	Y	3.65	2	Y
<i>Caladenia christineae</i>	T	N	N	Y	6.80	1	Y
<i>Caladenia winfieldii</i>	T	N	N	N	5.78	1	Y
<i>Cyathochaeta stipoides</i>	3	Y	N	N	6.46	2	Y
<i>Kennedia glabrata</i>	T	N	N	N	9.09	1	Y
<i>Lomandra ordii</i>	4	Y	Y	Y	5.77	6	Y
<i>Myriophyllum trifidum</i>	4	N	Y	Y	5.25	2	Y

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

C.4. Fauna analysis table

Species name	Conservation status	Suitable habitat features? [Y/N]	Suitable vegetation type? [Y/N]	Distance of closest record to application area (km)	Number of known records (total)	Are surveys adequate to identify? [Y, N, N/A]
<i>Bettongia penicillata ogilbyi</i> (Woylie, brush-tailed bettong)	CR	Y	Y	7.54	11	N/A
<i>Zanda baudinii</i> (previously <i>Calyptorhynchus baudinii</i>) (Baudin's cockatoo)	EN	Y	Y	2.37	9	N/A
<i>Zanda latirostris</i> (previously <i>Calyptorhynchus latirostris</i>) (Carnaby's cockatoo)	EN	Y	Y	2.22	4	N/A
<i>Calyptorhynchus</i> sp. 'white-tailed black cockatoo' (White-tailed black cockatoo)	EN	Y	Y	0.37	9	N/A
<i>Dasyurus geoffroyi</i> (chuditch, western quoll)	VU	Y	Y	5.77	3	N/A
<i>Galaxiella munda</i> (Mud minnow, western dwarf galaxias)	VU	Y	Y	5.14	24	N/A
<i>Galaxiella nigrostriata</i> (Black-stripe minnow, black-striped dwarf galaxias)	EN	Y	Y	6.53	9	N/A
<i>Hydromys chrysogaster</i> (Water-rat, rakali)	P4	Y	Y	8.51	2	N/A
<i>Isoodon fusciventer</i> (quenda, southwestern brown bandicoot)	P4	Y	Y	3.98	12	N/A
<i>Lepidogalaxias salamandroides</i> (Salamanderfish)	EN	Y	Y	5.61	4	N/A

Species name	Conservation status	Suitable habitat features? [Y/N]	Suitable vegetation type? [Y/N]	Distance of closest record to application area (km)	Number of known records (total)	Are surveys adequate to identify? [Y, N, N/A]
<i>Nannatherina balstoni</i> (Balston's pygmy perch)	VU	Y	Y	6.53	5	N/A
<i>Notamacropus eugenii derbianus</i> (Tammar wallaby)	P4	Y	Y	7.56	86	N/A
<i>Notamacropus irma</i> (Western brush wallaby)	P4	Y	Y	8.48	6	N/A
<i>Phascogale tapoatafa wambenger</i> (south-western brush-tailed phascogale, wambenger)	CD	Y	Y	4.49	6	N/A
<i>Setonix brachyurus</i> (Quokka)	VU	Y	Y	6.18	49	N/A

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

C.5. Land degradation risk table

Risk categories	Minor Valleys S1 (Pimelia)
Wind erosion	H1: 50-70% of map unit has a high to extreme wind erosion risk
Water erosion	M1: 10-30% of the map unit has a high to extreme hazard
Salinity	L2: 3-10% of the map unit has a moderate or high hazard or is presently saline
Subsurface Acidification	M2: 30-50% of the map unit has a high susceptibility
Flood risk	L1: <3% of the map unit has a moderate to high hazard
Water logging	M1: 10-30% of the map unit has a high to extreme hazard
Phosphorus export risk	M1: 10-30% of the map unit has a high to extreme hazard

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 area proposed to be cleared does not contain conservation significant flora, or habitat which is considered significant for any conservation significant species. The application area does not comprise high biodiversity values relative to those likely to be present within the vast conservation reserves within the local area.</p>	Not likely to be at variance	Yes <i>Refer to Section 3.2.1, above.</i>
<p><u>Principle (b):</u> "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."</p>	At variance	Yes <i>Refer to Section 3.2.2, above.</i>

