Lot 2001 Pederick Road Neerabup

Native Vegetation Clearing Permit (Purpose Permit) Application Supporting Document

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DOCUMENT TRACKING

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Template 2.8.1

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Abbreviations

Abbreviation	Description
BoM	Bureau of Meteorology
DAFWA	Department of Agriculture and Food Western Australia
DBCA	Department of Biodiversity, Conservation and Attractions
DoEE	Department of the Environment and Energy
DPIRD	Department of Primary Industries and Regional Development
DWER	Department of Water and Environmental Regulation
ELA	Eco Logical Australia
EP Act	*Environmental Protection Act 1986*
EPBC Act	*Environmental Protection and Biodiversity Conservation Act 1999*
IBRA	Interim Biogeographic Regionalisation for Australia
km	Kilometres
m	Metres
mm	Millimetres
mgbl	Metres below ground level
MNES	Matters of National Environmental Significance
NVCP	Native Vegetation Clearing Permit
PEC	Priority Ecological Community
TEC	Threatened Ecological Community
WAPC	Western Australian Planning Commission
WONS	Weeds of National Significance

1. Introduction

DevelopmentWA (the Proponent) is Western Australia's central land development agency, operating across Western Australia with a diverse portfolio of industrial, commercial and residential projects. The Proponent is seeking approval to develop the southern portion (12.25 ha) of Lot 2001 on DP 60745 Pederick Road, Neerabup, Western Australia (the Proposal Area; Figure 1-1) into an industrial estate. The Proposal Area forms part of the Meridian Business Park within the Neerabup Industrial Area (NIA) and is located in the City of Wanneroo.

Development of the Proposal will include the following steps:

- Clearing of native vegetation and topsoil
- Bulk earthworks to create appropriate levels within the site
- Installation of services (water, power, electricity, gas, sewer, and communications)
- Construction of local roads (as required)
- Landscaping of streetscapes
- Selling of lot(s) and subsequent development of commercial buildings/industrial site(s).

The Proposal was referred to the Department of Climate Change, Energy, the Environment and Water (DCCEEW, formerly DAWE) on 30 March 2021 (EPBC reference 2021/8917). The vegetation proposed to be cleared contains ecological communities or habitat for Matters of National Environmental Significance (MNES). On 4 May 2021, the Minister for the Environment determined that the proposal constituted a Controlled Action under s 75 and s 87 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and thus required assessment and a decision about whether approval should be granted under that act. The controlling provision was 'Listed Threatened Species and Ecological Communities' (ss 18 and 18A of the EPBC Act), namely:

- Carnaby's Cockatoo (*Zanda latirostris*) - Endangered
- Forest Red-tailed Black-cockatoo (*Calyptorhynchus banksii naso*) - Vulnerable
- Banksia Woodlands of the Swan Coastal Plains threatened ecological community (TEC) - Endangered.

This document has been prepared to support the granting of a Native Vegetation Clearing Permit (NVCP) for the Proposal under Part V Division 2 of the *Environmental Protection Act 1986* (EP Act) and approval under the EPBC Act (accredited assessment under the bilateral agreement).

This NVCP application to the Department of Water and Environmental Regulation (DWER) includes the following information:

- The justification for the project and feasible alternatives.
- An overview of the existing environmental conditions of the site.
- An evaluation of potential impacts of the vegetation clearing.
- An evaluation of the proposed clearing against the ten clearing principles listed under Schedule 5 of the EP Act.
- Detailed description and assessment of impacts to the Matters of National Environmental Significance (MNES) associated with the Proposal.

- Detailed description of mitigation measures.
- Environmental approvals and management requirements.
- Proposed environmental offsets.
- Stakeholder consultation.

1.1. Location and ownership

The Proposal is located at Lot 2001 Pederick Rd, Neerabup, approximately 30 km north of the Perth Central Business District and 9 km inland from the Indian Ocean (Figure 1-1). It forms part of the Meridian Business Park within the Neerabup Industrial Area.

Lot 2001 Pederick Road comprises two land parcels: the 9.9 ha parcel north of Pederick Road has previously been cleared, while the southern 12.25 ha parcel south of Pederick Road contains remnant native vegetation. This application is therefore for the southern land parcel (the 'Proposal Area'), in which a total area of clearing of 6.42 ha is proposed (the 'Clearing Area') within a footprint of clearing for a purpose permit of 12.25 ha (the 'Proposal Area'). The Clearing Area comprises 6.21 ha of native vegetation and 0.21 ha of completely degraded area. The remaining 5.83 ha (of which 5.62 ha is native vegetation) within the wider Proposal Area will be retained and is hereafter referred to as the 'Avoidance Area' (Figure 1-2).

The Proposal Area is owned by the Western Australia Land Authority (trading as DevelopmentWA; the Proponent) and is zoned 'Industrial' under the Metropolitan Region Scheme (MRS) and 'Industrial Development' under the City of Wanneroo's District Planning Scheme No.2 (DPS 2).

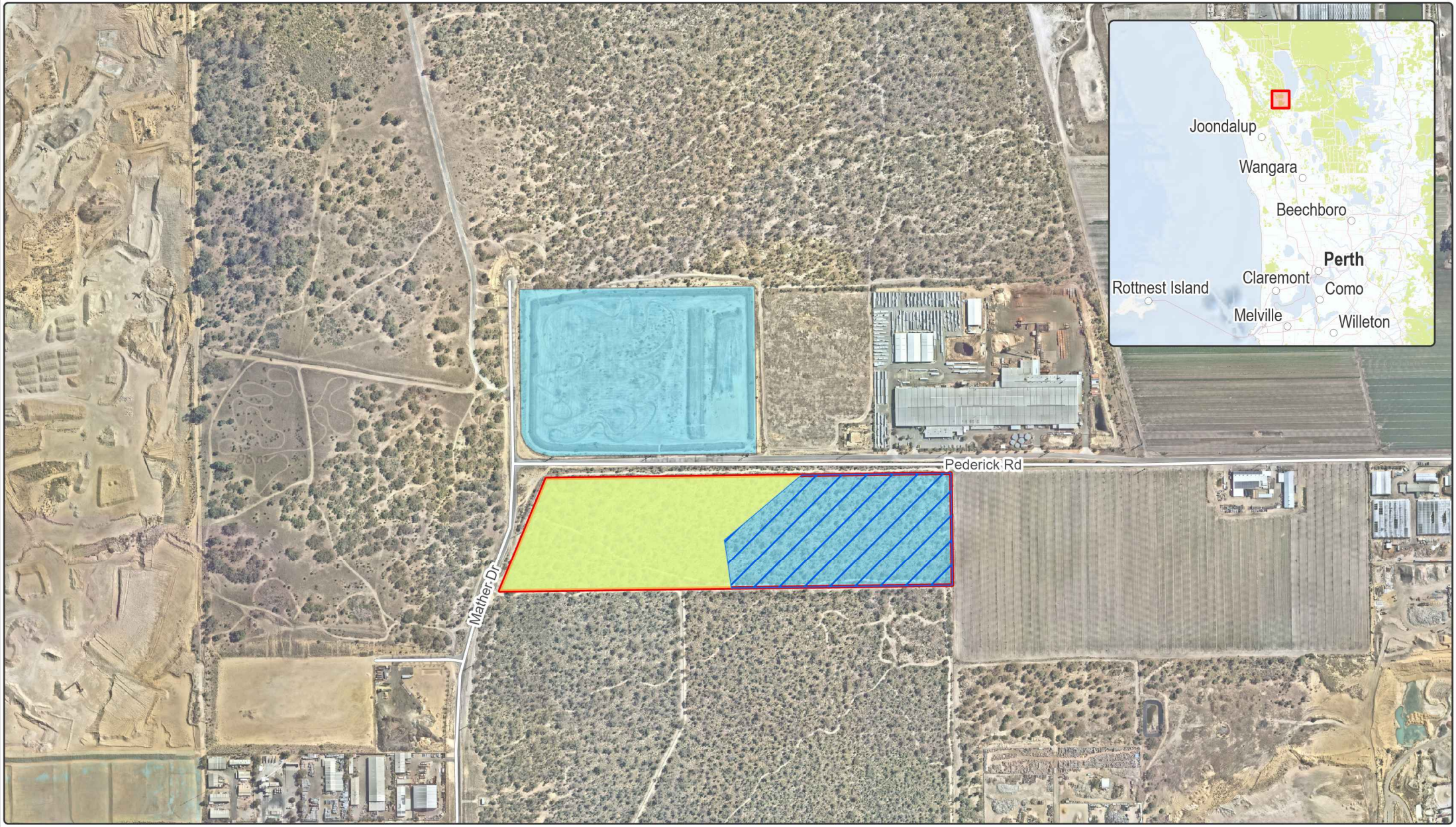

Figure 1-1: Location of the Proposal Area

Proposal Area
Lot 2001 Pederick Rd, Neerabup
Avoidance Area
Clearing Area
Distributor Road
Access Road

0 70 140 280
Metres

Datum/Projection:
GDA 1994 MGA Zone 50
22PER17694-DD Date: 2/09/2022

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Figure 1-2: Clearing and Avoidance Areas within the Proposal Area

Proposal Area
Avoidance Area
Clearing Area

0 25 50 100
Metres

Datum/Projection:
GDA 1994 MGA Zone 50
22PER17694-DD Date: 2/09/2022

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1.2. Proposal description

The Proposal includes the following steps:

- Clearing of native vegetation and topsoil.
- Bulk earthworks to create appropriate levels within the sites.
- Installation of services (water, power, electricity, gas, sewer and communications).
- Construction of local roads (as required).
- Landscaping and streetscapes.
- Selling of lot(s) and subsequent development of commercial buildings/industrial site(s).

1.3. Proposal benefits

The Proposal is strategically located within the north-west corridor of metropolitan Perth, with excellent existing and future road linkages. The area shows attractive locational attributes for industrial land development within the short term 3-5 years and extending longer term over 20-50 years.

1.4. Alternative Proposal options

The Neerabup Industrial Area Agreed Structure Plan (the Structure Plan; Element 2020) was adopted in January 2005. Development of the strategic planning document considered a range of design alternatives for the estate at this phase.

An alternative clearing application for the entire 12.25 ha Proposal Area was also considered by the Proponent. However, due to the presence of the FCT SCP 20a, listed as an Endangered TEC under the BC Act, the total Clearing Area has been reduced to 6.42 ha to avoid the clearing of FCT 20a. This is further discussed in Section 3.1.

2. Existing Environment

2.1. Climate

The Swan Coastal Plain subregion is described as having a Mediterranean-type climate, with total annual rainfall ranging between 600 and 1000 mm (Mitchell et al. 2002). The Proposal Area receives, on average, a total of 789. mm of rainfall per year with most rainfall occurring during the winter months of June, July and August (161.6 mm, 161.8 mm and 122.7 mm respectively; BoM 2021).

2.2. Geology, landform and soils

The Proposal Area is situated on the Spearwood Dune System (Spearwood 6) with soils derived from Tamala Limestone, characterised as yellow sands of quartz, coated with iron oxide (Government of Western Australia 2000). The Spearwood Sand Phase occurs within the Proposal Area, characterised by undulating dunes with rocky crests on Aeolian sand over limestone.

According to broad scale soil mapping, two phases of the Spearwood soil system occur within the Proposal Area:

- Karrakatta Sand Yellow Phase (Ky): Low hilly to gently undulating terrain. Yellow sand over limestone at 1-2 m.
- Karrakatta Sand Grey Phase (Kg): Low hilly to gently undulating terrain. Iron podzols.

2.3. Hydrology

Groundwater depth ranges between 33-36 m AHD, with the distance to the watertable increasing in an easterly direction across the Proposal Area due to increasing elevation of the land surface (DWER 2022). Groundwater flows in a west/south-westerly direction. Distance to the water table from the surface varies from approximately 23-33 m from east to west of the Proposal Area.

The closest surface water feature to the Proposal Area is Lake Pinjar, located approximately 1.4 km north-east of the Proposal Area. There are no surface water features or wetlands present within the Proposal Area.

2.4. Conservation Areas

Mather Reserve (R53163), covering approximately 50 ha immediately to the south of the Proposal Area, was transferred to the Crown, and land zoning changed to reflect its Conservation purpose, as part of an offset associated with the NIA.

In addition, several Bush Forever sites are located within close proximity to the Proposal Area (

Figure 2-1):

- Bush Forever site 295 (Flynn Drive Bushland, Neerabup), located approximately 600 m south of the Proposal Area
- Bush Forever site 494 (West Flynn Drive Bushland, Carramar), located approximately 1 km south of the Proposal Area
- Bush Forever site 384 (Neerabup Lake and Adjacent Bushland, Neerabup) located approximately 1.9 km west of the Proposal Area
- Bush Forever site 382 (Lake Pinjar and Adjacent Bushland, Pinjar), located approximately 1.5 km east of the Proposal Area
- Bush Forever site 444 (State Forest 65 – Pinjar Plantation South Bushland (11), Nowergup/Yanchep/Neerabup), located approximately 1.1 km north of the Proposal Area.

