



GOVERNMENT OF
WESTERN AUSTRALIA

CLEARING PERMIT

Granted under section 51E of the Environmental Protection Act 1986

PERMIT DETAILS

Area Permit Number: CPS 8500/1
File Number: DWERVT2847
Duration of Permit: From 28 May 2021 to 28 May 2036

PERMIT HOLDER

AMG (WA) PTY LTD

LAND ON WHICH CLEARING IS TO BE DONE

Lot 3 on Diagram 35920, Waroona

AUTHORISED ACTIVITY

The permit holder must not clear more than 10.04 hectares of native vegetation within the area cross-hatched yellow in Figure 1 of Schedule 1.

CONDITIONS

1. Period during which clearing is authorised

The permit holder must not clear any native vegetation after 28 May 2026.

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. Wind erosion management

The Permit Holder must commence construction no later than three months after undertaking clearing authorised under this Permit, to reduce the risk of soil erosion by minimising the exposure time of soils prior to construction.

4. Weed and dieback management

When undertaking any clearing authorised under this permit, or *revegetation/rehabilitation* actions in accordance with conditions 8 and 9 of 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 and other vehicles of soil and vegetation prior to entering and leaving the area to be cleared;
- (b) clean earth-moving machinery and other vehicles of soil and vegetation prior to entering the areas to be *revegetated/rehabilitated*;
- (c) shall only move soils in *dry conditions*;
- (d) ensure that no known dieback or weed-affected soil, *mulch, fill*, or other material is brought into the areas to be cleared or *revegetated/rehabilitated*;
- (e) restrict the movement of machines and other vehicles to the limits of the areas to be cleared or *revegetated/rehabilitated*;
- (f) demarcate *dieback infested areas* with flagging tape and appropriate signage prior to clearing;
- (g) ensure that all vehicles are cleaned of soil and vegetation prior to moving between known *dieback infested areas* and *dieback free areas*; and
- (h) ensure that drainage, resulting from clearing authorised under this permit, is directed away from *dieback free areas*.

5. Directional clearing

When conducting clearing activities under this permit, the permit holder must conduct clearing in a slow, progressive manner from east to west or south to north, to allow fauna to move into adjacent native vegetation ahead of the clearing activity.

6. Offsets – conservation covenant

Prior to undertaking any clearing authorised under this permit, and no later than 28 May 2022, the permit holder shall:

- (a) give a conservation covenant under section 30B of the *Soil and Land Conservation Act 1945* setting aside the areas hatched red in Figure 2 of Schedule 1, for the protection and management of vegetation in perpetuity; and
- (b) provide to the CEO a copy of the executed conservation covenant.

7. Fauna management – south-western brush-tailed phascogale

- (a) In relation to the area cross hatched yellow in Figure 1 of Schedule 1, the permit holder must engage a *fauna specialist* to inspect all tree hollows for the presence of south-western brush-tailed phascogale(s) (*Phascogale tapoatafa wambenger*) within 24 hours prior to clearing.
- (b) Clearing must not commence in any area where south-western brush-tailed phascogale(s) are identified under Condition 7(a) of this permit until either:
 - (i) the south-western brush-tailed phascogale(s) has moved on from that area to adjoining *suitable habitat*; or
 - (ii) the south-western brush-tailed phascogale(s) has been removed by a *fauna specialist*.

- (c) Any south-western brush-tailed phascogale individuals removed in accordance with condition 7(b)(ii) of this permit must be relocated by a *fauna specialist* to *suitable habitat*.
- (d) Where south-western brush-tailed phascogale(s) are identified under condition 7(b) of this permit, the permit holder must provide the following records to the *CEO* as soon as practicable:
 - (i) the number of individuals identified;
 - (ii) the date each individual was identified;
 - (iii) the location where each individual was identified recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994 (GDA94), expressing the geographical coordinates in Eastings and Northings or decimal degrees;
 - (iv) the number of individuals removed and relocated;
 - (v) the relevant qualifications of the *fauna specialist* undertaking removal and relocation;
 - (vi) the date each individual was removed;
 - (vii) the method of removal;
 - (viii) the date each individual was relocated;
 - (ix) the location where each individual was relocated to, recorded using a GPS unit set to GDA94, expressing the geographical coordinates in Eastings and Northings or decimal degrees; and
 - (x) details pertaining to the circumstances of any death of, or injury sustained by, an individual.

8. Revegetation, offset

Within 12 months of undertaking clearing authorised under this permit, and no later than 28 May 2023, for the area hatched red in Figure 1 of Schedule 1, the permit holder must implement and adhere to the 'Revegetation Management Plan, Lot 3 Buller Road, Waroona' dated April 2021, including but not limited to the following actions:

- (a) commence *revegetation* and *rehabilitation* by;
 - (i) deliberately *planting* and/or *direct seeding* native vegetation that will result in similar species composition, structure and density of native vegetation to *reference sites 1*; and
 - (ii) ensuring only *local provenance* seeds and propagating material are used to *revegetate* and *rehabilitate*.
- (b) establish a minimum of three 10 x 10 metre quadrat monitoring sites;
- (c) water *planted* vegetation between December and April during the first year following *planting*;
- (d) undertake weed control activities prior to *planting*, and annually thereafter until completion criteria have been met and maintained for two years;
- (e) achieve the following completion criteria after a five year monitoring period for areas *revegetated* and *rehabilitated* under condition 8 of this permit:

Aspect	Completion Criteria	Monitoring
Species richness	Species richness is at least 60 per cent of that recorded in reference sites 1.	Annually in Spring until completion criteria has been met and maintained for two years.
Dominant tree species	Dominant tree species must be <i>Corymbia calophylla</i> , <i>Eucalyptus marginata</i> and <i>Banksia attenuata</i> .	Annually in Spring until completion criteria has been met and maintained for two years.
Vegetation structure	Vegetation structure, species density (stems per hectare), weed cover and bare ground cover of the revegetation/rehabilitation area must be consistent with those values recorded in reference sites 1.	Annually in Spring until completion criteria has been met and maintained for two years.
Species density (stems per hectare)		
Weed cover		
Bare ground cover		
Declared weeds	No declared weeds regulated under the <i>Biosecurity and Agriculture Management Act 2007</i> .	Annually in Spring until completion criteria has been met and maintained for two years.
Vegetation condition	Vegetation must be in a very good (Keighery, 1994) or higher condition.	Annually in Spring until completion criteria has been met and maintained for two years.
Survival rate	A survival rate of at least 60 per cent of the density planted is achieved.	Annually in Spring until completion criteria has been met and maintained for two years.

- (f) undertake remedial actions for areas *revegetated* and *rehabilitated* under condition 8, where monitoring indicates that *revegetation/rehabilitation* has not met the completion criteria outlined in condition 8(e) of this permit, including;
- (i) *revegetate/rehabilitate* the area by deliberately *planting* and/or *direct seeding* native vegetation that will result in the minimum completion criteria detailed in condition 8(e) and ensuring only *local provenance* seeds and propagating material are used;
 - (ii) additional weed control activities; and
 - (iii) annual monitoring of the *revegetated* and *rehabilitated* areas by an *environmental specialist*, until the completion criteria, outlined in 8(e) are met.

9. Revegetation, mitigation

Immediately after the cessation of extraction activities, and no later than 28 May 2027, for the area hatched yellow in Figure 1 of Schedule 1, the permit holder must implement and adhere to the 'Revegetation Management Plan, Lot 3 Buller Road, Waroona' dated April 2021, including but not limited to the following actions:

- (a) commence *revegetation* and *rehabilitation* by;
 - (i) ripping the ground on the contour to remove soil compaction;
 - (ii) deliberately *planting* or *direct seeding* native vegetation that will result in similar species composition, structure and density of native vegetation to *reference sites 2*; and
 - (iii) ensuring only *local provenance* seeds and propagating material are used to *revegetate* and *rehabilitate* the area.
- (b) establish four 10 x 10 metre quadrat monitoring sites;
- (c) temporarily fence the area until completion criteria have been met and maintained for two years;
- (d) undertake weed control activities prior to *planting* or *direct seeding*, and annually thereafter until completion criteria has been met and maintained for two years;
- (e) achieve the following completion criteria after the five year monitoring period for areas *revegetated* and *rehabilitated* under condition 9 of this permit:

Aspect	Completion Criteria	Monitoring
Species richness	Species richness is at least 60 per cent of that recorded in reference sites 2.	Annually in Spring until completion criteria has been met and maintained for two years.
Dominant tree species	Dominant tree species must be dieback resistant species <i>Corymbia calophylla</i> and <i>Allocasuarina fraseriana</i> .	Annually in Spring until completion criteria has been met and maintained for two years.
Vegetation structure	Vegetation structure, species density (stems per hectare), weed cover and bare ground cover of the revegetation/rehabilitation area must be consistent with those values obtained for reference sites 2.	Annually in Spring until completion criteria has been met and maintained for two years.
Species density (stems per hectare)		
Weed cover		
Bare ground cover		
Vegetation condition	Vegetation in a good (Keighery, 1994) or higher condition.	Annually in Spring until completion criteria has been met and maintained for two years.

- (f) undertake remedial actions for areas *revegetated* and *rehabilitated* under condition 9 of this permit, where monitoring indicates that *revegetation/rehabilitation* has not met the completion criteria, outlined in condition 9(e) of this permit, including;
 - (i) *revegetate* the area by deliberately *planting* and/or *direct seeding* native vegetation that will result in the minimum targets detailed in condition 9(e) and ensuring only *local provenance* seeds and propagating material are used
 - (ii) undertake additional weed control activities; and
 - (iii) annual monitoring of the *revegetated* and *rehabilitated* areas by an *environmental specialist*, until the completion criteria, outlined in 9(e) are met.

PART III - RECORD KEEPING AND REPORTING

10. 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 size of the area cleared (in hectares); (e) actions taken to avoid, minimise, and reduce the impacts and extent of clearing in accordance with condition 2; (f) actions undertaken in accordance with condition 3; (g) actions taken to minimise the risk of the introduction and spread of weeds and dieback in accordance with condition 4; (h) actions undertaken in accordance with condition 5; (i) actions taken to give a conservation covenant in accordance with condition 6; (j) actions taken to manage impacts to south-western brush-tailed phascogale in accordance with condition 7.
2.	In relation to the <i>revegetation</i> and <i>rehabilitation</i> of areas pursuant to conditions 8 and 9 of this permit	<ul style="list-style-type: none"> (a) a description of the <i>revegetation</i> and <i>rehabilitation</i> activities undertaken each year, once commenced, outlined in a report produced by an <i>environmental specialist</i>; (b) the location and size of the areas <i>revegetated</i> and <i>rehabilitated</i> (in hectares) recorded using a GPS unit set to GDA94, expressing the geographical coordinates in Eastings and Northings or decimal degrees;

No.	Relevant matter	Specifications
		(c) the date that <i>revegetation</i> and <i>rehabilitation</i> works began; (d) the baseline data recorded for <i>reference sites 1</i> and <i>reference sites 2</i> , including species richness, species density, vegetation structure, bare ground cover, weed cover and vegetation condition; (e) at least two photographs of the areas <i>revegetated/rehabilitated</i> recorded annually at the same location each year; (f) the species composition, structure, density of the areas <i>revegetated/rehabilitated</i> recorded annually; (g) a description of the extent of bare ground cover, weed cover and vegetation condition of the areas <i>revegetated/rehabilitated</i> , recorded annually; (h) a species list identifying those species <i>planted</i> or <i>direct seeded</i> ; (i) a copy of the <i>environmental specialist</i> report and activities undertaken during monitoring; and (j) other actions taken in accordance with conditions 8 and 9 of this permit.

11. Reporting

- (a) The permit holder must provide to the *CEO* on or before 30 June of each year, a written report:
- (a) of records required under condition 10 of this permit; and
 - (b) concerning activities done by the permit holder under this permit between 1 January to 31 December of the preceding calendar year.
- (b) If no clearing authorised under this permit has been undertaken, a written report confirming that no clearing under this permit has been undertaken, must be provided to the *CEO* on or before 30 June of each year.
- (c) Prior to 28 February 2036, the permit holder must provide to the *CEO* a written report of records required under condition 10 of this permit where these records have not already been provided under condition 11(a) of this permit.

DEFINITIONS

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


Table 2: Definitions

Term	Definition
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.
completion criteria	means a measurable outcome based on suitable <i>reference sites</i> , used to determine <i>revegetation/rehabilitation</i> success
condition	a condition to which this clearing permit is subject under section 51H of the EP Act.
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.