Assessment against the clearing principles	Variance level	Is further consideration required?
<p><u>Assessment:</u></p> <p>The area proposed to be cleared contains foraging habitat which may be used by threatened Black cockatoo species. Noting the limited amount of habitat to be cleared and availability of protected habitat nearby which is assumed to be of similar or better quality, it is unlikely that the application area comprises a significant habitat for fauna</p>		
<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>A targeted flora survey conducted in October 2022 (Emerge, 2022) indicated that area proposed to be cleared does not contain any threatened flora species or habitats that would support threatened flora species.</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 area proposed to be cleared and the local area (10 km radius) do not contain species that can indicate a threatened ecological community.</p>	Not likely to be at variance	No
Environmental value: 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 are consistent with the national objectives and targets for biodiversity conservation in Australia. The vegetation proposed to be cleared is not considered to be part of a significant ecological linkage in the local area.</p>	Not likely to be at variance	No
<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>The application area is adjacent to the Shannon National Park. The proposed clearing has potential to impact on the environmental values of adjacent conservation areas through the introduction of weeds and dieback. Conditions have been imposed on the permit to mitigate these risks.</p>	May be at variance	Yes <i>Refer to Section 3.2.2, above.</i>
Environmental value: 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>The proposed clearing area comprises mostly of riparian vegetation occurring along a creek. The proposed dam expansion will result in the inundation of the riparian vegetation. The proposed clearing may impact on the on and off-site hydrology and water quality, particularly downstream of the river.</p>	At variance	Yes <i>Refer to Section 3.2.3, above.</i>

Assessment against the clearing principles	Variance level	Is further consideration required?
<p><u>Principle (g)</u>: “Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.”</p> <p><u>Assessment</u>:</p> <p>Dam construction may result in increased sedimentation downstream, which may cause land degradation. The map soils are also highly susceptible to wind erosion, nutrient export and acidification. Management conditions have been imposed on the permit to address these risks.</p>	May be at variance	Yes <i>Refer to Section 3.2.3, above.</i>
<p><u>Principle (i)</u>: “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.”</p> <p><u>Assessment</u>:</p> <p>The application area is situated on a non-perennial minor tributary to the Shannon River system. The proposed clearing may impact surface or ground water quality. Management conditions have been imposed on the permit to address these risks.</p>	May be at variance	Yes <i>Refer to Section 3.2.3, above.</i>
<p><u>Principle (j)</u>: “Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.”</p> <p><u>Assessment</u>:</p> <p>The 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>	Not likely to be at variance	No

Appendix E. Vegetation condition rating scale

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

Considering its location, the scale below was used to measure the condition of the vegetation proposed to be cleared. This scale has been extracted from Keighery, B.J. (1994) *Bushland Plant Survey: A Guide to Plant Community Survey for the Community*. Wildflower Society of WA (Inc). Nedlands, Western Australia.

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.

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

Appendix F. Dam design and Targeted Flora and Black cockatoo surveys

Dam design and topography survey

The applicant provided detailed drawing and survey of the proposed dam with options to consider. Two options were particularly considered by the applicant, namely “Option 4” and “Option 5” (Figure xx and Figure xx). The original site of new dam wall selected by the applicant at the time of clearing application submission was depicted by “Option 5”. During assessment, the applicant decided to move the dam wall position further upstream to provide a minimum of 5 meters buffer around a clump of 10 old karri trees at the foot of the dam, depicted in Figure xx, to avoid impacts of the dam on the root systems of these trees. This option has not only avoided impact on the old karri trees, but also reduce the clearing area.

