



CLEARING PERMIT

Granted under section 51E of the Environmental Protection Act 1986

Purpose Permit number:	CPS 9167/1
Permit Holder:	Shire of Dardanup
Duration of Permit:	19 August 2021 to 19 August 2026

The permit holder is authorised to clear *native vegetation* subject to the following conditions of this permit.

PART I – CLEARING AUTHORISED

1. Clearing authorised (purpose)

The permit holder is authorised to clear *native vegetation* for the purpose of road widening and road upgrades.

2. Land on which clearing is to be done

Pile Road Reserve (PINs 1334102, 1334103 and 1280690), Ferguson and Henty
Lot 6259 on Deposited Plan 40706, Wellington Forest

3. Clearing authorised

The permit holder must not *clear* more than 3.8 hectares of *native vegetation* within the area cross-hatched yellow in Figure 1 (Maps A to F) of attached Schedule 1.

PART II – MANAGEMENT CONDITIONS

4. Avoid, minimise and reduce the impacts and extent of clearing

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

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

5. Weed and dieback management

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

- clean earth-moving machinery of soil and vegetation prior to entering and leaving the area to be cleared;
- ensure that no known *dieback* or *weed*-affected soil, *mulch*, *fill* or other material is brought into the area to be cleared;
- restrict the movement of machines and other vehicles to the limits of the areas to be cleared; and
- only move soils in dry conditions.

6. Directional clearing

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

PART III - RECORD KEEPING AND REPORTING

7. Records that must be kept

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

Table 1: Records that must be kept

No.	Relevant matter	Specifications
1.	In relation to the authorised <i>clearing</i> activities generally	<ul style="list-style-type: none">(a) the location where the <i>clearing</i> occurred, recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994 (GDA94), expressing the geographical coordinates in Eastings and Northings;(b) the date that the area was cleared;(c) the size of the area cleared (in hectares);(d) the direction that clearing occurred;(e) actions taken to avoid, minimise, and reduce the impacts and extent of <i>clearing</i> in accordance with <i>condition 4</i>; and(f) actions taken to minimise the risk of the introduction and spread of <i>weeds</i> and <i>dieback</i> in accordance with <i>condition 5</i>.

8. Reporting

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

DEFINITIONS

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

Table 2: Definitions

Term	Definition
CEO	Chief Executive Officer of the <i>department</i> responsible for the administration of the clearing provisions under the <i>Environmental Protection Act 1986</i>
clearing	has the meaning given under section 3(1) of the EP Act
condition	a condition to which this clearing permit is subject under section 51H of the EP Act
Department	means the department established under section 35 of the <i>Public Sector Management Act 1994</i> (WA) and designated as responsible for the administration of the EP Act, which includes Part V Division 3.
dieback	means the effect of <i>Phytophthora</i> species on native vegetation

Term	Definition
EP Act	<i>Environmental Protection Act 1986 (WA)</i>
fill	means material used to increase the ground level, or to fill a depression
mulch	means the use of organic matter, wood chips or rocks to slow the movement of water across the soil surface and to reduce evaporation
native vegetation	has the meaning given under section 3(1) and section 51A of the EP Act
weeds	means any plant – <ul style="list-style-type: none"> (a) that is a declared pest under section 22 of the <i>Biosecurity and Agriculture Management Act 2007</i>; or (b) published in a Department of Biodiversity, Conservation and Attractions species-led ecological impact and invasiveness ranking summary, regardless of ranking; or (c) not indigenous to the area concerned