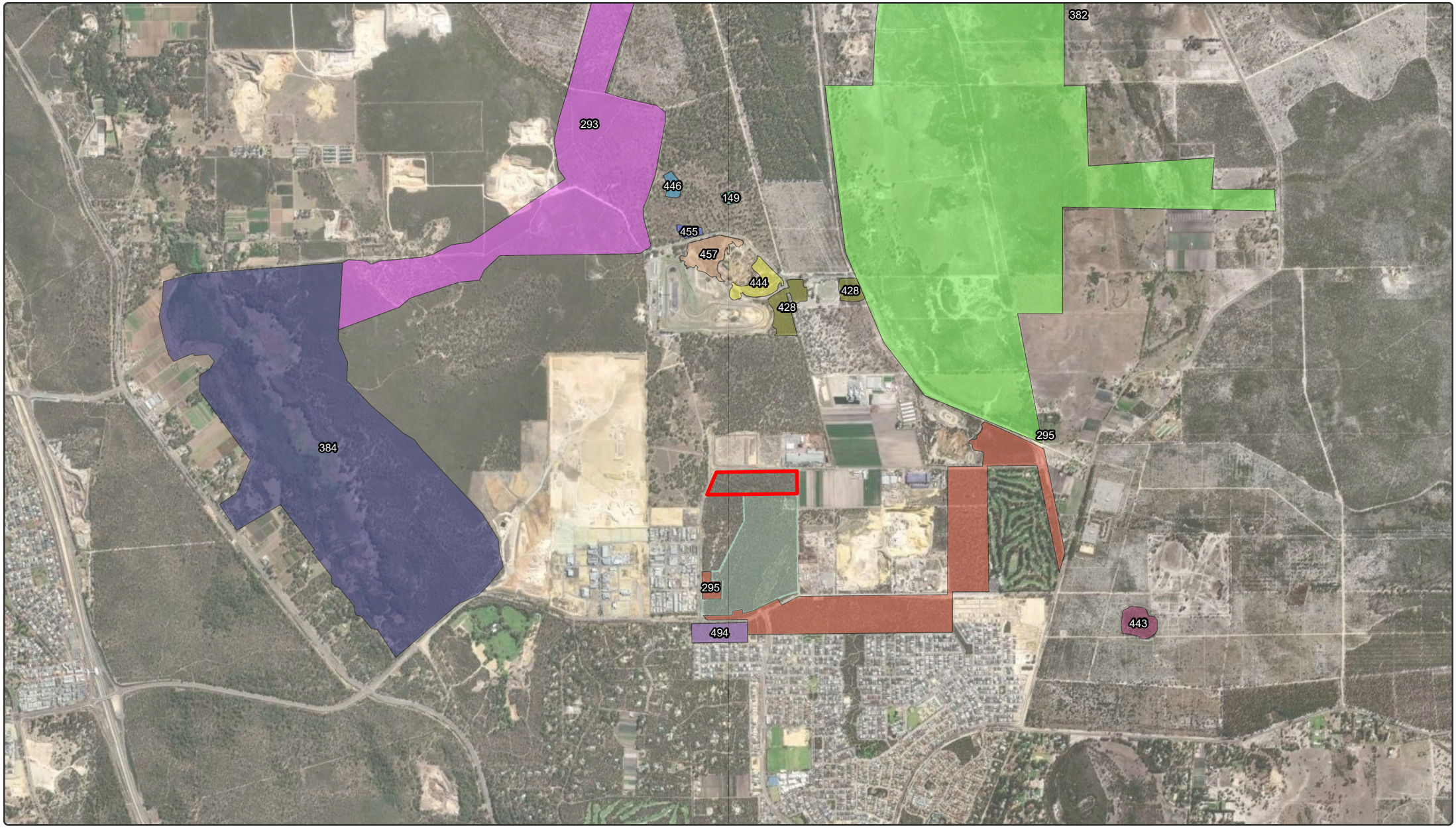

Figure 2-1: Conservation Areas surrounding the Proposal area

Proposal Area
Mather Reserve

Bush Forever Sites

149
293
295
382
384
428
443
444
446
455
457
494

0 0.38 0.75 1.5
Kilometres

Datum/Projection:
GDA 1994 MGA Zone 50
22PER17694-ED Date: 7/11/2022

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2.5. Flora and Vegetation

2.5.1. Survey effort

A number of biological surveys have been completed in the Proposal Area and its vicinity. The findings of these surveys were generally consistent with one another, with any differences seemingly based on the scale at which vegetation was assessed. A summary of previous findings is shown in Table 2-1 below.

The Proponent notes that technical studies undertaken for this project prior to 2019 refer to the Acts in force at the time of those studies; however, they have been reviewed to ensure this NVCP considers values consistent with the *Biodiversity Conservation Act 2016* (BC Act). Priority flora taxa and priority ecological communities (PECs) continue to be listed by the Department of Biodiversity, Conservation and Attractions (DBCA).

Table 2-1: Previous biological surveys and reports completed within the Proposal Area

Source	Survey dates	Environmental Aspect	Conclusion
Flora and Vegetation Report, Lots 4, 40, 41 & 1002, Neerabup Industrial Estate (RPS 2006)	September/ October 2004 and October/ November 2005	Flora and vegetation	Vegetation was mapped as vegetation community EmBAf (*Eucalyptus marginata*, *Banksia menziesii*, *B. attenuata* and *Allocasuarina fraseriana* Low Woodland). Vegetation was mapped as being Excellent through to Completely Degraded.
Flora, Vegetation and Vertebrate Fauna Assessment. Neerabup Industrial Area (ATA 2007)	4-6 October 2006 & 27-29 November 2006 (flora and vegetation) 14-24 November 2006 (vertebrate fauna)	Flora, vegetation and vertebrate fauna.	Vegetation was mapped as Very Good condition vegetation community BaBmLW (*Banksia attenuata* and *B. menziesii* Low Woodland). Two black cockatoo potential nesting trees were recorded.
Flora and Fauna Technical Studies, Lot 1002 Pederick Road, Neerabup (ELA 2013a)	2 November 2012	Targeted flora and fungi survey, re-assessment of ATA (2007) vegetation communities.	Vegetation was considered to be BaBmLW and was primarily in Very Good condition. The vegetation analysed in two quadrats was considered to be FCT 28. A total of 48 potential Carnaby's Cockatoo breeding trees were identified, with seven trees observed containing hollows possibly suitable for Carnaby's Cockatoo nesting. Evidence of Carnaby's Cockatoo foraging activity was recorded.
Neerabup Lot 2001 Pederick Rd Flora, Vegetation and Black Cockatoo Survey (ELA 2021a)	21 November 2019	Flora, vegetation and black cockatoo habitat	Vegetation was mapped as vegetation community EmBAf. Two quadrats were consistent with SCP 20a, and a third was consistent with FCT 28. The vegetation was primarily in Excellent condition, with small areas in Good and Completely Degraded condition. Vegetation was considered to represent Good quality foraging habitat for Carnaby's Cockatoo

Source	Survey dates	Environmental Aspect	Conclusion
			and Moderate quality foraging habitat for Forest Red-tailed Black-cockatoo. 54 potential Carnaby's Cockatoo breeding trees were identified, five containing visible hollows potentially suitable for nesting. Two priority flora species under the BC Act were recorded; *Pimelea calcicola* (P3) and *Acacia benthamii* (P2).
Targeted Survey for *Caladenia huegelii* at Lot 2001 Pederick Rd, Neerabup (ELA 2021b)	14 October 2020	Grand Spider-orchid (*Caladenia huegelii*)	No individuals of the Threatened *Caladenia huegelii* were recorded and the species can be considered highly unlikely to occur within the Proposal Area.
Lot 2001 Pederick Rd TEC Clarification Survey (ELA 2022)	12 January 2022	Bankia Woodlands of the Swan Coastal Plain TEC, Floristic Community Types 20a and 28	A total of 11.84 ha (96.63%) of the Proposal Area was recorded as representative of the Banksia Woodlands of the Swan Coastal Plain TEC. The survey concluded that the Proposal Area consists of 2.77 ha of FCT 20a, 9.06 ha of FCT 28 and 0.42 ha of cleared area (vehicle tracks and/or fence line firebreaks).

2.5.2. Vegetation

2.5.2.1. Regional vegetation complexes

Two broadscale vegetation complexes occur within the Proposal Area, Karrakatta Complex - Central and South, and Cottesloe Complex - Central and South (Table 2-2). Karrakatta Complex - Central and South has less than 25% of its total pre-European extent remaining within the Swan Coastal Plain subregion (Table 2-2).

Table 2-2: Vegetation Complexes mapped within the Proposal Area

Vegetation Complex	Description	Pre-European extent (ha) within the Swan Coastal Plain subregion	Current extent (ha) within the Swan Coastal Plain subregion	Remaining (%)
Karrakatta Complex – Central and South	Predominantly open forest of *Eucalyptus gomphocephala* (Tuart), *Eucalyptus marginata* (Jarrah), and *Corymbia callophylla* (Marri), and woodland of *Eucalyptus marginata* (Jarrah) and *Banksia* species. *Agonis flexuosa* (Peppermint) is co-dominant south of Capel River.	53,080.99	12,467.20	23.49
Cottesloe Complex – Central and South	Mosaic of woodland of *Eucalyptus gomphocephala* (Tuart) and open forest of *Eucalyptus gomphocephala* (Tuart, *Eucalyptus marginata* (Jarrah) and *Corymbia calophylla* (Marri; closed heath on the Limestone outcrops.	45,299.61	14,567.87	32.16

2.5.2.2. Vegetation type and condition

A single vegetation community type, EmBAf, was identified in the Proposal Area (RPS 2006, ELA 2012, 2013a, 2013b, 2021a), covering a total area of 11.83 ha (96.6% of the Proposal Area). Cleared tracks account for the remaining 0.42 ha (3.4%) of the Proposal Area.

Vegetation community EmBAf is described as *Eucalyptus marginata*, *Allocasuarina fraseriana* and *Banksia attenuata* Woodland over Open Shrubland of *Xanthorrhoea preissii* over Low Shrubland of *Hibbertia hypericoides*, *Stirlingia latiflora*, *Eremaea pauciflora, Desmocladus asper* and *Mesomelaena pseudostygia* on grey loamy sands (Figure 2-2). This vegetation community is considered to represent the Banksia Woodlands of the Swan Coastal Plain TEC (Banksia Woodlands TEC) listed as Endangered under the EPBC Act, comprising two Floristic Community Types, 20a and 28. These are further discussed in Section 2.5.2.3.

Vegetation condition within the Proposal Area has been classified based on the condition scale adapted from Keighery (1994) described in the EPA *Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA 2016). The majority of the Proposal Area is considered to be in Excellent condition (92.9%), with a thin band on the margins of the remnant bushland in Good condition (3.75%; ELA 2021a). Existing cleared firebreaks round the margin of the Proposal Area, as well as some vehicle tracks dissecting the Proposal Area are all classed as Completely Degraded (3.35%). Identified disturbances within the Proposal Area included clearing of tracks, edge effects and fire. Vegetation condition within the Proposal is presented in Table 2-3 and Figure 2-3.

Table 2-3: Vegetation condition within the Proposal Area

Vegetation Condition	Area (ha)	Portion of Proposal Area (%)
Excellent	11.38	92.9
Good	0.45	3.75
Completely Degraded	0.42	3.35
Total	**12.25**	**100.0**

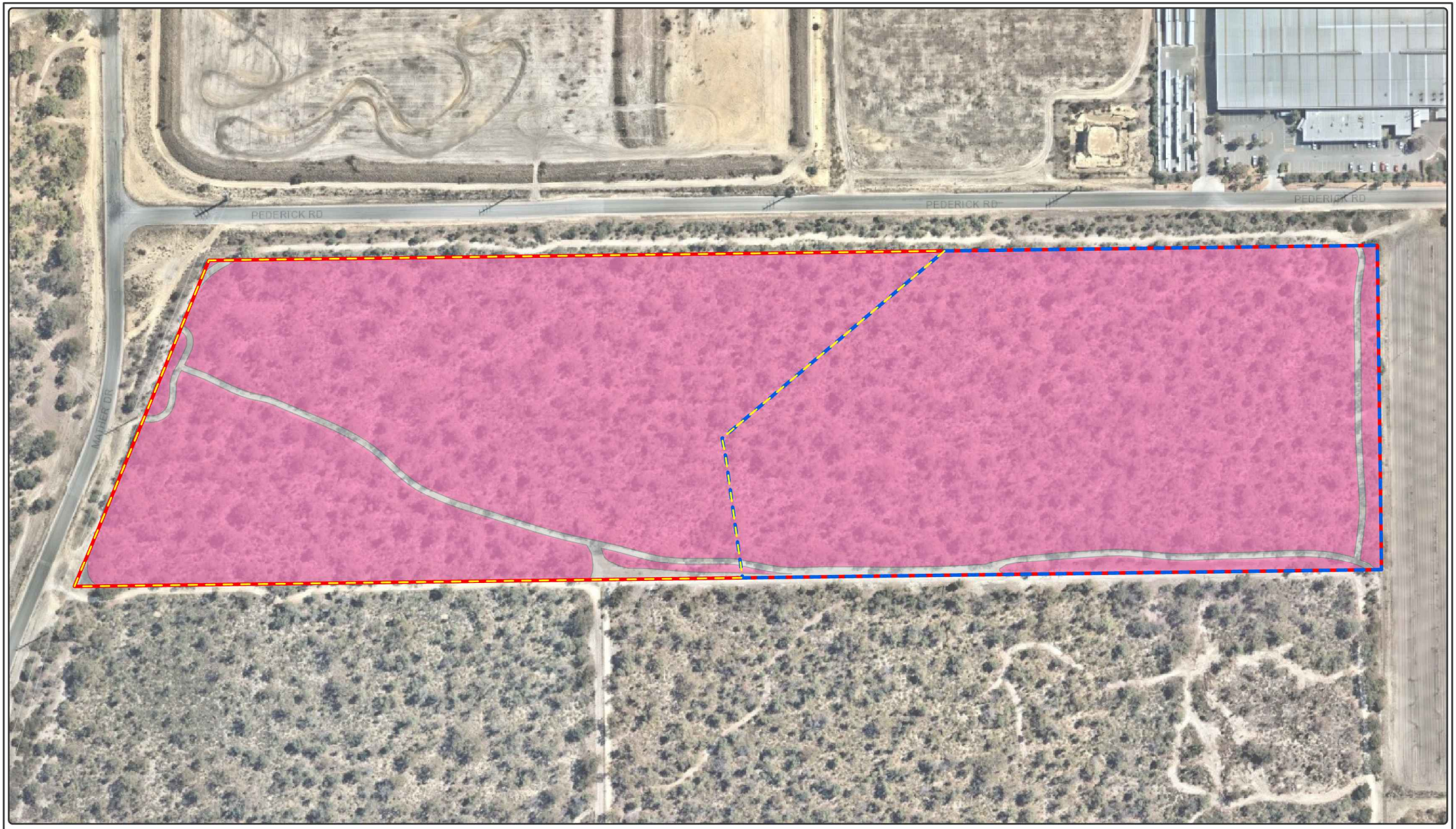

Figure 2-2: Vegetation community recorded within the Proposal Area

Proposal Area
Avoidance Area
Clearing Area

EmBAf - *Eucalyptus marginata, Banksia* and *Allocasuarina fraseriana* Low Woodland
Completely Degraded