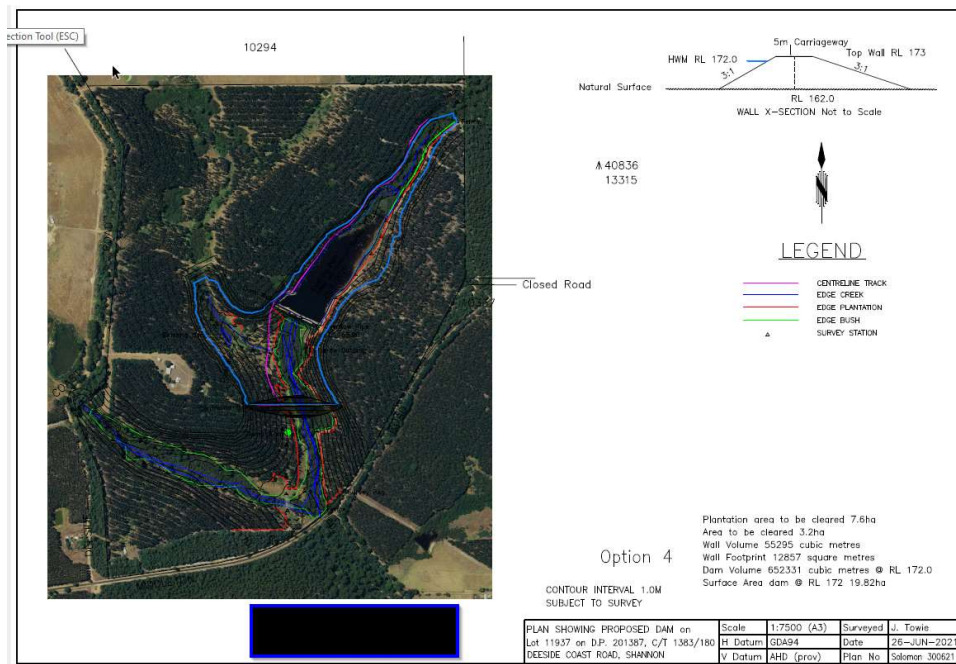


Figure 4. Dam design “Option 4” places the dam wall slightly upstream of that of “Option 5”. The blue polygon represents the wetted area which mostly consists of plantation vegetation. The green lines mark the extent of remnant riparian native vegetation.

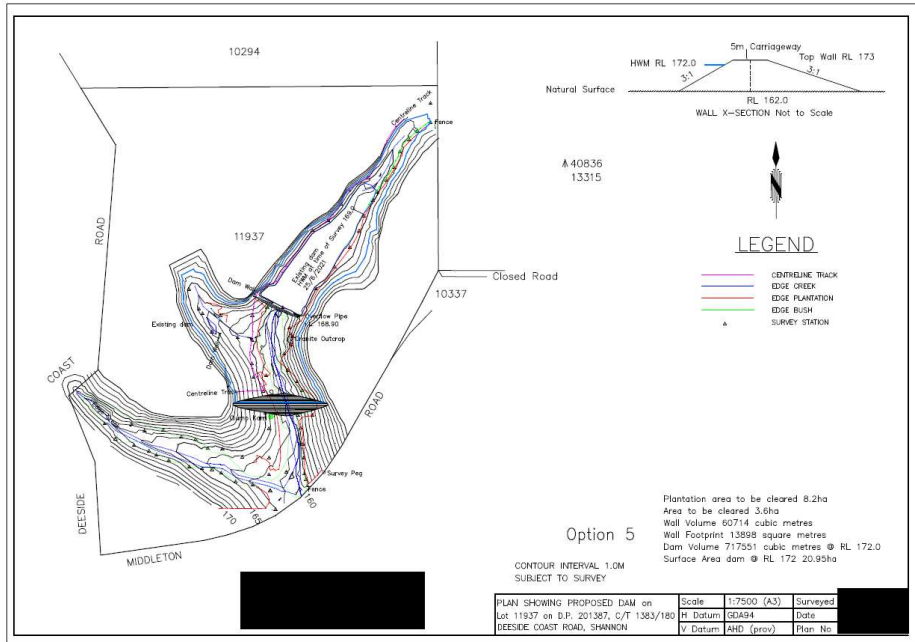


Figure 5. Dam design “Option 5” would result in slightly larger surface area and volume of dam but is too close to the clump of older karri trees at the foot of the dam wall. This option was selected when the clearing permit application was submitted.

