GOVERNMENT OF
WESTERN AUSTRALIA

CLEARING PERMIT

Granted under section 51E of the Environmental Protection Act 1986

PERMIT DETAILS

Area Permit Number: CPS 9406/1

File Number: DWERVT8516

Duration of Permit: 17 July 2023 – 17 July 2035

PERMIT HOLDER

Aigle Royal Superannuation Pty Ltd

ARD No. 3 Pty Ltd

LAND ON WHICH CLEARING IS TO BE DONE

Lot 4 on Diagram 48008, Oldbury

AUTHORISED ACTIVITY

The permit holder must not clear more than 7.05 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 17 July 2025.

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

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

(a) avoid the clearing of *native vegetation*;

(b) minimise the amount of *native vegetation* to be cleared; and

(c) reduce the impact of clearing on any environmental value.

3. Weed and dieback management

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

(a) clean earth-moving machinery of soil and vegetation prior to entering and leaving the area to be cleared;

(b) ensure that no known *dieback* or *weed*-affected soil, *mulch*, *fill*, or other material is brought into the area to be cleared; and

(c) restrict the movement of machines and other vehicles to the limits of the areas to be cleared.

4. Directional clearing

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

5. Staged clearing

The permit holder shall not clear *native vegetation* unless extractive activities begin within three months of the clearing being undertaken.

6. Vegetation management - fencing

The permit holder must:

(a) Within 12 months of the commencement of clearing and no later than 25 June 2025, the permit holder shall construct a fence on the north and eastern boundaries of the area cross-hatched yellow on Figure 1 of Schedule 1 to protect adjacent *native vegetation*.

(i) Fences should allow for the movement of wildlife by being raised 15 centimetres from the ground.

(ii) The permit holder shall inspect the fence constructed in accordance with condition 6(a) of this permit every 12 months for the duration of this permit to ensure the fence is protecting adjacent *native vegetation*.

(iii) Where the permit holder identifies that the fence constructed in accordance with condition 6(a) of this permit is not protecting adjacent *native vegetation*, the permit holder shall repair the fence.

(b) Within 12 months of *direct seeding* and/or *planting* tube stock in accordance with condition 7(b), fence the area cross hatched red on Figure 2 of Schedule 1 to exclude livestock.

(i) Fences should allow for the movement of wildlife by being raised 15 centimetres from the ground.

(ii) The permit holder shall inspect the fence constructed in accordance with condition 6(b) of this permit every 12 months for the duration of this permit to ensure the fence is protecting adjacent *native vegetation*.

(iii) Where the permit holder identifies that the fence constructed in accordance with condition 6(b) of this permit is not protecting adjacent *native vegetation*, the permit holder shall repair the fence.

7. Revegetation and rehabilitation

(a) The permit holder must retain the vegetative material and topsoil removed by clearing authorised under this permit and stockpile the vegetative material and topsoil in an area that has already been cleared;

(b) within three months following completion of extraction activities, *revegetate* and *rehabilitate*, the area cross hatched red on Figure 2 of Schedule 1 by:

(i) re-shaping the surface of the land so that it is consistent with the surrounding five (5) metres of uncleared land;

(ii) ripping the ground on the contour to remove soil compaction;

(iii) ripping the pit floor and contour batters within the extraction site;

(iv) laying the vegetative material and topsoil retained under condition 7(a) on the cleared area(s);

(v) deliberately *direct seeding* and/or *planting* tube stock that will result in suitable *black cockatoo species* foraging habitat including *Banksia attenuata* and *Banksia menziesii.*

(vi) ensuring only *local provenance* seeds and propagating material are used to *revegetate* and *rehabilitate* the area;

(c) water planted vegetation at the *optimal time* for the first two years post planting, as required;

(e) implement hygiene protocols by cleaning earth-moving machinery of soil and vegetation prior to entering and leaving the site;

(f) Within 24 months of *direct seeding* and/or *planting* tube stock in accordance with condition 7(b)(v) of this Permit:

(i) engage an *environmental specialist* to determine the likelihood of the survival of the *Banksia attenuata* and *Bankia menziesii* that has been *direct seeded* and/or *planted*; and

(ii) where, in the opinion of an *environmental specialist*, that the direct seeded and/or planted *Banksia attenuata* and *Banksia menziesii* will not survive, *revegetate* the area by deliberately *planting* and/or *direct seeding* native vegetation that will result in suitable *black cockatoo species* foraging habitat including *Banksia attenuata* and *Banksia menziesii* persisting within the area cross hatched red on Figure 2 of Schedule 1.

(g) Where additional *planting* or *direct seeding* of native vegetation is undertaken in accordance with condition 7(e)(ii) of this permit, the permit holder shall repeat condition 7(e)(i) and 7(e)(ii) within 24 months of undertaking the additional *planting* or *direct seeding* of native vegetation.

8. 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	(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 direction of clearing; (e) the date extraction activities commenced;

No.	Relevant matter	Specifications
		(f) the size of the area cleared (in hectares); (g) actions taken to avoid, minimise, and reduce the impacts and extent of clearing in accordance with condition 2; (h) actions taken to minimise the risk of the introduction and spread of *weeds* and *dieback* in accordance with condition 3; and (i) fencing acitivities in accordance with condition 6.
2.	In relation to the *revegetation* of areas pursuant to condition 7 of this Permit:	(a) the location of any area *revegetated* and *rehabilitated* recorded as a shapefile; (b) a description of the *revegetation* and *rehabilitation* activities undertaken; (c) the size of the area *revegetated* and *rehabilitated* (in hectares); (d) the date that the area was *revegetated* and *rehabilitated*; (e) a description of any remediation activities required; and (f) a copy of a report *environmental specialist* monitoring report and determination;

9. Reporting

The permit holder must provide to the *CEO* the records required under condition 8 of this permit when requested by the *CEO*.

DEFINITIONS

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

Table 2: Definitions

Term	Definition
black cockatoo species	means one or more of the following species: (a) *Zanda lateriosis* (Carnaby's cockatoo); (b) *Zanda baudinii* (Baudin's cockatoo); and/or (c) *Calyptorhynchus banksii naso* (forest red-tailed black cockatoo).
clearing	has the meaning given under section 3(1) of the EP Act.
condition	a condition to which this clearing permit is subject under section 51H of the EP Act.
fill	means material used to increase the ground level, or to fill a depression.
CEO	means the Chief Executive Officer of the Department responsible for the administration of the clearing provisions under the *Environmental Protection Act 1986*.
dieback	means the effect of *Phytophthora* species on native vegetation.

Term	Definition
department	means the department established under section 35 of the *Public Sector Management Act 1994* (WA) and designated as responsible for the administration of the EP Act, which includes Part V Division 3.
direct seeding	means a method of re-establishing vegetation through the establishment of a seed bed and the introduction of seeds of the desired Plant species;
EP Act	*Environmental Protection Act 1986* (WA)
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
local provenance	means native vegetation seeds and propagating material from natural sources within 50 kilometres and the same Interim Biogeographic Regionalisation for Australia (IBRA) subregion of the area cleared. means native vegetation seeds and propagating material from natural sources within 50 kilometres and the same Interim Biogeographic Regionalisation for Australia (IBRA) subregion of the area cleared.
mulch	means the use of organic matter, wood chips or rocks to slow the movement of water across the soil surface and to reduce evaporation.
native vegetation	has the meaning given under section 3(1) and section 51A of the EP Act.
optimal time	means the optimal time for undertaking direct seeding and planting for that region.
planting	means the re-establishment of vegetation by creating favourable soil conditions and planting seedlings of the desired species.
rehabilitate / rehabilitated / rehabilitation	means actively managing an area containing native vegetation in order to improve the ecological function of that area.
revegetate / revegetated / revegetation	means the re-establishment of a cover of local provenance native vegetation in an area using methods such as natural regeneration, direct seeding and/or planting, so that the species composition, structure and density is similar to pre-clearing vegetation types in that area.
weeds	means any plant – (a) that is a declared pest under section 22 of the *Biosecurity and Agriculture Management Act 2007*; or (b) published in a Department of Biodiversity, Conservation and Attractions species-led ecological impact and invasiveness ranking summary, regardless of ranking; or (c) not indigenous to the area concerned.