0 25 50 100
Metres

Datum/Projection:
GDA 1994 MGA Zone 50
22PER-17694 Date: 2/09/2022

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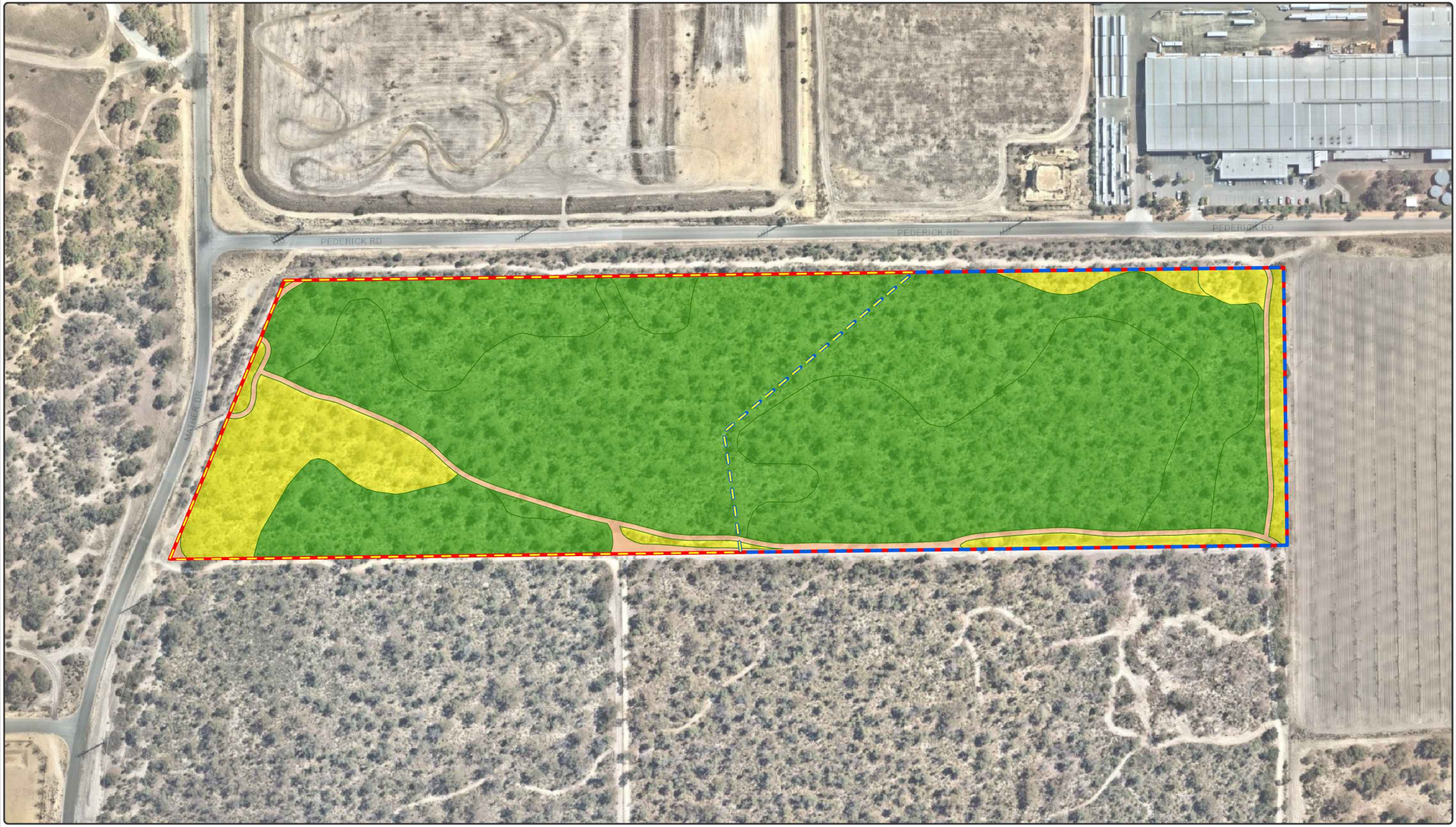

Figure 2-3: Vegetation condition within the Proposal Area

Proposal Area
Avoidance Area
Clearing Area

Vegetation Condition Assessment

Excellent
Good
Completely Degraded

0 30 60 120
Metres

Datum/Projection:
GDA 1994 MGA Zone 50
22PER17694-DD Date: 2/09/2022

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2.5.2.3. Threatened and Priority Ecological Communities

Banksia Woodlands of the Swan Coastal Plain TEC

A qualitative assessment undertaken for the site (ELA 2022) has identified the vegetation within the Proposal Area as being representative of the Banksia Woodlands of the Swan Coastal Plain TEC (Banksia Woodlands TEC), listed as Endangered under the EPBC Act. Vegetation communities were assessed against key diagnostic characteristics outlined in the Banksia Woodlands of the Swan Coastal Plain TEC approved Conservation Advice (DoEE 2016) to determine the presence of this TEC within the Proposal Area (ELA 2022).

To be considered as representative of a Banksia Woodlands TEC a patch needs to meet at least the 'Good' condition category (DoEE 2016). The Banksia Woodland TEC is described as (DoEE 2016):

> *The ecological community is a woodland associated with the Swan Coastal Plain (and some adjacent areas) of southwest Western Australia. It typically has a prominent tree layer of Banksia sometimes with scattered eucalypts and other tree species present within or above the Banksia canopy. The understorey is species rich and has many wildflowers, including sclerophyllous shrubs, sedges and herbs.*

A total of 11.83 ha of vegetation within the Proposal Area was assessed as representative of the Banksia Woodlands TEC. This is comprised of:

- 11.38 ha of vegetation in Excellent condition; and
- 0.45 ha of vegetation in Good condition. Variation in condition of vegetation across a patch should not necessarily be considered to be evidence of multiple patches (DoEE 2016), therefore a precautionary approach was taken. Vegetation in Good condition was considered to be part of the greater patch, and was assessed as representing the Banksia Woodlands TEC.

SCP 20a TEC

A survey undertaken by ELA in 2019 (ELA 2021a) determined the presence of the Floristic Community Types (FCTs) 20a and 28, which are recognised as being part of the EPBC Act listed Banksia Woodlands TEC. At the State level, FCT 20a is listed as an Endangered TEC under the BC Act, while FCT 28 is not listed under the BC Act.

A subsequent survey was undertaken by ELA (2022) which aimed to clarify the distribution and extent of each component of the Banksia Woodlands TEC in the Proposal Area. To identify potential State listed TECs and PECs in the Proposal Area, ELA quadrats and vegetation communities were compared to FCTs defined by Gibson *et al*. (1994). Results of the multivariate analysis infer that quadrats ELA01 and ELA05 are closely affiliated with FCT 20a and quadrats ELA02, ELA03, ELA04, and ELA06 are closely affiliated with FCT 28 (Table 2-4).

A total of 11.83 ha (96.63%) of the Proposal Area was recorded as representative of the Banksia Woodlands TEC. Of this, 2.77 ha (22.65% of the Proposal Area) was identified as SCP 20a TEC and 9.06 ha (73.99% of the Proposal Area) was FCT 28 (Figure 2-4Figure 5-1). DBCA has subsequently provided written advice supporting the methodology and outcome of the definition of the boundary of the SCP 20a TEC. The remaining 0.42 ha (3.36%) of the Proposal Area is occupied by cleared vehicle tracks and/or fence line firebreaks.

Table 2-4: Relationship between ELA vegetation communities and FCTs defined by Gibson et al. (1994)

Inferred FCT	Quadrat number	Closest affiliated sites (Gibson *et al*. 1994)
20a	ELA01	GOLF-1, LAND-1, KOON-1, KOON-2
	ELA05	GOLF-1, LAND-1, KOON-1, KOON-2
28	ELA02	TRIG-4, KING-2, KING-1, WARI-2, SHENTI-1, TRIG-3, WARI-1
	ELA03	TRIG-4, KING-1, KING-2, WARI-2, SHENTI-1, TRIG-3, WARI-1
	ELA04	KING-2
	ELA06	TRIG-4, KING-1, KING-2, WARI-2, SHENTI-1, TRIG-3, WARI-1

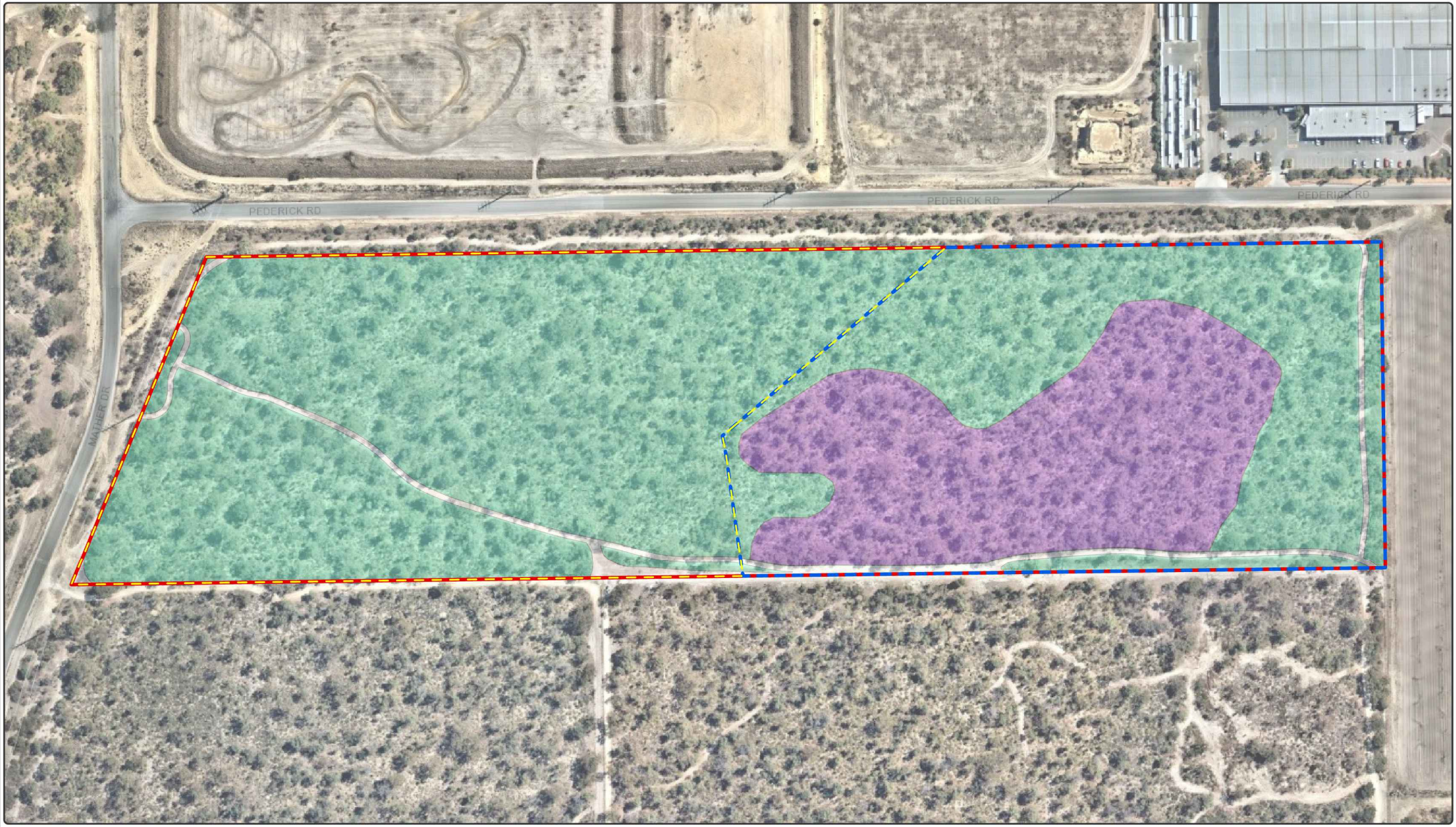

Figure 2-4: Banksia Woodlands Floristic Community types within the Proposal Area

Proposal Area
Avoidance Area
Clearing Area

Vegetation Communities

FCT 20a
FCT 28
Completely Degraded

0 25 50 100
Metres

Datum/Projection:
GDA 1994 MGA Zone 50
22PER17694-DD Date: 2/09/2022

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2.5.3. Flora

The most recent detailed flora and vegetation survey (ELA 2022) recorded a total of 86 taxa (80 native and six introduced taxa) from 68 genera and 30 families across the Proposal Area. Families with the highest number of species included Fabaceae and Orchidaceae, with 12 and nine species respectively. *Conostylis, Lepidosperma, Pterostylis* and *Stylidium* were the best represented genera with three species recorded for each. The most common species (those that recorded an average of greater than 2% Foliar Cover across all sites) included *Allcasuarina fraseriana, Banksia attenuata, Desmocladus flexuosus, Eucalyptus marginata, Hibbertia hypericoides, Stirlingia latiflora* and *Xanthorrhoea preissii.*

2.5.4. Conservation significant flora

No flora species listed as Threatened under the EPBC Act or BC Act have been recorded within the Proposal Area.

Two DBCA listed Priority flora species were recorded during the 2021 ELA survey (2021a); *Acacia benthamii* (P2) and *Pimelea calcicola* (P3). Five individuals of *Acacia benthamii* from a single location within the Proposal Area, near the southern boundary (Figure 2-5), individuals of this species were not flowering at the time of the field survey. *Pimelea calcicola* was recorded from a single individual within Quadrat 2 (Figure 2-5). Both species are known to have a wide distribution along the Swan Coastal Plain subregion. The former has been recorded close to the coast between Mandurah and Cervantes, while the latter is recorded between Preston Beach and Guilderton and has been recorded further away from the coast.

Four additional Priority flora species were considered to have the potential to occur within the Proposal Area based on the presence of suitable habitat (ELA 2021a):

- *Calectasia elegans* (Priority 2)
- *Stenanthemum sublineare* (Priority 2)
- *Styphelia filifolia* (Priority 3)
- *Jacksonia sericea* (Priority 4).

However, neither the 2021 nor 2022 surveys (ELA 2021a; ELA 2022) identified any of these four species within the Proposal Area.

2.5.5. Introduced flora

A total of six introduced (weed) species have been recorded within the Proposal Area during the most recent survey (ELA 2022), none of which are listed as Declared Plant species in Western Australia pursuant to Section 22 of the State *Biosecurity and Agriculture Management Act 2007* (BAM Act) or as Weeds of National Significance (WoNS).

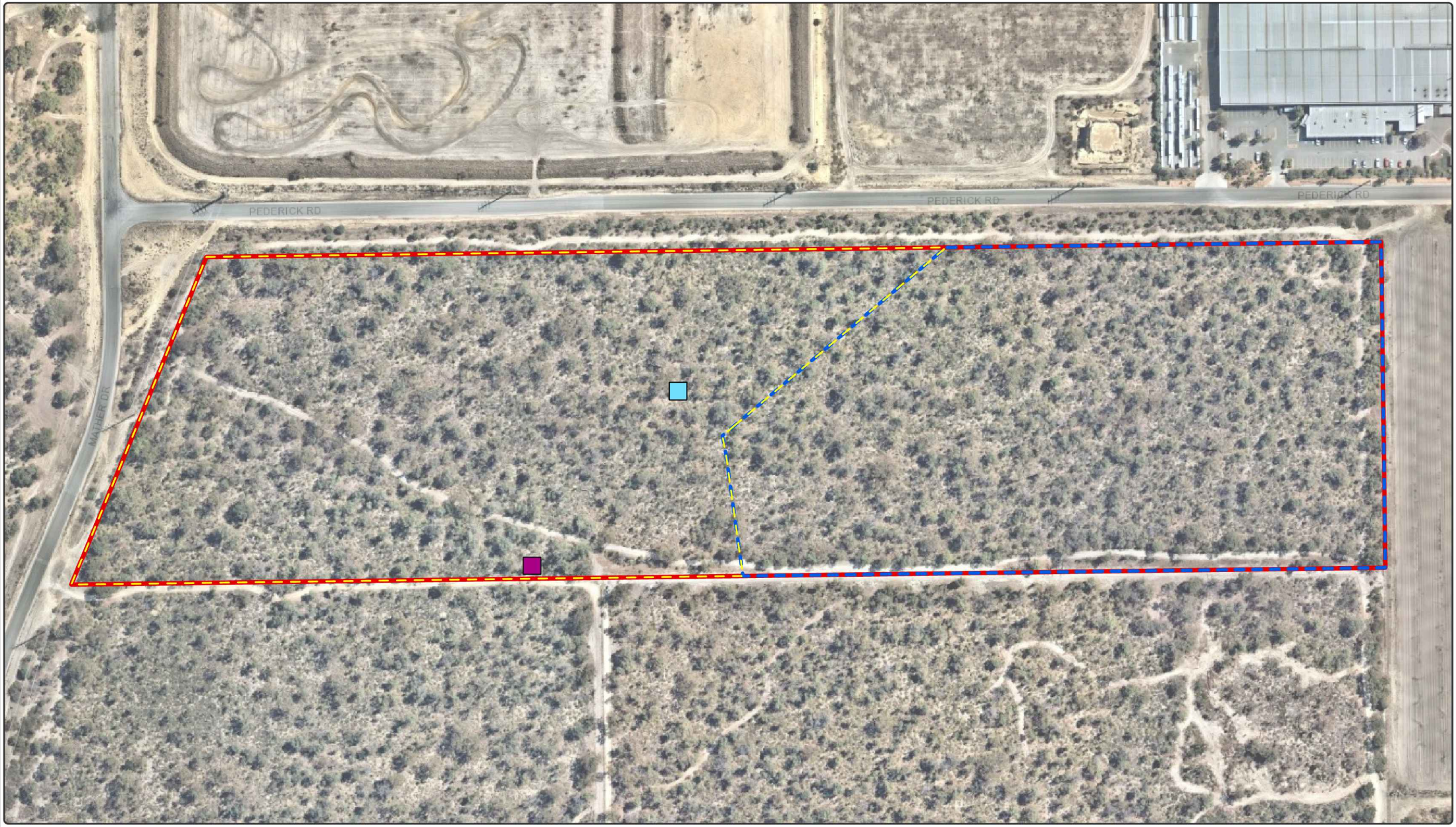

Figure 2-5: Conservation significant flora species recorded within the Proposal Area