Term	Definition
dieback	means the effect of <i>Phytophthora</i> species on native vegetation.
dieback infested areas	means those areas identified as dieback (<i>Phytophthora cinnamomi</i>) infested in the document titled ‘Lot 3, Buller Road Waroona. Phytophthora Dieback occurrence assessment – Version 2.0’.
dieback free areas	means those areas identified as dieback (<i>Phytophthora cinnamomi</i>) free in the document titled ‘Lot 3, Buller Road Waroona. Phytophthora Dieback occurrence assessment – Version 2.0’.
direct seed/ed/ing	means a method of re-establishing vegetation through the establishment of a seed bed and the introduction of seeds of the desired plant species.
environmental specialist	means a person who holds a tertiary qualification in environmental science or equivalent, and has experience relevant to the type of environmental advice that an environmental specialist is required to provide under this Permit, or who is approved by the CEO as a suitable environmental specialist.
EP Act	<i>Environmental Protection Act 1986</i> (WA)
fauna specialist	means a person who holds a tertiary qualification specialising in environmental science or equivalent, with a minimum 2 years work experience in fauna identification and surveys of fauna native to the region being inspected or surveyed, or who is approved by the CEO as a suitable fauna specialist for the bioregion, and who holds a valid fauna licence issued under the Biodiversity Conservation Act 2016.
fill	means material used to increase the ground level, or to fill a depression.
local provenance	means native vegetation seeds and propagating material from natural sources within 100 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.
plant/ed/ing	means the re-establishment of vegetation by creating favourable soil conditions and planting seedlings of the desired species
quadrat	Means a sample plot established for the purpose of data collection and monitoring vegetation characteristics, for example species composition, structure, density and condition
reference sites 1	means the nearby sites identified as “Indicative Reference Sites – Site A” in the ‘Revegetation Management Plan, Lot 3 Buller Road, Waroona’ dated April 2021. Measurements from fixed reference points or plots where biodiversity components are measured are used to set measurable completion criteria for revegetation projects. The <i>reference sites</i> contain the following values: (a) Suitable foraging and potential roosting and breeding habitat for Carnaby’s cockatoo (<i>Calyptorhynchus latirostris</i>), Baudin’s cockatoo (species name) and forest red-tailed black cockatoo (<i>Calyptorhynchus banksii naso</i>) (b) Vegetation representative of the ‘Banksia Woodlands of the Swan Coastal Plain’ (Banksia woodlands) ecological community (c) Vegetation in very good (Keighery, 1994) condition
reference sites 2	means the nearby sites identified as “Indicative Reference Sites – Site B” in the ‘Revegetation Management Plan, Lot 3 Buller Road, Waroona’ dated April 2021. Measurements from fixed reference points or plots where biodiversity components are measured are used to set

Term	Definition
	measurable completion criteria for revegetation projects. The <i>reference sites</i> contain the following values: (a) Suitable foraging and potential roosting and breeding habitat for Carnaby's cockatoo (<i>Calyptorhynchus latirostris</i>), Baudin's cockatoo (species name) and forest red-tailed black cockatoo (<i>Calyptorhynchus banksii naso</i>) (b) Vegetation representative of the 'Banksia Woodlands of the Swan Coastal Plain' (Banksia woodlands) ecological community (c) Vegetation in good (Keighery, 1994) condition
rehabilitate/ed/ion/ing	means actively managing an area containing native vegetation in order to improve the ecological function of that area
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
suitable habitat	means habitat known to support south-western brush-tailed phascogales (<i>Phascogale tapoatafa wambenger</i>), within the known current distribution of the species, typically characterised by abundant foliage, presence of suitable nesting structures such as tree hollows, as well as high canopy cover and continuity.
vegetation condition	means the rating given to native vegetation which refers to the impact of disturbance on each of the layers and the ability of the community to regenerate (Keighery 1994)
weeds	means any plant – (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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Ryan Mincham
 MANAGER
 NATIVE VEGETATION REGULATION

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

5 May 2021

SCCHEDULE 1

The boundary of the area authorised to be cleared, those required for revegetation in accordance with conditions 8 and 9 of this permit, and those required for a conservation covenant in accordance with condition 6 of this permit are shown in the maps below (Figures 1 and 2 respectively).

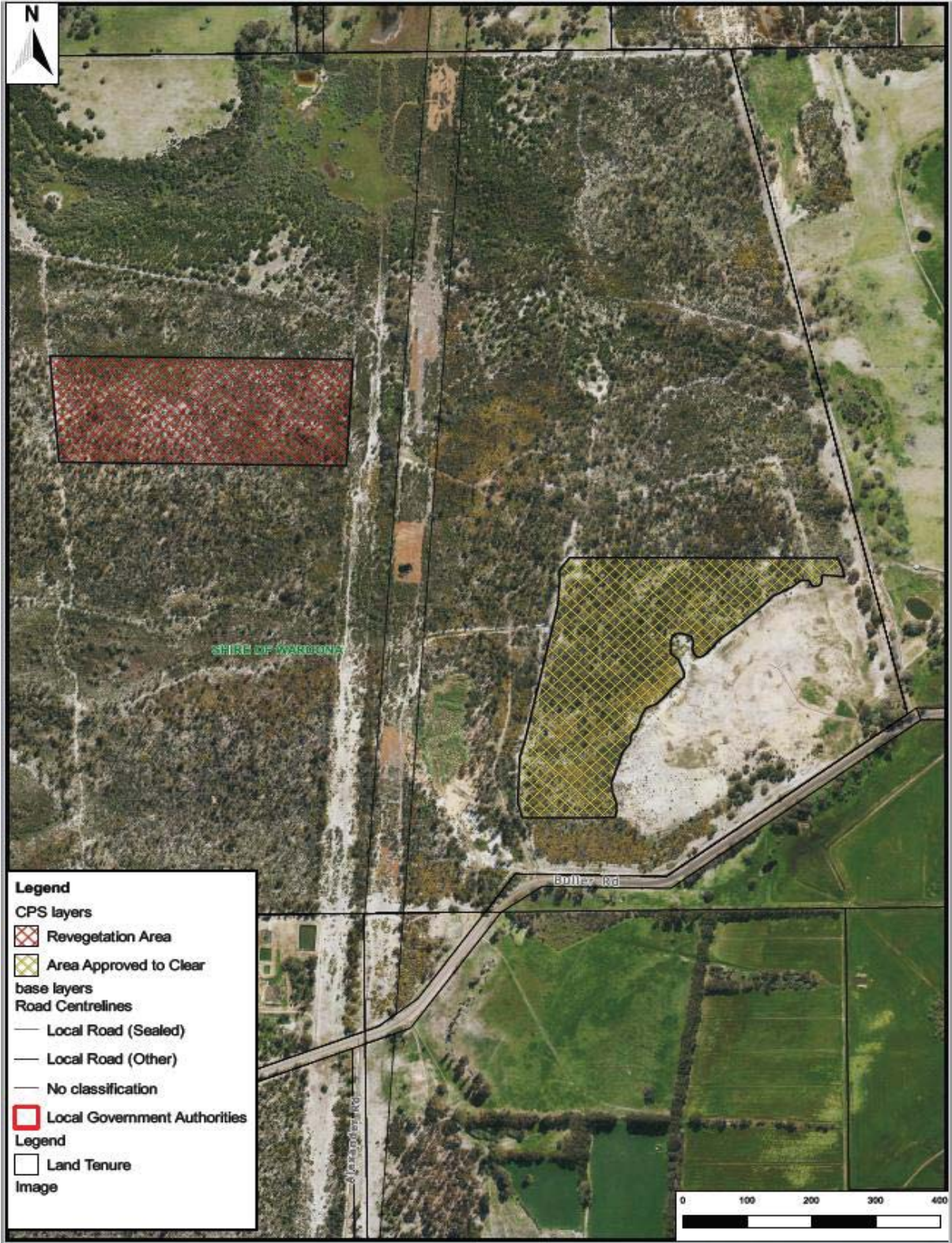


Figure 1: The area hatched yellow shows the approved clearing area. This area requires revegetation in accordance with condition 9 of this permit post-cessation of extractive activities. The area hatched red represents the area required for revegetation in accordance with condition 8 of this permit.



Figure 2: The areas hatched red represent the areas within which a conservation covenant is required, in accordance with condition 6 of this permit.



Clearing Permit Decision Report

1 Application details and outcome

1.1. Permit application details

Permit number:	CPS 8500/1
Permit type:	Area permit
Applicant name:	AMG Pty Ltd
Application received:	22 May 2019
Application area:	10.04 hectares
Purpose of clearing:	Sand extraction
Method of clearing:	Mechanical
Property:	Lot 3 on Diagram 35920 (Lot 3 Buller Road)
Location (LGA area/s):	Shire of Waroona
Localities (suburb/s):	Waroona

1.2. Description of clearing activities

AMG Pty Ltd proposes to clear 10.04 hectares of native vegetation to extract sand from Lot 3 on Diagram 35920, Waroona. The applicant has advised that the sand represents a valuable resource to meet current development demands in the local area.

The applicant has further advised that the proposed action is a joint venture between AMG and Pandanus Park Aboriginal Corporation and that the proposed development will be used to provide training and employment opportunities to indigenous people.

The application area forms the south-eastern corner of a larger patch of remnant vegetation within Lot 3 Buller Road, comprising around 210 hectares. It is bordered by remnant native vegetation to the north and west, and extractive sand industry operations and agriculture activities, to the east and south respectively.

The larger remnant occurs in a highly cleared portion of the Swan Coastal Plain which has been extensively used for agriculture activities.

The initial application area of 12.94 hectares was revised to exclude 2.9 hectares of good condition vegetation to the west (see figures 1 and 2). This has reduced the extent of impact to black cockatoo habitat and to the Commonwealth listed Banksia woodlands of the Swan Coastal Plain threatened ecological community (see Section 3.1 for further details).

1.3. Decision on application

Decision:	Granted
Decision date:	5 May 2021
Decision area:	10.04 hectares of native vegetation as depicted in Section 1.5, below.

1.4. Reasons for decision

This application was 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 no public submissions were received.

In undertaking their assessment and in accordance with section 51O of the EP Act, the Delegated Officer considered the site characteristics (see Appendix B), the Clearing Principles in Schedule 5 of the EP Act (see Appendix C), relevant planning instruments and other matters (see Sections 3 and 4), the findings of biological surveys (see Appendix E), as well as relevant datasets available at the time of the assessment (see Appendix F).

The Delegated Officer determined that the proposed clearing will result in the following significant impacts:

- the loss of 10.04 hectares of native vegetation in largely good to completely degraded (Keighery, 1994) condition, that provides significant foraging habitat for Carnaby's cockatoo, Baudin's cockatoo and forest red-tailed black cockatoo
- the loss of 3.68 hectares of native vegetation representative of the Banksia woodland on the Swan Coastal Plain (Banksia Woodlands) Commonwealth listed threatened ecological community (TEC). This community is also a state listed priority ecological community (Priority 3)
- the loss of 10.04 hectares of native vegetation representative of a highly cleared vegetation complex (Southern River Complex) that contributes towards ecological linkage values within a fragmented portion of the Swan Coastal Plain

The proposed clearing may also result in the following impacts:

- the introduction and spread of weeds and dieback into adjacent vegetation with high biodiversity values, including into the nearby Buller Nature Reserve
- minor wind erosion
- direct impacts to fauna utilising the application area during the time of clearing

After considering the available information and the applicants minimise and mitigation measures (see Section 3.1), the Delegated Officer determined that the following requirements will be conditioned on the clearing permit to manage and address the impacts of clearing:

- avoid and minimise measures to reduce the impacts and extent of clearing
- take hygiene steps to minimise the risk of the introduction and spread of weeds and dieback
- extraction must occur within three months of clearing to minimise wind erosion risks
- undertake slow, progressive one directional clearing to allow terrestrial fauna to move into adjacent habitat ahead of the clearing activity
- revegetate the 10.04 hectare extraction area to a good (Keighery, 1994) condition post-extraction, with flora species that provide suitable foraging habitat for black cockatoos (Carnaby's, Baudin's and forest red-tailed black cockatoos)
- offset measures to:
 - conserve in perpetuity and rehabilitate an adjacent area of 8.2 hectares, from a degraded to very good (Keighery, 1994) condition, with suitable habitat for black cockatoos
 - conserve in perpetuity 20.61 hectares of adjacent native vegetation in a very good (Keighery, 1994) condition, which provides significant habitat for black cockatoos, is representative of the Banksia Woodlands TEC, is mapped as the Southern River Complex and provides ecological linkage values within a highly cleared portion of the Swan Coastal plain
- fauna management measures to remove and relocate (if present) south-western brush-tailed phascogales (*Phascogale tapoatafa wambenger*) to an adjacent area of suitable habitat.

Given the above, and noting that the offset provided (see Section 4) counterbalances the impacts to black cockatoo foraging habitat, Banksia Woodland TEC, Southern River Complex and ecological linkage values, the Delegated Officer determined that the proposed clearing is unlikely to lead to an unacceptable risk to the environment.

1.5. Site map

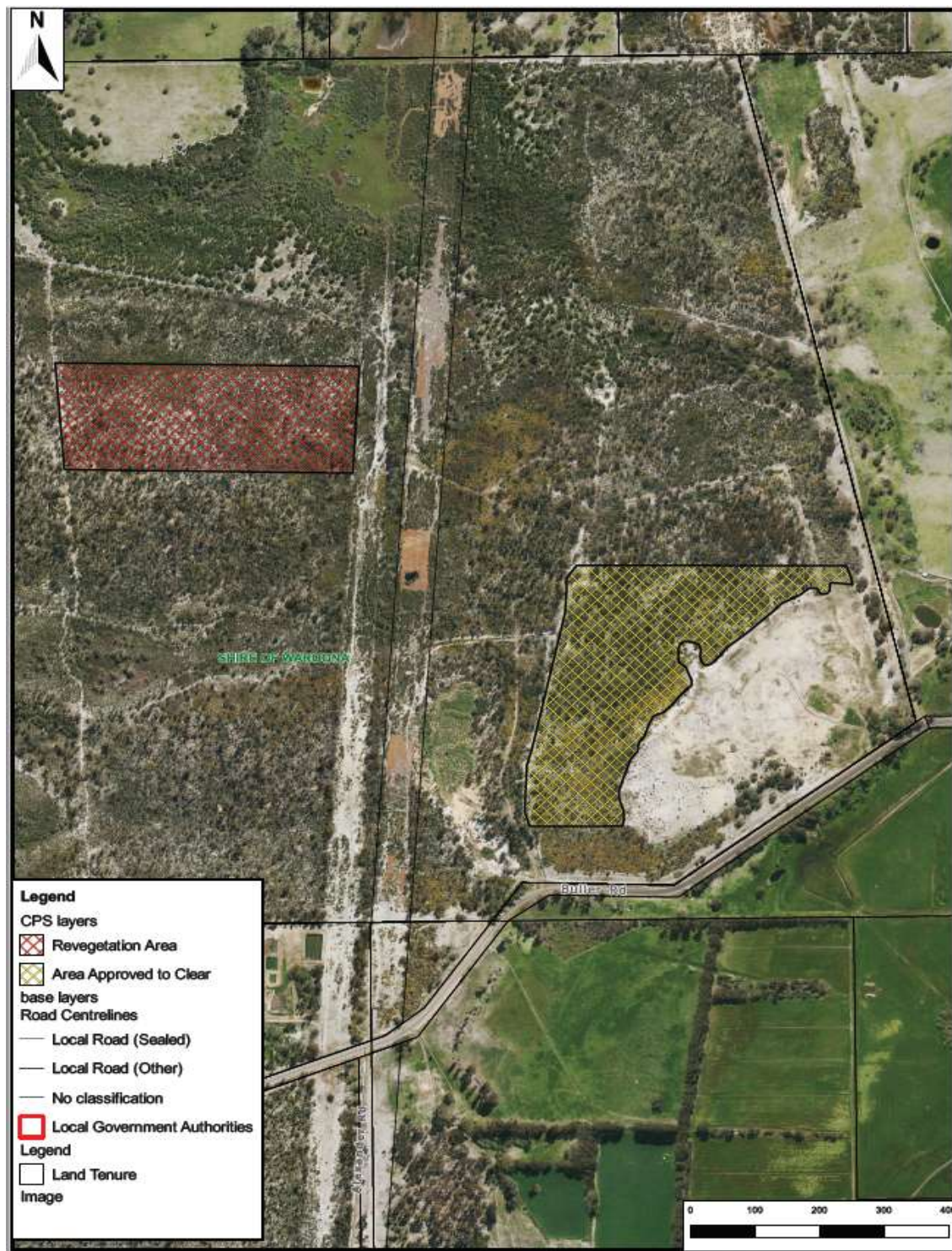


Figure 1. Map of the revised (current) application area and required rehabilitation area

The area cross-hatched yellow indicates the area authorised to clear under the granted clearing permit. This area will require revegetating post extraction. The area cross-hatched red indicates the area required to be rehabilitated from a degraded to very good (Keighery, 1994) condition.