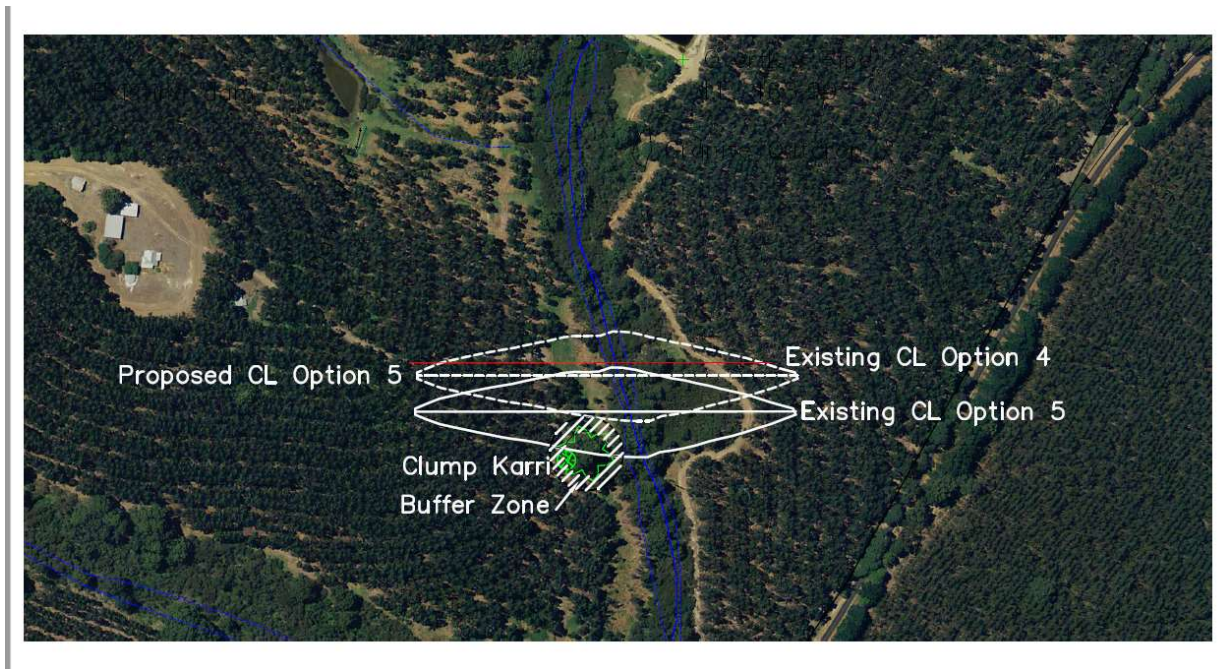


Figure 6. The final location of the dam wall is indicated by the dashed line, located between Option 4 and 5 (referred to as Option 4D). This option results in slightly less surface area dan dam capacity than Option 5, but it avoids impact on the clump of older karri trees (the green spot) and the clearing of a large marri tree. The Applicant chose this option during assessment.

Targeted Flora Survey (Emerge, 2022)

In April 2022 the Department of Water and Environment Regulation (DWER) requested a targeted survey be conducted to confirm the absence of the following conservation significant flora within the site:

- *Actinotus repens* (Priority 3)
- *Brachyscias verecundus* (Threatened)
- *Lomandra ordii* (Priority 4).

Emerge Associates were engaged by Arkenstone Pty Ltd and March Bell Pty Ltd to conduct this targeted flora survey and provide a report for submission to DWER. An experienced botanist from Emerge Associates visited the site on 7 October 2022 and completed the targeted flora survey. During the survey the botanist traversed the site searching areas of suitable habitat. A hand-held GPS receiver was used to record a tracklog of the survey, and also the location of individuals of target flora or other conservation significant flora if detected.

Results

The site contains portions of a waterway that runs through a minor valley in upland setting. Soils were heavy and generally inundated / ponded.