Mathew Gannaway
MANAGER
NATIVE VEGETATION REGULATION

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

26 July 2021

Schedule 1

Figure 1: Map of the boundaries of the areas within which *clearing* may occur

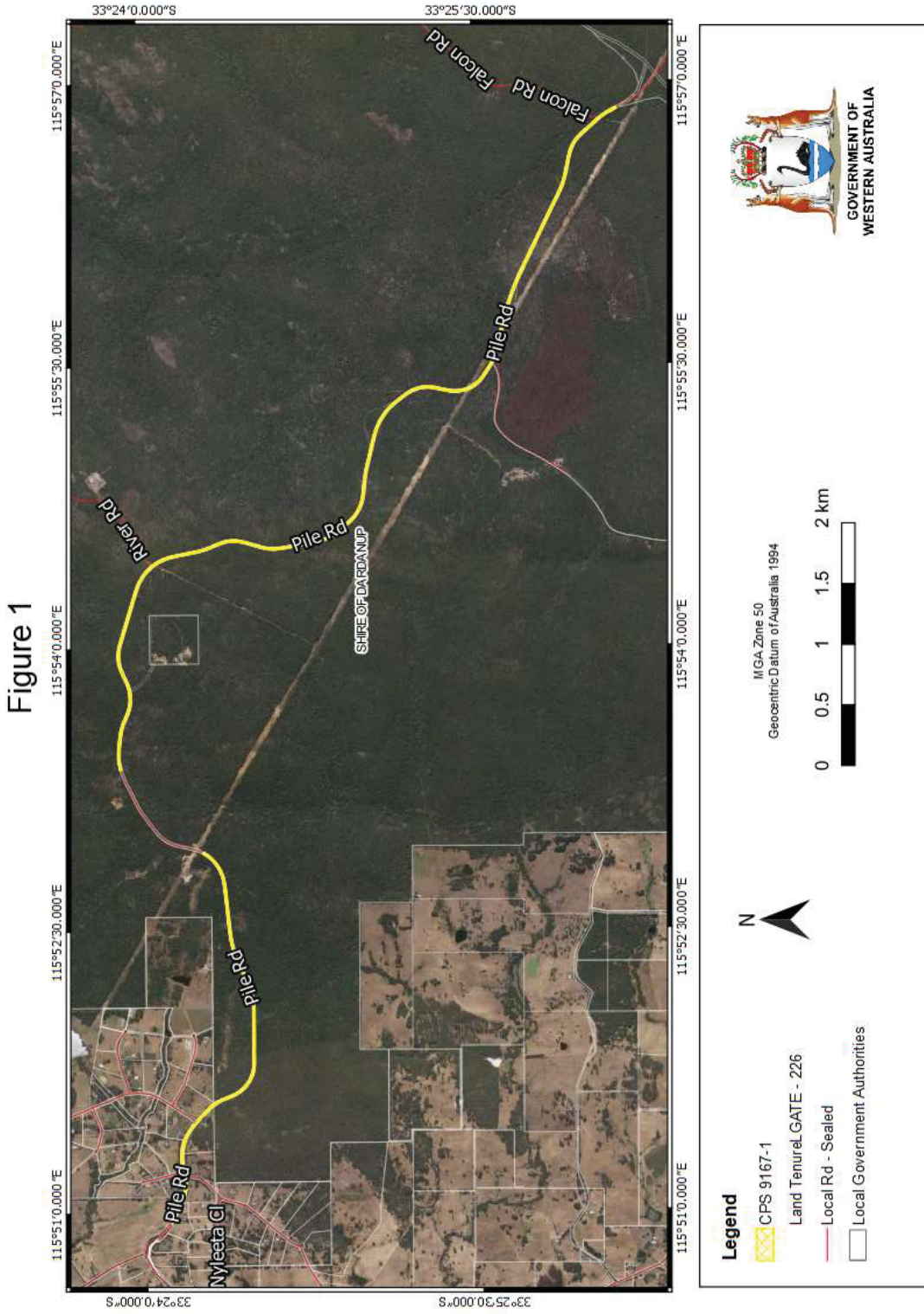


Figure 1: Map A

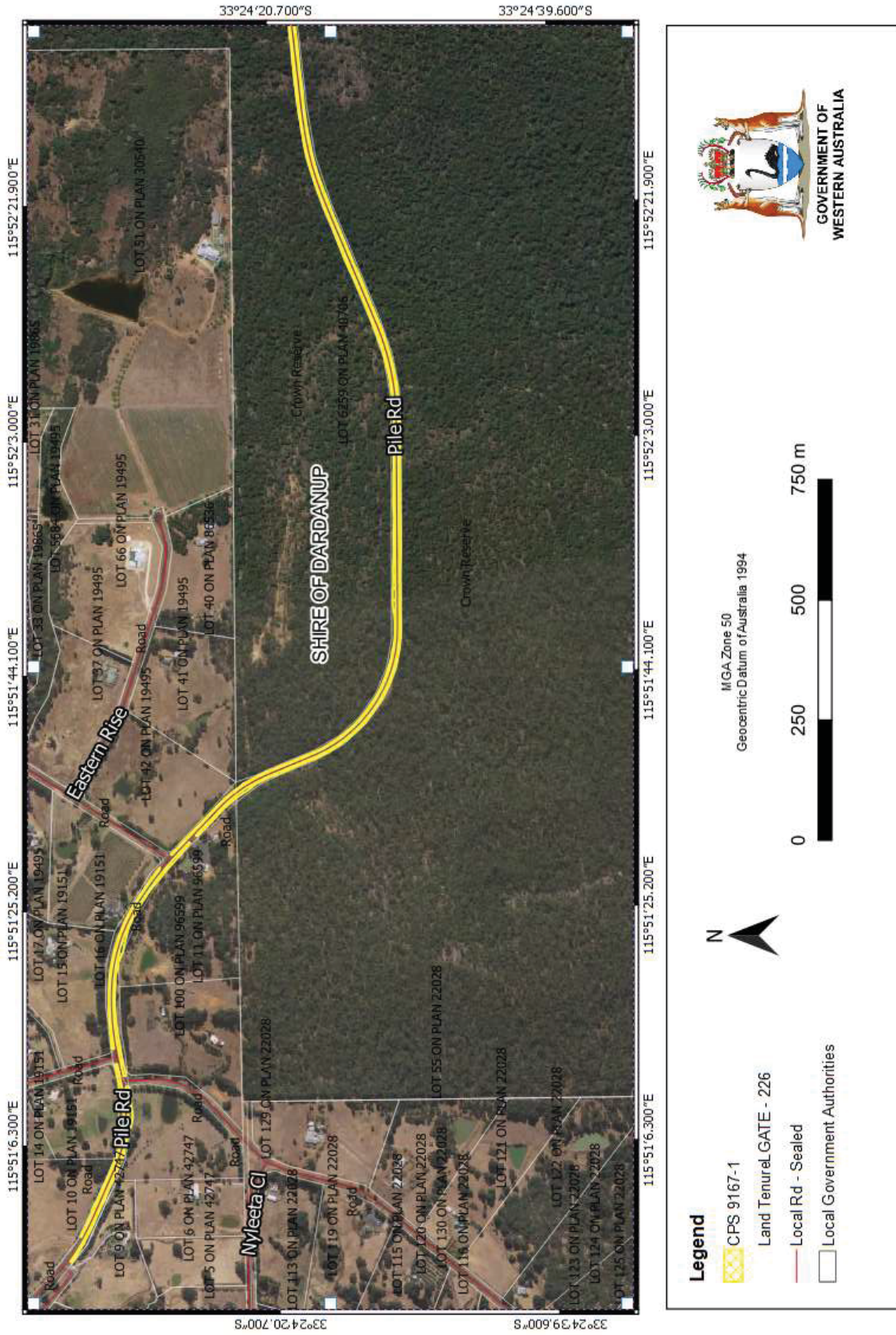