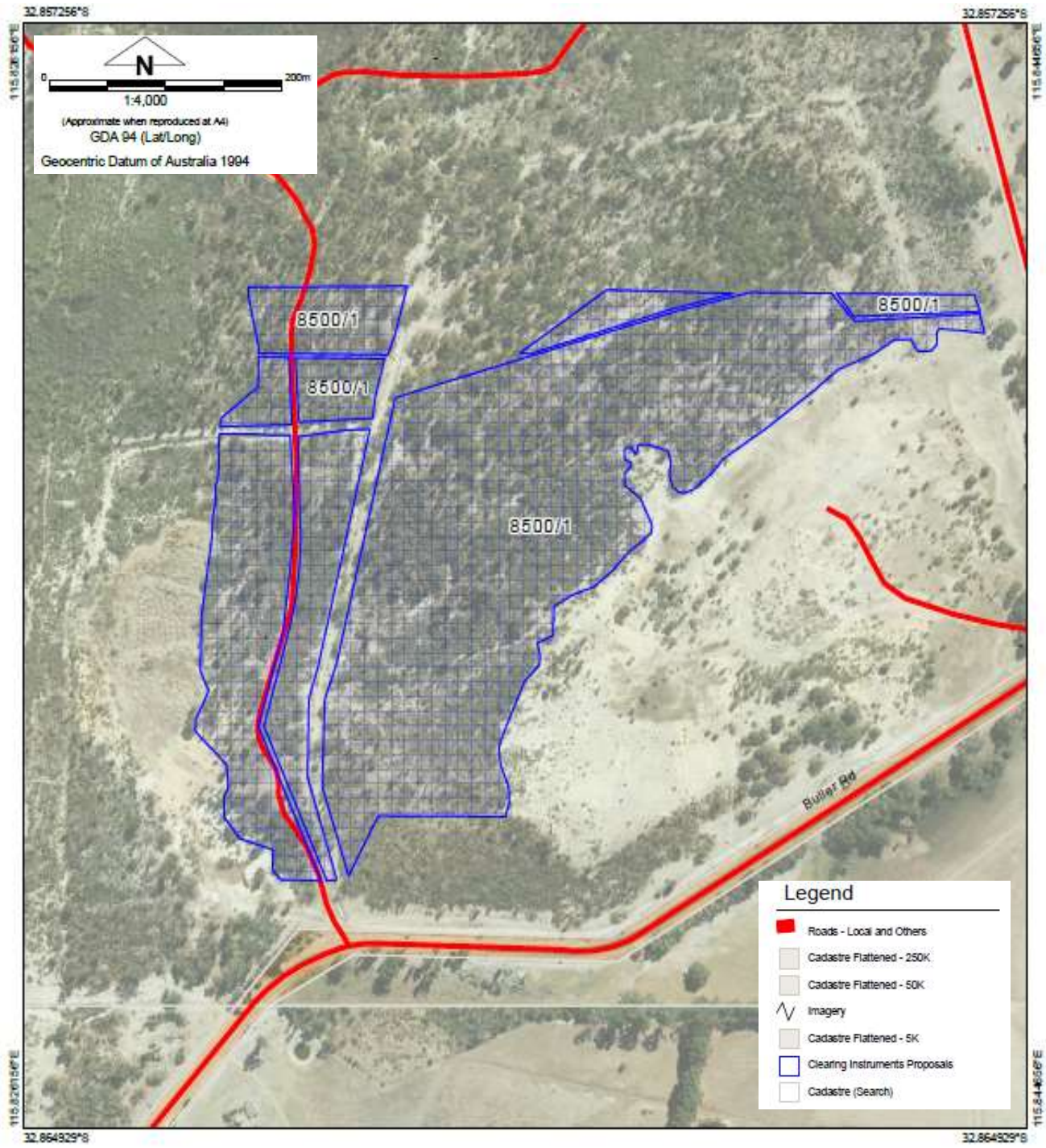


Figure 2. Map of the original application area

The areas cross-hatched blue indicate the areas originally applied to clear.



Figure 3. Map of the offset and revegetation areas

The areas cross-hatched red indicate the offset areas which will be placed under a conservation covenant for long-term protection.

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 polluter pays principle
- 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)
- *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act)
- *Planning and Development Act 2005* (WA) (P&D Act)

Relevant policies considered during the assessment include:

- *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)
- *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)

3 Detailed assessment of application

3.1. Avoidance and mitigation measures

Alternatives considered

The applicant advised that the application area represents the most historically disturbed portion of the larger remnant of native vegetation leased by the applicant, and therefore provides the least significant environmental values, relative to other portions of the remnant.

Avoidance measures

The applicant historically applied for two clearing permit applications that encompass the application area (see detailed information under Section 3.3). Clearing permit application CPS 6620/1 applied to clear 33.84 hectares of native vegetation largely in a good to very good (Keighery, 1994) condition, and was later revised to 20.8 hectares. Clearing permit application CPS 7516/1 applied to clear 14 hectares of native vegetation largely in a good to very good condition. DWER refused both applications due to the significance of impacts to black cockatoo habitat, ecological linkage values in a highly cleared landscape, impacts to Banksia Woodlands TEC and impacts to Southern River Complex. DWER determined that these impacts could not be offset.

The current application area comprises 10.04 hectares of native vegetation largely in a good to completely degraded (Keighery, 1994) condition. This has been reduced from an initial area of 12.94 hectares to exclude 2.9 hectares of native vegetation largely in a good (Keighery, 1994) condition. This results in the retention of 23 potential black cockatoo breeding trees, 2.9 hectares of black cockatoo foraging habitat and around 2.9 hectares of vegetation representative of the Banksia Woodlands TEC.

The key differences in environmental impacts identified under the current assessment, relative to the historically refused CPS 7516/1 include:

- the application area has been reduced from 14 hectares to 10.04 hectares
- the extent of impact on potential future breeding trees has reduced from 107 trees, of which 17 had potentially suitable breeding hollows, to 24 trees, of which none have potentially suitable breeding hollows
- the extent of impact to black cockatoo foraging habitat has reduced from 14 hectares to 10.04 hectares
- the extent of impact to vegetation in a good or better condition has reduced from 10.75 hectares to 3.68 hectares (based on revised vegetation condition mapping) (Plantecology, 2018b)

- the extent of impact to the Banksia Woodlands TEC has reduced from 10.75 hectares to 3.68 hectares
- the extent of impact to the Southern River Complex and vegetation contributing linkage values has reduced from 14 hectares to 10.04 hectares

Mitigation measures

General

The following mitigation measures are proposed by the applicant (Accendo, 2019):

- the clearing area is to be marked with white flagging tape attached to either pegs or tied to vegetation with each peg/marker clearly visible from the last. This is to ensure the prevention of any inappropriate clearing;
- a fence will be constructed around the clearing footprint to avoid foot and traffic incursions into the remnant vegetation within Lot 3 Buller Road;
- no unauthorised movement of vehicles or personnel within the vegetation retention areas will be allowed;
- during clearing, a qualified fauna expert will be present to direct clearing operators, particularly when clearing trees are occupied by fauna, to ensure that these are cleared in a way that allows the animals to safely mobilise to adjacent areas. In addition, they will supervise any animal handling and the rescue of injured animals should this be required;
- no stockpiling of topsoil or other material is to occur outside of the clearing boundary;
- a two metre separation distance to groundwater will be maintained during sand excavation and all surface water will be contained within the extraction area, where direct infiltration will occur;
- extraction will be undertaken progressively in stages in a south to north direction to reduce the potential for stormwater erosion and dust by limiting the open pit area as far practical.

Revegetation

The applicant has committed to revegetating the 10.04 hectare application area post-sand extraction, to a good (Keighery, 1994) condition. The applicant has submitted a revegetation plan (Accendo, 2021) which details the revegetation measures proposed and includes commitments to completion criteria, which are conditioned on the clearing permit.

Under the Shire of Waroona's Development Approval (DA), the applicant is also required to submit a rehabilitation and decommissioning plan. Under the DA the applicant is required to enter into a deed of agreement with the Shire to implement the revegetation plan, with no less than 30 per cent of the cost of implementing the revised plan being bonded with the Shire of Waroona to ensure post development rehabilitation (Shire of Waroona, 2020).

Management Plans

As part of the Development Application process through the Shire of Waroona (the Shire), the applicant has provided a Site Management Plan which outlines a number of measures that will be implemented to reduce impacts associated with the extractive industry. The Shire's DA requires that the applicant implements and adheres to the Site Management Plan.

As part of the DA, the applicant is also required to submit a dieback management plan to the satisfaction of the Shire.

As part of the applicants approval from the former Department of the Environment and Energy ((DotEE) now the Department of Agriculture Water and the Environment (DAWE)) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), the applicant will be required to develop a Buller Road Environmental Management Plan (BREMP) for approval of the Commonwealth Minister prior to clearing. The EPBC Act approval requires that at a minimum, the BREMP will detail measures to control (DotEE, 2019):

- site access
- weeds and dieback
- prevent injury or mortality to black cockatoos during clearing
- delineate the clearing footprint to prevent unauthorised clearing
- water management measures to prevent intersection of groundwater during sand extraction.

Conclusion

The Delegated Officer was satisfied that the applicant has made a reasonable effort to avoid and minimise potential impacts of the proposed clearing on environmental values.

After consideration of avoidance and mitigation measures, the Delegated Officer determined that offsets to counterbalance the significant residual impacts to black cockatoo habitat, Banksia Woodlands TEC, ecological linkage values and a highly cleared vegetation complex (Southern River Complex) were necessary. In accordance with the Government of Western Australia's *Environmental Offsets Policy* and *Environmental Offsets Guidelines*, these significant residual impacts have been addressed through the conditioning of environmental offset requirements on the permit. The offsets are summarised in Section 4.

3.2. Assessment of impacts on environmental values

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

The assessment identified that the clearing presents a risk to flora, fauna, significant remnant vegetation and conservation area values, and that these required further consideration. The consideration of impacts to these values, 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. Environmental value: Biological values (fauna) – Clearing Principle (b)

Background

A basic fauna habitat assessment (Fauna Assessment) undertaken by Terrestrial Ecosystems in 2015 identified one broad fauna habitat type in the application area, being *Eucalyptus marginata* (jarrah), *Corymbia calophylla* (marri), *Allocasuarina fraseriana* and *Banksia* sp. woodland over sparsely vegetated shrubs over grasses and herbs on grey sands (Terrestrial Ecosystems, 2015).

The following conservation significant fauna species have been identified as potentially occurring within the application area (see conservation status and scientific names of each species in Appendix B):

- Carnaby's cockatoo
- forest red-tailed black cockatoo
- Baudin's cockatoo
- quenda
- coastal plains skink
- western brush wallaby
- chuditch
- south-west brush-tailed phascogale

This assumption is based on the habitat requirements, distribution, mapped vegetation types and condition of the vegetation, and findings of the Fauna Assessment (Terrestrial Ecosystems, 2015) and a Black Cockatoo Habitat Review (Black Cockatoo Assessment) undertaken by Harewood (2018).

The fauna habitat within the application area has undergone historical disturbance through:

- January 2016 fires which left the application area badly burnt (the site is recovering)
- dieback (*Phytophthora cinnamomi*) infestation
- edge effects from nearby cleared areas (agriculture and extractive industry)

As a result of the historical disturbance, the vegetation within the application area is largely in a good to completely degraded (Keighery, 1994) condition (Plantecology, 2018a). Despite this disturbance, the application area provides significant fauna habitat and ecological linkage values, as discussed below.

Black cockatoos (Carnaby's cockatoo, Baudin's cockatoo and forest red-tailed black cockatoo)

Breeding Habitat

The application area is in the modelled distribution of Baudin's cockatoo and within the known breeding range of Carnaby's cockatoo and forest red-tailed black cockatoo. The closest known breeding sites for Carnaby's cockatoo and forest red-tailed black cockatoo are located around 8.6 and 19 kilometres from the application area respectively. The closest known Baudin's cockatoo breeding site is unknown, given the lack of available data relating to confirmed breeding records for this species.

Black cockatoos generally breed in woodland or forest, but may also breed in former woodland or forest now present as isolated trees (Commonwealth of Australia, 2012). They commonly breed in several different tree species, including jarrah and marri, which are utilised by all three species (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).