The channel and immediate margins support dense remnant native and/or native regrowth riparian vegetation in 'good' and 'very good' condition, with a canopy dominated by *Eucalyptus diversicolor*, *Allocasuarina decussata*, *Agonis flexuosa*, *Melaleuca lanceolata* and *Callistachys lanceolata* over dense *Lepidosperma effusum*, *Pteridium esculentum* and occasional **Rubus* sp.2 (Keighery 1994). The margins and exterior of site are cleared and comprise native and non-native herbs, grasses and bare ground in 'degraded to completely degraded' condition, or support a variety of non-native herbs and grasses in 'completely degraded' condition.

No individuals of the target flora or any other threatened or priority species were detected in the site. No other threatened or priority species were detected or are considered to occur in the site.

Black cockatoo habitat survey (Harewood, 2022)

The applicant commissioned Mr Greg Harewood to perform a black cockatoo habitat survey in response to the Department request for further information.

The survey was performed on 1 October 2022.

Methods

Breeding habitat:

The assessment involved a series of transects across the survey area while searching for trees which contained or potentially contained one or more hollows that appeared suitable or potentially suitable for black cockatoos to use for nesting purposes. Details on each tree were recorded including species, location, number and type of hollows observed. Potential hollows were initially placed into one of three categories based on the type of hollow entry:

- Chimney: the hollow entry faces directly upwards in the end of the trunk;
- Spout: hollow entry which is at the end of a broken branch; or
- Side: the entry is directly into the side of the trunk or a branch with no protrusions.

For the purpose of this review, hollows have then been placed into one of five categories based on the observable characteristics of each hollow. The categories used were:

- Confirmed Hollow: Black cockatoos observed utilising the hollow for breeding purposes;
- Chewed Hollow: The hollow shows signs of chewing ("chipping" around or near entrance and/or internally) attributed to black cockatoo activity (in most cases indicating nesting activity, but in some cases possibly marks left by black cockatoos investigating ("prospecting") hollows);
- Unused Hollow: The hollow appears to be of a suitable size for black cockatoos to use for nesting, but no conclusive evidence of this activity seen. It should be noted that chew marks/chipping are not always evident or present on some hollows that have been used for nesting. Hollows classified as "unused" may therefore have been used for nesting but cannot be specifically classified as such. Alternatively, some "unused" hollows may not be suitable for black cockatoos as a range of characteristics, not all of which can be seen or measured, ultimately determined if a hollow will ever actually be used;
- Unsuitable Hollow: The hollow has been assessed, based on information obtained, as being unlikely to be suitable for black cockatoos (generally because of the entrance appearing to be too small or because the actual hollow or accommodating branch/tree trunk appears to be too small or as having an unfavourable orientation);
- No Hollow: A possible hollow was found upon closer inspection to not be present. Identified hollows were examined using binoculars for evidence of actual use by black cockatoos (e.g. chewing around hollow entrance, scarring and scratch marks on trunks and branches). Where possible each potential hollow was also inspected and photographed with a drone.

Foraging habitat

Foraging habitat is represented by plant species that are known to provide a food source for black cockatoos. This can be in the form of seeds, flowers and also boring grubs that are extracted from some plant species.

Specific plant species present that represent potential foraging habitat have been documented. The location and nature of black cockatoo foraging activity (e.g. chewed fruits around base of trees) observed during the field survey was also recorded.

Results

The survey area is comprised of two areas located along a drainage situated immediately upstream and downstream of an existing dam (Figure 1). The vegetation present is generally represented by a tall dense shrubland over sedges with scattered emergent karri (*Eucalyptus diversicolor*), occasional marri (*Corymbia calophylla*) and blackbutt (*E. patens*) trees.

The vast majority of the trees present are relatively young and appear to represent regrowth from historical clearing events. Because of their relatively young age most trees do not appear to contain hollows.

During the survey one tree was identified as containing one possible hollow potentially suitable for black cockatoos to use for nesting purposes. Drone photographs suggest that the hollow is too small internally (i.e. lack of floor and roof space) for black cockatoos to use for nesting and has therefore been classified as an unsuitable hollow. No conclusive evidence of use by other fauna evident.