END OF CONDITIONS

Mathew Gannaway
A/SENIOR MANAGER
NATIVE VEGETATION REGULATION

Officer delegated under section 20
of the Environmental Protection Act 1986

23 June 2023

SCHEDULE 1

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

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

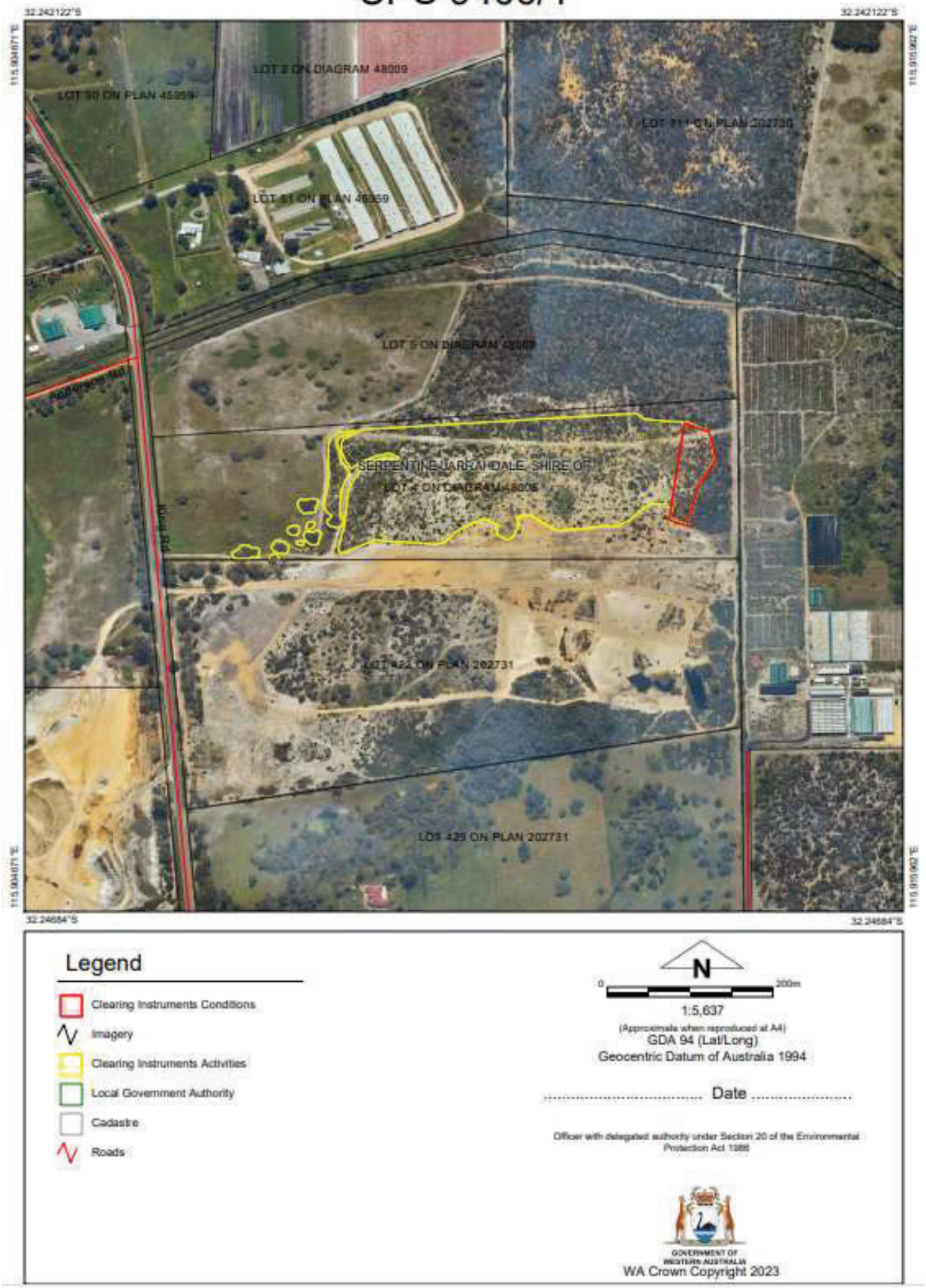

Figure 2: Map of the boundary of the area within which revegetation must occur (area cross-hatched red).

Government of Western Australia
Department of Water and Environmental Regulation

Clearing Permit Decision Report

1 :Application details and outcome

1.1. Permit application details

Permit number:	CPS 9406/1
Permit type:	Area permit
Applicant name:	Aigle Royal Superannuation Pty Ltd and ARD No. 3 Pty Ltd
Application received:	24 August 2021
Application area:	7.05 hectares of native vegetation
Purpose of clearing:	Sand extraction
Method of clearing:	Mechanical
Property:	Lot 4 on Diagram 48008, Oldbury
Location (LGA area/s):	Shire of Serpentine-Jarrahdale
Localities (suburb/s):	Oldbury

1.2. Description of clearing activities

The vegetation proposed to be cleared is contained within a contiguous area (see Figure 1, Section 1.5). The eastern side of the application area has previously been cleared and mined for sand (PGV Environmental, 2021).

The application was revised during the assessment process to align the application area with the development approval issued by the Shire of Serpentine-Jarrahdale which included conditions to avoid good to very good condition Banksia Woodland and provide a 10-metre set back on the northern boundary of the property (Shire of Serpentine-Jarrahdale, 2022). The application area was increased during assessment to include an area of completely degraded vegetation not covered within the original application. This increased the application area from 3.81 hectares of native vegetation to 7.57 hectares.

During the assessment of the revised application, the application area was reduced to avoid 0.52 hectares of native vegetation representative of the Banksia woodland of the Swan Coastal Plain (Banksia Woodlands) Threatened Ecological Community (TEC) located along the eastern side of the proposed clearing area. This decreased the application area from 7.57 hectares of native vegetation to 7.05 hectares.

1.3. Decision on application

Decision:	Granted
Decision date:	23 June 2023
Decision area:	7.05 hectares of native vegetation, as depicted in Section 1.5, below.

1.4. Reasons for decision

This clearing permit application was submitted, accepted, assessed and determined in accordance with sections 51E and 51O of the *Environmental Protection Act 1986* (EP Act). The Department of Water and Environmental Regulation (the Department) advertised the application for 21 days and one submission was received. The Department re-advertised the modified clearing permit application area for 7 days and the original submitter advised that their original submission was relevant to the amended proposal.

In making this decision, the Delegated Officer had regard for the site characteristics (see Appendix C), relevant datasets (see Appendix G.1.), the findings of a flora, vegetation and fauna survey (see Appendix FF), the clearing principles set out in Schedule 5 of the EP Act (see Appendix D), relevant planning instruments and any other matters considered relevant to the assessment (see Section 3). The Delegated Officer also took into consideration the extractive industry licence issued by the Shire of Serpentine-Jarrahdale, and the native vegetation to be cleared is comprised of regrowth from 2008. In addition, the resource once extracted will be used for fill of land within Byford Town Centre, for commercial development to occur (Shire of Serpentine and Jarrahdale, 2022).

The assessment identified that the proposed clearing will result in:

- the potential introduction and spread of weeds and dieback into adjacent vegetation, which could impact on the quality of the adjacent vegetation and its habitat values including a threatened ecological community;
- loss of 0.31 ha of foraging habitat for black cockatoos; and
- potential land degradation in the form of wind erosion.

After consideration of the available information, as well as the applicant's minimisation and mitigation measures (see Section 3.1), the Delegated Officer determined the proposed clearing is unlikely to lead to appreciable land degradation or have long-term adverse impacts on the environment. Environmental risk can be minimised and managed to unlikely lead to an unacceptable risk to the environment and revegetation of temporary cleared areas will ensure no long-term loss of habitat in the local area.