The Black Cockatoo Assessment identified 47 potential breeding trees (jarrah and marri), with a DBH of greater than 500 millimetres, within the larger survey area. Of these, the applicant has committed to retaining 23 trees. No suitable black cockatoo breeding hollows were observed in any of the remaining 24 trees proposed for clearing (Harewood, 2018).

Given the lack of suitably sized breeding hollows, the proposed clearing is unlikely to impact on significant breeding habitat for these species.

Roosting Habitat

The closest known Carnaby's cockatoo and forest red-tailed black cockatoo roost sites are around 8.7 kilometres and 9.8 kilometres from the application area respectively. The closest known Baudin's cockatoo roosting site is not known, given the lack of available data relating to confirmed roosting records for this species.

The Fauna Assessment and Black Cockatoo Assessment did not identify any evidence of roosting within the application area (Terrestrial Ecosystems, 2015; Harewood, 2018). However, the application area contains numerous tall trees, including 24 with a DBH of greater than 500 millimetres (Harewood, 2018), and therefore provides suitable roosting habitat for black cockatoos.

Foraging Habitat

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

Baudin's cockatoos forage within Eucalypt woodlands and forest, and proteaceous woodland and heath. During the breeding season this species feeds primarily on marri, and to a lesser extent proteaceous trees and shrubs (Commonwealth of Australia, 2012).

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. This species mostly feeds on seeds of marri and jarrah (Commonwealth of Australia, 2012).

The vegetation within the application area comprises 10.04 hectares of jarrah, marri, *Allocasuarina* and *Banksia* woodland (Terrestrial Ecosystems, 2015) and therefore contains preferred foraging habitat for all three species.

The Fauna Assessment identified evidence of Carnaby's or Baudin's cockatoos foraging in the form of chewed *Banksia* cones, in addition to marri nuts chewed by either forest red-tailed black or Carnaby's cockatoo (Terrestrial Ecosystems, 2015). The Black Cockatoo Assessment identified evidence of forest red-tailed black-cockatoo foraging in the form of chewed marri fruits at several locations. No conclusive evidence of any other foraging activity by Carnaby's or Baudin's cockatoo was observed during this assessment.

Harewood (2018) noted that some older banksia cones showed potential foraging evidence, but given their age, may have been the result of natural deterioration.

The forest red tailed-black cockatoo and Baudin's cockatoo recovery plan notes that habitat critical to the survival of these species includes all marri, karri and jarrah forests, woodlands and remnants in the south-west of Western Australia receiving, on average, more than 600 millimetres of annual rainfall (Department of Environment and Conservation (DEC), 2008) . The application area fits this description of critical habitat.

The Carnaby's cockatoo EPA technical advice notes that *Banksia* species provide the most important natural food resource on the Swan Coastal Plain, given Carnaby's cockatoo exploit all areas of available *Banksia* food resources on the Swan Coastal Plain (EPA, 2019). Banksia woodland in the Perth metropolitan area has been reduced to one third of its pre-European extent. The remaining portions are fragmented, with the majority (82 per cent) of remnant patches under 10 hectares (EPA, 2019).

The importance of foraging habitat for Carnaby's cockatoo increases when it occurs within foraging distance of nesting sites (12 kilometres), as it supports breeding effort (Department of Parks and Wildlife, 2013). The closest known breeding site occurs around 8.6 kilometres from the application area. The distance of nearby water sources also increases foraging habitat value, and there are several wetlands mapped within 12 kilometres, including a conservation category sumpland located 250 metres west of the application area.

Food resources within the range of roost sites are also important to sustain populations of black cockatoos, and foraging resources should therefore be viewed in the context of the proximity to known night roosting sites (Commonwealth of Australia, 2017). Specifically, night roosting sites need suitable foraging habitat and water within six kilometres (EPA, 2019). Overlapping foraging ranges within 12 kilometres also support roosting sites and maintain habitat connectivity and movement across the landscape (EPA, 2019). While there are no known roost sites within six kilometres, there are four within 12 kilometres of the application area.

As discussed below, the application area forms part of a regionally significant ecological linkage. When moving between roosting, water and food resources, black cockatoo flocks follow vegetation corridors and actively avoid cleared and open areas, including dense urban areas (EPA, 2019). Therefore, the application area is likely to support the movement of black cockatoos through the landscape between roosting, water and food resources.

The Department of Biodiversity, Conservation and Attractions (DBCA) provided comment on the proposed clearing. In reviewing the Black Cockatoo Habitat Assessment, DBCA noted that "*The current suitability and usability of the Application Area by black cockatoo for foraging appears low. The significance of the habitat, in its current regenerating stage, is not likely to be significant for any of the black cockatoo species.*" (DBCA, 2019).

DBCA also noted the following "... *There is likely to be limited available food ...within the area until it has sufficiently regenerated after the fire. [However] the vegetation still comprises flora species which are known to be cockatoo food plants, and once regenerated it will be a food resource for black cockatoos*" (DBCA, 2019).

DWER considers that the vegetation within the application area is regenerating, and has been assessed as such in determining impacts to black cockatoo habitat.

The Black Cockatoo Assessment notes that on a regional scale there appears to be considerable areas of black cockatoo habitat with over 7,400 hectares of remnant native within 12 kilometres of the survey area, almost half of which is under DBCA management (Harewood, 2018).

While the extent of black cockatoo habitat in the local area is acknowledged, the Delegated Officer considers that the application area provides 10.04 hectares (reduced from 12.94 hectares) of significant foraging habitat for black cockatoos given the following reasons:

- potential evidence of historical foraging from all three species was identified within the application area
- there are known Carnaby's cockatoo breeding sites within 12 kilometres of the application area
- there are multiple known water resources within one kilometre of the application area
- there are known Carnaby's cockatoo and forest red-tailed black cockatoo roosting sites within 12 kilometres of the application area
- the application area includes preferred foraging habitat for all species in a highly fragmented area of the Swan Coastal Plain
- the application area forms part of a vegetated, regionally significant ecological linkage that supports the movement of Carnaby's cockatoo between roosting, water and food resources

Other Species

Noting the presence of higher quality native vegetation immediately west, lack of dense riparian habitat, lack of horizontal hollow logs and lack of direct evidence of confirmed use (Terrestrial Ecosystems, 2015), the application area is not likely to include significant habitat for the coastal plains skink, western brush wallaby, south-west brush-tailed phascogale, quenda or chuditch. However, these species may transiently visit the site, and individuals may be impacted should they occur at the time of clearing.

Regarding the south-western brush-tailed phascogale, the Fauna Assessment noted that this species had been recorded within the vicinity of the larger project area (not within). The Fauna assessment noted several trees with small hollows (Terrestrial Ecosystems, 2015), and while the 2016 fire may have destroyed a number of these hollows, the potential exists for this species to use any remaining small hollows on site.

Ecological Linkage

The application area forms part of a larger remnant of around 210 hectares (Lot 3 Buller Road) and is linked by contiguous vegetation to Buller Nature Reserve south which comprises around 301 hectares. Most of the vegetation forms part of a South West Regional Ecological Linkage (SWREL). The SWREL report defines an ecological linkage as a series of contiguous and non-contiguous patches which act as stepping stones of habitat that facilitate the maintenance of ecological processes and movement of organisms within and across a landscape (Molloy et al., 2009).

Remnant vegetation within the SWREL boundary can be assigned a 'proximity analysis' group. A patch of vegetation with an edge touching or less than 100 metres from a linkage (axis line) is assigned to group 1(a) which is the highest category group. A SWREL axis line is mapped approximately 250 metres west of the Application Area. There is contiguous native vegetation from the mapped SWREL linkage to Buller Nature Reserve (240 metres south), Myalup State Forest (8.8 hectares west) and Hamel State forest (7.3 kilometres east) (Molloy et al., 2009). The application area is located within this contiguous native vegetation, and is therefore within group 1(a).

In the context of the landscape, which has been subject to high levels of historical clearing, the application area forms part of an important linkage and stepping stone for fauna. While clearing the application area would not sever the linkage, it would make the linkage patch smaller and expose larger portions of the patch to edge effects.

Conclusion

Based on the above assessment, and with consideration of the applicants measures to avoid and minimise impacts, the proposed clearing will result in:

- the loss of 10.04 hectares of significant foraging habitat, and suitable roost habitat for Carnaby's cockatoo, forest red-tailed black cockatoo and Baudin's cockatoo
- a reduction in the patch size of native vegetation that forms part of a regionally significant ecological linkage
- potential direct impacts to south-western brush-tailed phascogale, quenda, coastal plains skink, chuditch and western brush wallaby, should they occur within the application area at the time of clearing.

Outcome

The Delegated Officer determined that the proposed clearing requires management and offset conditions in relation to this environmental value. Therefore, the following management/offset measures will be required as conditions on the clearing permit:

- slow directional clearing to allow quenda, coastal plains skink, chuditch and western brush wallaby individuals to move into adjacent vegetation ahead of the clearing activity
- identify, remove (if present), and relocate (if necessary) south-western brush-tailed phascogales from the application area to an area of suitable habitat
- an offset involving the conservation (through covenant) and rehabilitation of 8.2 hectares of adjacent remnant native vegetation in a degraded (Keighery, 1994) condition, which contains significant habitat for black cockatoos and provides ecological linkage values (further information provided under Section 4).
- an offset involving the conservation (through covenant) of 20.61 hectares of adjacent remnant native vegetation in a very good to good (Keighery, 1994) condition, which contains significant habitat for black cockatoos and provides ecological linkage values (further information provided under Section 4).
- revegetate the 10.04 hectare application area post-extraction with suitable habitat for black cockatoos (further information provided under Section 4).

3.2.2. Environmental value: Biodiversity values (flora and ecological communities) – Clearing Principles (a) and (c)

Threatened and Priority Flora

The application area provides suitable habitat for four priority and three threatened flora species (see Appendix B for detailed information). This presumption is based on habitat suitability of the application area for these species, and the presence of known records within the local area.

MBS Environmental undertook a Level 1 Flora and Vegetation Survey over a 36.8 hectare area (encompassing the application area) in May 2015. The survey consisted of a desktop assessment and reconnaissance site survey. The survey did not identify any threatened or priority flora taxa. The timing of the survey was identified as a major constraint in identifying conservation significant flora, noting it was outside the flowering period of many species (MBS Environmental, 2015).

Woodman Environmental subsequently undertook a Level 2 spring flora survey between 22 to 25 September 2015 (Woodman Survey). The survey consisted of a desktop assessment and a reconnaissance survey followed by a detailed field survey including targeted searches of threatened and priority flora (Woodman Environmental, 2015). The survey covered an area of around 218 hectares, including the application area (Woodman Environmental, 2015). The survey was conducted at an appropriate time to identify most potentially occurring conservation significant flora.

The Woodman Survey identified one priority flora species, *Acacia semitrullata* (Priority 4) around 750 metres from the application area (Woodman Environmental, 2015). Noting the distance to this species and lack of other priority flora species identified within the Woodman Survey, the proposed clearing is not likely to impact on priority flora species.

The Woodman Survey did not identify any threatened flora species within the application area (Woodman Environmental, 2015). The survey timing was appropriate for all but one threatened flora species, *Drakaea elastica*. The most appropriate time to survey for this species is July/August when the orchids leaves are most evident. The Woodman survey involved a targeted search for this species on 2 September 2015, and Woodman Environmental noted that the leaves would still have been present in early September (Woodman Environmental, 2015).

Drakaea elastica is commonly found on white or grey sand in low-lying situations adjoining winter-wet swamps (Western Australian Herbarium, 1998-). The application area is 100 metres from the closest watercourse. The closest record of this species to the application area is 10.7 kilometres away.

Given the above, and the Woodman Survey findings, the proposed clearing is not likely to impact on *Drakaea elastica* or any other threatened flora species.

Threatened and Priority Ecological Communities

The application area is mapped as the Banksia Woodlands of the Swan Coastal Plain ecological community (Banksia Woodlands), which is listed by the Commonwealth as a threatened ecological community (TEC) (endangered) and by the state as a Priority 3 ecological community.

This ecological community has undergone a decline of about 60 per cent in its original extent and most of the community that remains, occurs as highly fragmented patches less than 10 hectares in size (DotEE, 2016). This ecological community has a dominant *Banksia* component, which includes at least one of four key species—*Banksia attenuata*, *B. menziesii*, *B. prionotes* and/or *B. ilicifolia* (DotEE, 2016). The ecological community provides habitat for many native flora and fauna reliant on *Banksia* Woodland. Remaining patches of the ecological community provide important wildlife corridors and refuges in a mostly fragmented landscape (DotEE, 2016).

The conservation advice for this TEC states that these Banksia woodland community types are fire prone habitats that include species with a range of life history traits that allow them to persist in a fire prone environment (DotEE, 2016).

The Woodman Survey described the vegetation as *Allocasuarina fraseriana*, *Eucalyptus marginata* and *Corymbia calophylla* woodland over *Banksia* woodland over taxon-rich shrubland on variable landforms from upper slopes to

flats. Woodman Environmental (2015) stated that this vegetation type appears to have similarities to two floristic community types; SCP21c 'Low lying *Banksia attenuata* woodlands or shrublands', and SCP21a 'Central *Banksia attenuata*, *Eucalyptus marginata* woodland' than SCP21c. Both SCP21a and SCP21c are listed in the approved conservation advice as floristic community types representative of the Banksia Woodlands TEC.

A follow up survey by Plantecology in November 2018 was undertaken to assess whether the application area met the criteria for consideration as the Banksia Woodlands TEC. The survey identified that all vegetation in a good or better condition in the application is representative the Banksia Woodlands TEC (Plantecology, 2018b). This is based on the condition thresholds specified in the approved conservation advice for this TEC.

The initial application area included around 6.4 hectares of native vegetation representative of this TEC. The applicant has amended the application area, and the proposed impact to the Banksia Woodland TEC/PEC is now 3.68 hectares.