Figure 1: Map B

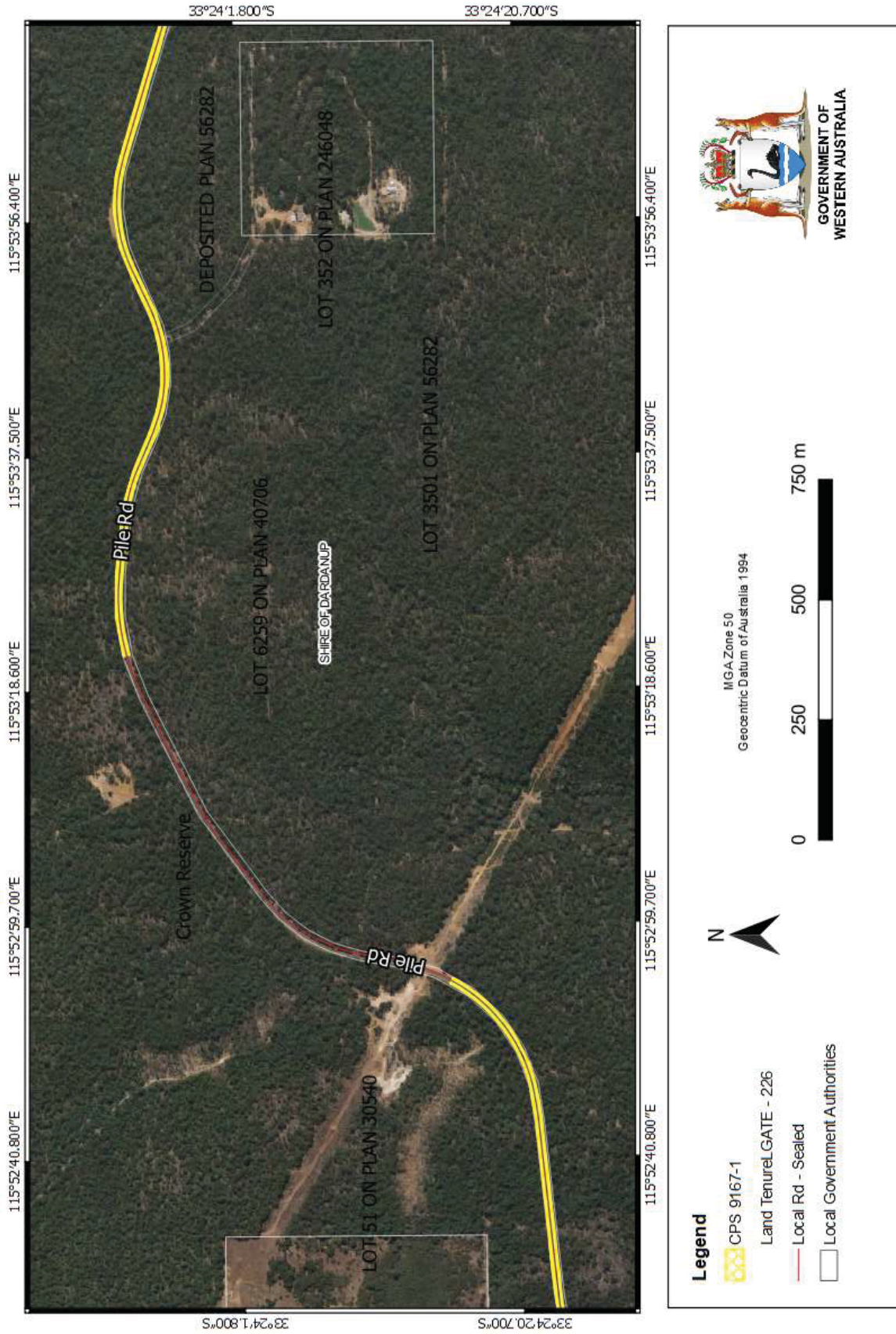


Figure 1: Map C

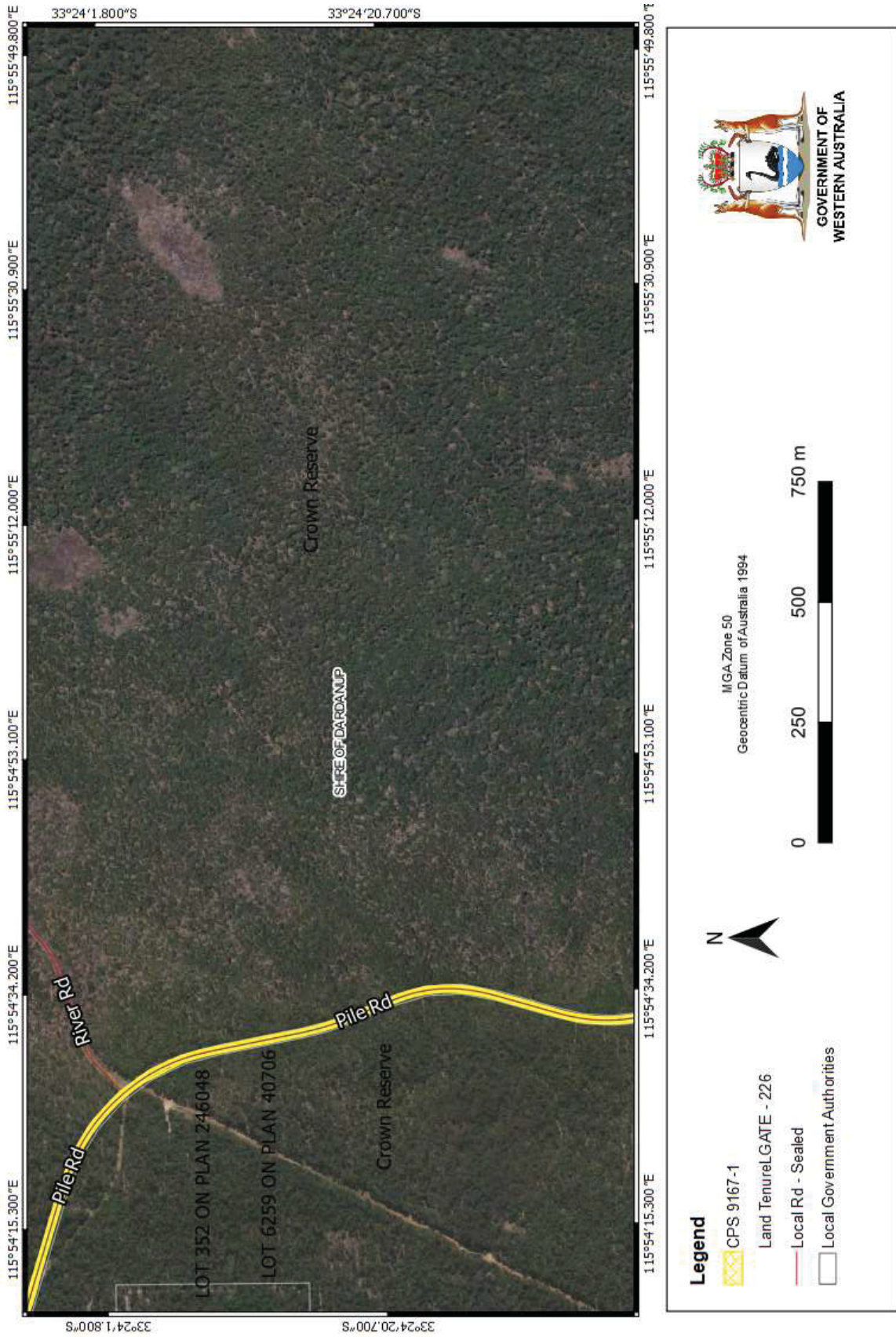


Figure 1: Map D

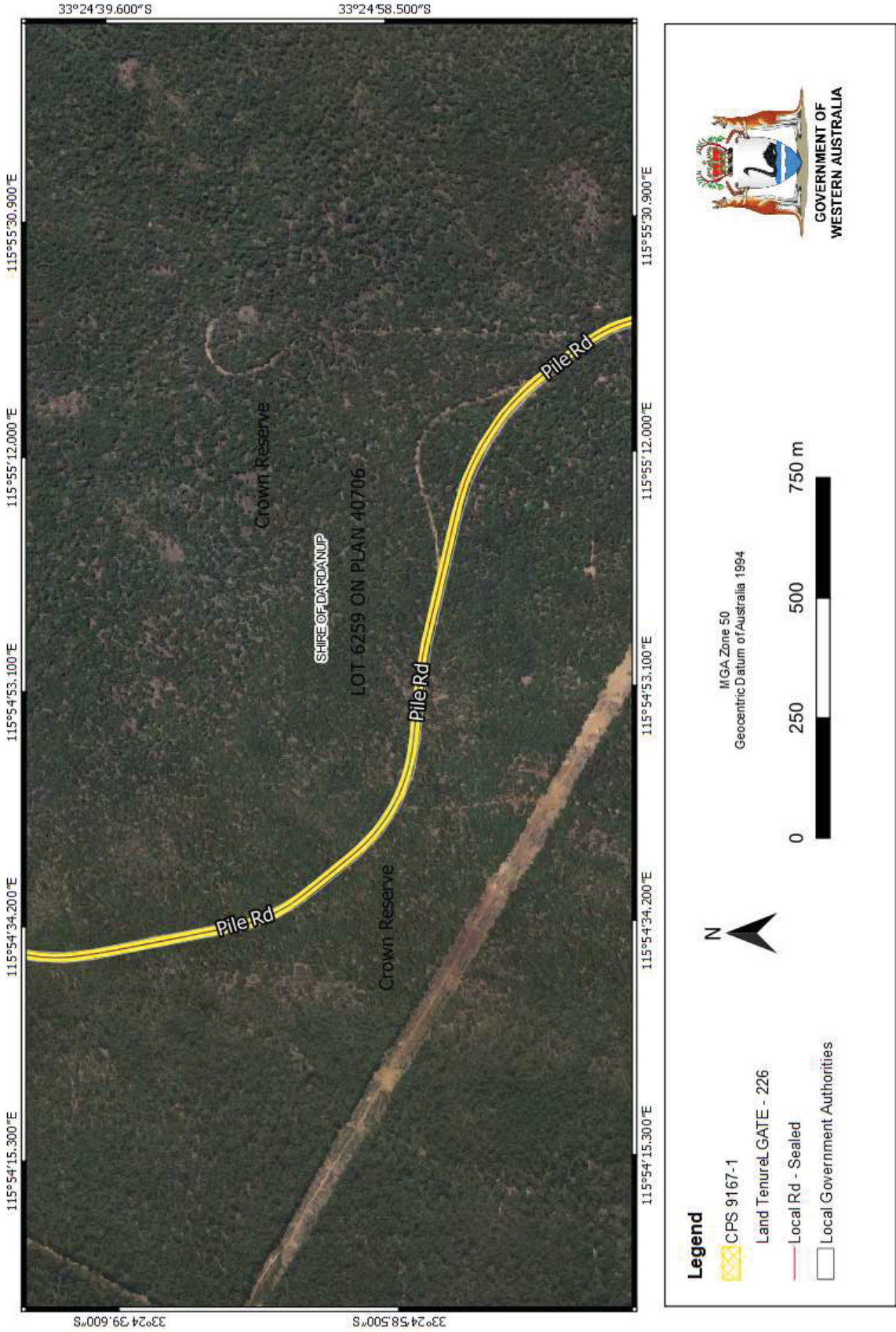


Figure 1: Map E

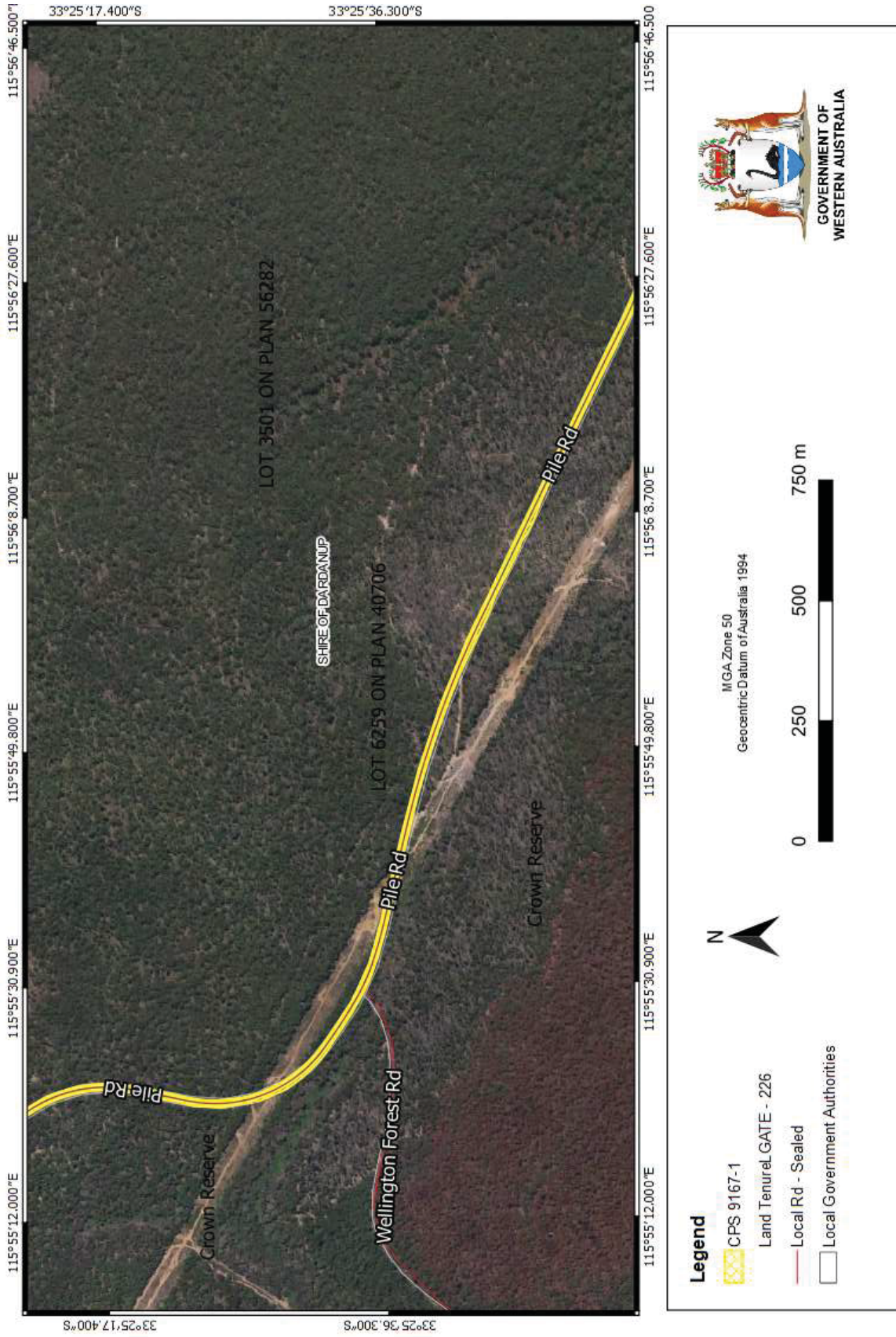
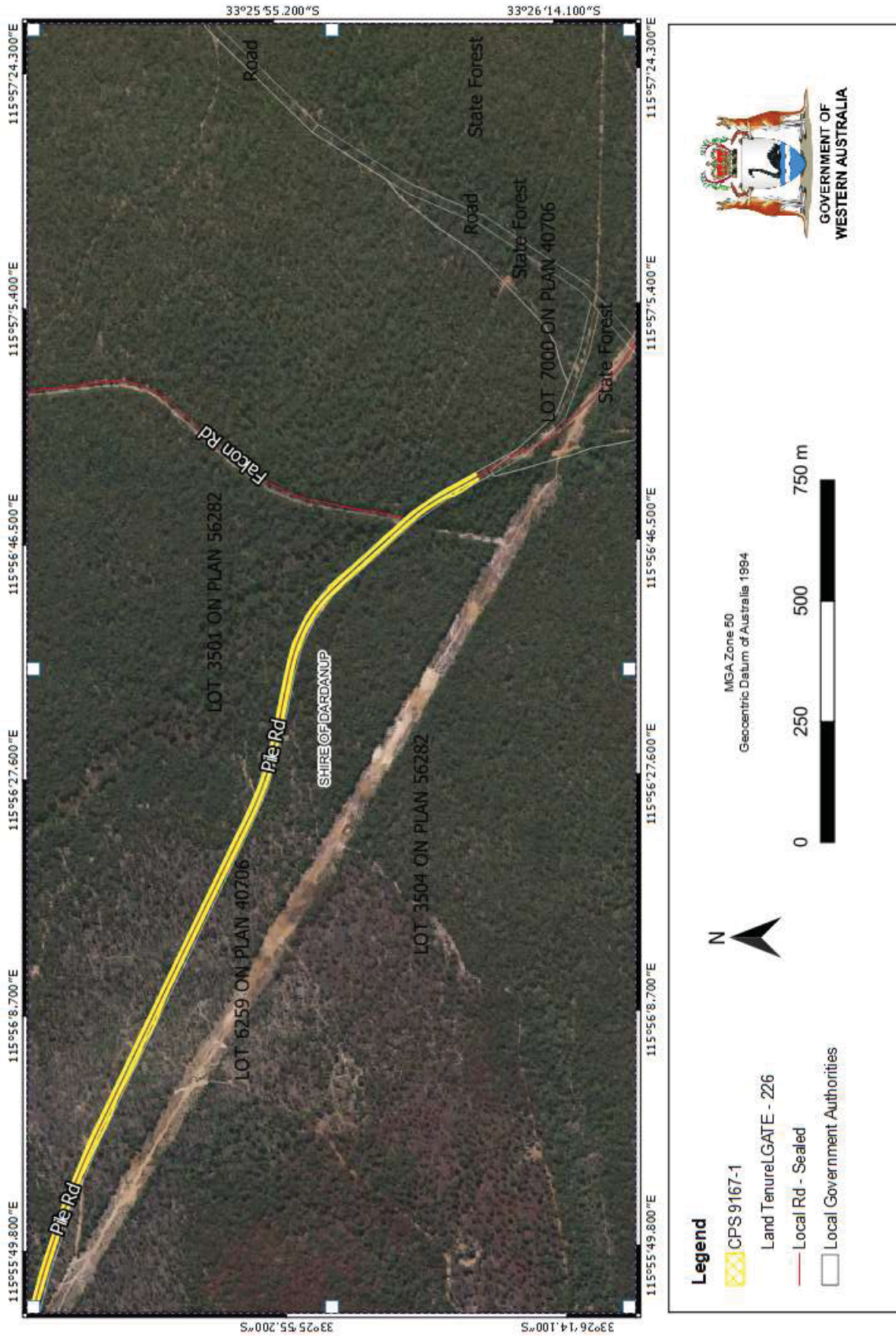