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

- avoid, minimise to reduce the impacts and extent of clearing
- take hygiene steps to minimise the risk of the introduction and spread of weeds and dieback
- staged clearing to minimise wind erosion;
- fencing of the adjacent occurrence of Banksia woodland TEC;
- retain cleared vegetation and topsoil and respread this on areas no longer required for sand extraction, ensuring no permanent loss of fauna habitat
- rehabilitate 0.45 hectares of the application area with species suitable for foraging by black cockatoos

1.5. Site map

Figure 1 Map of the permit area

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

2 Legislative context

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

In addition to the matters considered in accordance with section 51O of the EP Act (see Section 1.4), the Delegated Officer has also had regard to the objects and principles under section 4A of the EP Act, particularly:

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

Other legislation of relevance for this assessment include:

- *Biodiversity Conservation Act 2016* (WA) (BC Act)
- *Conservation and Land Management Act 1984* (WA) (CALM 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)
- 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

The application areas were modified during the assessment process to align with existing approvals from the Shire of Serpentine-Jarrahdale, including the requirement to maintain a 10 metre vegetation buffer on the northern boundary and a 20 metre buffer along the eastern boundary to reduce the impact on a small area of Banksia Woodland on the eastern boundary of the application area (Shire of Serpentine-Jarrahdale, 2022b). The vegetation within the application area is consistent with areas approved for extraction by the Shire of Serpentine-Jarrahdale (Shire of Serpentine-Jarrahdale, 2022b).

The modification of the application area has removed 0.52 hectares of native vegetation determined to be part of a 5.7-hectare patch of good condition Banksia Woodlands TEC.

3.2. Assessment of impacts on environmental values

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

The assessment against the clearing principles (see **Error! Reference source not found.**) identified that the impacts of the proposed clearing present a risk to biological values (fauna, adjacent flora and vegetation) and conservation areas. The consideration of these impacts, and the extent to which they can be managed through conditions applied in line with sections 51H and 51I of the EP Act, is set out below.

3.2.1. Biological values (fauna) – Clearing Principle (b)

According to available databases, seven fauna of conservation significance that may occur within the application area include:

- Carnaby's Black Cockatoo (*Zanda latirostris*) (Endangered);
- Baudin's Black Cockatoo (*Zanda baudinii*) (Endangered);
- Cattle Egret (*Ardea ibis*) (Marine);
- Rainbow Bee-eater (*Merops ornatus*) (Marine);
- Perth Slider, Lined Skink (*Lerista lineata*) (Priority 3);
- Black-striped Snake (*Neelaps calonotos*) (Priority 3); and
- Southern Brown Bandicoot, Quenda (*Isoodon fusciventer*) (Priority 4).

A survey of the application area identified three fauna habitats:

1. Tall shrubland habitat
2. Open woodland habitat; and
3. Cleared habitat (PGV Environmental, 2021)

A survey identified a number of introduced feral species such as feral cats, foxes, rabbits, black rats and house mice within the application area. These introduced feral fauna are resource competitors and degrade the quality of the habitat for conservation significant fauna (PGV Environmental, 2021).

Assessment

Black Cockatoo

Carnaby's cockatoo and Baudin's cockatoo are listed as Endangered and forest red-tailed black cockatoo (FRTBC) is listed as Vulnerable under the BC Act and the EPBC Act. Black cockatoos' nest in hollows in live or dead trees of Karri, Marri, Wandoo, Tuart, Salmon Gum, Jarrah, Flooded Gum, York Gum, Powder Bark, Bullich and Blackbutt (DotEE, 2017). Breeding habitat or 'habitat tree' is defined in the EPBC Act referral guidelines as 'trees of species known to support breeding within the range of the species which either have a suitable nest hollow or are of a suitable diameter at breast height (DBH) to develop a nest hollow' (DotEE, 2017). The application area is within the known breeding range of the three conservation significant black cockatoo species listed above. The site does not contain any tall trees that could be used for roosting or breeding by Black Cockatoos (PGV Environmental, 2021).

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

The application area contains native vegetation which includes species known to be foraging resources for black cockatoos. However, the majority of the application area (6.74 hectares) is dominated by a mixture of *Kunzea glabrescens* and *Adenanthos cygnorum* with a small area of *Eucalyptus rudis* over *Melaleuca rhaphiophylla* (PGV Environmental, 2021). These species are not the preferred foraging species for black cockatoos and is deemed to largely comprise of very low to minimal foraging habitat.

Some evidence of foraging by Carnaby's Black Cockatoos was observed on Banksia cones within Lot 4 (PGV Environmental, 2021). Two areas comprising Banksia species were identified within Lot 4. The two stands of Banksia trees within Lot 4 contain a relatively low density of the preferred foraging species for black cockatoos (PGV Environmental, 2021). The two areas provide 1.05 hectares (eastern area) and 0.31 hectares (north western area) of foraging habitat, respectively. The applicant has amended the application area to avoid the eastern area of Banksia Woodland (1.05 hectares) to minimise impacts to black cockatoos. The Banksia trees in the western section of the application area (0.31 hectares) provides foraging habitat for Carnaby's and Baudin's Black Cockatoos. The site contained only one Sheoak tree suitable for foraging by Forest Red-tailed Black Cockatoos (PGV Environmental, 2021).

The referral guidelines indicate while breeding, black cockatoos will generally forage within a 6–12 kilometre radius of their nesting site. Following breeding, black cockatoos assemble into flocks and move through the landscape searching for food, usually foraging within 6 kilometres of a night roost (DotEE, 2017). This variable range indicates large areas of foraging habitat are required to support black cockatoo populations. Cumulative impacts of the loss of remnant vegetation restrict the availability of food sources for black cockatoos (DotEE, 2017). A total of 46 mapped black cockatoo roosting sites and one breeding site are known within 12 kilometres of the application area.

Evidence of roosting activity within the local area include (Submission, 2021):

- Around 175 Carnaby's black cockatoo have been recorded roosting within daily foraging distance (6 kilometre radius of the application area) during the non-breeding season.
- There are 12 roost nights spent within 2km of the envelope, and 31 roost nights within 3km. The nearest roost site for a tagged bird (part of the flock of ~175 birds) is 850m north of the application area.
- The application area has been modified to avoid an approximately 1.05 hectare area of native vegetation determined to be part of a 5.7-hectare patch of good condition Banksia Woodland TEC.

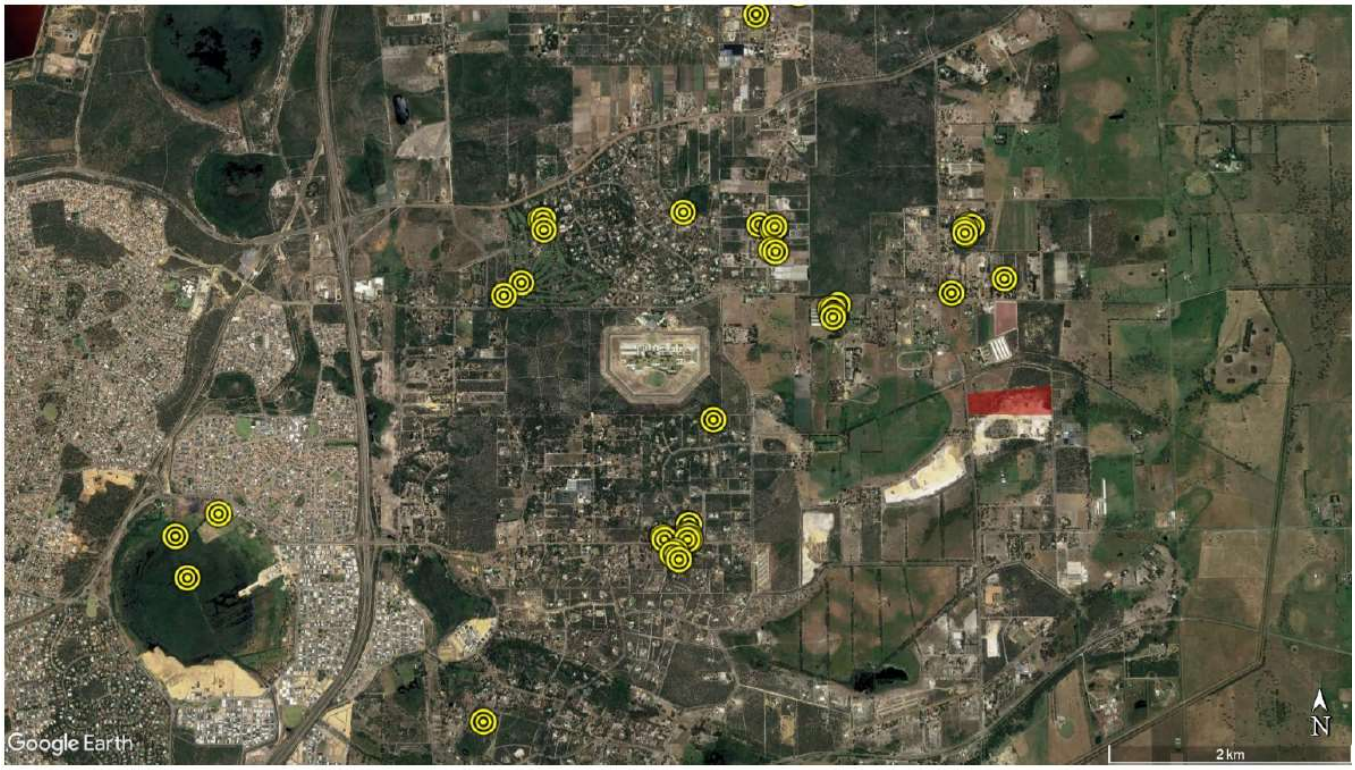

Figure 2: Roost night locations on tagged Carnaby's cockatoo from May 2016 to September 2016 (Submission, 2021) (application area in red)