Dieback and weeds risks to biodiversity

Glevan Consulting (2015) conducted a dieback (*Phytophthora cinnamomi*) assessment of a 36.8 hectare area within Lot 3, including the application area. The assessment identified that around six hectares of the application area is dieback infested.

The Woodman Survey recorded 46 weed species across the larger survey area encompassing the application area (Woodman Environmental, 2015). This includes *Zantedeschia aethiopica* (arum lily) which the Department of Primary Industries and Regional Development has classified as a declared pest. A vegetation condition survey undertaken by Plant Ecology in 2018 noted that portions of the application area are dominated by weeds (Plantecology, 2018a).

The proposed clearing will increase the risk of weeds and dieback spreading into adjacent areas of native vegetation, including areas of higher quality native vegetation within the adjacent remnant west of the application area. These areas provide important linkage and fauna habitat values, including conservation category wetlands, and are mapped as, and likely representative of the Banksia Woodlands TEC.

Conclusion

Based on the above assessment, and with consideration of the applicants measures to avoid and minimise impacts, the Delegated Officer has determined that the proposed clearing will result in the following impacts to biodiversity values:

- loss of 3.68 hectares of the Commonwealth listed Banksia Woodland TEC (endangered) and state listed PEC (priority 3)
- potential impacts to biodiversity values within adjacent native vegetation through the spread of weeds and dieback.

Outcome

The Delegated Officer determined that the proposed clearing requires management and offset conditions in relation to this environmental value. The offset measures are summarised under the 'Outcome' section 3.2.1 above and detailed under Section 4. The applicant will also be required to undertake weed and dieback hygiene management measures as a condition of the clearing permit.

3.2.3. Environmental value: Significant remnant vegetation – Clearing Principle (e)

The national objectives and targets for biodiversity conservation in Australia has a target to prevent clearing ecological communities below 30 per cent of that present pre-1750. Below this level, species loss appears to accelerate exponentially at an ecosystem level (Commonwealth of Australia, 2001).

As indicated in section B.2, the application area is within the Swan Coastal Plain Interim Biogeographic Regionalisation of Australia (IBRA) bioregion which retains 32.5 per cent of its pre-European vegetation extent. The application area is mapped as the Southern River vegetation complex which retains 18.4 of its pre-European vegetation extent. The local area retains around 15 per cent native vegetation cover (Government of Western Australia, 2019a; Government of Western Australia, 2019b).

The Southern River Complex is described as open woodland of *Corymbia calophylla* (Marri), *Eucalyptus marginata* (Jarrah) and *Banksia* species with fringing woodland of *Eucalyptus rudis* (Flooded Gum), and *Melaleuca raphiophylla* (Swamp Paperbark) along creek beds (Heddl et al, 1980). The application area is representative of this vegetation complex.

The local area and Southern River complex vegetation extents are both below the 30 per cent threshold target. The application area is within an extensively cleared agricultural band of the southern Swan Coastal Plain and is part of a larger remnant that provides important linkage and fauna habitat values, within a highly fragmented landscape. Therefore, the vegetation within the application area is a significant remnant within a highly cleared landscape.

The vegetation within the application area is considered a significant remnant as it provides foraging habitat for black cockatoos, is representative of the Banksia Woodland TEC/PEC and provides ecological linkage values.

Conclusion

Based on the above assessment, and with consideration of the applicants measures to avoid and minimise impacts, the Delegated Officer has determined that the proposed clearing will result in the loss of 10.04 hectares of significant remnant native vegetation in a highly cleared landscape.

Outcome

The Delegated Officer determined that the proposed clearing requires management and offset conditions in relation to this environmental value. The offset measures are summarised under the 'Outcome' section 3.2.1 above and detailed under Section 4. The applicant will also be required to undertake weed and dieback hygiene management measures as a condition of the clearing permit.

3.2.4. Environmental value: Conservation areas – Clearing Principle (h)

The application area is around 240 metres north west of Buller Nature Reserve. Hamel State Forest is located around 7.3 kilometres east and Myalup State Forest is located approximately 8.8 kilometres west.

As discussed under Section 3.2.1, the application area is part of an ecological linkage, defined by the South West Regional Ecological Linkage (SWREL) Report (Molloy et al., 2009) which connects Buller Nature Reserve, Myalup State Forest and Hamel State Forest. The SWREL Report notes that patches of remnant vegetation which contribute to the maintenance, function and viability of conservation estate are high priorities for retention (Molloy et al, 2009).

As the application area forms part of an ecological linkage, it assists in the maintenance of ecological process between conservation reserves in the local area. This value is heightened by the significant black cockatoo fauna habitat value present within the application area, which assists in the movement of these species between the connected reserves.

A phytophthora dieback occurrence assessment for Lot 3 reports that infestation of the application area (more than five hectares) may have been due to the existing adjacent sand mining operation managed by the applicant. The disturbance caused by the proposed clearing may further spread dieback and weeds to Lot 3 and surrounding areas. Therefore, the proposed clearing has the potential to introduce dieback and weeds into Buller Nature Reserve.

Conclusion

Based on the above assessment, and with consideration of the applicants measures to avoid and minimise impacts, the Delegated Officer determined that the proposed clearing will result in the potential spread of dieback into Buller Nature Reserve, and the loss of 10.04 hectares of significant remnant native vegetation that contributes linkage values between Buller Nature Reserve, Hamel State Forest and Myalup State Forest.

Outcome

The Delegated Officer determined that the proposed clearing requires management and offset conditions in relation to this environmental value. The offset measures are summarised under the 'Outcome' section 3.2.1 above and detailed under Section 4. The applicant will also be required to undertake weed and dieback hygiene management measures as a condition of the clearing permit.

3.3. Relevant planning instruments and other matters

Clearing application history

Clearing permit 6701/1

On 12 August 2015, AMG (WA) Pty Ltd applied for a permit to clear 6.02 hectares of vegetation in a degraded (Keighery, 1994) condition within Lot 3 Buller Road. DER's assessment did not identify any significant environmental impacts, and on 15 October 2015 the former DER granted a permit to clear, subject to conditions, including revegetation requirements of the extraction area, post-extraction. The applicant has advised that extraction activities have not yet been finalised, as sand resource remains, hence revegetation has not yet commenced.

Clearing permit application CPS 6620/1

On 17 June 2015, AMG (WA) Pty Ltd applied for a permit to clear 33.84 hectares of native vegetation within Lot 3 Buller Road, for sand extraction. During the assessment, the application was reduced to 20.8 hectares. The Delegated Officer determined that the proposed clearing would have resulted in the loss of 20.8 hectares of vegetation that contains high biodiversity, significant habitat for fauna, forms part of a regionally significant ecological linkage and is a significant remnant in a highly cleared area.

The applicant was provided an opportunity to further revise the application area to avoid significant environmental impacts. The applicant declined to revise, and on 10 August 2016, DER refused the application, noting that the residual environmental impacts were too significant to offset.

On 24 August 2016, the applicant appealed DER's decision. The appellant submitted that the environmental values could have been adequately offset, and the on-site values have been impacted by dieback and the Waroona fires in January 2016. The appellant submitted that the decision to refuse the permit was inconsistent with planning and other decisions made by DER in the area.

On 31 January 2017, the Minister for Environment dismissed the appeal noting that while some damage to vegetation was an inevitable consequence of fire, the values of the vegetation are capable of being re-established, specifically black cockatoo foraging habitat and linkage values. The Minister further advised that the applicable planning instruments do not identify the site as an area of regional or state significance for basic raw materials (Minister for Environment, 2017).

Clearing permit application CPS 7516/1

On 13 March 2017, the applicant applied to clear 14 hectares of native vegetation within Lot 3 for sand extraction.

The Delegated Officer determined that the proposed clearing contained high biodiversity, significant habitat for fauna, forms part of a regionally significant ecological linkage and is a significant remnant in a highly cleared area.

DWER determined that environmental offsets were not appropriate for the proposed clearing, given the significance of impacts. On 5 January 2018, the Delegated Officer determined to refuse the application. On 22 January 2018 DWER was notified of an appeal against the decision to refuse the application.

On the 9 July 2018 the Minister for Environment dismissed the appeal stating that (Minister for Environment, 2018):

"while the values of the vegetation to black cockatoos were negatively impacted by the Waroona fires, the Minister considered that the vegetation nonetheless retains habitat values for the identified species. The Minister also acknowledged the Appeals Committee's advice in respect to the status of the three species, and the impact posed by further clearing of vegetation that is of habitat value. It follows that the Minister agreed with the Appeals Committee that the 14 hectares of native vegetation proposed to be cleared forms part of a significant habitat for black cockatoos.

The Minister also noted that the vegetation may form part of a habitat for brush-tailed phascogales and quendas. In coming to this conclusion, the Minister also noted that only 18 per cent of the pre-European Southern River vegetation complex on the coastal plain remains intact, and only 15 per cent of the original extent of native vegetation remains within a 10 kilometre radius of the property."

The determination by the Minister for Environment further noted that (Minister for Environment, 2018):

“the Appeals Committee acknowledged that factors such as the powerline corridor, the adjoining landfill, the adjoining farmland and the previous un-remediated sand extraction pits may support the notion that the ecological linkage is not maintained. However, the Committee found that the subject area is clearly part of a patch of bushland within a regional linkage. Based on the information available, the Minister agreed with the Appeals Committee that while clearing the Application Area would not sever the regional linkage, it would make the linkage patch smaller and expose to edge effects a greater area that is in better condition. As such, the Minister was of the view that DWER appropriately considered ecological linkages in its assessment of the proposal.”

In summary the Minister for Environment noted (Minister for Environment, 2018):

“Taking into account the values identified in respect to the entire Application Area, the Minister believed DWER was justified in forming the view that an offset was not appropriate in this instance. ... It follows that the Minister considered DWER’s assessment of the proposed clearing was appropriate, and adequately considered the environmental values and other relevant matters relevant to the proposal. The Minister has therefore dismissed the appeal.”

EPBC Act Approval

On 9 February 2018, the applicant applied for approval to clear under the *EPBC Act 1999*. On 17 January 2019, the former Department of the Environment and Energy approved the proposal (reference EPBC 2018/8138), subject to conditions. The conditions require the provision of a suitable offset, which involves the conservation of remnant vegetation immediately west of the application area. This approval also requires the applicant to provide an Environmental Management Plan for approval of the Commonwealth Minister prior to clearing.

Current application – CPS 8500/1

In granting a clearing permit subject to conditions, including offset requirements, the Delegated Officer considered the following key differences between the environmental impacts of the current proposal relative to those assessed under the refused CPS 7516/1:

- the application area has been reduced from 14 hectares to 10.04 hectares
- the extent of impact on potential future breeding trees has reduced from 107 trees, of which 17 had potentially suitable breeding hollows, to 24 trees, of which none have potentially suitable breeding hollows
- the extent of impact to black cockatoo foraging habitat has reduced from 14 hectares to 10.04 hectares
- the extent of impact to vegetation in a good or better condition has reduced from 10.75 hectares to 3.68 hectares (based on revised vegetation condition mapping)
- the extent of impact to the Banksia Woodlands TEC has reduced from 10.75 hectares to 3.68 hectares
- the extent of impact to the Southern River Complex and vegetation contributing linkage values has reduced from 14 hectares to 10.04 hectares

In addition to offset measures that involve placing a conservation covenant over 20.61 hectares of adjacent high quality remnant vegetation, the applicant has also included rehabilitation measures as part of the proposed offset, including the rehabilitation of 8.2 hectares of native vegetation from a degraded to very good (Keighery, 1994) condition.

The Delegated Officer acknowledges the applicants’ previous difficulties in historically revegetating a nearby area, and has factored this into the mitigation credit provided, and in calculating the required offsets. The Delegated Officer also considered the following factors:

- the fires of 2016 hindered historical revegetation success
- the applicant has submitted a comprehensive revegetation plan to support revegetation of the pit post-extraction
- the clearing permit will include a condition which requires revegetation of the pit immediately post-extraction, to achieve a final vegetation condition of ‘good’. The condition also includes contingency actions which need to occur to achieve successful revegetation
- the requirement to undertake revegetation of the pit is included as a requirement of the development approval and extractive industry licence. The applicant is required to provide a 30 per cent bond for the revegetation to ensure that revegetation actions are undertaken

Planning Approvals

The Shire of Waroona Town Planning Scheme No. 7 1996 maps the Application Area as being zoned as rural (Rural 1). In this zone, extraction 'is not permitted unless the local government has exercised its discretion by granting development approval after giving notice in accordance with clause 64 of the deemed provisions' (DoP, 1996).

On 21 December 2020, the Shire of Waroona issued the applicant with an extractive industry licence and development approval over the application area, subject to conditions. These conditions include the following (Shire of Waroona, 2020):

- all stormwater and drainage run-off shall be contained onsite or be connected to a Shire of Waroona stormwater legal point of discharge to the satisfaction of the Shire
- fuel storage/refuelling areas shall be contained wholly within the 10.04 hectare application area, comprising a bunded hardstand area and drained to a pollutant receptor to the satisfaction of the Shire
- measures being implemented to the satisfaction of the Shire of Waroona to avoid the risk of spills or leaks of fuel, oils or other hydrocarbons or chemicals within the application area
- a minimum separation distance of two metres between the maximum excavation depth and the highest known groundwater level
- all stockpiles of sand and topsoil shall be located below the highest ridgelines of the application area, in an east west alignment (to reduce wind erosion) and be regularly watered to suppress dust from blowing on to adjoining lots
- within 60 days, a dieback management plan is to be prepared and implemented once approved by the Shire, prior to mining the application area
- materials imported for rehabilitation shall be certified dieback free
- the rehabilitation and Decommissioning plan is to be revised to the satisfaction of the Shire of Waroona detailing how the site will be revegetated to enable a self sustaining ecological community
- the applicant must enter into a deed of agreement with the Shire to implement revegetation, with no less than 30 per cent of the cost of actioning the plan being bonded to the Shire to ensure revegetation
- the spreading of topsoil over excavated areas is to be dressed to a minimum depth of five centimetres prior to seeding and planting the application area
- mining is to be undertaken in accordance with the site management plan.