Proposal Area
Avoidance Area
Clearing Area

Priority Species

Acacia benthamii (P2)
Pimelea calcicola (P3)

0 25 50 100
Metres

Datum/Projection:
GDA 1994 MGA Zone 50
22PER17694-DD Date: 2/09/2022

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2.6. Fauna

2.6.1. Fauna habitat

The Proposal Area contains 11.83 ha of fauna habitat classified as *Eucalyptus* woodland with a *Banksia* sp. low woodland understorey (ATA 2007). A Level 2 fauna survey was undertaken within the Proposal Area in November 2006 (ATA 2007), as part of a larger survey within the NIA (survey area was 325 ha in size). One trapping site was located within the Proposal Area, with a total of 1900 trap nights undertaken utilising a mixture of pitfall, funnel, Elliott and cage traps. Spotlighting, avifauna and bat surveys were also undertaken (both systematic and opportunistic). At total of 25 vertebrate fauna species were trapped during the survey (18 species within the Proposal Area), an additional three large mammals were observed through the Proposal Area (Cat, Rabbit and Western Grey Kangaroo) and 42 species of birds were observed (number of birds species records within the Proposal Area unknown). Overall, the NIA survey area, including the Proposal Area, was considered to contain a 'moderately diverse' fauna assemblage (ATA 2007).

An additional targeted fauna survey was undertaken in 2012 to assess the presence of habitat for Carnaby's Cockatoo within the Proposal Area (ELA 2013a). The survey determined the presence of suitable foraging and potential breeding habitat for the Carnaby's Cockatoo. A further black cockatoo habitat assessment was undertaken in 2019, confirming the presence of suitable foraging habitat and potentially suitable breeding habitat within the Proposal Area for both Carnaby's Cockatoo and Forest Red-tailed Black-cockatoo (ELA 2021a).

2.6.2. Conservation significant fauna

Three conservation significant fauna species have been recorded within the Proposal Area or adjacent NIA survey areas: Carnaby's Cockatoo (*Zanda latirostris*, listed as Endangered under the EPBC Act and BC Act); Rainbow Bee-eater (*Merops ornatus*, listed as Marine under the EPBC Act); and the Peregrine Falcon (*Falco peregrinus*, listed as Other Specially Protected Fauna under the BC Act) (ATA 2007).

A further five conservation significant fauna species have been identified as having potential to occur within the Proposal Area (ATA 2007):

- Forest Red-tailed Black-cockatoo (*Calyptorhynchus banksii naso*) – listed as Vulnerable under the EPBC Act and the EP Act.
- Chuditch or Western Quoll (*Dasyurus geoffroii*) – Listed as Vulnerable under the EPBC Act and BC Act.
- Black-striped Snake (*Neelaps calonotus*) – Listed as a Priority 3 species by DBCA.
- Western Brush Wallaby (*Notamacropus irma*) – Listed as a Priority 4 species by DBCA.
- Southern Brown Bandicoot or Quenda (*Isoodon fusciventer*) – Listed as a Priority 4 species by DBCA.

Although the Peregrine Falcon was recorded within the NIA, it is considered to be an infrequent visitor and not dependent on the habitat within the Proposal Area (ATA 2007). As such, the Proposal is not expected to significantly impact the species, therefore it will not be discussed further in this assessment. Similarly, the Rainbow Bee-eater is a migratory bird that visits the south-west of Western Australia from September-October. Although the species was recorded within the NIA, there is suitable foraging and breeding habitat outside of the Proposal Area and throughout the wider region. Therefore, the Proposal

is not expected to result in significant impacts to the Rainbow Bee-eater and this species will not be discussed further in this assessment.

The most recent targeted black cockatoo survey (ELA 2021a) did not record Carnaby's Cockatoo within the Proposal Area, however this species has previously been recorded within the NIA (ATA 2007), and the Forest Red-tailed Black-cockatoo is considered likely to occur. These species and their habitat are discussed in Sections 2.6.2.1 and 2.6.2.2.

Fauna surveys have not recorded Quenda within the Proposal Area. However, the species has been recorded at a site approximately 0.8 km south-west of the Proposal (Natural Area 2021) and secondary evidence of the species (i.e. diggings) has been recorded at a nearby site located approximately 1.8 km from the Proposal (Natural Area 2019). As such, it is assumed that the Quenda has the potential to occur within the Proposal Area and mitigation measures will be implemented to manage potential impacts to this species.

The Black-striped Snake and Western Brush Wallaby have not been recorded within the Proposal Area or within the adjacent areas of the NIA (ATA 2007). Within the Perth region, the Black-striped Snake is considered to be most abundant in heathland habitats along the coast, and large undisturbed Banksia woodland habitat further inland (He 2021). Given the presence of potentially suitable Banksia woodland habitat within the Proposal Area, it assumed that the species has the potential to occur. Similarly, the Proposal Area is within the known distribution of the Western Brush Wallaby, and the species has been recorded approximately 5 km west of the Proposal Area (ATA 2007). Therefore, it is considered to have potential to occur. As such, mitigation measures will be implemented to manage potential impacts to the Black-striped Snake and Western Brush Wallaby.

A likelihood of occurrence assessment of these species with the potential to occur within the Proposal Area determined that the habitat was unsuitable for the Chuditch and is therefore unlikely to occur. On this basis, the Proposal is not expected to result in significant impacts to this species and it will therefore not be discussed further in this assessment.

A summary of the conservation significant fauna associated with the Proposal Area is provided in Table 2-5.

Table 2-5: Summary of conservation significant fauna likelihood of occurrence within the Proposal Area

Species	Likelihood of Occurrence
Rainbow Bee-eater (*Merops ornatus*) Marine (EPBC Act)	**Recorded within the broader NIA survey area** The species is Migratory and visits the locality of the Proposal Area from September-October. The species is not dependent on the habitat present within the Proposal Area.
Peregrine Falcon (*Falco peregrinus*) Other Specially Protected Fauna (BC Act)	**Recorded within the broader NIA survey area** The species is an infrequent visitor to the Proposal Area and is no considered to be dependent on the habitat present within the Proposal Area.
Carnaby's Cockatoo (*Zanda latirostris*) Endangered (EPBC Act and BC Act)	**Recorded within the broader NIA survey area** The species has previously been recorded within the NIA (ATA 2007) and is therefore considered to occur within the Proposal Area. Foraging and breeding habitat for this species is further discussed in Sections 2.6.2.1 and 2.6.2.2.

Species	Likelihood of Occurrence
Forest Red-tailed Black-cockatoo (*Calyptorhynchus banksii naso*) Vulnerable (EPBC Act and BC Act)	**Likely to occur** Foraging and breeding habitat for this species is further discussed in Sections 2.6.2.1 and 2.6.2.2.
Black-striped Snake (*Neelaps calonotus*) Priority 3 (BC Act)	**Potential to occur** The Proposal Area contains suitable habitat for the species and is within the species' known distribution.
Western Brush Wallaby (*Notamacropus Irma*) Priority 3 (BC Act)	**Potential to occur** The Proposal Area is within the species' known distribution and the species has been recorded within 5 km of the Proposal Area.
Quenda or Southern Brown Bandicoot (*Isoodon fusciventer*) Priority 4 (BC Act)	**Potential to occur** The species has been recorded within 0.8 km of the Proposal Area.
Chuditch or Western Quoll (*Dasyurus geoffroii*) Vulnerable (EPBC Act and BC Act)	**Unlikely to occur** Habitat within the Proposal Area is considered unsuitable for the species.

2.6.2.1. Black Cockatoo foraging habitat

The modelled distributions of the Carnaby's Cockatoo and the Forest Red-tailed Black-cockatoo intersect the Proposal Area (ELA 2021a). The Forest Red-tailed Black-cockatoo's distribution has only recently extended into the Swan Coastal Plain and Perth metropolitan area to feed on the introduced Cape Lilac (*Melia azedarach*). There is a previous record of the species approximately 2.2 km south-southeast of the Proposal Area, and the Carnaby's Cockatoo has been recorded foraging within the Proposal Area.

Forest Red-tailed Black-cockatoos have a relatively restricted foraging diet, targeting *Eucalyptus/Corymbia* seeds, *Allocasuarina* cones, Snottygobble fruits (*Persoonia longifolia*) and Cape Lilac (ELA 2021a). Carnaby's Cockatoos have more of a wide-range foraging diet, consuming a variety of species but particularly proteaceous plants. Common Black Cockatoo breeding, foraging and roosting habitat is summarised in Table 2-6.

Table 2-6: Black Cockatoo breeding, foraging and roosting habitat (adapted from DAWE 2022a)

Habitat	Carnaby's Cockatoo	Forest Red-tailed Black-cockatoo
Breeding	Generally, in woodland or forest, but also breed in partially cleated woodland or forest, including isolated trees. Nest in hollows in live or dead trees (many Eucalyptus species may provide suitable hollows), particularly Salmon Gum (*Eucalyptus salmonophloia*), Wandoo (*E. wandoo*), Tuart, Jarrah, Flooded Gum (*E. rudis*), York Gum (*E. loxophleba* subsp. *loxophleba*), Powderbark (*E. accedens*), Karri (*E. diversicolor*) and Marri (*Corymbia calophylla*).	Generally, in woodland or forest but may also breed in partially cleared woodlands or forest, including isolated trees. Nest in hollows in live or dead trees (many eucalyptus species may provide suitable hollows), particularly marri, Karri, Wandoo, Bullich, Blackbutt (*Eucalyptus patens*), Tuart and Jarrah.

Habitat	Carnaby's Cockatoo	Forest Red-tailed Black-cockatoo
Night Roosting	Generally, in or near riparian environments or natural and artificial permanent water sources. Any tall trees may provide roosting habitat, but particularly Flat-topped Yate (*E. occidentalis*), Salmon Gum, Wandoo, Marri, Karri, Blackbutt, Tuart, introduced eucalypts and introduced pines.	Any tall trees may provide roosting habitat, but particularly tall Jarrah, Marri, Blackbutt, Tuart and introduced eucalyptus species or large trees on the edges of forests.
Foraging	Native shrubland, kwongan heathland and woodland on seeds, flowers, and nectar of native proteaceous species (*Banksia* spp., *Hakea* spp. and *Grevillea* spp.) as well as *Callistemon* spp. and Marri. Also seeds of introduced species including *Pinus* spp., *Erodium* spp., wild radish, canola, almonds, macadamia and pecan nuts, insects and insect larvae; occasionally apples and persimmons; and liquidambar.	Primarily seeds of Jarrah and Marri in woodlands and forest, and edges of Karri forests, including Wandoo and Blackbutt. Forages on *Allocasuarina* cones, fruit of Snottygobble (*Persoonia longifolia*) and Mountain marri (*Corymbia haemetoxylon*). Other less important foods include Blackbutt, Bullich, *Allocasuarina fraseriana, Hakea* spp., Tuart, Redheart Moit (*Eucalyptus decipiens*) and Bushy Yate (*Eucalyptus lehmanni*). Also, some introduced eucalypts such as the River Red Gum (*E. camaldulensis*) and Rose Gum (*E. grandis*). On the Swan Coastal Plain, oftenfeeds on introduced Cape Lilac *(Melia* azedarach*), E. caesia*, *E. erthrocorys*, Lemon-scented Gum and Kaffir Plum (*Harpephyllum caffrum*).

Two Targeted Black cockatoo surveys have been undertaken within the Proposal Area (ELA 2013a, ELA 2021a). Evidence of Carnaby's Cockatoo foraging has been recorded within the Proposal Area (ELA 2013a), while the Forest Red-tailed Black-cockatoo is considered likely to utilise the Proposal Area for foraging and/or roosting on an occasional basis. Foraging habitat for black cockatoos is generally defined as the availability of plant food sources within an area (Finn 2012). Food availability for black cockatoos is a function of the diversity, abundance, distribution, energetic and nutritional qualities, and seasonality (phenology) of the food sources within a particular area. Black cockatoo foraging habitat has been determined using vegetation associations defined in the vegetation assessment and from ground-truthing in the field. The quality of foraging habitat (as defined in Table 2-7 below) for black cockatoos within the Proposal Area has been assessed based on the availability and density of plant food sources observed in the field.

Table 2-7: Definition of black cockatoo foraging habitat quality

Foraging quality	Justification
Excellent	High density of species suitable for foraging by black cockatoos (i.e. foliage cover of suitable species >60%) and presence of food sources at several strata (i.e. canopy, midstorey and understorey).
Good	High density of species suitable for foraging by black cockatoos (i.e. foliage cover of suitable species >60%) but food sources only present at one or two strata (e.g. canopy and midstorey).
Moderate	Moderate foraging value density of species suitable for foraging by black cockatoos (i.e. foliage cover of suitable species 20-40%) and food sources only present at one or two strata (e.g. canopy and midstorey).
Poor	Low density of species suitable for foraging by black cockatoos (i.e. foliage cover of suitable species 10-20%) and presence of food sources at only one stratum (e.g. canopy).

Foraging quality	Justification
Very Poor	Very low density of species suitable for foraging by black cockatoos (i.e. foliage cover of suitable species <10%) and presence of food sources at only one stratum (e.g. canopy).
Nil	Cleared areas or no suitable vegetation present.

Source: adapted from DotEE 2017 and DSEWPaC 2012a

All vegetation within the Proposal Area (11.83 ha) is considered to provide 'Good' quality foraging habitat for Carnaby's Cockatoo, as it contained native shrubland dominated by proteaceous plant species, particularly *Banksia* spp., with over 60% foliage cover (DSEWPaC 2012a).