Figure 1: Map F





Clearing Permit Decision Report

1. Application details and outcome

1.1. Permit application details

Permit number:	CPS 9167/1
Permit type:	Purpose Permit
Applicant name:	Shire of Dardanup
Application received:	24 December 2020
Application area:	3.8 hectares (as revised) of native vegetation
Purpose of clearing:	Road construction and upgrades
Method of clearing:	Mechanical removal
Property:	Pile Road Reserve (PINs 1334102, 1334103 and 1280690), Ferguson and Henty Lot 6259 on Deposited Plan 40706, Wellington Forest
LGA area:	Shire of Dardanup
Localities:	Ferguson, Henty and Wellington Forest

1.2. Description of clearing activities

The existing sealed width of Pile Road in the Shire of Dardanup is approximately six metres, with unsealed gravel shoulders on either side of the road. 'Clear zones', that is, the distance between the sealed edge and traffic hazards such as trees, do not currently meet the minimum distances recommended in relevant road design guidelines. The Shire of Dardanup propose to upgrade two sections of Pile Road, totalling approximately 11.38 kilometres, by widening the road to seven metres of sealed width (that is two 3.5 metre lanes), with 0.5 metre partially-sealed shoulders on each side, and installing audible edge lines.

The application was revised during the assessment process in response from the applicant to a request for further information. The changes included a reduction in the amount of clearing required from 6.93 hectares to 3.8 hectares to accommodate the proposed upgrade, whilst avoiding and minimising the clearing impacts.

1.3. Decision on application and key considerations

Decision:	Granted
Decision date:	26 July 2021
Decision area:	3.8 hectares of native vegetation on both sides of Pile Road as depicted Figure 1 in Section 1.5 below, and in Appendix A.

1.4. Reasons for decision

This clearing permit application was submitted, accepted, assessed and determined in accordance with sections 51E and 51O of the *Environmental Protection Act 1986* (EP Act). The Department of Water and Environmental Regulation (DWER) advertised the application for public comment for 21 days and one submission was received (Appendix C). The submission raised concerns about the amount of clearing required to upgrade the road. The applicant subsequently reduced the amount of clearing required from 6.93 hectares to 3.8 hectares.

In making this decision, the Delegated Officer had regard for the site characteristics (Appendix D), relevant datasets (Appendix H2), the findings of a flora and vegetation survey and black cockatoo habitat assessment (Appendix B), the clearing principles set out in Schedule 5 of the EP Act (Appendix E), proposed avoidance and minimisation measures (Section 3.1), relevant planning instruments, and any other matters considered relevant to the assessment (Section 3.3). The Delegated Officer also took into consideration the purpose of the clearing to upgrade Pile Road to improve community safety by reducing roadside hazards under the State Black Spot program.

The assessment identified that the proposed clearing may result in the loss of native vegetation that provides foraging habitat to three Threatened black cockatoo species. In consideration of the local context, and in particular the extent, quality and tenure of foraging habitat available in the local area, the Delegated Officer determined that the proposed

clearing is unlikely to have any long-term adverse impacts on any black cockatoo populations utilising foraging habitat within the local area.

Proposed clearing may also result in the introduction and/or spread of dieback disease and weeds into adjacent vegetation that is contiguous with native vegetation within tenure managed for conservation purposes, and that fauna of conservation significance may be present.

After consideration of the available information, as well as the applicant's minimisation and mitigation measures (Section 3.1), the Delegated Officer determined that the applicant has suitably demonstrated avoidance and minimisation measures and that the proposed clearing can be minimised and managed to be unlikely to lead to an unacceptable risk to environmental values.

The Delegated Officer decided to grant a clearing permit subject to conditions to implement dieback disease and weed management strategies to minimise the risk to the biodiversity values of adjacent native vegetation, and to undertake slow, progressive one directional clearing to allow terrestrial fauna to move into adjacent habitat ahead of the clearing activity.

1.5. Site map

A site map of proposed clearing is provided in Figure 1 below. More detailed site maps (Figure 1: Maps A to F) are provide in Appendix A.

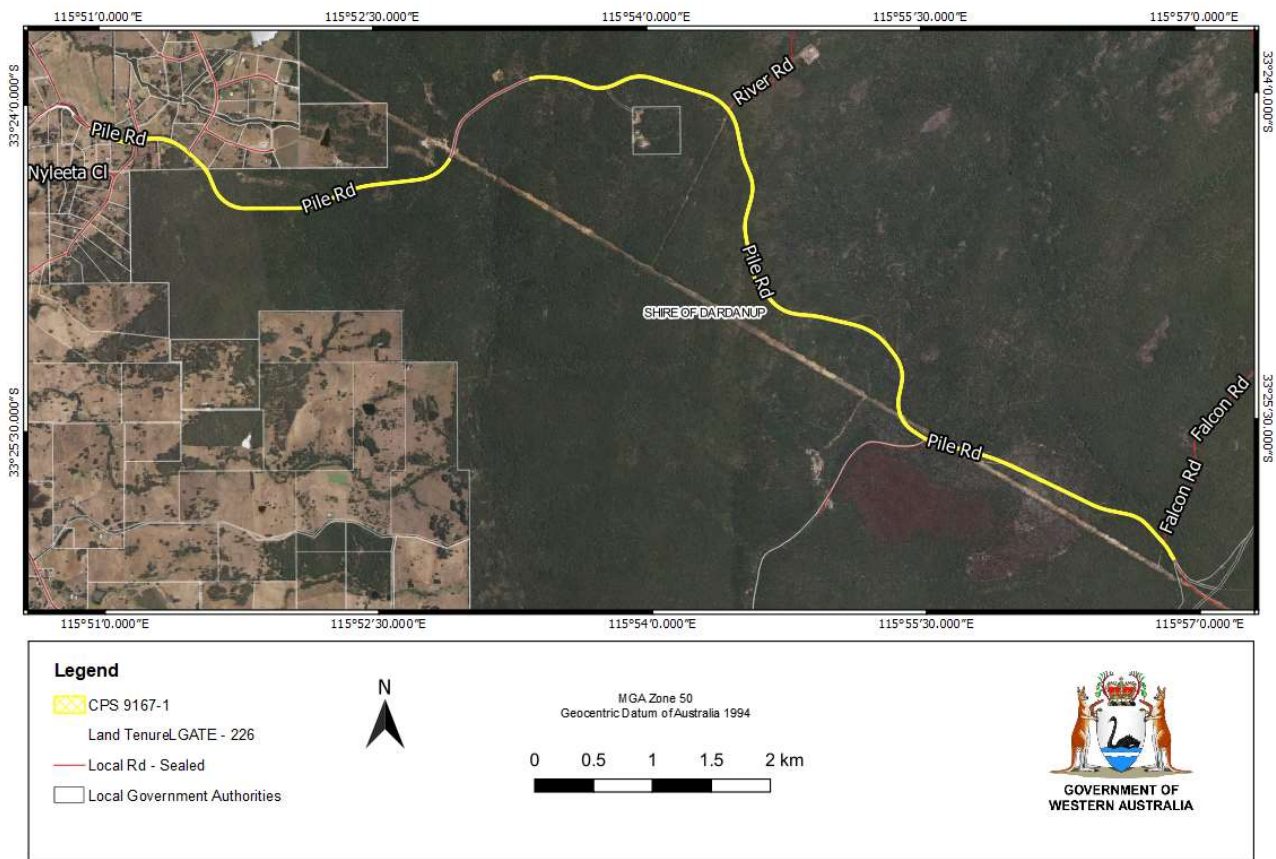


Figure 1: Map of the application area CPS 9167/1. The area cross-hatched yellow indicates the area within which 3.8 hectares of native vegetation is authorised to be cleared under the granted clearing permit.