It is estimated that the local area comprises approximately 5667 hectares of native vegetation which is mapped as black cockatoo foraging habitat. The application area contains 0.31 hectares of preferred foraging habitat for black cockatoos, which represents approximately 0.005 per cent of this extent. However, the local area is extensively cleared with approximately 17 percent pre-European vegetation extent remaining and a number of known breeding and roosting sites are known within 12 kilometres of the application area. Given this, the application area is considered significant in supporting the viability of the local populations of black cockatoos.

To mitigate the loss of 0.31 hectares of suitable foraging habitat, the applicant will be rehabilitating 0.45 hectares of native vegetation within the application area with preferred black cockatoo foraging species including *Banksia* spp.. The mitigation planting proposed was input into the WA Environmental Offsets Metric Calculator to determine the ratio required to mitigate the loss of 0.31 hectares of preferred black cockatoo foraging habitat. The applicant will be required to ensure the survival of at least 0.45 hectares of preferred black cockatoo foraging habitat. The proposed rehabilitation was determined to be a suitable mitigation measure. A significant residual impact does not remain following the rehabilitation. The Department considers the mitigation planting aligns with the WA Environmental Offsets Policy (2011) and WA Environmental Offsets Guideline (2014).

Other conservation significant fauna

Noting the vegetation identified (PGV Environmental, 2021) within the application area and its quality, the habitat requirements and distribution of the species listed in Table 1 below, the application area provides suitable habitat for each of these species. Taking into consideration the extent of the proposed clearing and its degraded to completely degraded condition, the habitat within the application area is not considered significant in the local context.

Whilst not considered significant habitat, impacts to individual terrestrial fauna may occur at the time of clearing. To minimise these potential impacts, the applicant will be required to undertake slow, progressive one directional clearing to allow terrestrial fauna to disperse ahead of the clearing activity should they occur on site at the time of clearing.

Species	Habitat requirements
Cattle Egret	The Cattle Egret occurs in tropical and temperate grasslands, wooded lands and terrestrial wetlands. It has occasionally been seen in arid and semi-arid regions however this is extremely rare. High numbers have been observed in moist, low-lying poorly drained pastures with an abundance of high grass; it avoids low grass pastures. It has been recorded on earthen dam walls and ploughed fields. It is commonly associated with the habitats of farm animals, particularly cattle, but also pigs, sheep, horses and deer. The Cattle Egret is known to follow earth-moving machinery and has been located at rubbish tips. It uses predominately shallow, open and fresh wetlands including meadows and swamps with low emergent vegetation and abundant aquatic flora. They have sometimes been observed in swamps with tall emergent vegetation (Department of the Environment, 2023a)
Rainbow Bee-eater	The Rainbow Bee-eater occurs mainly in open forests and woodlands, shrublands, and in various cleared or semi-cleared habitats, including farmland and areas of human habitation. It usually occurs in open, cleared or lightly-timbered areas that are often, but not always, located in close proximity to permanent water. It also occurs in inland and coastal sand dune systems, and in mangroves in northern Australia, and has been recorded in various other habitat types including heathland, sedgeland, vine forest and vine thicket, and on beaches. The Rainbow Bee-eater occurs in open woodlands and shrublands, including mallee, and in open forests that are usually dominated by eucalypts. It also occurs in grasslands and, especially in arid or semi-arid areas, in riparian, floodplain or wetland vegetation assemblages (Department of the Environment, 2023b)
Black-striped snake, black-striped burrowing snake	Black-striped snake, black-striped burrowing snake (*Neelaps calonotos*) is one of five species of small burrowing elapids in the Perth region. The species is more abundant north of the Swan River, whereas records are comparatively scarcer to the south. *N. calonotos* typically occupy Banksia woodlands atop soft calcareous sand and, to a lesser extent, coastal heathlands and shrublands. Although relatively abundant in both habitats, scientists recorded higher capture rates of *N. calonotos* in Banksia woodlands which are also the preferred habitat for skinks, such as *Aprasia* and *Lerista spp*., which are exclusive food resources for *N. calonotos*. *N. calonotos* is rarely found in small urban bushland remnants as these are more susceptible to weed infestation, bushfires and predation by feral species, with weeds having an adverse effect on the composition of microhabitats required by fossorial species (He, 2021).
Perth slider, lined skink	Perth slider, lined skink (*Lerista lineata*) is largely restricted to the Swan Coastal Plain including Garden and Rottnest Island, mostly within the highly developed southern Perth Metropolitan Area. The species likely has poor dispersal abilities and relies on litter ground cover and other debris for shelter, which makes it vulnerable to fire. *L. lineata* is known to occur in several bush remnants near Perth, including Forrestdale Lake Nature Reserve, Jandakot Airport, Modong Nature Reserve and Woodman Point. The species unlikely occupies small remnants of native vegetation (Threatened Species Scientific Committee, 2020).
Quenda	The Quenda is known to inhabit scrubby, swampy vegetation with low, dense understorey, located nearby water courses, pasture, or forest/woodland that is regularly burnt and is in areas of pasture and cropland lying close to dense cover. Populations which inhabit jarrah and wandoo forests are usually associated with watercourses. Quendas will thrive in more open habitat subject to exotic predator control. For example, quenda have become abundant in Lake Magenta Nature Reserve (Western Australia) in Mallee scrub and woodland following fox control (Department of Conservation, 2012a).

Conclusion

Based on the above assessment, the proposed clearing will result in the loss of 0.31 hectares of foraging habitat for black cockatoos. The proposed clearing may indirectly impact significant habitat for black cockatoos located adjacent to the application area through the spread of weed and dieback. Impacts to individual terrestrial fauna may occur if present at the time of clearing.

For the reasons set out above, it is considered that the impacts of the proposed clearing on black cockatoos can be managed and mitigated by taking steps to minimise the risk of the introduction and spread of weeds and dieback, slow directional clearing to allow fauna to move into adjacent vegetation and rehabilitating 0.45 hectares of the application area, with Banksia species to ensure the fauna habitat values within the application area are not permanently lost.

Conditions

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

- Weed and dieback hygiene measures to be implemented during clearing to minimise the risk of weed and dieback spreading to areas of adjacent native vegetation
- Slow directional clearing to allow fauna to move into adjacent vegetation ahead of the clearing activity will minimise impact to individuals
- Rehabilitation of 0.45 hectares of native vegetation within the application area with black cockatoo foraging species including *Banksia 8anksia8e* and *Bankia menziesii*;
- Fencing of the north and eastern boundaries of the application area to mitigate impacts to adjacent fauna habitat.

3.2.2. Biological values (biodiversity, flora and communities) – Clearing Principles (a, c, d and e)

Flora

A flora survey identified 53 flora species within the application area, of which 42 are native and 11 are introduced species. The survey was a reconnaissance survey, therefore, it is reasonable to assume a more detailed survey in spring would record more species (PGV Environmental, 2021).

Given the condition, historical clearing, characteristics of the application area and results of the reconnaissance survey, the vegetation proposed to be cleared is unlikely to contain habitat for Threatened or Priority flora.

Threatened ecological community

The small area of Banksia woodland in Good condition located adjacent to the eastern boundary of the application area is most likely to be FCT 23a 'Central Banksia 8anksia8e – B. menziesii woodlands'. FCT 23a is not a TEC or Priority Ecological Community (PEC). However, FCT 23a is part of a broader ecological community called the Banksia Woodlands, which is listed as a PEC at State level and TEC under the EPBC Act.