The vegetation within the Proposal Area (11.83 ha) is considered to provide 'Moderate' quality foraging habitat for Forest Red-tailed Black-cockatoo, as it contained foliage cover of suitable species (Jarrah/Sheoak (*Allocasuarina fraseriana*)) of between 20-40% at one stratum. The extent of foraging habitat for both species is shown in Figure 2-6.

2.6.2.2. Black Cockatoo breeding and roosting habitat

Both black cockatoo species nest in tree hollows formed in large eucalypts. The black cockatoo breeding habitat assessment (ELA 2021a) identified 54 breeding trees within the Proposal Area, shown in Figure 2-6. These trees were all Jarrah except for one dead (unidentifiable) tree (presumably Jarrah); Jarrah is a suitable breeding tree species for both species of black cockatoo. Of the 54 breeding trees recorded, only five have been identified as containing hollows greater than 100 mm diameter (trunk and/or spout hollows) (suitable nesting trees). The other 49 trees in the Proposal Area are potential nesting trees.

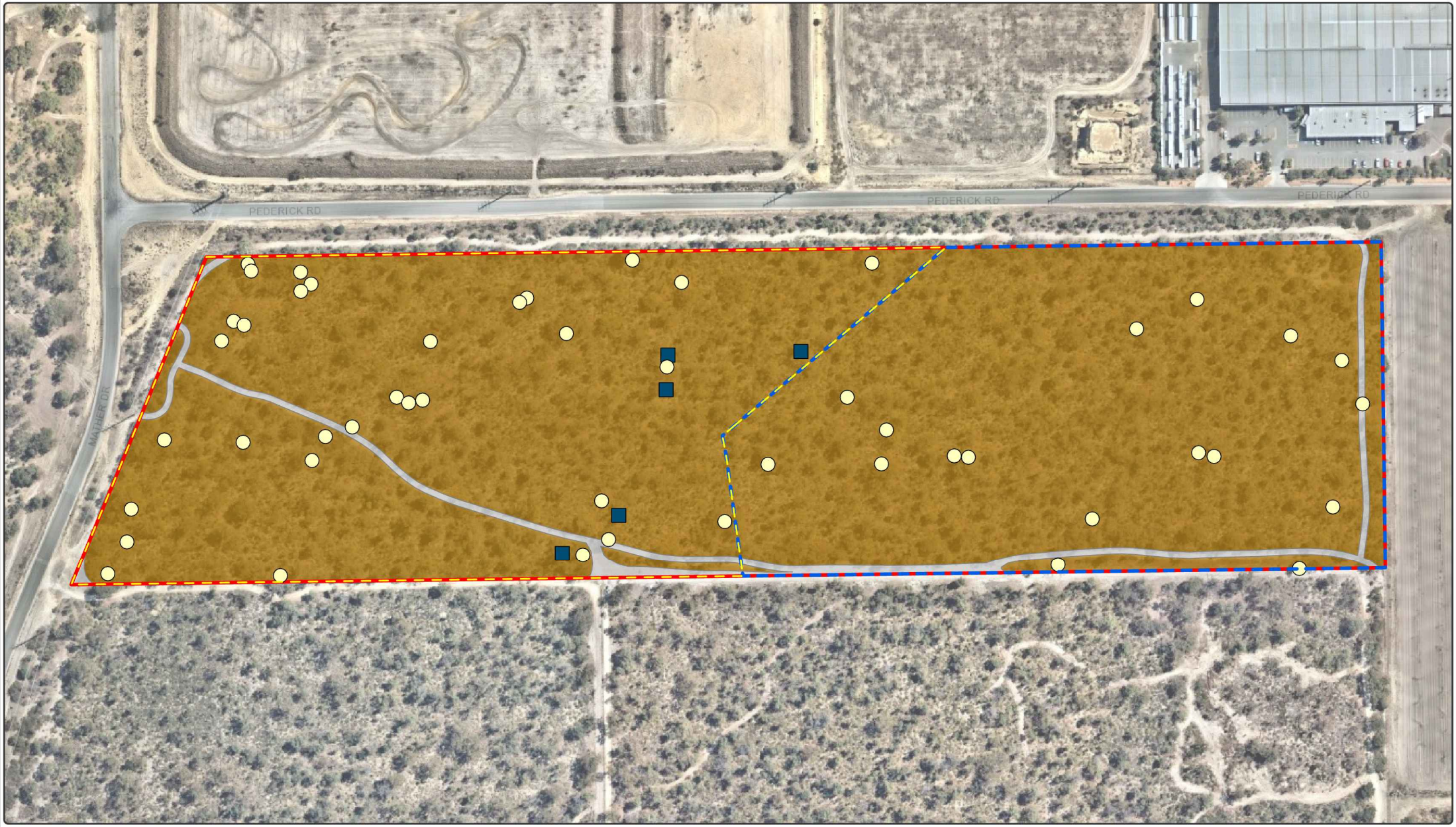

Figure 2-6: Black cockatoo potential suitable foraging, breeding and roosting habitat within the Proposal Area

Proposal Area
Avoidance Area
Clearing Area

Foraging Value

Potential Foraging Habitat
No Foraging Value
Trees DBH >500mm with visible hollow >10mm diameter
Trees DBH >500mm

0 25 50 100
Metres

Datum/Projection:
GDA 1994 MGA Zone 50
22PER17694-DD Date: 2/09/2022

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3. Application of Mitigation Hierarchy

In accordance with *A guide to the assessment of applications to clear native vegetation* (DER 2014), the impact mitigation sequence has been considered in order to ensure the environmental impact from the proposed clearing for the Proposal was minimised.

3.1. Avoidance

3.1.1. Avoidance of SCP 20a TEC

Following referral of the Proposal to DAWE (now DCCEEW) under the EPBC Act, additional studies have been undertaken to delineate the components of the Banksia Woodland TEC within the Proposal Area. The survey determined that 2.77 ha of the Proposal Area is comprised of FCT SCP 20a, listed as an Endangered TEC under the BC Act (ELA 2022). As a result of these findings, the Clearing Area has been refined to avoid FCT 20a (Figure 3-1). As such, the Clearing Area has been reduced to 6.42 ha within the Proposal Area. The Clearing Area comprises 6.21 ha of native vegetation and 0.21 ha of completely degraded area. The closest the Clearing Area comes to the TEC is 5m, with a greater buffer distance at most points to the mapped boundary of the TEC.

The Avoidance Area is a 5.83 ha area which includes 5.62 ha of native vegetation (including 2.77 ha of FCT SCP 20a) and 0.21 ha of completely degraded area.

3.1.2. Avoidance of Black Cockatoo foraging habitat

As a result of the revision of the Clearing Area to avoid SCP 20a, clearing of black cockatoo foraging habitat has been reduced to the removal of 6.21 ha.

It is noted that the proposed Avoidance Area contains 5.62 ha of black cockatoo foraging habitat that will be retained within the Proposal Area.

3.1.3. Avoidance of Black Cockatoo breeding trees

The Proposal Area contains a total of 54 breeding trees, comprising five suitable nesting trees (trees with suitable nest hollows) and 49 potential nesting trees. The Clearing Area contains 37 breeding trees, including 32 potential nesting trees and five suitable nesting trees.

Seventeen potential nesting trees will be retained within the proposed Avoidance Area.

Figure 3-1: Clearing and Avoidance Areas associated with FCT 20a within the Proposal Area

Proposal Area
Avoidance Area
Clearing Area

Vegetation Communities

FCT 20a

0 25 50 100
Metres

Datum/Projection:
GDA 1994 MGA Zone 50
22PER17694-DD Date: 2/09/2022

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3.2. Mitigation

The Proponent commits to the following measures to mitigate disturbance to conservation significant fauna from the proposed clearing:

- A fauna spotter will on-site during clearing works.
- Clearing will be undertaken in a southerly direction beginning from the northern boundary to allow fauna to relocate into the vegetation adjacent to the Proposal Area.
- Vegetation clearing will be undertaken outside of the Black Cockatoo breeding seasons as far as practical. Where vegetation clearing during the breeding seasons is unavoidable, breeding trees will be assessed for the presence of nesting Black Cockatoos within a week prior to clearing. If breeding cockatoos are present, clearing will not take place within a 10 m radius buffer zone of the suspected or known nesting tree, until the tree hollow(s) are no longer being used by Black Cockatoos.
- A Construction Environmental Management Plan (CEMP) will be prepared to manage the potential environmental impacts associated with clearing and construction. This will include the management of potential threatening processes to the vegetation retained on site and adjacent to the Proposed Action Area, such as:
    - Dust
    - Erosion
    - Waste and hazardous materials
    - Noise and vibrations
    - Weeds
    - Phytophthora dieback.

3.3. Offset

Whilst avoidance and mitigation measures have been explored and implemented as part of this application, the Proponent is aware that environmental offsets are likely to be required to counterbalance significant residual impacts of the Proposal. The proposed offsets are addressed in Section 6.

4. Assessment against the EP Act clearing principles

An assessment of the proposed clearing against the ten clearing principles is provided in the following section and summarised in Table 4-1. The ten clearing principles are defined under Schedule 5 of the EP Act and are considered prior to the decision being made to issue a clearing permit.

This assessment demonstrates that the proposed removal of 6.21 ha of native vegetation may be at variance with clearing principles b and d. Environmental offsets are therefore proposed to address the residual environmental impacts.

Table 4-1: Summary of assessment against the ten clearing principles

Clearing Principle	Is not at variance	May be at variance
a) Native vegetation should not be cleared if it comprises a high level of biological diversity	☒	☐
b) Native vegetation should not be cleared if it comprises the whole, or part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia	☐	☒
c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of Rare flora	☒	☐
d) Native vegetation should not be cleared if it comprises the whole, or part of, or is necessary for the maintenance of a threatened ecological community (TEC)	☐	☒
e) Native vegetation should not be cleared if it is significant as remnant vegetation in an area that has been extensively cleared	☒	☐
f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland	☒	☐
g) Native vegetation should not be cleared if the clearing of vegetation is likely to cause appreciable land degradation	☒	☐
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	☒	☐
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	☒	☐
j) Native vegetation should not be cleared if the clearing of vegetation is likely to cause, or exacerbate, the incidence of flooding	☒	☐

4.1. Comprises high level of biological diversity

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

A single vegetation community (EmBAf) has been identified across the Proposal Area, covering a total of 11.83 ha (96.6%), with disturbed areas (i.e. tracks) accounting for the remaining 0.42 (3.4%) (ELA 2022). The majority of this vegetation is considered to be in Excellent condition (92.9%), with a thin band on the margins of the remnant bushland in Good condition (3.75%; ELA 2022).

Vegetation community EmBAf is identified as being representative of the Banksia Woodlands of the Swan Coastal Plain TEC, which is listed as Endangered under the EPBC Act and as Priority 3 under the BC Act. Two corresponding FCT's have also been identified within the Proposal Area: 2.77 ha of SCP 20a, listed as Endangered under the BC Act; and 9.06 ha of FCT 28, not listed. The Clearing Area avoids all occurrence of FCT 20a within the Proposal Area, as shown on Figure 3-1.

Within this single vegetation community, a total of 100 vascular plant taxa (of which 12 were introduced species) were recorded from 76 genera and 34 families. No flora species listed as Threatened under the EPBC Act or BC have been recorded within the Proposal Area (ELA 2021a; ELA 2022). Two DBCA listed Priority flora species have been identified within the Proposal Clearing Area: *Acacia benthamii* (P2) and *Pimelea calcicole* (P3) (ELA 2021a). Five *Acacia benthamii* individuals were recorded within the Clearing Area, along with a single *Pimelea calcicola* individual. Due to the fragmented nature of vegetation within the Swan Coastal Plain, it is possible that these individuals represent significant populations at the local scale. However, at the sub-regional scale the populations are unlikely to be significant for the survival of the species, due to the widespread occurrence of these species within the Swan Coastal Plain sub-region (Western Australian Herbarium 2022).

To ensure the Clearing is not at variance with *Principle (a)* the Clearing Area has been revised and reduced to a 6.42 ha area (of which 6.21 ha is native vegetation) which will avoid clearing of any instances of FCT 20a. The flora and fauna diversity within the Clearing Area is not considered to be atypical of the sub-region and the local populations of *Acacia benthamii* and *Pimelea calcicole* are unlikely to represent significant populations. In addition to this, approximately 2,076.6 ha of vegetation with similar characteristics to EmBAf is retained in existing Bush Forever sites located within 2 km of the Proposal Area. As such, biological diversity within the Proposal Area is not expected to be significantly affected given the relatively small area of vegetation proposed for clearing. The proposed clearing activities are therefore not at variance to this Principle.

4.2. Potential impact to any significant habitat for fauna indigenous to Western Australia

Principle (b): Native vegetation should not be cleared if it comprises the whole, or part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.

Overall, the Proposal Area is considered to contain a 'moderately diverse' fauna assemblage (ATA 2007). Three conservation significant fauna species have previously been recorded in or close to the Proposal Area: Carnaby's Cockatoo, Rainbow Bee-eater, and the Peregrine Falcon. The Peregrine Falcon and Rainbow Bee-eater are considered infrequent migratory visitors that are not dependent on the habitat present within the Proposal Area. Of the 6.21 ha of vegetation within the Clearing Area, 100% was considered 'Good' quality foraging habitat for Carnaby's Cockatoos and 'Moderate' quality foraging habitat for Forest Red-tailed Black-cockatoos (EPA 2021a). The Proposal Area also contains 54 breeding

trees (five suitable nesting trees containing hollows) suitable for Black Cockatoo breeding/roosting. Of these 54 breeding trees, 17 potential nesting trees are being retained within the Avoidance Area. The Proponent has proposed several additional avoidance and mitigation measures to reduce the impact to Carnaby's Cockatoos and Forest Red-tailed Black-cockatoos (see Section 3.1).

The Proposal will remove approximately 6.21 ha of habitat for indigenous fauna species within the Clearing Area, including potential habitat for seven conservation listed fauna species with potential to occur in the Proposal Area. This habitat is not considered significant to the survival of five of these species (Black-striped snake, Peregrine Falcon, Rainbow Bee-eater, Western Brush Wallaby and Quenda).

The residual impact to Carnaby's Cockatoo and Forest Red-tailed Black-cockatoo, having applied the avoidance and mitigation measures, is the loss of 6.21 ha of known foraging habitat of moderate to high value, and the loss of 37 breeding trees comprising five suitable nesting trees and 32 potential nesting trees. As a significant residual impact to these species, the Proposal could be considered to be at variance to this Principle. Environmental offsets are therefore proposed.

4.3. Potential impact to any rare flora

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

No flora species listed as Threatened under the EPBC Act or BC Act have been recorded within the Proposal Area. As there are no known Rare flora species within the Proposal Area, the Proposal is not considered at variance with this Principle.

4.4. Potential of any threatened ecological communities

Principle (d): Native vegetation should not be cleared if it comprises the whole, or part of, or is necessary for the maintenance of a threatened ecological community (TEC).