2. Legislative context

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

In addition to the matters considered in accordance with section 51O of the EP Act (see Section 3), the Delegated Officer has also had regard to the objects and principles under section 4A of the EP Act, particularly:

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

Other legislation of relevance for this assessment includes:

- *Biodiversity Conservation Act 2016* (WA) (BC Act);
- *Conservation and Land Management Act 1984* (WA) (CALM Act);
- *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act); and
- *Planning and Development Act 2005* (WA) (P&D Act).

The key guidance documents which inform this assessment are:

- *A guide to the assessment of applications to clear native vegetation* (December 2013);
- Technical guidance – *Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA, 2016); and
- *Procedure: Native vegetation clearing permits* (DWER October 2019).

3. Detailed assessment of application

3.1. Avoidance and mitigation measures

The proposed widening of Pile Road is a capital upgrade project to increase the safety of the road. The existing sealed width of Pile Road in the Shire of Dardanup is approximately six metres, with unsealed gravel shoulders on either side of the road. 'Clear zones', that is, the distance between the sealed edge and traffic hazards such as trees, do not currently meet the minimum distances recommended in the Austroads guide to road design (Shire of Dardanup 2021), and the majority of motor vehicle accidents on Pile Road (as well as other similar roads in the area), are run-off type vehicle crashes (Shire of Dardanup 2021). Austroads is a collective of the Australian and New Zealand transport agencies, and the Austroads guide to road design is intended to provide designers with a framework that promotes efficiency in design and construction, economy, and both consistency and safety for road users (Austroads 2021).

The initial application for 6.93 hectares of clearing (Shire of Dardanup 2020) was revised to 3.8 hectares to accommodate the proposed upgrade, whilst avoiding and minimising the clearing impacts (Shire of Dardanup 2021). The Shire of Dardanup propose to upgrade two sections of Pile Road by widening the road to seven metres of sealed width (that is two 3.5 metre lanes), with 0.5 metre partially-sealed shoulders on each side, and installing audible edge lines (Shire of Dardanup 2021).

The treatment was developed through the State Black Spot Program that targets roads with a proven crash history, or locations identified as high-risk. The program is mainly focused on the most cost-effective treatment of hazardous road locations (MRWA 2021). The proposed treatment is considered a compromise for roads such as Pile Rd where construction of alternative alignments:

- are not be possible; or
- minimum clear zones cannot be reasonably established; and/or
- there are areas of adverse road geometry that would be impractical to improve.

The audible edge line treatment provides warning to road users, and the partially sealed shoulder provides some margin of error for the driver, who may be inadvertently veering off the road, to recover and revert to the lane. The treatment increases the safety of the road without having to realign the road or provide clear zones that would necessitate extensive clearing of trees (Shire of Dardanup 2021). The recommended treatment minimises the need for clearing since:

- the existing alignment is maintained;
- the increase in road width is small; and
- clear zones are largely left as they are.

This minimum treatment is also proposed to be applied to other similar roads in the area as different projects under the State Black Spot Program (Shire of Dardanup 2021).

Trees impacted by the proposed clearing are the result of widening the road to seven metres of seal, and with half of the shoulder width being sealed. The clearing width varies along the length of the road due to batter cuts or spills, depending on the relative geometry of the terrain. In general, the clearing width is relatively small along the length of the road, in the order of one metre on each side. Additional clearing width is required in some localised areas to accommodate embankment batters as well as drainage structures such as culverts and headwalls.

Five trees within the application area were assessed by Natural Areas (2020) as potentially providing breeding hollows for Threatened black cockatoo species. Further investigations initiated by the Shire of Dardanup concluded that none of the identified trees contained hollows suitable for use by black cockatoos for nesting purposes (Harewood 2021). Of the five trees identified by Natural Areas (2020), three will be avoided (Shire of Dardanup 2021).

3.2. Assessment of environmental impacts

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

The assessment identified that the clearing may pose a risk to the environmental values of biological values and conservation areas, and that these required further consideration. The consideration of these impacts, and the extent to which they can be managed through conditions applied in line with sections 51H and 51I of the EP Act, is set out below.

3.2.1. Environmental value: biological values (flora) – Clearing Principles (a), (c) and (d)

Assessment: The application area is situated within the Jarrah Forest Bioregion (JAF), and the proposed clearing comprises native vegetation on both sides of Pile Road within Ferguson and Henty, and Wellington Forest.

The application area comprises a single vegetation type of Jarrah-Marri Woodland (*Corymbia calophylla* and *Eucalyptus marginata*) over a middle storey of *Bossiaea aquifolium* subsp. *aquifolium*, and an understorey of *Patersonia umbrosa*, *Acacia lateriticola*, *Conostylis serrulata* and *Lepidosperma pubisquameum* (Appendix G2). This vegetation description aligns with the regional south west forest regional vegetation description for Hester (SWF 140) (Mattiske and Havel 1998).

Vegetation is along an existing road verge and is in degraded condition over the western section of the application area where the road reserve passes through small holdings of agricultural lands, and in excellent condition (Keighery 1994) along the remainder where it passes through Wellington Forest (Natural Areas 2020).

Two Threatened flora taxa listed under the *Biodiversity Conservation Act 2016* have been recorded within the local area (ten kilometre radius from the application area), along with nineteen Priority (P) flora taxa listed by the Department of Biodiversity, Conservation and Attractions (DBCA) (Appendix D2). There are no mapped Threatened Ecological Communities (TECs) endorsed by the Western Australian Minister for the Environment within the local area, and no Priority Ecological Communities (PECs) listed by DBCA within four kilometres of the application area.

A flora and vegetation survey was undertaken over the application area during the spring of 2020 by Natural Areas (2020) and is consistent with relevant guidance (EPA 2016). The vegetation within the application area does not align with any described PECs or TECs, and is not considered representative of any significant ecological community. Habitat is not suitable for the two Threatened flora taxa recorded from the local area, and these taxa were not recorded by Natural Areas (2020).

The flora and vegetation survey recorded a total of 115 flora species from 36 families, of which 99 were native species and 16 were non-native (weed) species. Species recorded are those typically found in Jarrah-Marri Woodland (Natural Areas 2020). The application area does not represent an area of high biodiversity and has no unique attributes, particularly in consideration of the Hester complex of Mattiske and Havel (1998) that occurs over 23,760 hectares (Appendix D3), the majority of which is within DBCA managed lands (Section 3.2.3).

Nineteen Priority flora taxa listed by the DBCA have been recorded within ten kilometres of the application area. Of these, habitat was deemed suitable by Natural Areas (2020) for five Priority taxa (Appendix G2); *Styliidium acuminatum* subsp. *acuminatum* (P2), *Synaphea polypodioides* and *Pithocarpa corymbulosa* (P3), and *Senecio leucoglossus* and *Boronia tenuis* (P4). Given the vegetation type and soil types within the application area extend over a large area around and beyond the application area, it is likely that, if present, each of these species would occur in similar numbers in expansive areas associated with the adjacent Wellington Forest and any potential impact would be insignificant.

Furthermore, the application area is narrow, and located immediately adjacent to an existing road, and edge effects may inhibit the occurrence of Priority flora taxa. No Priority flora were identified during the survey by Natural Areas (2020) during the optimal spring timing when the majority of species are flowering or in reproductive stages. The P3 listed *Pithocarpa corymbulosa* was identified by Natural Areas (2020) as a species that could be found within the application area, but does not flower during springtime when the survey was undertaken (with flowering occurring from January to April). *Pithocarpa corymbulosa* is a perennial species with distinctive white/grey foliage and its presence would be detected during the survey despite timing being outside its known flowering time (Natural Areas 2020).

Sixteen weed species were recorded by Natural Areas (2020). Noting that the vegetation forms part of a very large remnant that is contiguous with Wellington Forest, the proposed clearing may result in the spread of weeds and dieback disease (*Phytophthora* sp.) into adjacent areas managed by DBCA and vested in the Conservation and Parks Commission. Weed and dieback management practices would assist in minimising this risk.

Conclusion: For the reasons set out above, it is considered that the impacts of the proposed clearing on biodiversity values can be managed by taking steps to minimise the risk of the introduction and spread of dieback disease and weeds.

Conditions: To address the above impacts, the implementation of dieback and weed management strategies as a condition on the permit will minimise the risk to the biodiversity values of adjacent native vegetation.

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

Assessment: According to available databases, ten mammals and eight birds of conservation significance have been recorded within ten kilometres of the application area (Appendix D2). The survey of Natural Areas (2020) included a basic fauna survey.