No evidence of black cockatoos foraging within the survey area was observed. Suitable foraging habitats within the survey area is limited in extent and quality. Black cockatoos favoured foraging resource, marri, is limited to only a few specimens. Other plants species present known to be used as a resource (e.g. karri, blackbutt and sheoak) either represent low quality foraging habitat (e.g. karri) or are limited in abundance (e.g. blackbutt and sheoak).

Site inspection (DWER, 2022)

DWER performed a site inspection on 16 December 2022 to acquire further information regarding the actual conditions of the application area, availability and condition of black cockatoo habitat within the application area and investigate mitigation options as required (DWER, 2022).

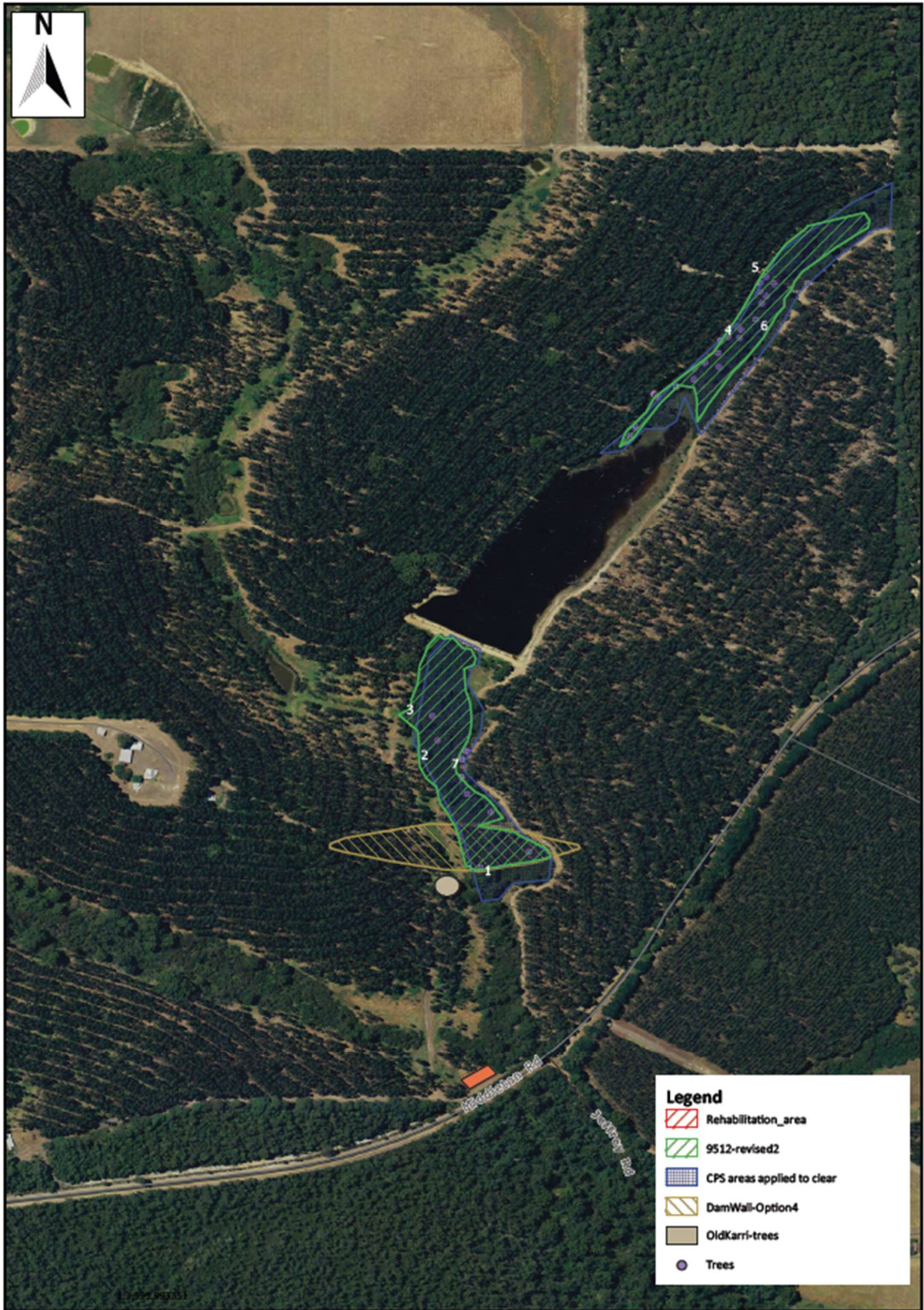


Figure 7. Map of the inspection area depicting the original application area, revised application area, locations of dam wall, proposed rehabilitation area, a clump of old Karri trees avoided, and the location of trees whose representative photos are shown in Figure 8 to 9.



A. A group of 10 mature Karri trees at the foot of the dam wall. Shifting the wall slightly upstream from the original location provide a 5 m buffer from the wall.



B. The mature Karri trees have DBH > 50 cm and are amongst the tallest native trees on the property.



C. Impact on the mature marri tree at the foot of the future new dam wall is avoided by shifting the dam wall location further upstream.

Figure 8 (A to B). A clump of 10 old karri trees and an old marri tree retained and avoided from impact.

Representative photographs of trees in the application area



Point 1 on the map. A karri tree with DBH>50 cm over sedges and weed.



Point 2 on the map: karri tree.



Point 3 on the map – karri trees over riparian shrubs and sedges.



Point 4 on the map – a Marri tree with *Allocasuarina decussata* in the background.



Point 5 on the map. Two *E. patens* with DBH>50 cm



Point 6 on the map. A marri tree with DBH>50 cm.



Point 7 on the map. A marri tree with DBH>50 cm over ground covered by blackberry.

Figure 9. Representative photographs of trees proposed to be cleared of affected by the dam. Refer to Figure 7 for locations of photographs.