Both the Endangered State-listed SCP20a TEC (*Banksia attenuata* woodland over species rich dense shrublands) and the Endangered Federally-listed Banksia Woodland of the Swan Coastal Plain TEC have been identified within the Proposal Area. The SCP20a TEC was identified over 2.77 ha within the Proposed Action Area, with the Banksia Woodland TEC covering the all 11.83 ha of the vegetated areas of the Proposed Action Area.

The Proposal Area has been revised to avoid all occurrences of the TEC SCP 20a (see Section 3.1.1). However, the Proposal will result in the clearing of 6.21 ha of Banksia Woodland of the Swan Coastal Plain TEC (Endangered – EPBC Act). The clearing of this Federally-listed TEC is a significant residual impact, and the Proposal could be considered to be at variance with this Principle. To counterbalance these impacts, environmental offsets are therefore proposed. Further assessment of the Banksia Woodland TEC is provided in Section 5.

4.5. Significance as a remnant of native vegetation in the area that has been extensively cleared

Principle (e): Native vegetation should not be cleared if it is significant as remnant vegetation in an area that has been extensively cleared.

The Proposal Area intersects two vegetation complexes mapped for the Swan Coastal Plain by Heddle et al. (1980), 'Karrakatta Complex – Central and South' and 'Cottesloe Complex – Central and South' (Table 2-2).

The Karrakatta Complex – Central and South vegetation complex has less than 25% of its total pre-European extent remaining within the Swan Coastal Plain subregion (Government of Western Australia 2019), approximately 12,467.20 ha. The Proposal will result in the clearing of 0.32 ha of the Karrakatta Complex – Central and South, reducing the extent retained within the subregion to 23.49% of the pre-European extent.

The Cottesloe Complex – Central and South vegetation complex has approximately 32% of its total pre-European extent remaining, with approximately 14,567.87 ha within the Swan Coastal Plain subregion. The Proposal will result in the clearing of 6.10 ha of Cottesloe Complex – Central and South, reducing the extent retained within the subregion to 32% of the pre-European extent.

The Western Australian Government is committed to the National Objectives and Targets for Biodiversity Conservation (Commonwealth of Australia 2001) to prevent the clearing of ecological communities with a current extent of 30% or less of that present prior to European settlement. However, the government also recognises that due to past land use decisions meeting this target in 'constrained areas', such as the Swan Coastal Plain, may not be achievable. As such in these areas the minimum retention level has been reduced to 10% of the extent prior to European settlement. On this basis, this Proposal is not considered to be at variance with this Principle as neither the Karrakatta Complex – Central and South or the Cottesloe Complex – Central and South will be reduced below 10% of the pre-European extent, 23.49% and 32% respectively.

4.6. Impact on any watercourses and/or wetlands

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.

There are no watercourses, wetlands or riparian vegetation located within the Proposal Area or immediately adjacent, with Lake Pinjar being the nearest waterbody located approximately 1.4 km north-east of the Proposal Area. Therefore, the proposed clearing is not considered to be at variance to this Principle.

4.7. Potential to cause appreciable land degradation

Principle (g): Native vegetation should not be cleared if the clearing of vegetation is likely to cause appreciable land degradation.

The clearing of native vegetation for the Proposal is not expected to cause appreciable land degradation. The Proposed Action Areas is not highly sloping so is unlikely to be significantly impacted by water or

wind erosion. Furthermore, the Proponent has proposed to manage any wind erosion impacts through the implementation of the CEMP.

The soil within and surrounding the Proposal Area is sandy, which is highly porous and is generally nutrient poor. As such any stormwater is likely to drain readily, limiting stormwater ponding on the surface, and is unlikely to result in a significant export of nutrients. Due to the depth of the groundwater table, porous nature of the soil, the limited amount of vegetation proposed to be cleared and the low likelihood of sodic minerals being present soil salinity is unlikely to be significantly increased as a result of the Proposal (DPIRD 2021). The site also does not contain any known soils which are likely to result in an increased in acidity, i.e., acid sulphate soils (DWER 2022).

The Proposal is not expected to result in severe water logging, increases in soil salinity or acidity, nutrient exporting or water/wind erosion within the Proposal Area or the immediate surrounding areas. As such, the Proposal is not considered to be at variance to this Principle.

4.8. Potential to impact on the environmental values of adjacent or nearby conservation areas

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.

There are a number of conservation areas in proximity to the site, protecting mor than 2000 ha of native vegetation. Due to the proximity (2 km), the vegetation in these areas is likely to have similar structural characteristics to the EmBAf vegetation community present in the Proposal Area. The closest of these is Mather Reserve, located immediately to the south of the Proposal Area. The Proposal Area does not form a linkage between surrounding conservation areas. The area to be avoided is the area immediately adjacent to Mather Reserve; thus the retained portion will maintain physical and genetic linkages to the adjacent conservation area.

Given the small distance between the Proposal Area and the nearest conservation area, as well as the retention of 5.62 ha of native vegetation to maintain ecological linkages, clearing is not anticipated to impact the remnant environmental values in the Proposal Area or the nearby conservation areas. Thus, the Proposal is not considered to be at variance with this Principle.

4.9. Potential deterioration in the quality of surface or underground water

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.

There are no surface water features present within the Proposal Area. The nearest water body is Lake Pinjar, located approximately 1.4 km northeast of the Proposal Area. Due to the distance between the potential source (Proposal Area) and receptor (Lake Pinjar), it is unlikely that this surface water feature will be negatively impacted by the minimal amount of dust, sediment or nutrients generated within the Proposal Area. The depth to groundwater ranges between 33-36 m AHD, with the distance to the watertable increasing in an easterly direction across the Proposal Area. The absence of any acid forming soils (i.e., acid sulphate soils), the depth of the ground water table and the low likelihood of sodic minerals being present in the soil (DPIRD 2021), indicates that clearing is unlikely to negatively impact on the quality of the local groundwater.

The proposed clearing of 6.21 ha of native vegetation within the Proposal Area is not expected to cause the deterioration of surface or underground water quality; thus, the Proposal is not considered to be at variance to this Principle.

4.10. Potential of clearing to cause, or exacerbate, the incidence of flooding

Principle (j): Native vegetation should not be cleared if the clearing of vegetation is likely to cause, or exacerbate, the incidence of flooding.

There are no surface water features or wetlands present within or immediately adjacent to the Proposal Area. The soil within and surrounding the Proposal Area is sandy and thus porous and as such stormwater drains away readily and surface ponding is unlikely to occur (ATA 2007). The clearing associated with the Proposal is not anticipated to cause or exacerbate flooding in the vegetation adjacent to the Clearing Area. As such, the clearing of 6.21 ha of native vegetation for the Proposal is not considered to be at variance to this Principle.

5. Matters of National Environmental Significance

The EPBC Act provides a legal framework for the protection of MNES. The EPBC Act requires that all actions that will or may have a significant impact on an MNES must be referred to the Minister for the Environment via DCCEEW. Protected matters under the EPBC Act include:

- World heritage properties
- National heritage places
- Wetlands of international importance (Ramsar wetlands)
- Listed threatened species and ecological communities
- Migratory species protected under international agreements
- Commonwealth marine areas
- A water resource, in relation to coal seam gas activities and large coal mining activities
- The Great Barrier Reef Marine Park
- Nuclear Actions including uranium mining.

In addition, protected matters include the environment where actions proposed will affect Commonwealth land or proposed actions are being undertaken by a Commonwealth agency.

For consistency with the EPBC Act, the Proposal is referred to as the Proposed Action in this section of the NVCP application, and the Proposal Area the Proposed Action Area. Further information regarding the Proposed Action is presented in Section 1. A summary of existing environmental values relating to MNES is provided in Section 2.

5.1. Potential impacts to listed threatened species and communities

A summary of potential impacts on MNES species from the Proposed Action is presented in Table 5-1.

Table 5-1: Environmental impacts on MNES species

Species and communities	Impact
Banksia Woodlands of the Swan Coastal Plain Threatened Ecological Community (TEC) Recorded in the Proposed Action Area	Removal of 6.21 ha of the TEC
Carnaby's Cockatoo, *Zanda latirostris* Recorded in the Proposed Action Area	Removal of 37 breeding trees, including five which contain suitable hollows for nesting Carnaby's Cockatoo (suitable nesting trees) and 32 potential nesting trees. Removal of 6.21 ha of 'Good' quality foraging habitat
Forest Red-tailed Black-cockatoo, *Calyptorhynchus banksii naso* Likely to occur in the Proposed Action Area	Removal of 37 breeding trees, including five which contain suitable hollows for nesting Forest Red-tailed Black-cockatoo (suitable nesting trees) and 32 potential nesting trees. Removal of 6.21 ha of 'Moderate' quality foraging habitat

5.2. Assessment of significance of potential impacts

The following section provides an assessment of the significance of potential impacts against significant impact criteria.

5.2.1. Banksia Woodlands TEC

A total of 11.83 ha of Banksia Woodlands of the Swan Coastal Plain TEC (Banksia Woodlands TEC) is located within the Proposed Action Area (Figure 5-1). The majority (11.38 ha; 92.9%) of the Proposed Action Area was recorded as being in excellent condition, with remainder of vegetation recorded as Good condition (0.45 ha; 3.75%; ELA 2022). The remainder of the Proposed Action Area (0.42 ha; 3.35%) is completely degraded, constituting vehicle tracks, road verges and firebreaks.

The Proposed Action will result in the clearing of up to 6.21 ha of Banksia Woodlands TEC within the 6.41 ha Clearing Area. Within the Proposed Action Area, 5.62 ha of the TEC will remain (Figure 5-1).

An assessment of the significance of impacts of the Proposed Action to the Banksia Woodlands TEC is presented in Table 5-2. This assessment, against criteria presented in the *Significant Impact Guidelines* (DoE 2013), was based on the key characteristics described in the conservation advice relating to the Banksia Woodlands TEC (DoEE 2016).

All patches of the Banksia Woodlands TEC within the Proposed Action Area meet the condition thresholds (at least 'Good' condition) and are considered critical to the survival of this community (DoEE 2016). The clearing of up to 6.21 ha of this Banksia Woodlands TEC is considered a significant residual impact due to the following:

- the action will reduce the extent of an ecological community
- the action will fragment or increase fragmentation of an ecological community
- the action will adversely affect habitat critical to the survival of an ecological community.

Environmental offsets are therefore proposed to address this significant residual impact. The proposed offsets are outlined in Section 6.

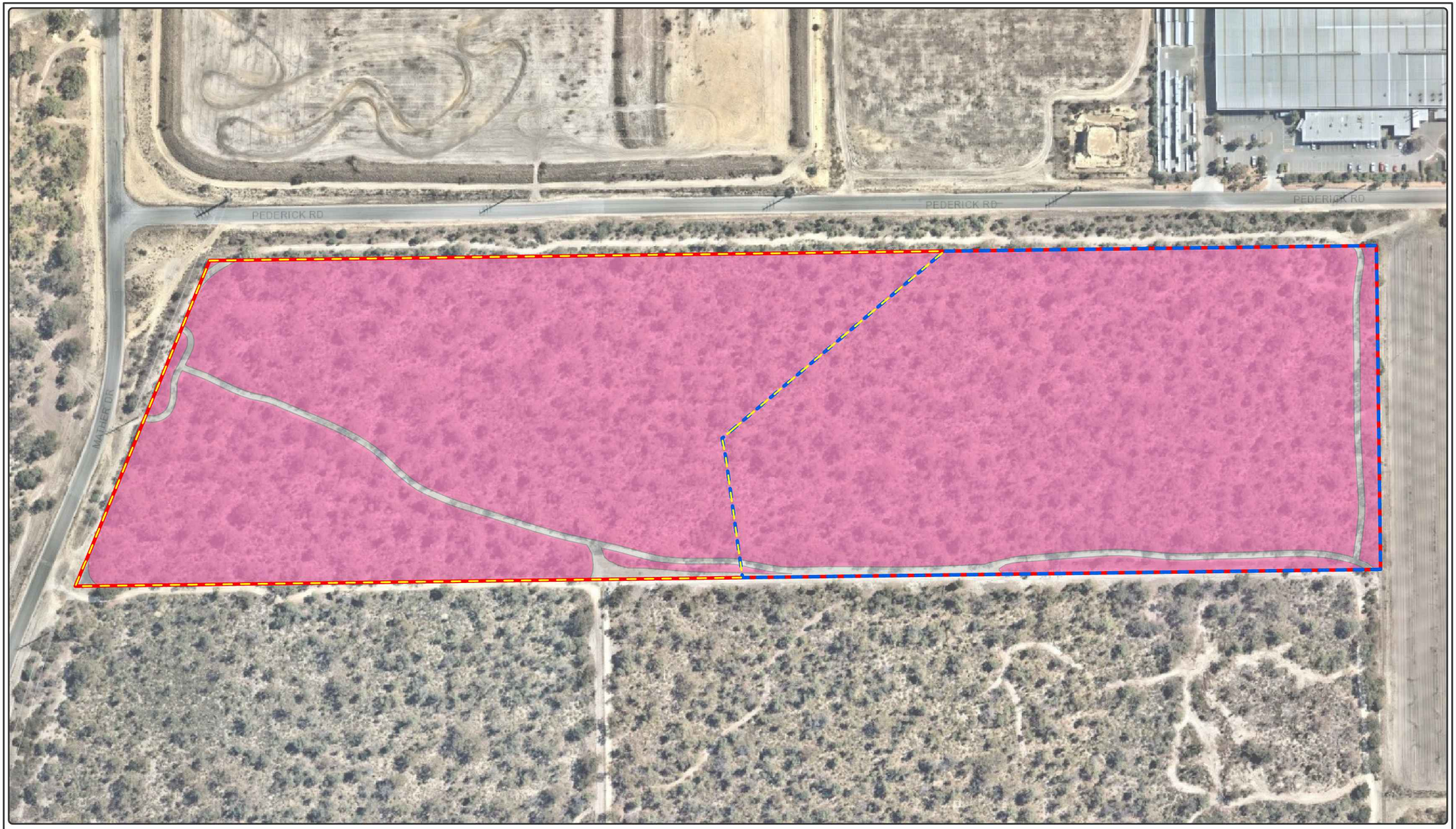

Figure 5-1: Banksia Woodlands TEC within the Proposed Action Area

Proposed Action Area
Avoidance Area
Clearing Area

Vegetation community

Banksia Woodlands TEC
Completely Degraded

0 25 50 100
Metres

Datum/Projection:
GDA 1994 MGA Zone 50
22PER17694-DD Date: 2/09/2022

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Table 5-2: Assessment of significant impact criteria for Banksia Woodlands TEC