In consideration of the habitat present, the application area represents the general habitat requirements of the Threatened species; Woylie (*Bettongia penicillata ogilbyi*) (CR), mainland Quokka (*Setonix brachyurus*) (VU), Chuditch (*Dasyurus geoffroii*) (VU), the conservation dependent south-west Brush-tailed Phascogale (*Phascogale tapoatafa wambenger*) (CD), and the Priority species Quenda (*Isodon fusciventer*) (P4), Western Brush Wallaby (*Notamacropus Irma*) (P4), and Western False Pipistrelle (a bat) (P4).

Apart from the Western False Pipistrelle (a bat), the other species are 'critical weight range' (CWR) mammals whose distribution and abundance have declined severely, most likely due to fox and feral cat predation (Burbidge and McKenzie 1989). Immediately adjacent to the Pile Road Reserve along approximately 90 per cent of the application area, and on both sides of the road, are DBCA lands managed for conservation purposes including Wellington National Park (R46213). Western Shield is a DBCA managed conservation program that focuses on broadscale introduced predator control and the recovery of Threatened species (Burbidge *et al.* 1995; Mawson 2003) including most of the species above. Woylies (*Bettongia penicillata ogilbyi*) were translocated to the adjacent Wellington National Park in 2000 (Mawson 2003), and feral predator control in the form of baiting is undertaken routinely in Wellington National Park (but not the adjacent Wellington Discovery Forest) (DBCA 2020a).

Of the mammals recorded from the local area, six are ground-dwelling and two shelter or roost in hollows (the south-west Brush-tailed Phascogale and the Western False Pipistrelle). The Woylie is a ground-dwelling species that creates a well-concealed nest, amongst dense vegetation and can occur where feral predator control is implemented in open forest or woodland, with a low clumped understorey of tussock grasses or woody shrubland (Yeatman and Groom 2012). The Chuditch and Brush-tailed Phascogale are Dasyurids that are wide-ranging with large home ranges. These species require large areas of habitat such as the adjacent Wellington National Park. The Chuditch typically dens at ground level in hollow logs or rocky areas, while the phascogale requires hollows within trees (van Dyck and Strahan 2008). The mainland Quokka typically occurs in dense vegetation such as swamp habitat or riparian habitats with a sedge dominated understorey, as well as incised gullies and dense coastal heath (DEC 2013; de Tores *et al.* 2007). However, they disperse between these areas and road kill specimens have been recorded in the local area including along Pile Road. Quenda, too, require a dense understorey for cover (van Dyck and Strahan 2008) that may also include exotic species along roadsides. The Western Brush Wallaby has been recorded in the vicinity, but is a grazer and optimum habitat is more open forest or woodland, particularly open seasonally wet flats with low grasses (DBCA 2020b). The Western False Pipistrelle roosts in hollows in old trees, branches and stumps. The species range has contracted predominantly to old growth wet sclerophyll forest in the higher rainfall areas (Richards *et al.* 2012; WAM 2021).

The basic fauna survey of Natural Areas (2020) did not record any evidence of mammals of conservation significance in the form of sightings, or observations of secondary presence in the form of scats, tracks, runnels, dreys, dens, or calls.

Mammals of conservation significance are known from the vicinity of the application area. The specific habitat attributes within Jarrah-Marri forest for the Quokka, Brush Wallaby and Western False Pipistrelle are not present. The narrow strip proposed for clearing is unlikely to provide large areas of dense vegetation or remove core habitat for the mammal species identified, or reduce their capacity to disperse across the landscape. There is a minor risk of mammals of conservation significance being present at the time of clearing. Slow and directional clearing toward adjacent native vegetation would allow any fauna present to retreat into adjacent vegetation ahead of the clearing activity and minimise impacts to individuals.

Of the avian fauna species of conservation significance identified, the species most likely to occur over the application area are the three vagile species of Threatened black cockatoo species that could utilise the tree canopy present. The Endangered Baudin's Cockatoo (*Calyptorhynchus baudinii*) and Carnaby's Cockatoo (*Calyptorhynchus latirostris*), as well as the Vulnerable Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*) are all known from the vicinity of the application area. The application area is within the modelled distribution of all three species, but not in the area where breeding is likely to occur for Carnaby's Cockatoo.

Black cockatoo habitat can be considered in terms of breeding habitat, night roosting habitat, and foraging habitat. Black cockatoos will generally forage up to 12 kilometres from an active breeding site (Commonwealth of Australia 2017; DPaW 2013; DSEWPaC 2012; EPA 2019). Following breeding, they will flock in search of food, usually within six kilometres of a night roost (DSEWPaC 2012; Commonwealth of Australia 2017; DPaW 2013) but may range up to 20 kilometres (Commonwealth of Australia 2017).

Black cockatoo night roosts are usually located in the tallest trees of an area, and in close proximity to both a food supply and surface water (DAWE 2020). Flocks will use different night roosts, often for weeks, or until the local food supply is exhausted. Flocks show some fidelity to night roosts with sites used in most years to access high-quality feeding sites. However, not all night roosts are used in every year (DPaW 2013).

Food resources within the range of breeding sites and roost sites are important to sustain populations, and foraging resources are therefore viewed in the context of known breeding and night roosting sites, particularly within 12 kilometres of an impact area (Commonwealth of Australia 2017).

No black cockatoo breeding sites have been recorded with 12 kilometres of the application area. Seven known black cockatoo roost sites have been monitored within 12 kilometres of the application area. Of these roost sites, three have recorded black cockatoo usage since 2016; recording either 'white-tailed black cockatoos' (either Baudin's Cockatoo or Carnaby's Cockatoo) or 'red-tailed black cockatoos' (the Forest Red-tailed Black Cockatoo). Two roost sites (DARBURR001 and DONLOWR001) have recorded both white-tailed black cockatoos and red-tailed black cockatoos, and one roost site (CAPFERR001) has recorded solely red-tailed black cockatoos (Figure 3).

Natural Areas (2020) undertook a basic black cockatoo habitat assessment whereby evidence of black cockatoo usage was recorded, and potential habitat trees identified based on their diameter at breast height (DBH) being 50 centimetres or greater. A total of 45 eucalypts were recorded with a DBH greater than 50 centimetres incorporating 31 Marri, 13 Jarrah and one Karri (*Eucalyptus diversicolor*). Of these trees, five trees were assessed from the ground by Natural Areas (2020) as containing hollows potentially suitable for black cockatoos (Figure 2), although no sign of usage was recorded. Sightings of both Carnaby's Cockatoo and the Forest Red-tailed Black Cockatoo were recorded, as well as evidence of black cockatoo foraging in the form of chewed Marri fruit beneath five of the trees along the length of the application area.

After the five habitat trees were identified by Natural Areas (2020), the Shire of Dardanup engaged an experienced zoologist to further examine these particular trees (Harewood 2021). The five previously identified trees were examined with the aid of a drone (DJI Mavic Mini) and photographed. A summary of results are provided in Appendix G4. Harewood (2021) concluded that none of the five previously identified trees were found to contain hollows that were considered suitable for use by black cockatoos for nesting purposes. This conclusion was in most cases based on the hollows actually being non-existent or being too small, shallow or open (Appendix G4). Harewood (2021) also concluded that if required, the trees could be removed without impacting on breeding black cockatoos that may be frequenting the general area. Of the five trees identified by Natural Areas (2020), three can be avoided (Shire of Dardanup 2021); Trees 441, 447 and 466 (Figure 2). Two trees (Trees 432 and 443) are too close to the proposed new road edge and will require removal (Section 3.1) (Figure 2). Appendix G4 provides a description of the five trees (Harewood 2021).

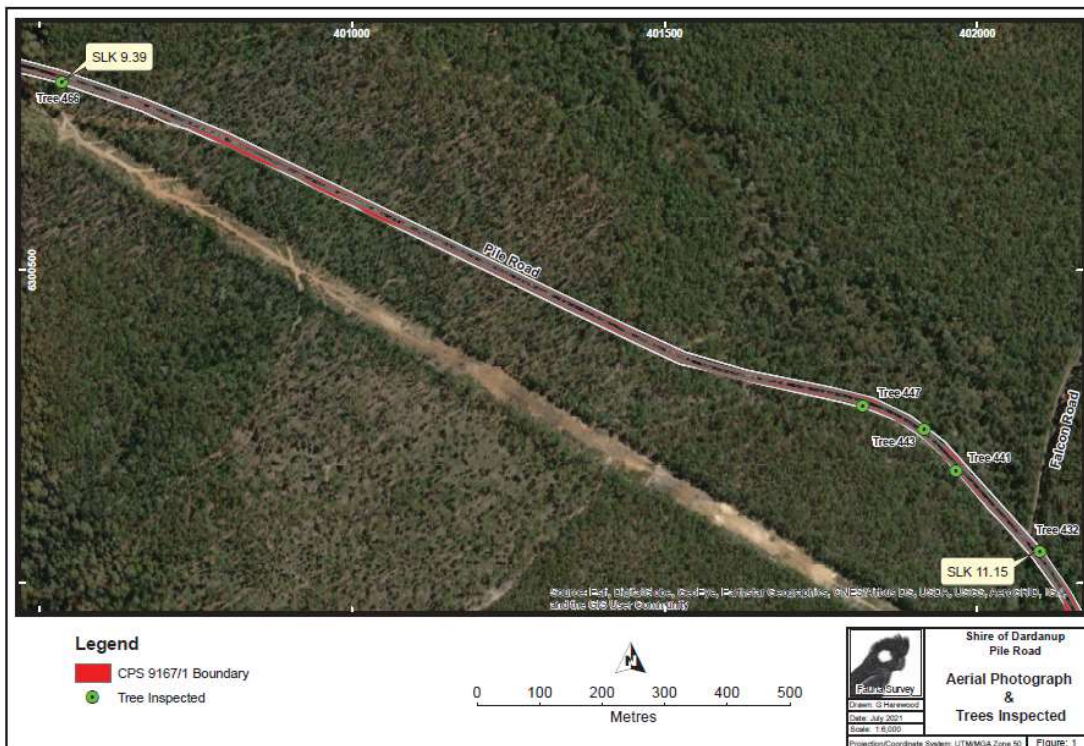


Figure 2: Potential habitat trees identified by Natural Areas (2020) and inspected by Harewood (2021)

Due to the presence of black cockatoo roost sites within 12 kilometres, foraging habitat within the application area may provide foraging resources for night-roosting black cockatoo populations during the non-breeding period.