The Approved Conservation Advice (incorporating listing advice) for the Banksia Woodlands TEC (Commonwealth of Australia, 2016) (Conservation Advice) describes the TEC as:

- The ecological community is a woodland associated with the Swan Coastal Plain of southwest Western Australia. A key diagnostic feature is a prominent tree layer of Banksia, with scattered eucalypts and other tree species often present among or emerging above the Banksia canopy.
- The understorey is a species rich mix of sclerophyllous shrubs, graminoids and forbs. The ecological community is characterised by a high endemism and considerable localised variation in species composition across its range (Commonwealth of Australia, 2016).

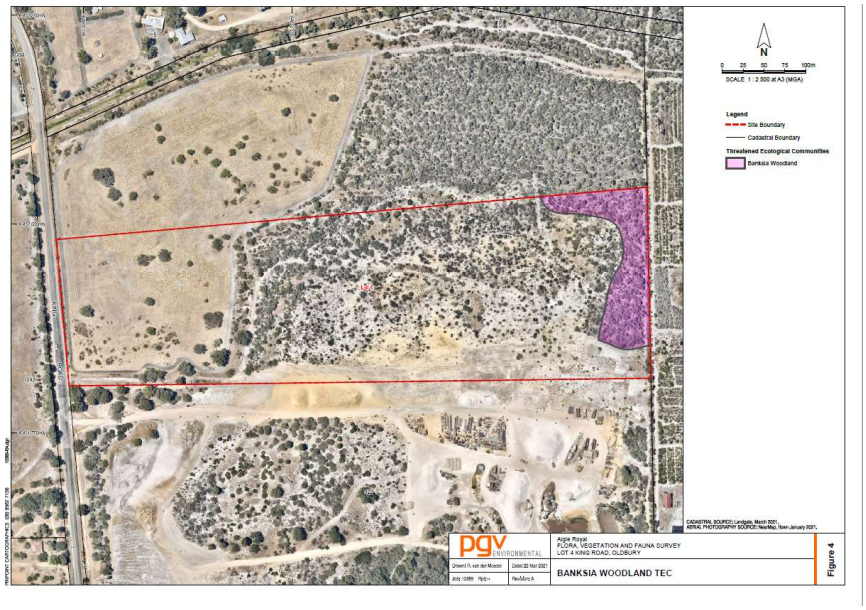

Figure 3: Ground truthed Banksia Woodland TEC area (PGV Environmental, 2021)

The eastern area mapped as *Banksia 9anksia9e/B. menziesii/Kunzea glabrescens* Low Open Woodland is approximately 1.05 hectares (Figure 5) in size (PGV Environmental, 2021). However it is considered to be a part of the larger 'patch' of Banksia vegetation that is continuous on Lot 5 to the north and totals around 5.7 hectares. The combined patch meets the requirements to be the Banksia Woodlands TEC.

Following the implementation of avoidance/mitigation measures, the applicant has removed the 1.05 hectares of Banksia Woodland TEC from the application area.

The small area containing Banksia trees in the north-west of the old sand mine is too small (0.31 hectares) and degraded, and not connected to any nearby Banksia vegetation and is not considered the Banksia Woodland TEC.

Significant remnant in an extensively cleared landscape

The national objectives and targets for biodiversity conservation in Australia has a target to prevent clearance of ecological communities with an extent below 30 per cent of that present prior to the year 1750, below which species loss appears to accelerate exponentially at an ecosystem level (Commonwealth of Australia 2001).

The Environmental Protection Authority (EPA) recognises the Perth Metropolitan Region to be a constrained area, within which a minimum 10 per cent representation threshold for ecological communities is recommended (EPA, 2008). The application area is located within the mapped extent of the Greater Bunbury Region Scheme constrained area.

The application area is located within the Swan Coastal Plain bioregion. The Swan Coastal Plain (IBRA) bioregion retains approximately 38.6 per cent of its pre-European vegetation extent (Government of Western Australia 2019a).

The vegetation within the application area is mapped within the Bassendean Complex-Central and South vegetation complex (Heddle et al 1980), which retains approximately 26.9 per cent of its pre-European extent (Government of Western Australia 2019b). Approximately 16.86 per cent of the native vegetation has been retained within the local area, defined as a ten kilometre radius from the application area (Government of Western Australia 2019a).

The local area is highly cleared (less than 16.86 per cent remaining). However, given the vegetation representation outlined above and that the application area occurs within a constrained area, the application area is above the 10 percent threshold.

The vegetation proposed to be cleared comprises 0.31 hectares of significant habitat for black cockatoo species and is located adjacent to a TEC and therefore may contain vegetation necessary for the maintenance of this TEC. The proposed clearing may indirectly impact this TEC through edge effects and the spread of weed and dieback. Given this, the vegetation present within the application is considered to be a significant remnant of native vegetation.

Conclusion

Based on the above assessment, the proposed clearing will not directly impact the adjacent Banksia woodland TEC. Indirect impacts through the spread of weeds and dieback may occur.

The proposed clearing will result in the loss of 0.31 hectares of foraging habitat for black cockatoos that occurs within an extensively cleared area. To mitigate the loss of 0.31 hectares of suitable foraging habitat within an extensively cleared landscape, the applicant will be rehabilitating 0.45 hectares of native vegetation within the application area with preferred black cockatoo foraging species including *Banksia* spp..

Conditions

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

- Weed and dieback hygiene measures to be implemented during clearing to minimise the risk of weed and dieback spreading to areas of adjacent native vegetation
- Fencing of the adjacent Banksia Woodland TEC to mitigate impacts of edge effects
- Rehabilitation of 0.45 hectares of native vegetation within the application area with black cockatoo foraging species including *Banksia 9anksia9e* and *Bankia menziesii*;

3.3. Relevant planning instruments and other matters

Other relevant authorisations required for the proposed land use include an Extractive Industry Licence (issued by the Shire of Serpentine-Jarrahdale).

The Shire of Serpentine-Jarrahdale advised the Department that;

"*The extractive industry proposal is to deepen the existing pit by about 1m and mine the surrounding vegetated areas. The floor of the pit has regenerated to a certain extent, while the surrounding areas are vegetated with banksia woodland in apparently good or better condition. As the area proposed for clearing is part of a larger patch of vegetation which extends to the north, the area meets the criteria to be considered a Threatened Ecological Community under the EPBC Act.*

The extractive industry has been granted development approval, subject to conditions for a reduction of the proposed clearing. Therefore, the Shire is yet to finalise the exact area to be approved for clearing, with further discussion to occur with the applicant before the final approval is given. Please find within the link below the Council agenda item regarding this extractive industry proposal on page 93, with the section of preservation of banksia woodland being described in page 106. Interestingly this proposes the removal of 1.3 ha of native vegetation for removal for sand extraction.

Under condition b (page 114) the applicant is required to provide a 10m setback from the northern boundary and protection of the banksia woodland on the eastern part of the property and to protect the community of "good to very good" Banksia woodland on the eastern portion of the subject land. This significantly reduces the area to be cleared, and any clearing permit should reflect these conditions and not permit clearing of areas which are not to be developed. It is also recommended that the entire site be revegetated to banksia woodland following extraction, rather than rehabilitated to pasture as is proposed."

(Shire of Serpentine-Jarrahdale, 2021)

On 21 November 2022, the Shire determined to grant an amendment to the condition of Approved extractive Industry being Development Approval 12.1.1 pursuant to Clause 68(2) of the Deemed Provisions of Planning and Development (Local Planning Schemes) Regulations 2015 for Proposed Amendment to Conditions of Approved Extractive Industry subject to compliance to conditions including:

- Excavation is to be setback a minimum of 10m from the northern boundary, and a minimum of 20m from the eastern boundary (Shire of Serpentine-Jarrahdale, 2022).

The Shire has confirmed that the amended application area meets the requirements of the extractive industry licence (Shire of Serpentine-Jarrahdale, 2022a). The development approval covers all of Lot 4 including areas within and outside of the application area (Shire of Serpentine-Jarrahdale, 2022b).