It is considered that impacts associated with the end land use, including potential run-off and sedimentation into the closest mapped wetlands and watercourses on site, have been addressed through the Shire of Waroona's conditional development approval and extractive industry licence, and the applicants site management plan.

Other relevant matters

Peel Harvey Catchment Council comment

On 14 June 2019, DWER sent a direct interest letter to the Peel Harvey Catchment Council (PHCC). On 10 July 2019, PHCC provided a response. The comments align with those previously provided under CPS 7516/1. PHCC reiterated its previous advice and strongly objects to any further clearing in Lot 3 Buller Road and advised the following (PHCC, 2017; PHCC, 2019):

- Lot 3 supports a significant area of native vegetation of high ecological value
- the vegetation is likely to be part of the Southern River Complex, of which over 80 per cent has already been cleared
- the proposal will likely result in significant impacts to threatened or endangered black cockatoos species and the endangered Glossy - leafed Hammer Orchid (*Drakea elastica*)
- any further extractive use of Lot 3 (or any other lot with contiguous native vegetation) must be assessed with consideration to the long-term protection of biodiversity and water quality in the Peel-Harvey Catchment and the Perth and Peel Regions
- the further loss of native vegetation and perennial vegetation cover in the coastal catchment of the Peel-Harvey Estuary is not acceptable. Further loss of native vegetation (and sand) will increase:
 - runoff to local watercourses
 - sedimentation
 - nutrient movement to downstream ecosystems
- DWER should assess the vegetation in its pre-fire condition noting failure to do so sets a concerning precedent.

The concerns raised by PHCC have been addressed within this Decision Report.

Project Support

The applicant has obtained letters of support for the project from:

- Minister for Indigenous Affairs
- Peel Development Commission
- Josie Farrer – Member for the Kimberley
- Department of Aboriginal Affairs
- Minister for Employment
- Department of Training and Workforce Development

RIWI Act Approvals

The application area is mapped within the Murray groundwater area which is proclaimed under the *Rights in Water and Irrigation Act 1914* (RIWI Act). Under the RIWI Act, if a bore is to be drilled and water taken for purposes other than those purposes exempt from licensing, a licence application must be made to DWER. The applicant has advised that the proposed extractive industry will remain above the groundwater level, and therefore will not require a RIWI licence to take groundwater.

Aboriginal heritage

There is one Aboriginal Site of Significance mapped within the application area, Buller Road Camp. 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.

EPA Environmental Protection Bulletin (EPB) No. 12

Lot 3 Buller Road is identified as being part of a 'Peel Regionally Significant Natural Area' (RSNA) under the Environmental Protection Authority's Environmental Protection Bulletin (EPB) No. 12. EPB No.12 identifies regionally significant natural areas that should be considered during strategic planning. EPB No.12 notes that any developments in this area will be considered on their merits. However, those impacting on regionally significant natural areas will be subjected to higher scrutiny (EPA, 2013).

The EPA notes that (EPA, 2013)

- the primary protection of remnant native vegetation is best achieved by locating development in cleared areas in preference to un-cleared lands;
- the Peel RSNAs information provides a key resource to inform strategic regional planning;
- the information provides guidance to State and Local Government authorities, community, industry and developers in planning to firstly, avoid, and then minimise, the impacts of development proposals and planning schemes on natural areas; and,

Noting the applicants measures to avoid and minimise environmental impacts, and commitment to revegetation and offset measures, the proposed clearing is not considered to be in contravention of EPB No.12.

Former Department of Mines and Petroleum (DMP) comment

The former DMP confirmed Lot 3 Buller Road, Waroona has been identified and mapped as containing a Regionally Significant Basic Raw Material (RSBRM) for sand.

The RSBRM mapping of the Swan Coastal Plain was carried out using a consistent rule set, designed to identify the larger and most significant sand deposits, considering surface area and thickness above water table. DMP further advised that the mapping serves as a useful tool to identify the more significant basic raw material resources in a regional context, however it cannot be taken as government endorsement of approval for mining, which needs to consider other matters such as environmental and planning approvals. The now Department of Mines, Industry Regulation and Safety (DMIRS) confirmed this advice on 6 August 2019 (DMIRS, 2019).

4 Suitability of offsets/mitigation

The Delegated Officer determined that the following significant residual impacts remain after the application of avoidance and mitigation measures summarised in Section 3.1:

- loss of 10.04 hectares of significant foraging habitat for black cockatoos
- loss of 3.68 hectares of the Commonwealth listed Banksia Woodlands TEC and state listed PEC
- loss of 10.04 hectares of native vegetation that contributes to a regionally significant ecological linkage between conservation areas, within a highly cleared landscape
- loss of 10.04 hectares of vegetation representative of the highly cleared Southern River vegetation complex

To counterbalance the above residual impacts, the applicant has proposed environmental offsets.

Revegetation

The applicant has committed to on-site revegetation of 10.04 hectares with local provenance species within the application area post-extraction. The revegetation:

- is supported by a comprehensive revegetation plan, outlining revegetation activities, including completion criteria based on nearby reference sites in a good (Keighery, 1994) condition
- will achieve a good (Keighery, 1994) vegetation condition
- will comprise local provenance species and suitable foraging habitat for black cockatoos
- will comprise dieback resistant species.

Rehabilitation and conservation covenant

The applicant has committed to rehabilitating 8.2 hectares of native vegetation in a degraded (Keighery, 1994) condition within adjacent native vegetation in Lot 3, Buller Road. The vegetation currently provides significant habitat for black cockatoos, is representative of the Southern River vegetation complex and provides ecological linkage values. The rehabilitation area will be placed under a conservation covenant to be registered on the Certificate of Title in perpetuity, in accordance with Section 30B of the *Soil and Land Conservation Act 1945*. The revegetation:

- is supported by a comprehensive rehabilitation plan, outlining rehabilitation activities, including completion criteria based on nearby reference sites in a very good (Keighery, 1994) condition
- will achieve a very good (Keighery, 1994) vegetation condition
- will improve habitat for black cockatoos
- will improve ecological linkage values and the condition of vegetation representative of the Southern River vegetation complex

Conservation covenant

The applicant has committed to placing a conservation covenant over an additional 20.61 hectares of adjacent native vegetation in a very good to good (Keighery, 1994) condition. The vegetation contains significant habitat for black cockatoos, is representative of the Banksia Woodlands TEC, is representative of the Southern River vegetation complex, and contributes to a regionally significant ecological linkage. The covenant will be registered on the Certificate of Title in perpetuity, in accordance with Section 30B of the *Soil and Land Conservation Act 1954*.

In assessing whether the proposed offset is adequate and proportionate to the significance of environmental values being impacted, a calculation using the EPBC Act Offset Calculator was undertaken. The calculation indicates that the proposed offset is sufficient to counterbalance these impacts.

When combined with the conservation covenant required over the 8.2 hectare rehabilitation area described above, the total area required to be placed under a conservation covenant is 28.81 hectares.

End

Appendix A. Additional information provided by applicant

Summary of comments

DWER – 7 November 2019 - Intent to refuse

During the assessment of the application, DWER invited the applicant to comment on DWER's Draft Decision Report and notice of intent to refuse the application. The Draft Decision Report had identified significant impacts to:

- black cockatoo fauna habitat
- ecological linkage values within a highly cleared area
- Commonwealth listed Banksia Woodlands TEC
- the highly cleared Southern River vegetation complex

The draft decision report noted that given the current extent and significance of impacts, offsets would not be considered at that stage. DWER also noted that the applicant had not received development approval or an extractive industry licence for the proposed extraction from the Shire of Waroona.

Applicant - 6 December 2019

The applicants contact provided the following (abbreviated) comments on the draft decision report and intention of the Department to refuse the application. The applicant noted that:

- DWER's draft decision report was not consistent with the assessment and approval issued by the former DotEE under the EPBC Act (subject to appropriate offsets)
- DWER's decision report erred in its assessment against the 10 clearing principles, and did not appropriately consider the degraded condition of the application area, limited quality of habitat for black cockatoos, dieback infestation and limited value to the larger ecological linkage.

DWER

DWER acknowledged the applicant's response and provided clarity over some of the issues raised. However, as no new information was provided to the notice of intent to refuse or draft decision report, DWER advised the applicant that it would proceed with the decision to refuse the application.

Applicant – 19 March 2020 - Revised application area

The applicant provided a revised application area and offset proposal. The key changes in the proposal included the following:

- reduction in the application area from 12.94 hectares to 10.04 hectares
- additional offset commitments (in addition to the proposed conservation covenant of a larger area) to revegetate an adjacent 8.2 hectare area in a degraded condition, to be put under a conservation covenant

DWER – 23 March 2020

Upon review, DWER considered that additional information was required to determine the adequacy of the revised application and offset proposal. Specifically, DWER requested the following information:

- spatial files for the revised clearing area and revegetation areas
- a revegetation plan
- revised impact figures for black cockatoo habitat, Banksia Woodland TEC and vegetation condition
- confirmation from the landowner that the proposed revegetation area has been agreed to and would be returned to native vegetation, and held as such in perpetuity under a conservation covenant

Applicant – 11 May 2020

The applicant provided spatial information and extent of impact figures to environmental values on site. The applicant requested the requirement for a revegetation plan be placed on a clearing permit and provided at a later date. The applicant noted this would avoid the cost of preparing a revegetation plan prior to being assured of the decision outcome.

Summary of comments

DWER – 10 July 2020 – Additional information required

DWER's review of the applicants revised application identified that the revised application area:

- excluded 2.9 hectares of native vegetation largely in a good (Keighery, 1994) condition
- avoided 23 trees of a suitable DBH to provide future breeding habitat for black cockatoos, including one tree with a suitably sized breeding hollow
- excluded 2.9 hectares of significant foraging habitat for black cockatoos
- reduced the extent of impact to vegetation mapped as the Southern River complex
- reduced the extent of impact to vegetation contributing to regionally significant ecological linkage values within a highly cleared landscape
- reduced the extent of impact to the Banksia Woodland TEC by up to 2.9 hectares
- would result in impacts that could be deemed acceptable if adequately offset through a combination of revegetation and land acquisition actions.

However, DWER required additional information to progress the application, and wrote to the applicant to request the following information:

- clarification regarding the end-land-use of the application area once mining activities cease, noting that for clearing permits relating to extraction, DWER typically imposes conditions requiring revegetation of such areas;
- a comprehensive revegetation plan for areas proposed to be revegetated in accordance with DWER's 'A Guide to Preparing Revegetation Plans for Clearing Permits' (2018)
- required planning approvals, including an extractive industry licence, from the Shire of Waroona
- a finalised conservation covenant, under section 30B of the *Soil and Land Conservation Act 1945*, over 28.81 hectares (includes the proposed 8.2 hectare rehabilitation area) of Lot 3 Buller Road to be set aside to counterbalance the impacts of proposed clearing.

Applicant – 16 July 2020 and 13 August 2020

The applicant provided additional information to DWER, and noted the following:

- the applicant is prepared to commit to the required offset
- it is the applicant's view that the provision of a revegetation plan should only be required after a decision on the application is made and as a condition of approval, as the applicant should not need to incur costs engaging a consultant to prepare a plan before a decision, particularly if an approval is not forthcoming
- the applicant acknowledged the need for planning approval and a conservation covenant and was in the process of obtaining these
- a document detailing some potential rehabilitation measures was provided.

DWER – 19 August 2020 – Agreement in principle

DWER considered that a revegetation plan would be required upfront, as it is a key factor in determining if an offset is acceptable. DWER considered that should an adequate revegetation plan be provided, the proposed offset, which involved the revegetation and conservation of 8.2 hectares and the conservation of an additional area of 20.61 hectares (in predominantly very good (Keighery, 1994) condition) would be adequate to offset the significant residual environmental impacts of clearing. DWER subsequently wrote to the applicant to provide in principle agreement subject to receiving the following information:

- a comprehensive revegetation plan for the 8.2 hectare area proposed to be revegetated as an offset, and the 10.04 hectare area to be revegetated following the cessation of extraction activities, prepared in accordance with DWER's 'A Guide to Preparing Revegetation Plans for Clearing Permits' (2018) (Revegetation Guideline)
- planning approval and an extractive industry licence from the Shire of Waroona over the application area
- an executed conservation covenant, covering the abovementioned 28.81 hectare area.

Applicant – 17 December 2020 and 20 December 2020 – Revegetation plan and planning approvals

The applicant provided DWER with:

- a copy of the revegetation plan for the 8.2 hectare offset area and the application area, post-extraction.

Summary of comments

- a copy of the extractive industry licence and development approval from the Shire of Waroona

DWER – 22 January 2021

DWER reviewed the revegetation plan and emailed the applicant to advise of required revisions for DWER to accept the revegetation plan.

Applicant – 5 February 2021 – revised revegetation plan

The applicant emailed DWER a copy of the revised revegetation plan.

DWER confirmed that the revised revegetation plan is adequate.

Applicant – 19 April 2021 and 4 May 2021 – Executed conservation covenant and revised revegetation plan

The applicant noted that the proposed location of the 8.2 hectare rehabilitation area required adjusting, as a portion was being utilised to provide access (through a defined access track) to the leaseholders residence. Subsequently, an alternate 8.2 hectare rehabilitation area was proposed. A revised rehabilitation plan was subsequently provided to reflect the change.

The applicant also provided a copy of the final signed conservation covenant documents.

DWER considered that the revised rehabilitation area provides a better environmental outcome than that originally proposed and acknowledged the adequacy of the revegetation plan and final conservation covenant.