Evidence of foraging was recorded by Natural Areas (2020) comprising chewed Marri fruit beneath five trees. All three black cockatoo species forage on both the Marri and Jarrah canopy dominating the application area, with Red-tailed Black Cockatoos feeding predominantly on Jarrah but also Marri, Baudin's Cockatoo feeding on Marri but also Jarrah and Carnaby's Cockatoo feeding on proteaceous plant species, but also Marri and Jarrah.

All of the 3.8 hectares of native vegetation proposed to be cleared is considered black cockatoo foraging habitat, and high-quality foraging habitat particularly for Baudin's Cockatoo and Red-tailed Black Cockatoos. Approximately 38,665 hectares of remnant vegetation mapped as black cockatoo foraging habitat has been retained within a 12 kilometre radius of the application area (Figure 3). The western quarter of the 12 kilometre buffer area intersects the Swan Coastal Plain bioregion, and the vast majority of foraging habitat remaining is located within the Jarrah Forest (JAH) bioregion (Figure 3), and mapped as various forms of Jarrah-Marri woodland or open forest (Mattiske and Havel 1998). The majority of the mapped black cockatoo foraging habitat is also located within DBCA managed lands (Figure 4).

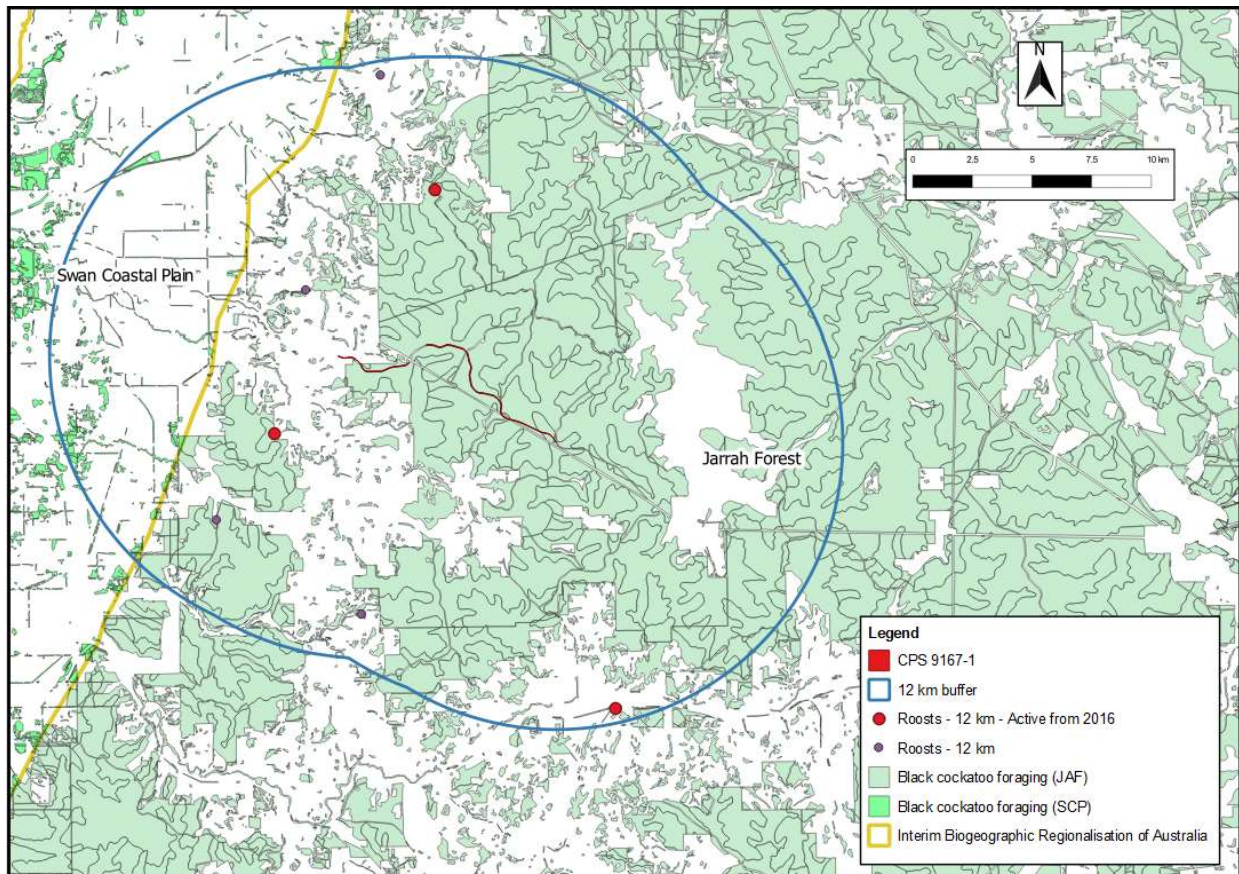


Figure 3: Extent of mapped black cockatoo foraging habitat within 12 kilometres of the application area

No evidence of black cockatoo roosting activity was observed over the application area, and no trees contain breeding hollows suitable for black cockatoos. The application area is within the foraging distance of known roosts utilised by at least two species of Threatened black cockatoo, and 3.8 hectares of foraging habitat is present within the application area.

Foraging habitat can be assessed in relation to its function within the landscape, with the quality of foraging habitat depending upon how black cockatoos utilise the habitat, and the attributes of that specific location. The 3.8 hectares of foraging habitat occupying the application area constitutes less than 0.0098 per cent of black cockatoo foraging habitat mapped within 12 kilometres of the application area, the majority of which occurs within lands managed by DBCA. Foraging habitat within the application area constitutes predominantly eucalypt trees. In general the clearing width will be relatively small along the length of the road (in the order of one metre on each side) and impact understorey species more so than the trees present. The assessment undertaken by Natural Areas (2020) recorded species typically found in Jarrah-Marri forest, and the application area has no unique attributes, and is considered analogous with the Hester complex of Mattiske and Havel (1998) that occurs over 23,760 hectares, the majority of which is located within DBCA managed lands.