The applicant has advised that sand extracted from the site will be used for various developments in Byford. These developments will directly contribute to the promotion of Byford as a district centre. Given it's low-lying nature, it is not possible to develop Byford without a reliable source of sand fill. Given the proximity of the site to Byford and minimal clearing involved, extraction of sand from the subject land is considered sustainable (Shire of Serpentine-Jarrahdale, 2022)

End

Appendix A. Additional information provided by applicant

Summary of comments	Consideration of comment
Supporting Information; Flora, Vegetation and Fauna Survey (PGV Environmental, 2021)	Information presented in the survey report has been incorporated into the assessment where relevant.

Appendix B. Details of public submissions

Summary of comments	Consideration of comment
Submission (2021) provided details of records of black cockatoos in proximity to CPS 9406/1. The submission contends that this greatly increased the importance of the foraging habitat within the application area. The submission raised particular concern of clearing the 1.05 hectare area of good quality Banksia Woodland. Where further habitat is approved for removal, this loss can only be mitigated effectively by providing sufficient replacement habitat in the range-area of affected flocks.	Information provided by the Submitter has been incorporated into the assessment where relevant. The 1.05 hectare area of good quality Banksia Woodland has been excluded from the approved clearing area. The proposed clearing only incudes an area of 0.31 hectares of sparsely vegetated Banksia species. The applicant will be rehabilitating 0.45 hectares of native vegetation within the application area with preferred black cockatoo foraging species including *Banksia* spp. To mitigate this loss.

Appendix C. Site characteristics

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

C.1. Site characteristics

Characteristic	Details
Local context	The area proposed to be cleared is part of a patch of native vegetation in the intensive land use zone of Western Australia. It is part of, and adjacent to native vegetation that is a patch of Banksia Woodlands of the Swan Coastal Plain TEC (Commonwealth of Australia, 2016) (5.7-hectare total area). The application area has been historically cleared for extraction, most recently in 2008 (see Figure 3 below). Plate 4: Aerial Photograph 2008 (Landgate, 2021)  **Figure 4**. Historical aerial imagery of the application area from 2008 (PGV Environmental, 2021). Spatial data indicates the local area (10-kilometre radius from the centre of the area proposed to be cleared) retains approximately 16.86 per cent of the original native vegetation cover.

<table>
<tr><th>Characteristic</th><th>Details</th></tr>
<tr><td>Ecological linkage</td><td>The application area is adjacent to a north-south ecological linkage to the eastern side of the application area. The application area has been modified to avoid vegetation growing in close proximity to this ecological linkage.</td></tr>
<tr><td>Conservation areas</td><td>The application area is not adjacent to any known conservation areas. The closest conservation area is Modong Nature Reserve, located approximately 1.3 kilometres northwest of the application area.</td></tr>
<tr><td>Vegetation description</td><td>The vegetation survey (PGV Environmental, 2021) indicates the vegetation within the proposed clearing area consists of four vegetation types (see Figure 4 below). The survey descriptions and maps are available in Appendix F.

Vegetation descriptions from vegetation survey undertaken by PGV Environmental (2021) are described as:
- Ac: Adenanthos cygnorum Tall Shrubland;
- Kg: Kunzea glabrescens Tall Shrubland to Closed Tall Scrub;
- BaBmKg: Banksia 12anksia12e/B. menziesii/Kunzea glabrescens Low Open Woodland over Adenanthos cygnorum Tall Open Scrub over Scholtzia involucrata Open low Heath; and
- Er: Eucalyptus rudis Open Woodland

This is consistent with the mapped vegetation type:
• Bassendean Complex-Central and South, which is described as vegetation which ranges from woodland of Jarrah (Eucalyptus marginata) – Sheoak (Allocasuarina fraseriana) – Banksia (Banksia spp.) to low woodland of Paperbark (Melaleuca spp.), and sedgelands on moister sites (Heddle et al., 1980).

The mapped vegetation type retains approximately 26.87 per cent of the original extent (Government of Western Australia, 2019).</td></tr>
<tr><td>Vegetation condition</td><td>A vegetation survey (PGV Environmental, 2021) indicates the vegetation within the proposed clearing area is in degraded to completely degraded (Keighery, 1994) condition.

The full Keighery (1994) condition rating scale is provided in Appendix E. Representative photos, survey descriptions and mapping are available in Appendix F.</td></tr>
<tr><td>Climate and landform</td><td>The annual average rainfall for the Oldbury area is 900 millimetres. The elevation within the proposed clearing area ranges from approximately 25 metres to 35 metres above sea level.</td></tr>
<tr><td>Soil description</td><td>The site is mapped as part of the Bassendean System, which consists of very low relief, leached, grey siliceous Pleistocene sand dunes, intervening sandy and clayey swamps and gently undulating plains.

The soils on the site have been described by the Department of Primary Industry and Regional Development (DPIRD) as:
• Bassendean B1 Phase (212Bs_B1) mapped on it which are extremely low to very low relief dunes, undulating sandplain and discrete sand rises with deep bleached grey sands sometimes with a pale yellow B horizon or a weak iron-organic hardpan at depths generally greater than 2 m (DPIRD, 2020) (eastern part of the site); and
• Bassendean B6 Phase (212Bs_B6) which is described as sandplain and broad extremely low rises with imperfectly drained deep or very deep grey siliceous sands (DPIRD, 2020) (western part of the site).</td></tr>
<tr><td>Land degradation risk</td><td>The application area is mapped as having a moderate risk of wind erosion. All other forms of land degradation are mapped as low risk.
<table>
<tr><th>Risk categories</th><th>Land Unit 1</th></tr>
<tr><td>Wind erosion</td><td>M1: 10-30% of the map unit has a high to extreme hazard</td></tr>
<tr><td>Water erosion</td><td>L2: 3-10% of the map unit has a very high to extreme hazard</td></tr>
<tr><td>Salinity</td><td>L2: 3-10% of the map unit has a moderate or high hazard or is presently saline</td></tr>
<tr><td>Subsurface Acidification</td><td>M2: 30-50% of the map unit has a high susceptibility</td></tr>
</table></td></tr>
</table>

Characteristic	Details
	Flood risk: L1: <3% of the map unit has a moderate to high hazard Water logging: L2: 3-10% of the map unit has a moderate to very high to risk Phosphorus export risk: L2: 3-10% of the map unit has a high to extreme hazard
Waterbodies	A Multiple Use Wetland, that extends over 277ha intersects the western side of the application area. The wetland is classified as Dampland although the extent of the wetland indicates it should more accurately be classified as a Palusplain wetland (PGV Environmental, 2021).
Hydrogeography	Groundwater is at approximately 19 to 20m AHD and is 1 to 9m below the surface level, and generally flows to the south-east (PVG Environmental, 2021)
Flora	A flora survey identified 53 flora species within the application area, of which 42 are native and 11 are introduced species. No threatened or priority flora species were identified (PGV Environmental, 2021).
Ecological communities	Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region TEC has been mapped within the application area.
Fauna	Fauna of conservation significance that may occur within the application area include: • Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*) (Endangered); • Baudin's Black Cockatoo (*Calyptorhynchus baudinii*) (Endangered); • Cattle Egret (*Ardea ibis*) (Marine); • Rainbow Bee-eater (*Merops ornatus*) (Marine); • Perth Slider, Lined Skink (*Lerista lineata*) (Priority 3); • Black-striped Snake (*Neelaps calonotos*) (Priority 3); • Southern Brown Bandicoot, Quenda (*Isoodon fusciventer*) (Priority 4).