Significant impact criteria	Assessment of impacts to Banksia Woodlands TEC
Potential to reduce the extent of an ecological community	The Banksia Woodlands TEC present in the Proposed Action Area meets the condition thresholds to be considered critical to the survival of the community (DoEE 2016). The Proposed Action will involve the clearing of up to 6.21 ha of this Banksia Woodlands TEC and will therefore reduce the extent of an ecological community. The clearing of up to 6.21 ha of this TEC is therefore considered a significant residual impact and will be offset.
Potential to fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines	The Proposed Action lies within the Neerabup Industrial Area, where fragmentation of the TEC has already occurred. The Proposed Action, however, will increase fragmentation of the Banksia Woodlands TEC as clearing will result in removal of previously uncleared vegetation. The Proposed Action will involve the clearing of up to 6.21 ha of Banksia Woodlands TEC of mostly continuous vegetation, with minor disturbance where a vehicle track has been cleared. The Proposed Action will result in increased fragmentation and therefore represents a significant residual impact and environmental offsets are proposed.
Potential to adversely affect habitat critical to the survival of an ecological community	The Proposed Action will involve the clearing of up to 6.21 ha of the Banksia Woodlands TEC classified as Excellent to Good condition and considered critical to the survival of the community (DoEE 2016). This is considered a significant residual impact and environmental offsets are therefore proposed.
Potential to modify or destroy abiotic (non-living) factors (such as water, nutrients or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns	The Proposal has the potential to modify the abiotic factors present within the Proposal Area this includes the removal of soil, and associated nutrients, through wind or water erosion. However, the removal of soil and nutrients through water erosion is likely to be minimal as the site lacks steep slopes and the soil is very porous which is antagonistic to surface water pooling. The retention of native vegetation on three sides of the Proposal area will also help to minimise the effects wind erosion may have on the site. Furthermore, the Proponent has proposed to manage any remaining wind erosion impacts through the implementation of the CEMP. The Proposal is unlikely to impact on either the groundwater or surface water factors within or surrounding the Proposed Action Area, due to the current depth of the former (between 33-36 m AHD) and the distance to any of the latter (closest being approximately 1.5 km away).
Potential to cause a substantial changes in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting	While the Proposed Action will clear up to 6.21 ha of Banksia Woodlands TEC classified as Excellent to Good condition, the ecological community will continue to be present in the Proposed Action Area and within the wider local region. It is unlikely that the small area proposed for clearing will cause a substantial change in the species composition of an occurrence of the ecological community.
Potential to cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including **– assisting invasive species, that are harmful to the listed ecological community, to become established, or**	A total of 12 introduced flora taxa were recorded in the Proposed Action Area (ELA 2021a), however none of these species listed as WoNS or Declared Pests under the BAM Act. A CEMP will be prepared prior to the commencement of vegetation clearing/construction to reduce potential direct and indirect impacts on the environment. This CEMP will include the management of potential threatening processes such as dust, erosion, waste and hazardous materials, noise and vibration, weeds and Phytophthora dieback. Therefore, the Proposed Action

Significant impact criteria	Assessment of impacts to Banksia Woodlands TEC
– causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community	will not cause a substantial reduction on the quality or integrity of an occurrence of an ecological community.
Potential to interfere with the recovery of an ecological community	Although a portion of the Banksia Woodlands TEC will be retained within the Proposed Action Area, the loss of 6.21 ha of Banksia Woodlands TEC may potentially interfere within the recovery of an ecological community. It is therefore considered a significant residual impact and environmental offsets are proposed.

5.2.2. Carnaby's Cockatoo

An assessment of the Proposed Action on Carnaby's Cockatoo is detailed in Table 5-3, with reference to the *Significant Impact Guidelines* (DoE 2013).

Table 5-3: Assessment of significant impact criteria for Carnaby's Cockatoo

Significant impact criteria	Assessment of impacts to Carnaby's Cockatoo
Potential to lead to a long-term decrease in the size of a population	The Clearing Area contains 6.21 ha of 'Good' quality foraging habitat and 37 breeding trees (five suitable nesting trees and 32 potential nesting trees). Recent targeted surveys for Carnaby's Cockatoo have not identified any individuals or foraging evidence within the Proposed Action Area (ELA 2013a & 2021a), however the species has historically been recorded foraging within the NIA (ATA 2007). Although the Proposed Action Area contains suitable habitat for Carnaby's Cockatoo, the species do not appear to be utilising the site on a regular basis and therefore, the Proposed Action is not expected to result in a long-term decrease in the size of a population for the species.
Potential to reduce the area of occupancy of the species	The species' recovery plan defines the area of occupancy as 'the area actually occupied within the extent of occurrence for a given taxon, excluding cases of vagrancy'. The recovery plan also includes the objective that 'the species' area of occupancy does not decline'. Given that Carnaby's Cockatoos have been previously recorded within the Proposed Action Area, the removal of 6.21 ha of 'Good' quality foraging habitat and 37 breeding trees (five suitable nesting trees and 32 potential nesting trees) the Proposal is likely to reduce the area of occupancy of the species. While the severity and extent of the impact to the species is likely to be minimised by the fact that the amount of clearing proposed is small (6.21 ha) and that 2,076.6 ha of similar habitat will be protected within conservation estate (within 2 km of the Proposed Action Area), the proposal will still result in a reduction of the species area of occupancy. This is considered to be a significant residual impact and as such the Proponent will propose appropriate offsets (further detail in Section 6).
Potential to fragment an existing population into two or more populations	The Proposed Action will not result in the fragmentation of an existing population. Although there is suitable habitat present and historical records of the Carnaby's Cockatoo foraging within the Proposed Action Area, recent targeted surveys have not identified any records of breeding or foraging individuals within the Proposed Action Area. Furthermore, 5.62 ha of 'Good' quality foraging habitat and 17 potential nesting trees will be avoided within the Proposed Action Area and will remain available for use by the species. Carnaby's Cockatoos are highly mobile species and the small amount of clearing associated with the Proposed Action is unlikely to fragment an existing population into two or more populations.
Potential to adversely affect habitat critical to the survival of a species	The recovery plan summarises habitat critical to survival for Carnaby's Cockatoos (DPaW 2013): • *Eucalyptus* woodlands that provide nest hollows used for breeding, together with nearby vegetation that provides feeding, roosting and watering habitat that supports successful breeding • Woodland sites known to have supported breeding in the past and which could be used in the future, provided adequate nearby food and/or water resources are available or are re-established • In the non-breeding season, the vegetation that provides food resources as well as the sites for nearby watering and night roosting that enable the cockatoos to effectively utilise the available food resources.

Significant impact criteria	Assessment of impacts to Carnaby's Cockatoo
	The Proposed Action will remove up to 6.21 ha of 'Good' quality foraging habitat and up to 37 breeding trees, five of which are suitable nesting trees which contain hollows and 32 are potential nesting trees. While this habitat may potentially constitute critical habitat for the species, the lack of recent records despite targeted survey effort indicates that the habitat present is not critical to the survival of the species. The Proposed Action is therefore not expected to adversely affect habitat critical to the survival of the species.
Potential to disrupt the breeding cycle of a population	There are 37 breeding trees within the Clearing Area, of which five are suitable nesting trees containing hollows; however, there is no evidence that Carnaby's Cockatoo are utilising the site. Furthermore, there are 17 potential nesting trees that will be retained within the Proposed Action Area and be available for use by the species. As such, the Proposed Action is unlikely to disrupt the breeding cycle of a population.
Potential to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The Proposed Action Area contains 11.83 ha of 'Good' quality foraging habitat and 54 breeding trees, of which 6.21 ha and 37 breeding trees (five suitable nesting trees and 32 potential nesting trees) will be cleared. Foraging and breeding habitat will continue to persist both within and outside of the Proposed Action Area, and within the wider region. The Proposed Action will also operate under a CEMP which will reduce potential direct and indirect impacts to the surrounding vegetation, limiting decline in the quality of habitat within the retained areas. Therefore, the Proposed Action is not expected to affect habitat in such a way as the species is likely to decline.
Potential to result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	The Proposed Action will not introduce any invasive species that may be harmful to the species, this will be achieved through the implementation of the management actions discussed in the CEMP, as detailed in Section 3.2
Potential to introduce disease that may cause the species to decline	There is no evidence to suggest that disturbance from the Proposed Action will introduce diseases that may cause the species to decline.
Potential to interfere with the recovery of the species	The Proposed Action is not expected to interfere with the recovery of Carnaby's Cockatoo given: • The limited clearing of potential breeding and foraging habitat • Lack of recent evidence of breeding or foraging within the Proposed Action area • Persistence of breeding and foraging habitat outside of the Proposed Action Area in the wider region, with up to 2,076.6 ha of potential breeding and foraging habitat being present within conservation areas located within a 2 km radius of the site.

5.2.3. Forest Red-tailed Black-cockatoo

An assessment of the Proposed Action on Forest Red-tailed Black-cockatoo is detailed in Table 5-4, with reference to the *Significant Impact Guidelines* (DoE 2013).

Table 5-4: Assessment of significant impact criteria for Forest Red-tailed Black-cockatoo

Significant impact criteria	Assessment of impacts to Forest Red-tailed Black-cockatoo
Potential to lead to a long-term decrease in the size of an important population of a species	The Proposed Action Area contains 11.83 ha of 'Moderate' quality foraging habitat and 54 breeding trees, of which 6.21 ha and 37 trees (five suitable nesting trees and 32 potential nesting trees) are proposed to be cleared. Recent targeted surveys (ELA 2013a & 2021a) for Forest Red-tailed Black-cockatoo did not identify any individuals or foraging evidence within the Proposed Action Area. The closest record of the species is approximately 2.2 km south-southeast of the Proposed Action Area. Although the Proposed Action Area contains suitable habitat for Forest Red-tailed Black-cockatoo, the species does not appear to be utilising the site. Furthermore, 5.62 ha of 'Moderate' quality foraging habitat and 17 potential nesting trees will remain available for use by the species within the Proposed Action Area. Therefore, the Proposed Action is not expected to result in a long-term decrease in the size of a population for the species.
Potential to reduce the area of occupancy of an important population	Area of occupancy is defined as the area within a species' extent of occurrence which is occupied by that species (IUCN 2021). Given that the Proposal will result in the removal of 6.21 ha of 'Moderate' quality foraging habitat and 37 breeding trees (five suitable nesting trees and 32 potential nesting trees) it is likely to reduce the area of occupancy for the species. While the severity and extent of the impact to the species is likely to be minimised by the fact that the amount of clearing proposed is small (6.21 ha) and that 2,076.6 ha of similar habitat will be protected within conservation estate (within 2 km of the Proposed Action Area), the proposal will still result in a reduction of the species area of occupancy. This is considered to be a significant residual impact and as such the Proponent will propose appropriate offsets (further detail in Section 6).
Potential to fragment an existing important population into two or more populations	The Proposed Action will not result in the fragmentation of an existing population. Despite the presence of suitable habitat for the Forest Red-tailed Black-cockatoo, recent targeted surveys have not identified any records of breeding or foraging from the Proposed Action Area. Furthermore, suitable habitat will remain both within and outside of the Proposed Action Area, and in the wider region. Forest Red-tailed Black-cockatoos are highly mobile species and the small amount of clearing associated with the Proposed Action is unlikely to fragment an existing population into two or more populations.
Potential to adversely affect habitat critical to the survival of a species	The conservation advice for the Forest Red-tailed Black-cockatoo (DEWHA 2009) does not define habitat critical for the survival of the species. The Proposed Action Area Is part of the Forest Red-tailed Black-cockatoo's recent distribution extension on the Swan Coastal Plain. While the Proposed Action will remove up to 6.21 ha of 'Moderate' value foraging habitat and 37 breeding trees (including five suitable nesting trees and 32 potential nesting trees), there are no records, or evidence of use, that would indicate the Forest Red-tailed Black-cockatoos utilise the site for either foraging or breeding. On this basis, the habitats present are considered potential habitat and do not represent habitat critical to the survival of the species. The Proposed Action is not expected to adversely affect habitat critical to the survival of the species.

Significant impact criteria	Assessment of impacts to Forest Red-tailed Black-cockatoo
Potential to disrupt the breeding cycle of an important population	There are 37 breeding trees within the Clearing Area, including five suitable nesting trees containing hollows and 32 potential nesting trees; however, there is no evidence that Forest Red-tailed Black-cockatoo are utilising the site. Furthermore, 17 potential nesting trees will remain within the Proposed Action Area. As such, the Proposed Action is unlikely to disrupt the breeding cycle of a population.
Potential to modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The Clearing Area contains 6.21 ha of 'Moderate' quality foraging habitat and 37 breeding trees (including five suitable nesting trees and 32 potential nesting trees). Foraging and breeding habitat will continue to persist within and outside of the Proposed Action Area, and within the wider region. The Proposed Action will also operate under a CEMP which will reduce potential direct and indirect impacts to the surrounding vegetation, ensuring no decline in habitat within adjacent retained areas. Therefore, the Proposed Action is not expected to affect habitat in such a way as the species is likely to decline.
Potential to result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The Proposed Action will not introduce any invasive species that may be harmful to the species, this will be achieved through the implementation of the management actions discussed in the CEMP, as detailed in Section 3.2
Potential to introduce disease that may cause the species to decline	There is no evidence to suggest that disturbance from the Proposed Action will introduce diseases that may cause the species to decline.
Potential to interfere substantially with the recovery of the species	The Proposed Action is not expected to interfere with the recovery of the Forest Red-tailed Black-cockatoo given: • The limited clearing of potential breeding and foraging habitat • Lack of recent evidence of breeding or foraging within the Proposed Action Area • Persistence of breeding and foraging habitat outside of the Proposed Action Area in the wider region, with up to 2,076.6 ha of potential breeding and foraging habitat being present within conservation areas located within a 2 km radius of the site.

5.3. Summary of residual impacts to MNES

Management of the environmental impacts associated with the clearing of native vegetation within the Proposed Action Area has been assessed against the mitigation hierarchy (Section 3). Alternatives to the Proposed Action Area have been assessed (Section 1.4) to avoid the required clearing of the Proposed Action Area, and the Clearing Area has been revised and reduced to 6.21 ha of native vegetation. In addition, mitigation measures have been developed to reduce the effects of the environmental impacts.

The main environmental impact associated with the Proposed Action will be the direct loss of vegetation and fauna habitat within the Proposed Action Area, namely:

- 6.21 ha of the Federally listed Endangered Banksia Woodlands TEC, which also represents 'Good' and 'Moderate foraging habitat for Carnaby's Cockatoos and Forest-Red-tailed Black-cockatoo, respectively.

- The removal of up to 37 potential breeding trees for black cockatoos, including at least five which contain hollows suitable for nesting, however, there is no evidence to support the current usage of these hollows.

A summary of residual impacts to MNES following implementation of management and mitigation measures is presented in Table 5-5.