Appendix B. Site characteristics

B.1. Site characteristics

Characteristic	Details
Local context	<p>The application area is in the Swan Coastal Plain Bioregion, and Shire of Waroona. It is bound by remnant vegetation to the north and west, and extractive industry and agricultural land uses east and south respectively.</p> <p>The application area comprises part of a larger remnant of native vegetation (around 650 hectares) which occurs in a band of highly cleared agricultural land within the southern Swan Coastal Plain.</p>
Climate and Landform	<p>The application area is located on the Bassendean Dunes landform, comprising gently undulating dunes made up of well-bleached white-grey sands. The landform of the larger remnant within Lot 3 Buller Road ranges from 24 mAHD on top of a sand rise in the southwest part of the area to around 15.5 mAHD within the adjacent eastern extraction areas (MBS Environmental, 2015).</p> <p>The climate of the area is warm and temperate (Mediterranean). The winter months have higher rainfall than summer months with an annual rainfall of around 950 millimetres.</p>
Vegetation description and condition	<p>Flora surveys indicate that the application area comprises the following vegetation type:</p> <p>VT1 - Mid open woodland to open forest of <i>Allocasuarina fraseriana</i>, <i>Eucalyptus marginata</i> and <i>Corymbia calophylla</i> over low open woodland to woodland dominated by <i>Banksia attenuata</i>, <i>Banksia grandis</i> and <i>Banksia ilicifolia</i> over mid sparse to open shrubland dominated by <i>Xanthorrhoea preissii</i> over low to mid sparse shrubland to</p>

Characteristic	Details												
	<p>shrubland dominated by <i>Hibbertia hypericoides</i> over low sparse to open forbland dominated by <i>Dasypogon bromeliifolius</i> and <i>Desmocladius flexuosus</i> on grey sand on lower to upper slopes and flats (Woodman Environmental, 2015).</p> <p>The full survey descriptions and maps are available online.</p> <p>According to broad scale vegetation mapping of the Swan Coastal Plain, the application area is mapped as the Southern River Complex. This complex is described as open woodland of <i>Corymbia calophylla</i> (Marri), <i>Eucalyptus marginata</i> (Jarrah) and <i>Banksia</i> species with fringing woodland of <i>Eucalyptus rudis</i> (Flooded Gum), and <i>Melaleuca raphiophylla</i> (Swamp Paperbark) along creek beds (Heddle et al, 1980). The application area is representative of this vegetation complex.</p> <p>As indicated in the table below, flora surveys indicate the vegetation within the application area is in a very good to completely degraded (Keighery, 1994) condition, with the majority in a degraded to completely degraded (Keighery, 1994) condition (Plant Ecology, 2018a).</p> <table border="1" data-bbox="467 680 1432 831"> <thead> <tr> <th>Vegetation condition</th> <th>Total (hectares)</th> </tr> </thead> <tbody> <tr> <td>Very good</td> <td>1.03</td> </tr> <tr> <td>Good</td> <td>2.65</td> </tr> <tr> <td>Degraded</td> <td>3.31</td> </tr> <tr> <td>Completely degraded</td> <td>3.06</td> </tr> </tbody> </table> <p>The full Keighery (1994) condition rating scale, with a description of each condition, is provided in Appendix D.</p>	Vegetation condition	Total (hectares)	Very good	1.03	Good	2.65	Degraded	3.31	Completely degraded	3.06		
Vegetation condition	Total (hectares)												
Very good	1.03												
Good	2.65												
Degraded	3.31												
Completely degraded	3.06												
Soil description	<p>The application is mapped as the 'Bassendean B2 Phase' map unit, described as extremely to very low relief dunes, undulating sandplain and discrete sand rises with deep bleached grey sands sometimes with a pale yellow B horizon or weak iron-organic hard pan at depths generally greater than 2 metres (DPIRD, 2017).</p>												
Conservation areas	<p>The closest conservation area is Buller Nature reserve located around 240 metres from the application area.</p>												
Ecological linkage	<p>The application area forms part of a South West Regional Ecological Linkage (SWREL). A patch of vegetation with an edge touching or less than 100 metres from a linkage (axis line) is assigned to proximity analysis group 1(a) which is the highest category group. The application area is within group 1(a).</p>												
Land degradation risk	<p>According to land degradation risk mapping, the highest risk on site is associated with wind erosion, as 50-70 per cent of the application areas mapped land unit has a high to extreme wind erosion risk (see all categories below).</p> <p>Groundwater salinity is mapped at between 500-1000 milligrams per litre total dissolved solids. This level is considered marginal.</p> <table border="1" data-bbox="467 1583 1411 1892"> <thead> <tr> <th>Risk categories</th> <th>Landform Unit S8</th> </tr> </thead> <tbody> <tr> <td>Wind erosion</td> <td>>70% of map unit has a high to extreme wind erosion risk</td> </tr> <tr> <td>Water erosion</td> <td>3-10% of map unit has a high to extreme water erosion risk</td> </tr> <tr> <td>Salinity</td> <td>30-50% of map unit has a moderate to high salinity risk or is presently saline</td> </tr> <tr> <td>Flood risk</td> <td><3% of the map unit has a moderate to high flood risk</td> </tr> <tr> <td>Water logging</td> <td>3-10% of map unit has a moderate to very high waterlogging risk</td> </tr> </tbody> </table>	Risk categories	Landform Unit S8	Wind erosion	>70% of map unit has a high to extreme wind erosion risk	Water erosion	3-10% of map unit has a high to extreme water erosion risk	Salinity	30-50% of map unit has a moderate to high salinity risk or is presently saline	Flood risk	<3% of the map unit has a moderate to high flood risk	Water logging	3-10% of map unit has a moderate to very high waterlogging risk
Risk categories	Landform Unit S8												
Wind erosion	>70% of map unit has a high to extreme wind erosion risk												
Water erosion	3-10% of map unit has a high to extreme water erosion risk												
Salinity	30-50% of map unit has a moderate to high salinity risk or is presently saline												
Flood risk	<3% of the map unit has a moderate to high flood risk												
Water logging	3-10% of map unit has a moderate to very high waterlogging risk												

Characteristic	Details
Waterbodies	<p>According to available datasets, there are no wetlands mapped within the application area.</p> <p>The closest wetlands to the application area are:</p> <ul style="list-style-type: none"> • UFI 5004 multiple use sumpland (seasonally inundated basin) – 100 metres west • UFI 4807 conservation category sumpland – 250 metres west • UFI 4636 conservation category sumpland – 500 metres west • UFI 5005 resource enhancement dampland – 200 metres north <p>There are no natural watercourses mapped within, or close to the application area.</p>
Flora	<p>According to available datasets, there are records of four threatened and 20 priority flora species within the local area. These are presented below in section B.3. Of these, a likelihood of analysis identified four priority and three threatened species that may occur within the application based on habitat suitability (vegetation type, soil type and vegetation condition).</p> <p><i>Caladenia huegelii</i> is the closest known record of threatened flora to the application area, located 1.5 kilometres away.</p> <p><i>Caladenia speciosa</i> is the closest known record of priority flora to the application area, located one kilometre away.</p> <p>Flora surveys did not identify any threatened or priority flora species within the application area (Woodman Environmental, 2015; MBS Environmental, 2015). The Woodman Survey identified one priority 4 flora species, <i>Acacia semitrullata</i>, around 750 metres from the application area.</p>
Ecological communities	<p>Most of the application area is mapped as the 'Banksia woodlands of the Swan Coastal Plain' (Banksia Woodland) threatened ecological community (TEC) (endangered). These areas are also mapped as the state listed 'Banksia dominated woodlands of the Swan Coastal Plain IBRA region' priority ecological community (PEC) (priority 3).</p> <p>Of this area, 3.68 hectares (in a good or very good (Keighery, 1994) condition) meets the condition and size thresholds required under the diagnostic criteria for the Banksia Woodland TEC (DotEE 2016), and this portion is therefore considered representative of this TEC.</p>
Fauna	<p>According to available datasets, there are records of 13 conservation listed fauna species within the local area, as presented in section B.4 below. Of these, a likelihood of analysis identified nine species that may occur within the application area based on habitat suitability.</p> <p>A Fauna and Black Cockatoo Habitat Assessment identified forest red-tailed black cockatoo and Carnaby's cockatoo foraging evidence within the application area. No evidence of other conservation listed species was definitively identified within the application area (Terrestrial Ecosystems, 2015; Harewood, 2018).</p>

B.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*					
Swan Coastal Plain	1,501,222	579,814	38.6	153,955	10.3
Vegetation complex					
Hedde vegetation complex 'Southern River Complex' **	58,781	10,832	18.4	940	1.6
Local area					
10km radius	33,007	3,928	11.9	-	-

*Government of Western Australia (2019a)

**Government of Western Australia (2019b)

B.3. Flora records table

The below table shows threatened flora recorded within the local area. The table also includes four species recorded just outside (within three kilometres) the local area, given these species are known to commonly occur within this portion of the Swan Coastal Plain.

Threatened flora

Species name	Conservation status (state listing)	Number of known records in the local area (10km radius)	Suitable habitat present [Y, N, N/A]	Are surveys adequate to identify? [Y, N, N/A]	Did surveys identify? [Y, N, N/A]
<i>Caladenia huegelii</i>	Threatened (Endangered)	1	Yes	Yes	No
<i>Diuris drummondii</i>	Threatened (Vulnerable)	2	Yes	Yes	No
<i>Diuris purdiei</i>	Threatened (Endangered)	0	No	Yes	No
<i>Drakaea elastica</i>	Threatened (Endangered)	0	No	Yes	No
<i>Drakaea micrantha</i>	Threatened (Vulnerable)	0	Yes	Yes	No
<i>Eleocharis keigheryi</i>	Threatened (Vulnerable)	2	No	Yes	No
<i>Synaphea</i> sp. Fairbridge Farm (D.Papenfus 696)	Threatened (Critically endangered)	0	No	Yes	No
<i>Synaphea stenoloba</i>	Threatened (Endangered)	3	No	Yes	No

The below table shows priority flora recorded within the local area.

Priority Flora

Species name	Conservation status (state listing)	Number of known records in the local area (10km radius)	Suitable habitat present [Y, N, N/A]	Are surveys adequate to identify? [Y, N, N/A]	Did surveys identify? [Y, N, N/A]
<i>Amanita fibrilloses</i>	3	1	Yes	Yes	No
<i>Angianthus drummondii</i>	3	2	No	N/A	No
<i>Aponogeton hexatepalus</i>	4	2	No	N/A	No
<i>Boronia capitata</i> subsp. <i>gracilis</i>	3	2	No	N/A	No
<i>Caladenia speciosa</i>	4	6	Yes	Yes	No
<i>Carex tereticaulis</i>	3	1	No	N/A	No
<i>Chamaescilla gibsonii</i>	3	2	No	N/A	No
<i>Conostylis pauciflora</i> subsp. <i>pauciflora</i>	4	1	Yes	Yes	No
<i>Diuris brevis</i>	2	1	Yes	Yes	No
<i>Grevillea bipinnatifida</i> subsp. <i>pagna</i>	1	9	No	N/A	No
<i>Hemigenia microphylla</i>	3	2	No	N/A	No
<i>Melaleuca viminalis</i>	2	1	No	N/A	No
<i>Ornduffia submersa</i>	4	1	No	N/A	No
<i>Phyllangium palustre</i>	2	1	No	N/A	No
<i>Pterostylis frenchii</i>	2	1	No	N/A	No
<i>Schoenus capillifolius</i>	3	1	No	N/A	No
<i>Schoenus natans</i>	4	5	No	N/A	No
<i>Schoenus</i> sp. Waroona (G.J. Keighery 12235)	3	2	No	N/A	No
<i>Stylidium aceratum</i>	3	1	No	N/A	No
<i>Synaphea odocoileops</i>	1	3	No	N/A	No

B.4. Fauna records table

The below table shows conservation listed fauna recorded within the local area.

Species name	Conservation status (state listing)	Did surveys identify? [Yes, No, N/A]	Suitable habitat present [Yes, No, N/A]
<i>Calyptorhynchus latirostris</i> (Carnaby's cockatoo)	Endangered	Yes – evidence of foraging	Yes
<i>Calyptorhynchus baudinii</i> (Baudin's cockatoo)	Endangered	No	Yes
<i>Myrmecobius fasciatus</i> (numbat)	Endangered	No	Yes (foraging only)
<i>Calyptorhynchus banksii naso</i> (forest red-tailed black cockatoo)	Vulnerable	Yes – evidence of foraging	Yes
<i>Westralunio carteri</i> (Carter's freshwater mussel)	Vulnerable	No	No
<i>Dasyurus geoffroyi</i> (chuditch)	Vulnerable	No	Yes (foraging only)

Species name	Conservation status (state listing)	Did surveys identify? [Yes, No, N/A]	Suitable habitat present [Yes, No, N/A]
<i>Phascogale tapoatafa wambenger</i> (south-western brush-tailed phascogale)	Conservation dependant	No	Yes
<i>Ctenotus ora</i> (coastal plains skink)	P3	No	Yes
<i>Geotria australis</i> (pouched lamprey)	P3	No	No
<i>Notamacropus irma</i> (western brush wallaby)	P3	No	Yes
<i>Isodoon fusciventer</i> (quenda)	P4	No	Yes
<i>Thinornis rubricollis</i> (hooded plover)	P4	No	No
<i>Hydromys chrysogaster</i> (water-rat)	P4	No	No

Appendix C. Assessment against the clearing principles

Assessment against the clearing principles	Variance level	Is further consideration required?
Environmental value: biodiversity 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 application area comprises a high level of biodiversity as it contains:</p> <ul style="list-style-type: none"> significant foraging habitat for black cockatoos 3.68 hectares of vegetation representative of the Commonwealth listed Banksia Woodlands TEC and 3.68 hectares of the state listed Priority 3 'Banksia dominated woodlands of the Swan Coastal Plain IBRA region' ecological community regionally significant ecological linkage values within a highly cleared landscape 	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> <p><u>Assessment:</u></p> <p>The application area contains 10.04 hectares of foraging habitat for black cockatoos, within a highly cleared area of the Swan Coastal Plain. The application area also contains suitable habitat for an additional 8 species of conservation significant fauna.</p>	At variance	Yes <i>Refer to Section 3.2.1, above.</i>
<p><u>Principle (c):</u> "Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora."</p> <p><u>Assessment:</u></p> <p>The application area provides suitable habitat for three threatened flora species. A targeted spring flora survey did not identify any threatened flora (Woodman Environmental, 2015).</p>	Not likely to be at variance	Yes <i>Refer to Section 3.2.1, above.</i>