Appendix D. Assessment against the clearing principles

Assessment against the clearing principles	Variance level	Is further consideration required?
Environmental value: biological values		
Principle (a): *"Native vegetation should not be cleared if it comprises a high level of biodiversity."* Assessment The application area includes 0.31 hectares of foraging habitat for black cockatoos and occurs within an extensively cleared landscape. The application area occurs adjacent to an area identified as the Banksia Woodlands TEC.	At variance	Yes Refer to Section 3.2.2, above.
Principle (b): *"Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna."* Assessment: The area proposed to be cleared contains foraging habitat for black cockatoos.	At variance	Yes Refer to Section 3.2.1, above.
Principle (c): *"Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora."* Assessment: Given the condition, historical clearing, characteristics of the application area and results of the reconnaissance survey, the vegetation proposed to be cleared is unlikely to contain habitat for Threatened flora species.	Not likely to be at variance	No

Assessment against the clearing principles	Variance level	Is further consideration required?
Principle (d): *"Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a threatened ecological community."* Assessment: The area proposed to be cleared does not contain vegetation that meets the criteria to be considered as a TEC. The Banksia Woodlands TEC is located adjacent to the application area.	May be at variance	Yes Refer to Section 3.2.2, above
Environmental value: significant remnant vegetation and conservation areas		
Principle 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."* Assessment: The extent of the mapped vegetation type and native vegetation in the local area is consistent with the modified objectives and targets for biodiversity conservation for constrained areas (EPA, 2008) which aim to retain greater than 10 per cent of vegetation extents. The vegetation proposed to be cleared is not considered to be part of a significant ecological linkage in the local area. The vegetation present within the application comprises significant habitat for conservation significant fauna.	At variance	Yes Refer to Section 3.2.2, above
Principle (h): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area."* Assessment: Given the distance to the nearest conservation area, the proposed clearing is not likely to have an impact on the environmental values of nearby conservation areas.	Not likely to be at variance	No
Environmental value: land and water resources		
Principle (f): *"Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland."* Assessment: One wetland intersects the western edge of the application area (0.032 hectares). A reconnaissance survey identified an area of *Eucalyptus rudis* over *Melaleuca rhaphiophylla* within the application area (PGV Environmental, 2021). Given this, the proposed clearing is impacting vegetation growing in, or in association with a wetland. However clearing of this vegetation is not likely to be significant due to the completely degraded nature of the vegetation.	At variance	No
Principle (g): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation."* Assessment: The mapped soils are moderately susceptible to wind erosion and have low susceptibility to other land degradation mechanisms. Noting the extent of clearing, the removal of all of the vegetation at one time may result in short-term wind erosion of soils at the site. These risks can be mitigated with standard staged clearing and progressive revegetation of cleared areas as conditioned on the permit.	May be at variance	No

Assessment against the clearing principles	Variance level	Is further consideration required?
Principle (i): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water."* Assessment: Given no Public Drinking Water Sources Areas are recorded within the application area and taking into account that wetland mapping intersects 0.032 hectares of the application area, the proposed clearing is unlikely to impact surface or groundwater quality.	Not likely to be at variance	No
Principle (j): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding."* Assessment: The mapped soils and topographic contours in the surrounding area do not indicate the proposed clearing is likely to contribute to increased incidence or intensity of flooding. Given the above, the proposed clearing is unlikely to contribute to waterlogging.	Not likely to be at variance	No

Appendix E. Vegetation condition rating scale

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

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

Measuring vegetation condition for the South West and Interzone Botanical Province (Keighery, 1994)

Condition	Description
Pristine	Pristine or nearly so, no obvious signs of disturbance.
Excellent	Vegetation structure intact, with disturbance affecting individual species; weeds are non-aggressive species.
Very good	Vegetation structure altered, with obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and/or grazing.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and/or grazing.
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and/or grazing.
Completely degraded	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees or shrubs.

Appendix F. Biological survey information excerpts and photographs of the vegetation

Flora species list from PGV Environmental (2021)

Lot 4 King Road Species List (provisional)

* - non-native or planted

GYMNOSPERMS

CYCADACEAE
Macrozamia riedlei

MONOCOTYLEDONS

ANACARDIACEAE
Lyginia barbata

ASPARAGACEAE
Lomandra sp.

COLCHICACEAE
Burchardia congesta

CYPERACEAE
Caustis dioica
Lepidosperma pubisquameum

DASYPOGONACEAE
Dasypogon bromeliifolius

HAEMODORACEAE
Conostylis aculeata

HEMEROCALLIDACEAE
Arnocrinum preissii
Corynotheca micrantha
Dianella revoluta var. *divaricata*

IRIDACEAE
**Gladiolus caryophyllaceus*
Patersonia occidentalis

POACEAE
Amphipogon turbinatus
**Briza maxima*
**Ehrharta calycina*
**Eragrostis curvula*

RESTIONACEAE
Desmocladus flexuosus

XANTHORRHOEACEAE
Xanthorrhoea preissii

DICOTYLEDONS

AIZOACEAE
**Carpobrotus edulis*

ASTERACEAE
**Ursinia anthemoides*

CASUARINACEAE
Allocasuarina fraseriana

COMMELINACEAE
Cartonema philydroides

DILLENIACEAE
Hibbertia hypericoides
Hibbertia subvaginata

ERICACEAE
Conostephium pendulum
Styphelia xerophylla

EUPHORBIACEAE
**Ricinus communis*

FABACEAE
Acacia huegelii
**Acacia longifolia*
Bossiaea eriocarpa
Daviesia triflora
Gompholobium tomentosum
Jacksonia furcellata
Jacksonia sternbergiana

GERANIACEAE
**Pelargonium capitatum*

GOODENIACEAE
Dampiera linearis
Lechenaultia floribunda

LAMIACEAE
Hemiandra pungens

MYRTACEAE
**Calothamnus quadrifidus*
Calytrix fraseri
Eucalyptus rudis
**Eucalyptus todtiana*
Kunzea glabrescens
Melaleuca teretifolia
Scholtzia involucrata

PROTEACEAE
Adenanthos cygnorum
Banksia attenuata
Banksia ilicifolia
Banksia menziesii
Hakea trifurcata
Stirlingia latifolia
Synaphea spinulosa

Vegetation communities within the application area (PGV Environmental, 2021):

Table 5: Vegetation Types on the Site

Vegetation Type	Description	Photograph
BaBm *Banksia attenuata/B. menziesii/Kunzea glabrescens* Low Open Woodland over *Adenanthos cygnorum* Tall Open Scrub over *Scholtzia involucrata* Open low Heath	This vegetation type represents the uncleared areas on the eastern upland areas of the site that were not cleared for sand mining. The main area along the eastern boundary with a smaller, degraded section north-west of the old sand mine. *Banksia attenuata* and *B. menziesii* are common but not dense and are up to 4m high with native Spearwood (*Kunzea glabrescens*) abundant to 4m high. Woolly Bush (*Adenanthos cygnorum*) is common to 4m and the understorey is a mix of native species (*Scholtzia involucrata, Lyginia barbata, Patersonia occidentalis, Corynotheca micrantha*) and introduced grasses such as Perennial Veldtgrass (*Ehrharta calycina*) and Blowfly Grass (*Briza maxima*).	
Kg *Kunzea glabrescens* Tall Shrubland to Closed Tall Scrub	The batter slopes of the old sand mine contain *Kunzea glabrescens* to 3m tall with *Jacksonia furcellata* and *Adenanthos cygnorum* also common. No Banksia trees occur in this vegetation type. Understorey commonly contains *Styphelia xerophylla* and *Lyginia barbata.*	

Vegetation Type	Description	Photograph
Ac Rehab *Adenanthos cygnorum* Tall Shrubland	This vegetation type occurs on the old sand mine which has regenerated naturally and had some active revegetation. The vegetation consists of tall sparse Woolly Bush (*Adenanthos cygnorum*) shrubs with *Jacksonia sternbergiana* and *Kunzea glabrescens* also common taller shrubs. Very little ground cover is present but does include some native *Scholtzia involucrata* and some introduced Lovegrass (*Eragrostis curvula*) and Perennial Veldtgrass.	
Er *Eucalyptus rudis* Open Woodland	Several *Eucalyptus rudis* (Flooded Gum) trees and scattered few Paperbark (*Melaleuca rhaphiophylla*) trees occur on low-lying ground to the west of the sand quarry. The understorey is all grassy weed species.	