Representative photographs of vegetation condition

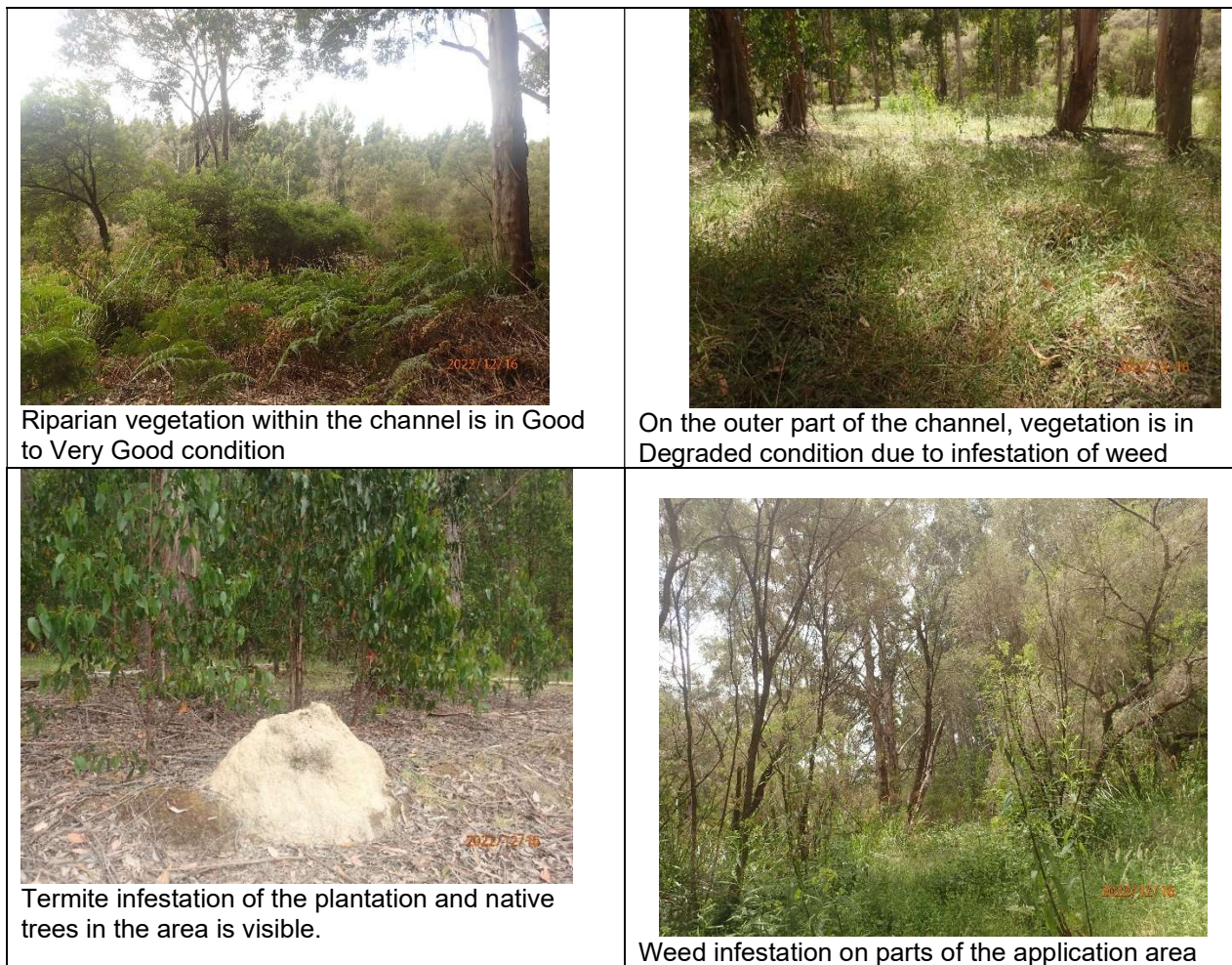


Figure 10. Representative photographs of the vegetation conditions

Appendix G. Sources of information

G.1. GIS databases

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

- 10 Metre Contours (DPIRD-073)
- Aboriginal Heritage Places (DPLH-001)
- Aboriginal Heritage Places (DPLH-001)
- Cadastre (LGATE-218)
- Cadastre Address (LGATE-002)
- Contours (DPIRD-073)
- DBCA – Lands of Interest (DBCA-012)
- DBCA Legislated Lands and Waters (DBCA-011)
- Directory of Important Wetlands in Australia – Western Australia (DBCA-045)
- Environmentally Sensitive Areas (DWER-046)
- Flood Risk (DPIRD-007)
- Groundwater Salinity Statewide (DWER-026)
- Hydrography – Inland Waters – Waterlines
- Hydrological Zones of Western Australia (DPIRD-069)
- IBRA Vegetation Statistics
- Imagery
- Local Planning Scheme – Zones and Reserves (DPLH-071)
- Native Title (ILUA) (LGATE-067)
- Offsets Register – Offsets (DWER-078)

- Pre-European Vegetation Statistics
- Public Drinking Water Source Areas (DWER-033)
- Ramsar Sites (DBCA-010)
- Regional Parks (DBCA-026)
- Remnant Vegetation, All Areas
- RIWI Act, Groundwater Areas (DWER-034)
- RIWI Act, Surface Water Areas and Irrigation Districts (DWER-037)
- Soil Landscape Land Quality – Flood Risk (DPIRD-007)
- Soil Landscape Land Quality – Phosphorus Export Risk (DPIRD-010)
- Soil Landscape Land Quality – Subsurface Acidification Risk (DPIRD-011)
- Soil Landscape Land Quality – Water Erosion Risk (DPIRD-013)
- Soil Landscape Land Quality – Water Repellence Risk (DPIRD-014)
- Soil Landscape Land Quality – Waterlogging Risk (DPIRD-015)
- Soil Landscape Land Quality – Wind Erosion Risk (DPIRD-016)
- Soil Landscape Mapping – Best Available
- Soil Landscape Mapping – Systems
- Wheatbelt Wetlands Stage 1 (DBCA-021)

Restricted GIS Databases used:

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

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