Assessment against the clearing principles	Variance level	Is further consideration required?
<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>According to available datasets, and flora surveys of the application area, the vegetation within the application area is not representative of any known state listed threatened ecological communities.</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 native vegetation in the local area is less than the national objectives and targets for biodiversity conservation in Australia.</p> <p>The application area provides significant habitat for fauna, ecological linkage values and is representative of the Banksia Woodlands TEC/PEC. Therefore, it is considered a significant remnant within a highly cleared area.</p>	At variance	Yes <i>Refer to Section 3.2.1, above.</i>
<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 around 240 metres from Buller Nature Reserve. The application area forms part of a larger remnant which provides linkage values between Buller Nature Reserve and other remnants within the local area. The proposed clearing will impact on these linkage values and may increase the risk of weeds and dieback spreading into the Reserve.</p>	May be at variance	Yes <i>Refer to Section 3.2.1, 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>There are no wetlands or watercourses mapped within the application area. The proposed clearing is not likely to impact on the closest water feature (multiple use wetland) which is located around 100 metres west of the application area. The application area is separated from the vegetation adjoining this wetland through an access track/firebreak.</p> <p>Flora surveys did not identify any riparian vegetation within the application area. The closest patch of riparian vegetation was recorded around 170 metres west of the application area.</p>	Not likely to be at variance	No
<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>Due to the sandy soil types, the application area has an increased risk of wind erosion, although this is not expected to be significant given that the application area is bordered by remnant native vegetation to the west and north.</p>	May be at variance	No

Assessment against the clearing principles	Variance level	Is further consideration required?
<p>As part of the application, the applicant has committed to implementing dust and erosion control measures. The applicant notes that all access roads into the site will be covered with bitumen hardstand for the initial 10 – 20 metres. Truck loading and turning points will be constructed out of limestone road base and primer sealed to minimise dust generation. Screening vegetation surrounding the excavation will provide wind protection for the site.</p> <p>The development approval for the extractive industry requires that stockpiles of sand and topsoil shall be located below the highest ridgelines of the application area, in an east west alignment (to reduce wind erosion) and be regularly watered to suppress dust from blowing on to adjoining lots.</p> <p>To further minimise the risk of wind erosion the applicant will be required to commence construction within three months of clearing, to reduce the exposure of bare sandy soils.</p>		
<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>Groundwater salinity levels are marginal, and there is not expected to be any surface expression of salinity due to clearing.</p> <p>There are no wetlands or watercourses mapped within the application area. The proposed clearing is not likely to impact on the closest water feature (multiple use wetland) which is located around 100 metres west of the application area. The application area is separated from the vegetation adjoining this wetland through an access track/firebreak.</p> <p>Noting the distance and extent of vegetation between the application area and the closest wetland/watercourse, the proposed clearing is unlikely to result in surface water quality impacts through sedimentation or otherwise.</p>	Not likely to be at variance	No
<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 are highly permeable, and noting the lack of hydrological features on site, the proposed clearing is not likely to exacerbate flooding.</p>	Not likely to be at variance	No

Appendix D. 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.
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 E. Biological survey information excerpts / photographs of the vegetation / DWER site inspection report

The application area has been subject to several biological surveys, which are detailed below:

MBS Environmental (2015)

MBS Environmental undertook a Level 1 Flora and Vegetation survey of the 'Jackson Block Survey Area' located in the southeast corner of Lot 3 (Diagram 35920) Buller Road in Waroona. The survey area covered around 36.8 hectares, including the application area. The survey involved two main components:

- a desktop assessment to collect background information on flora and vegetation of the target area
- a reconnaissance site visit to verify the accuracy of the desktop assessment and delineate and characterise the flora and range of vegetation units present.

The Level 1 reconnaissance site survey was undertaken by a senior environmental scientist on 5 May 2015. The reconnaissance survey involved traversing the survey area on foot to verify the accuracy of the desktop assessment, and delineate/characterise the flora and range of vegetation units present. Five 10 by 10 metre quadrats were surveyed. Photographs were taken of the quadrat sites and of additional photo points across the site. Opportunistic observations of the species present, vegetation type and condition were also made outside the quadrats.

The report identified the timing of the survey as a major constraint as it was conducted in May, noting the preferred survey season in the southwest is the main flowering period, which occurs in spring.

Woodman Environmental (2015)

Woodman Environmental undertook a detailed Level 2 Flora and Vegetation survey of the 'Jackson Block Survey Area' which encompasses the application area. This involved a desktop study and reconnaissance survey, followed by a detailed field survey.

An initial reconnaissance visit to the study area was conducted by two experienced botanists on 2 September 2015. The reconnaissance survey included targeted searches for *Drakaea elastica* (threatened). This was considered necessary, as the desktop review indicated that appropriate habitat was likely to be present in the study area. It is considered that *Drakaea elastica* searches should be undertaken in July / August when the orchid leaves are visible. However, Woodman Environmental noted that a survey in very early September remains appropriate for identifying this species, as its leaves are still likely visible.

Searching was conducted on foot and all areas of appropriate habitat, particularly grey sand areas adjacent to winter-wet areas, and thickets of *Kunzea glabrescens* (Spearwood), were inspected.

The detailed field survey was conducted in Spring, from the 22 to 25 of September 2015. It is considered that this visit was conducted in the most appropriate time to survey in the Swan Coastal Plain Bioregion, as most species in the region flower at this time.

16 permanently marked 10 x 10 metre flora survey quadrats were established during the survey. All vascular flora taxa that were visually identifiable within each quadrat were recorded.

Additional flora taxa, as well as any locations of known significant flora taxa and introduced taxa, were also recorded opportunistically in the study area via a search around the general vicinity of each quadrat or detailed recording site, and during searches on foot between quadrats or detailed recording sites.

In addition, specific, targeted searching for significant flora in the study area was undertaken. This included the threatened orchid taxon *Caladenia huegeli*, which is known to occur in close (within 1 km) proximity to the study area. Transects at 20 metre intervals were traversed through appropriate habitat, after considering known habitat.

Plant Ecology (2018a)

This survey was undertaken to map the vegetation condition over the larger Jackson Block Survey Area. The purpose of the survey was to assess whether the vegetation condition within the subject area had returned, or was returning, to that which existed prior to the fire of January 2016.

The subject area was traversed on foot and the condition of the vegetation assessed at eight points. Observations were made of the dominant species present, the cover and presence of weed species, the influence of disturbance factors and the cover and type of the three main strata.

Plant Ecology (2018b)

This survey was undertaken to assess whether any or all the vegetation within the application area met the criteria for consideration as part of the Commonwealth listed threatened ecological community (TEC) "Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region" (Banksia Woodlands).

The survey notes that the site was traversed on foot and the condition of the vegetation assessed at sixteen points. Observations were made of the dominant species present, the cover and presence of weed species, the influence of disturbance factors and the cover and type of the three main strata.

Harewood (2018)

This survey was undertaken to carry out a review of black cockatoo habitat/site use (habitat trees, existing and potential nest hollows, foraging and roosting habitat).

The field survey work was undertaken on 26 July 2018 by a senior zoologist and field assistant. The survey involved the following components:

Black Cockatoo Habitat Tree Review

The black cockatoo breeding habitat assessment involved the re-inspection of all 73 of the previously identified black cockatoo breeding trees (any suitable tree species with a Diameter at Breast height (DBH) of greater than 50 centimetres) (Terrestrial Ecosystems, 2015) within the defined survey area, with an emphasis on the 14 trees previously reported as possibly having hollows of a size suitable for nesting.

Identified hollows were examined using binoculars for evidence of use by black cockatoos (e.g. chewing around hollow entrance, scarring and scratch marks on trunks and branches). A drone was also utilised to examine and photograph hollows whenever possible.

Black Cockatoo Foraging Habitat Review

The location and nature of black cockatoo foraging evidence (e.g. chewed fruits around base of trees) observed during the field survey was recorded. The nature and extent of potential foraging habitat present was also documented irrespective of the presence of actual foraging evidence.

Black Cockatoo Roosting Habitat Review

Direct and indirect evidence of black cockatoos roosting within trees within the survey area was noted if observed (e.g. branch clippings, droppings or moulted feathers).



Weed infested area in completely degraded (Keighery, 1994) condition.



Parkland cleared area in completely degraded (Keighery, 1994) condition.



Completely degraded (Keighery, 1994) area.



Degraded (Keighery, 1994) area with few native understorey species.



Good (Keighery, 1994) condition vegetation with largely native species, evidence of dieback apparent.



Very good (Keighery, 1994) condition vegetation with some loss of structure from past disturbance.

Site photographs showing changing vegetation condition throughout the application area (Plantecology, 2018b).

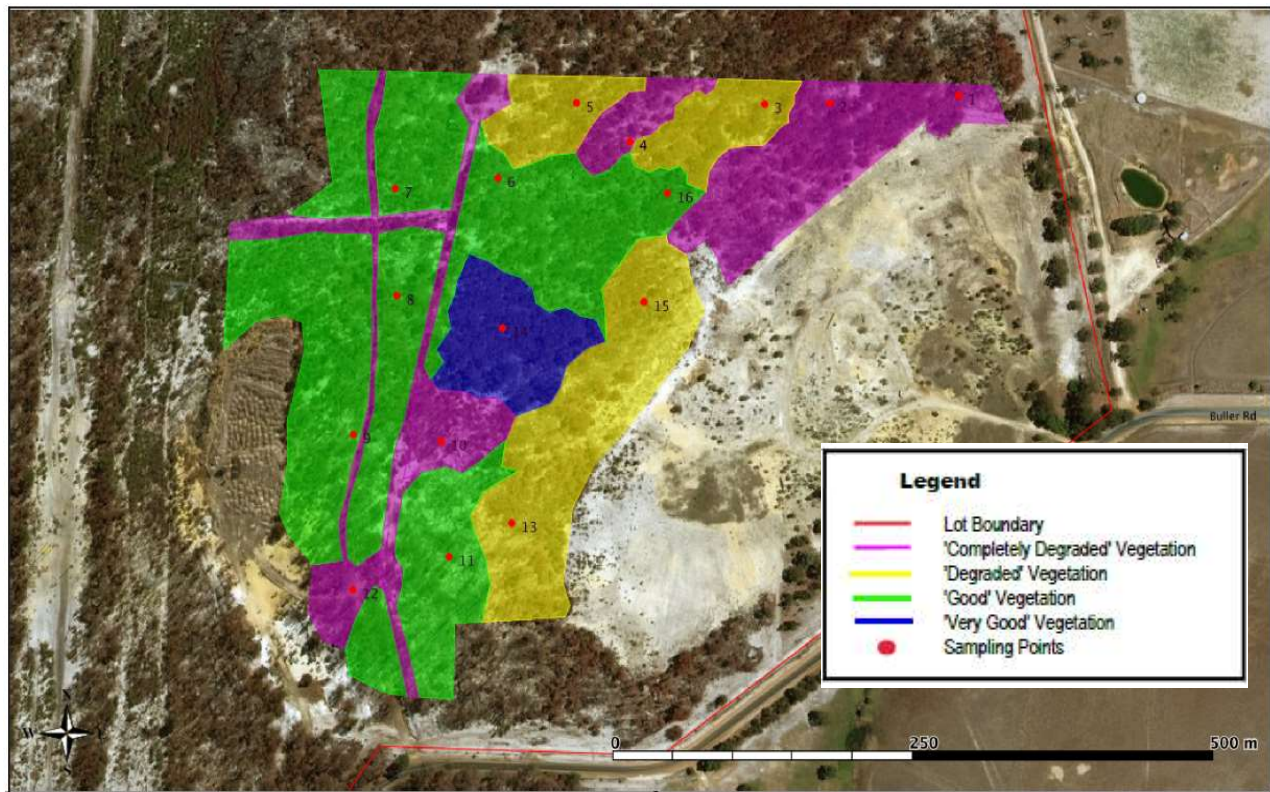


Figure 4. Vegetation condition mapping of the application area (Plantecology, 2018b).

Appendix F. Sources of information

F.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)
- Cadastre (LGATE-218)
- Cadastre Address (LGATE-002)
- Consanguineous Wetlands Suites (DBCA-020)
- 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)
- 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)
- Remnant Vegetation, All Areas
- Soil Landscape Mapping – Best Available
- Soil Landscape Mapping – Systems
- Soil Landscape Land Quality – Flood Risk (DPIRD-007)
- Soil Landscape Land Quality – Wind Erosion Risk (DPIRD-016)

- Soil Landscape Land Quality – Water Erosion Risk (DPIRD-013)
- Soil Landscape Land Quality – Waterlogging Risk (DPIRD-015)
- Soil Landscape Land Quality – Water Repellence Risk (DPIRD-014)
- Soil Landscape Land Quality – Subsurface Acidification Risk (DPIRD-011)
- Soil Landscape Land Quality – Phosphorus Export Risk (DPIRD-010)
- South Coast Significant Wetlands (DBCA-018)
- RIWI Act, Surface Water Areas and Irrigation Districts (DWER-037)
- RIWI Act, Groundwater Areas (DWER-034)

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

F.2. References

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- Commonwealth of Australia (2017) Revised draft referral guideline for three threatened black cockatoo species: Carnaby's Cockatoo, Baudin's Cockatoo and the Forest Red-tailed Black Cockatoo.
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- MBS Environmental (2015) Lot 3 Buller Road Waroona, Level 1 Flora and Vegetation Survey for Jackson Block. Prepared for KD.1 Pty Ltd. June 2015 (DER Ref: A922976).
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