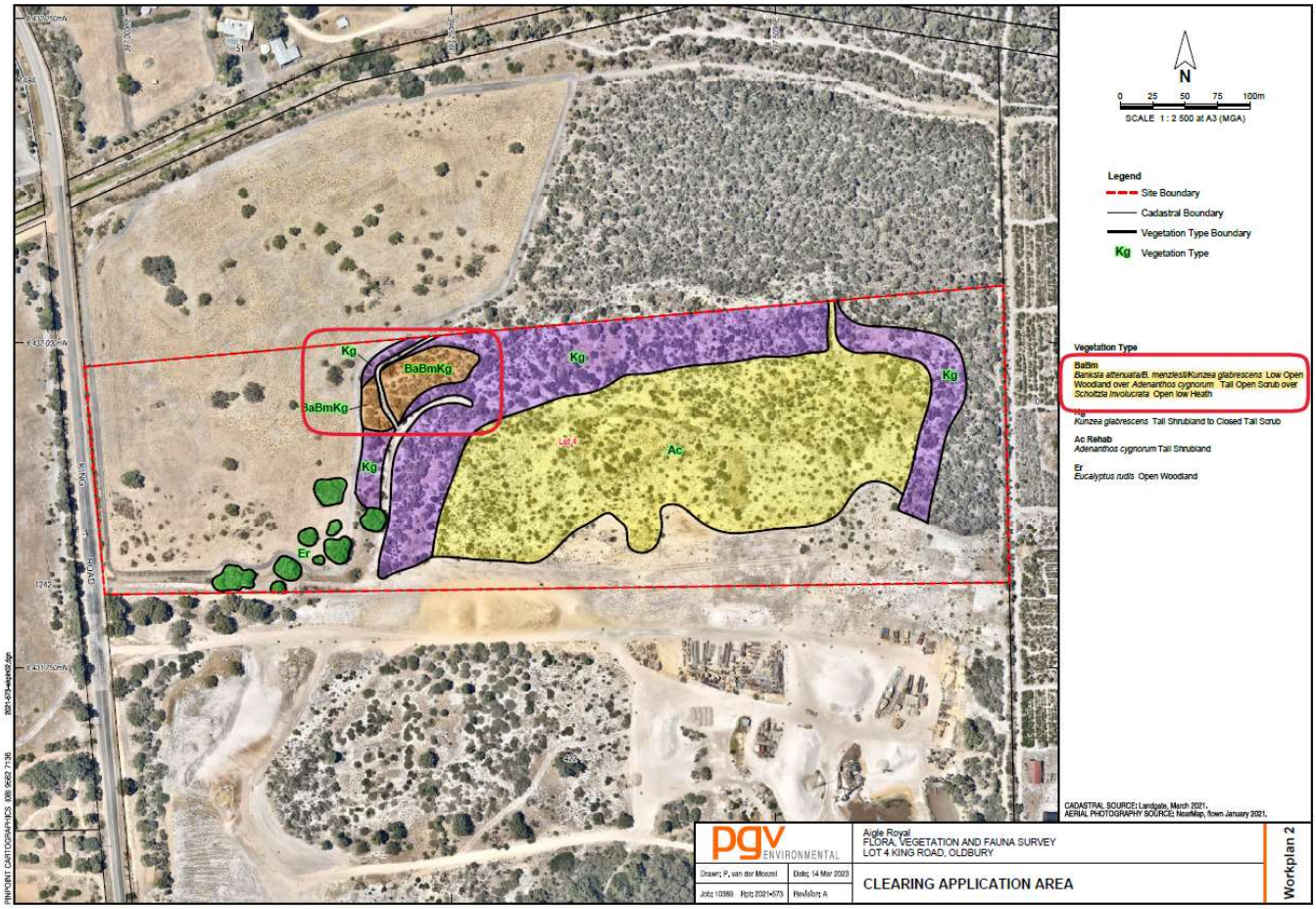

Figure 5: Vegetation types within the application area (PGV Environmental, 2023)

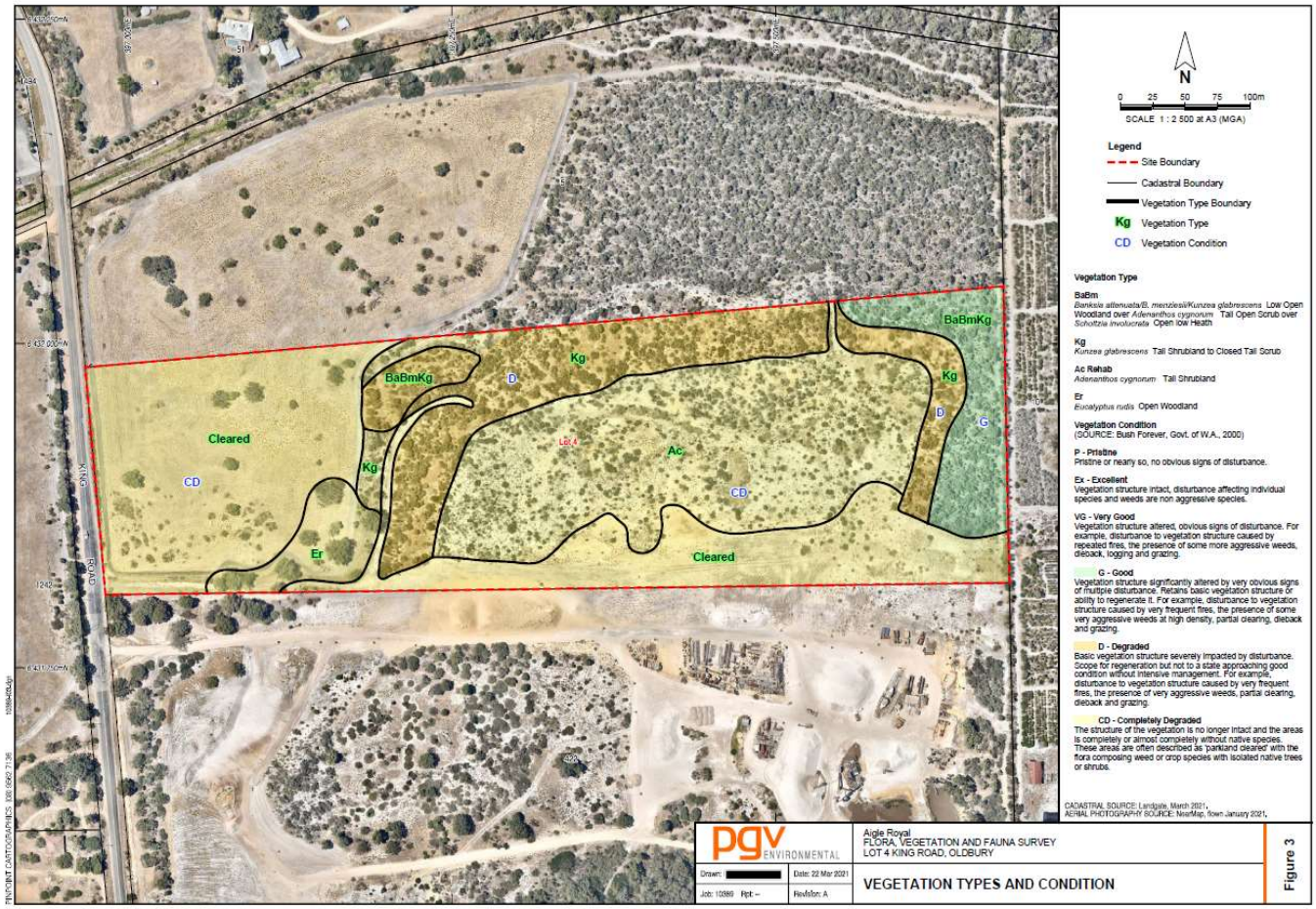

Figure 6: Vegetation Types and Condition

Appendix G Sources of information

G.1. GIS databases

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

- 10 Metre Contours (DPIRD-073)
- Aboriginal Heritage Places (DPLH-001)
- Aboriginal Heritage Places (DPLH-001)
- Cadastre (LGATE-218)
- Cadastre Address (LGATE-002)
- Contours (DPIRD-073)
- DBCA – Lands of Interest (DBCA-012)
- DBCA Legislated Lands and Waters (DBCA-011)
- Directory of Important Wetlands in Australia – Western Australia (DBCA-045)
- Environmentally Sensitive Areas (DWER-046)
- Flood Risk (DPIRD-007)
- Groundwater Salinity Statewide (DWER-026)
- Hydrography – Inland Waters – Waterlines
- Hydrological Zones of Western Australia (DPIRD-069)
- IBRA Vegetation Statistics
- Imagery
- Local Planning Scheme – Zones and Reserves (DPLH-071)
- Native Title (ILUA) (LGATE-067)
- Offsets Register – Offsets (DWER-078)
- Pre-European Vegetation Statistics
- Public Drinking Water Source Areas (DWER-033)

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

Restricted GIS Databases used:

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

G.2. References

Agile Royal Superannuation Pty Ltd (2020) *Clearing permit application CPS 9406/1*, received 24 August 2021 (DWER Ref: DWERDT494938).

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