Table 5-5: Summary of residual impacts to MNES following implementation of management and mitigation measures

Potential impact	Avoidance	Minimisation	Offset
Loss and fragmentation of vegetation, including Banksia Woodlands TEC and Black Cockatoo habitat	A total of 5.62 ha of Banksia Woodlands TEC will be avoided, including of 2.77 ha of the SCP 20a TEC (Endangered – BC Act) and 2.85 ha of SCP 28.	Measures to minimise the impacts to vegetation will be detailed in a CEMP which will include: • The Proposal Area and Clearing Area will be demarcated to prevent clearing outside of approved areas.	An offsets package is proposed to counterbalance the following residual impacts: • Clearing of 6.21 ha of Banksia Woodland TEC (Endangered - EPBC Act) • Clearing of 6.21 ha of 'Good' quality Carnaby' Cockatoo foraging habitat. • Clearing of 6.21 ha of 'Moderate' quality Red-tailed Black-cockatoo foraging habitat
Loss of life/injury to wildlife during clearing	Pre-clearance survey for evidence of Carnaby's Cockatoo and Forest Red-tailed Black-cockatoo breeding will be undertaken prior to clearing works commencing. Clearing will not commence in a 10 m radius from an active nesting tree until young have departed the nest, avoiding impacts to these individuals.	Implementation of a CEMP that will include the following measures: • Undertake pre-clearing fauna trapping for approximately five to seven days before clearing activities commence onsite. • Undertake progressive clearing to allow fauna to move away from clearing activities. • Ensure a trained fauna handler is on site at all times during clearing to handle and relocate fauna. • Fauna injured during clearing will be rehabilitated by a wildlife carer, where practical.	Not applicable
Loss of potential breeding trees for Carnaby's Cockatoo and Forest Red-tailed Black-cockatoo	The Proposed Action Area has been redesigned to reduce the clearing of breeding trees from 54 to 37 trees, which represents a 30% reduction.	• Implementation of a CEMP that will include measures to delineate the approved clearing boundary. • Inspection of breeding trees prior to clearing to ensure no active hollows.	An offsets package is proposed to counterbalance the removal of 37 potential breeding trees, including 5 trees with hollows for Carnaby's Cockatoo and Forest Red-tailed Black-cockatoo.

Potential impact	Avoidance	Minimisation	Offset
Loss and degradation of retained or surrounding habitat by indirect impacts	Not applicable.	Measures to minimise the impacts to vegetation will be detailed in a CEMP which will include: • Management measures for indirect impacts such as dust, to surrounding vegetation. • Measures to prevent introduction or spread of weed species and prevent introduction of *Phytophthora* dieback to the retained or surrounding vegetation. Require all personnel to complete a site induction that will include hygiene training with regards to weed and disease management requirements. • Implementation of measures to minimise the impacts of wind erosion.	Not applicable

6. Offsets

This section provides details of an offset proposal, summarising the Proposal's significant residual impacts and associated proposed offsets. As this NVCP application considers impacts to values under both the EP Act and the EPBC Act, requirements under both WA and Commonwealth offsets policies have been considered; specifically:

- WA Environmental Offsets Policy (Government of Western Australia 2011) and
- EPBC Act Environmental Offsets Policy (Australian Government 2012).

6.1. Significant residual impacts

Environmental offsets will only be applied where residual impacts are determined to be significant after avoidance, minimisation and rehabilitation have been pursued (Australian Government 2012; Government of Western Australia 2014). Following the implementation of mitigation measures outlined in Table 5-5, offsets are likely to be required for the following MNES and State listed species and communities:

- Banksia Woodlands TEC;
- Carnaby's Cockatoo; and
- Forest Red-tailed Black-cockatoo.

The area and quality of these significant residual impacts is provide in Table 6-1.

Table 6-1: Significant residual impacts

Value	Area (ha)	Quality (/10)
Banksia Woodland TEC	6.21	Excellent (8)
Carnaby's Black Cockatoo Habitat	6.21	Good (8)
Forest Red-tailed Black Cockatoo	6.21	Moderate (5)

6.2. Offset proposal

In 2013, DevelopmentWA provided funds to the Department of Parks and Wildlife (now DBCA) for the purchase of Lot 1 Wannamal Road West, Mindarra (among others), to form part of an advanced offset landbank. Attachment A is a copy of a letter from DevelopmentWA provided to (then) Department of Environment requesting recognition of the Advanced Offsets Package.

The offset strategy for the Proposal is the long-term protection and maintenance of values of a portion of this advanced offset site. Actions forming part of this offset are provided in Table 6-2, along with an indication of the current status of these actions.

Table 6-2: Actions forming part of the advanced offset

Action	Status
Acquisition and long-term protection	
Provision of funds to DBCA for acquisition	Complete. DevelopmentWA understands that DBCA acquired Lot 1 Wannamal Rd West, Mindarra in 2013 using funds provided by the Proponent.
Addition to the conservation estate	The land has been managed as part of the conservation estate since 2013.
Maintenance of values	
Fencing	Complete.
Maintenance of the fence and firebreaks and periodic prescribed burning	On-going. Maintenance of values has been partially provided for under a Memorandum of Understanding (MoU) between DBCA and DevelopmentWA initiated in 2019 to meet the requirement of the Neerabup Industrial Area offset. A copy of the MoU is provided as Attachment B. This MoU will be updated to ensure the definition of 'Offset site' includes the Lot 2001 Pederick Rd offset area.

6.3. Suitability of the proposed offset

In 2017, DWER undertook an assessment of the 950 ha lot to assess the presence of Banksia Woodland TEC and black cockatoo habitat. DWER's assessment determined the presence of 704 ha of Banksia Woodland TEC and 778 ha of black cockatoo habitat (as advised by James Widenbarr via email; Attachment C). Of the 950 ha, 482 ha has previously been allocated as an offset for the Neerabup Industrial Estate. As shown in Figure 6-1, there is 224 ha of Banksia Woodland TEC and black cockatoo foraging habitat at Lot 1 Wannamal Road remaining in the offset landbank.

The location of Lot 1 Wannamal Road is considered a suitable offset site for the Proposal given the presence of Banksia Woodland TEC, and potential foraging and breeding habitat for Carnaby's Cockatoo and Forest Red-tailed Black-cockatoo. The offset site is close to a known Black Cockatoo breeding site (approximately 5km from a known breeding buffer). Vegetation at both the impact and offset sites is in Very Good or Excellent condition.

The 2013 purchase of Lot 1 Wannamal Road was made in conjunction with others as part of an initiative by Department of Parks and Wildlife to establish a significant conservation corridor for Carnaby's Black Cockatoos extending from Boonanarring Nature Reserve to the Moore River. This strategic planning and outcome adds value to the landscape context of the individual sites, providing for the long-term protection and recovery of the species.

DBCA advised the (then) Department of the Environment and Energy, in a letter dated 27 August 2018, that the management measures needed to maintain Carnaby's Black Cockatoo habitat values at Lot 1 Wannamal Rd West, Mindarra, included the construction of a fence and the installation of gates to control illegal access to the offset site. DBCA stated that installation of boundary fencing and gates at the offset site would reduce potential vegetation degradation and, in conjunction with the ongoing reserve management by DBCA, contribute to the maintenance of habitat values in the long term.

6.4. Offset requirement

Outcomes of the EPBC Offsets Assessment Guide calculations and DWER offset calculator are provided in Attachment D – G, for Banksia Woodlands TEC and Black Cockatoo habitat respectively.

Given the higher conservation status of Carnaby's Black Cockatoo, the complete overlap of the habitat at the impact site, and the fact that the impact site represents better habitat for Carnaby's than Forest Red-tailed Black Cockatoos, the offset requirement for Black Cockatoo species has been calculated on the basis of Carnaby's Black Cockatoo habitat. Given species requirements, is assumed that the offset site will also provide a suitable habitat offset for Forest Black Cockatoo.

Using the EPBC Offsets Assessment Guide, the offset requirement for both Banksia Woodlands TEC and Black Cockatoo habitat is 49.3 ha (100% of offset requirement). Using the DWER Offset calculator, 49.3 ha equates to 158.8% of the offset requirement for Banksia Woodlands TEC and Carnaby's Black Cockatoo.

The area identified within Lot 1 Wannamal Rd West, Mindarra for the offset is shown in Figure 6-1.

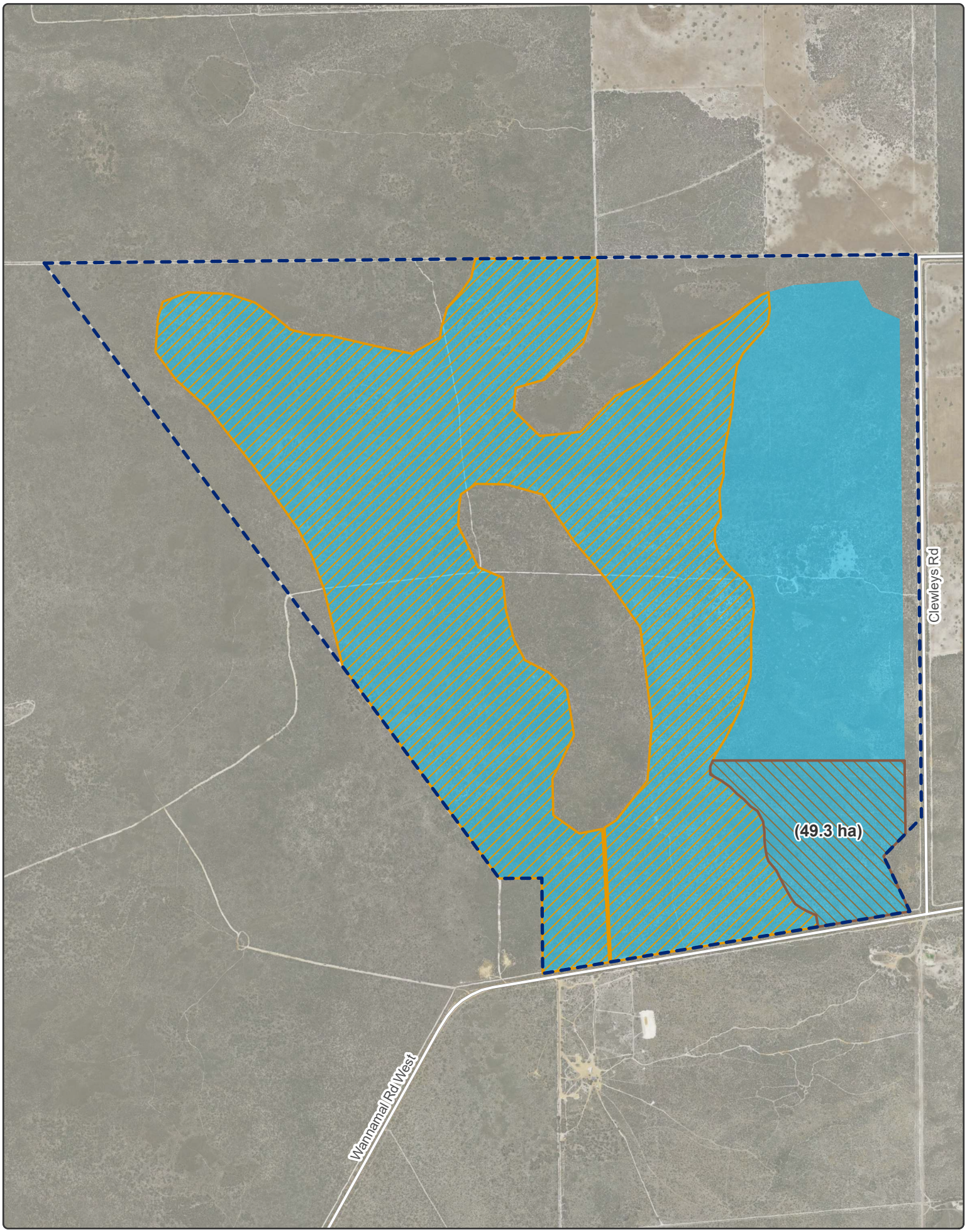

Figure 6-1: Proposed offset site

Lot 1 Wannamal Rd West, Mindarra

Neerabup Industrial Area Offset Site

Proposed offset site for Lot 2001 Pederick Rd

Co-occurrence of Black Cockatoo habitat and Banksia Woodlands TEC

N

0 200 400 800

Metres

Datum/Projection:
GDA 1994 MGA Zone 50

21PER17694-SM Date: 25/10/2022

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6.5. Consistency with offset principles

The offset proposal addresses the principles of both the State and EPBC Act offset policies. A summary of consistency with these principles is included in Table 6-3.

Table 6-3: Consistency with WA State and EPBC Act offset principles

WA Government offset principles	Evidence of consistency
Environmental offsets will only be considered after avoidance and mitigation options have been pursued.	Please see attached clearing application for detail of avoidance and mitigation measures.
Environmental offsets will be cost-effective, as well as relevant and proportionate to the significance of the environmental value being impacted.	he Offsets calculator has been used to calculate the offset requirements for significant residual impacts. At the time of purchase DBCA reported the vegetation to be in Very Good to Excellent condition.
Environmental offsets will be based on sound environmental information and knowledge.	The advanced offset package was facilitated by Department of Parks and Wildlife (now DBCA) in 2019, based on the advice of Departmental experts.
Environmental offsets will be applied within a framework of adaptive management.	Vegetation quality will be maintained at the offset site. This has been achieved through installation of gates and fencing (completed) and maintenance of fencing and firebreaks (on-going).
Environmental offsets will be focused on longer term strategic outcomes.	The advanced offset land parcels that include Lot 1 Wannamal Rd West, Mindarra were identified by and are now held in freehold by DBCA. DevelopmentWA understands that DBCA intends to vest these land parcels in the Conservation Commission.
EPBC Act offset principles	**Evidence of consistency**
Suitable offsets must deliver an overall conservation outcome that improves or maintains the viability of the aspect of the environment that is protected by national environment law and affected by the proposed action.	The offset comprises an avoided risk of loss of the offset property and maintenance of current environmental values.
Suitable offsets must be built around direct offsets but may include other compensatory measures.	The offset proposed is a direct offset in accordance with the definitions of the EPBC Offset Policy.
Suitable offsets must be in proportion to the level of statutory protection that applies to the protected matter.	The quantum of offsets has been determined by use of the EPBC offsets assessment guide.
Suitable offsets must be of a size and scale proportionate to the residual impacts on the protected matter.	The quantum of offsets has been determined by use of the EPBC offsets assessment guide.
Suitable offsets must effectively account for and manage the risks of the offset not succeeding.	The proposed offset is primarily an advanced offset, avoiding the risk of not succeeding.
Suitable offsets must be additional to what is already required, determined by law or planning regulations or agreed to under other schemes or programs (this does not preclude the recognition of state or territory offsets that may be suitable as offsets under the EPBC Act for the same action, see section 7.6).	Prior to implementating the advanced offset there was no other legislation, regulatory measure, scheme or program that required the protection or environmental management of the offset site.
Suitable offsets must be efficient, effective, timely, transparent, scientifically robust and reasonable.	Using an advanced offset ensures that offset delivery is efficient, effective and timely. Input from DBCA on site selection has ensured scientific robustness of the offset.

WA Government offset principles	Evidence of consistency
	The offset will be published on the WA offset register to ensure transparency. The EPBC offset assessment guide has been used to determine a reasonable offset.
Suitable offsets must have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced.	An MoU has been developed with DBCA to outline monitoring and management arrangements for Lot 1 Wannamal Rd West, Mindarra. This will be updated as part of this offset.

7. Stakeholder consultation

Extensive public and stakeholder consultation was undertaken for the development of the Neerabup Industrial Area, which includes the Proposal Area.

In regards to the Proposal Area specifically, DevelopmentWA has consulted with DBCA on the definition of the boundary of the SCP 20a TEC. DBCA provided written advice supporting the findings for the boundary presented in this document.

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