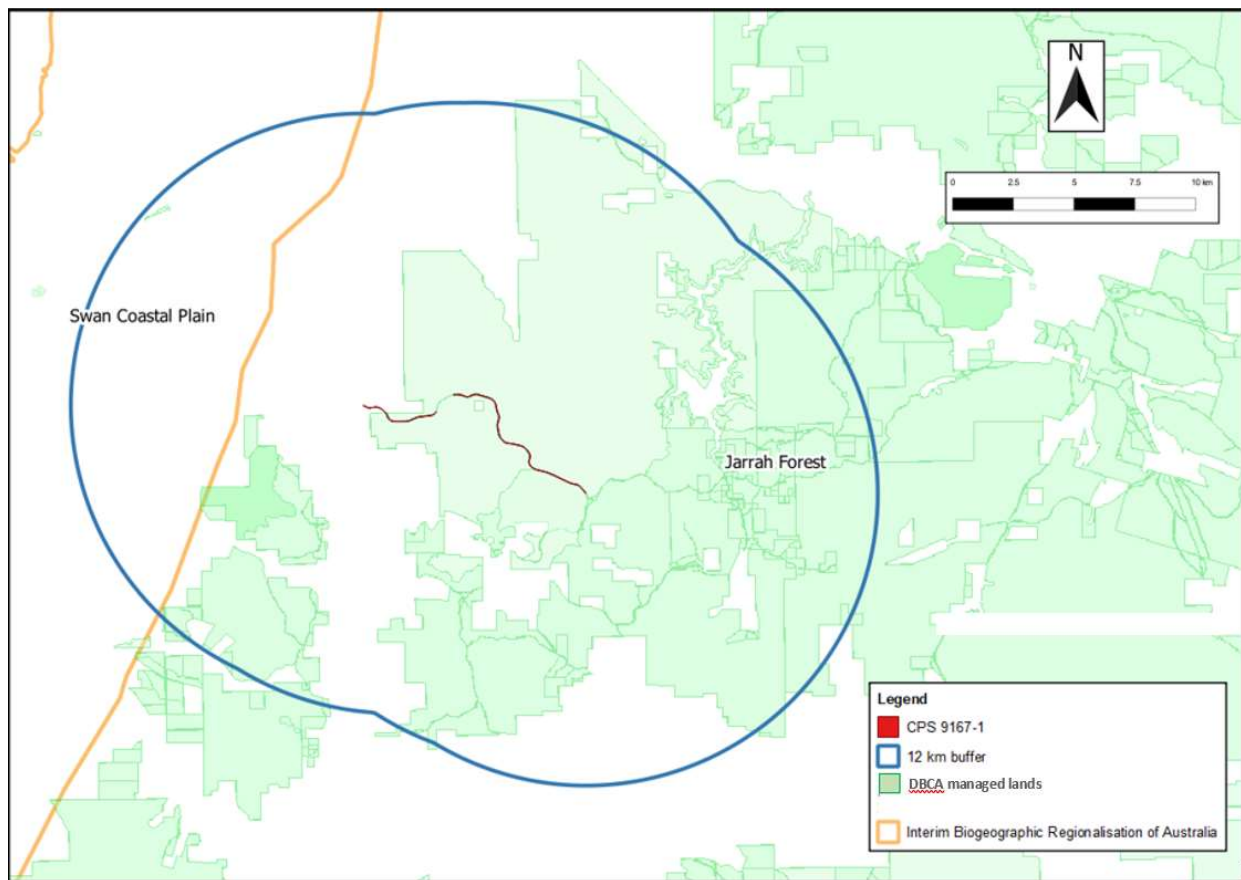


Figure 4: DBCA managed lands within 12 kilometres of the application area

Given the size of the clearing in relation to its position in the landscape, it is unlikely that native vegetation within the application area represents an important foraging resource to support known black cockatoo roosts. The proposed clearing is unlikely to impact black cockatoo species at either the local or regional scales. Noting that ground-dwelling mammals of conservation significance may occur within the vicinity of the application area, and that the native vegetation forms part of a very large remnant that is contiguous with DBCA managed lands, there is a risk that fauna may be present within the application area at the time of clearing. To minimise impact to individuals, slow and directional clearing toward adjacent native vegetation would allow any fauna present to retreat into adjacent vegetation ahead of the clearing activity.

Conclusion: For the reasons set out above it is considered that the impacts of the proposed clearing on fauna and fauna habitat values can be managed by implementing slow, progressive one directional clearing.

Conditions: To address the above impacts, the requirement to undertake slow, progressive one directional clearing to allow terrestrial fauna to move into adjacent habitat ahead of the clearing activity will be a condition on the permit.

3.2.3. Environmental value: nearby conservation areas – Clearing Principle (h)

Assessment: Proposed clearing is located entirely within the Pile Road Reserve. Immediately adjacent to the Pile Road Reserve along approximately 90 per cent of the application area, and on both sides of the road, are DBCA lands managed for conservation purposes (Figure 5). This includes the Wellington National Park (R 46213), and the Wellington Discovery Forest (R 48049). Both are vested in the Western Australian Conservation and Parks Commission.

The objective for the Wellington National Park is to fulfil the demand for recreation as is consistent with the proper maintenance and restoration of the natural environment and the protection of native flora and fauna (DEC 2008). Wellington National Park is a site for Western Shield, a DBCA managed conservation program that focuses on broadscale introduced predator control and the recovery of Threatened species (Burbidge *et al* 1995; Mawson 2003).

The Wellington Discovery Forest has a purpose of 'scientific research and education' and was established to provide visitors with an opportunity to learn about managing the Jarrah Forest (DEC 2008), and incorporates self-guided walk

trails as well as accommodation facilities. Both the Wellington National Park and the Wellington Discovery Forest are managed for conservation purposes.

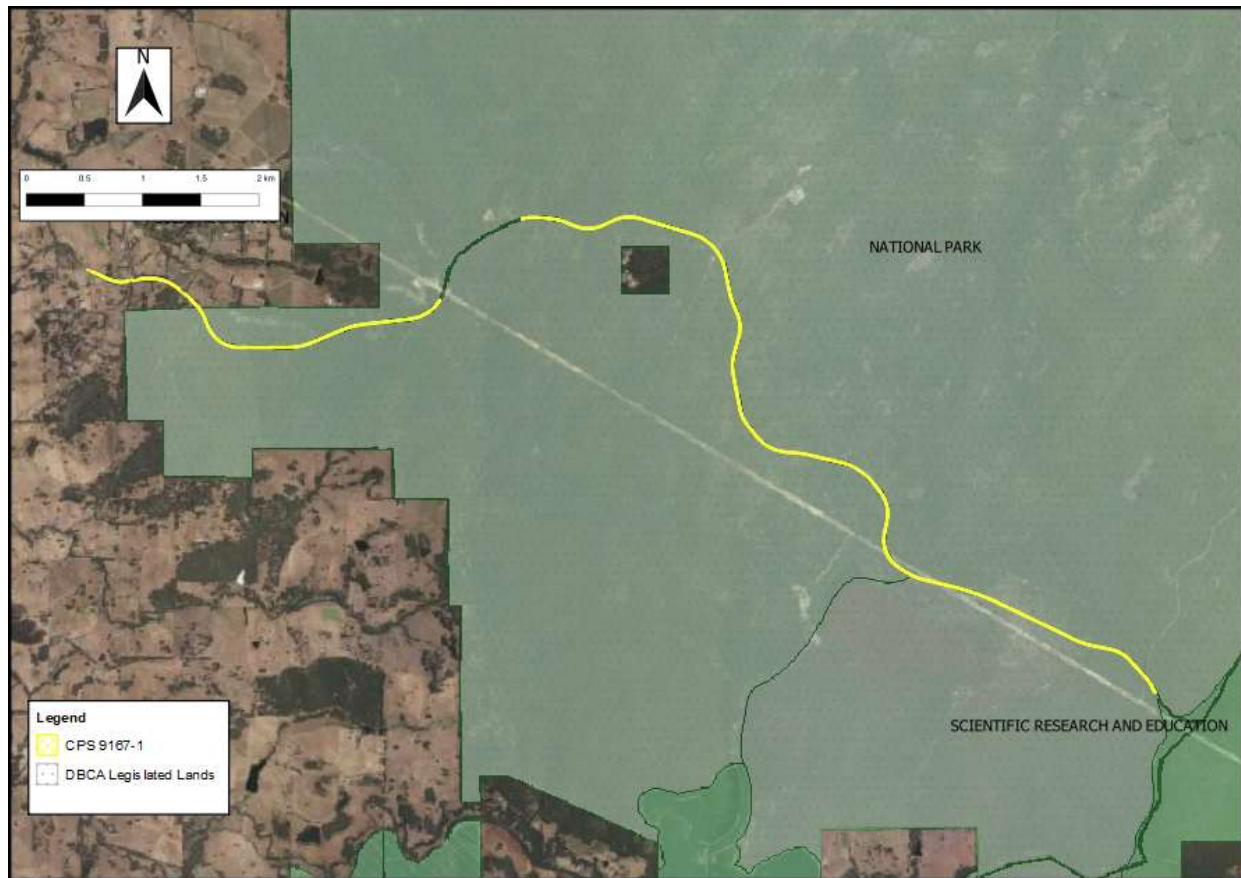


Figure 5: DBCA managed lands within the vicinity of the application area

The application area includes both sides of the Pile Road Reserve over a distance of approximately 11.38 kilometres, of which approximately 10.3 kilometres traverses DBCA managed lands. Native vegetation within the application area is contiguous with both Wellington National Park and the Wellington Discovery Forest. The application is confined to the Pile Road Reserve, and the entire road reserve will not be cleared. In general, the clearing width will be relatively small, in the order of one metre on each side (Section 3.1), and direct impacts to lands managed for conservation purposes are unlikely. Secondary impacts from the clearing proposed have the potential to affect lands managed for conservation purposes via off site erosion or the introduction or spread of dieback disease and weeds. Due to the contiguous native vegetation, dieback disease or weeds that are introduced or spread within areas adjacent to the application area have the potential to disperse into, and negatively impact, the adjacent DBCA managed lands.

Standard and staged road construction methodologies will be implemented including strategies for drainage controls and wind and water erosion. Soils will not be excavated at depth, and any indirect impacts to surrounding vegetation, soils, or drainage systems can be managed through appropriate design and standard construction methodologies (Shire of Dardanup 2021).

The clearing of up to 3.8 hectares of native vegetation along both sides of the existing Pile Road alignment is unlikely to directly impact adjacent lands managed for conservation purposes. However, the construction process has the potential to introduce or spread dieback disease and weeds into adjacent native vegetation contiguous with lands managed for conservation purposes.

Conclusion: For the reasons set out above, it is considered that the impacts of the proposed clearing on conservation areas can be managed by taking steps to minimise the risk of the introduction and spread of dieback disease and weeds.

Conditions: To address the above impacts, the implementation of dieback and weed management strategies as a condition on the permit will minimise the risk to the biodiversity values of adjacent native vegetation.

3.3. Relevant planning instruments and other matters

The application was advertised on the DWER website for a 21 day public comment period. One public submission was received in relation to this application (Appendix C).

The Shire of Dardanup is the public authority that manages the application area as it is located entirely within the Pile Road Reserve.

Local government approvals under the *Planning and Development Act 2005*, or any other Act, are not required. The application area is within a public road and the clearing purpose is consistent with the Shire of Dardanup Local Planning Strategy and Town Planning Scheme No. 3.

The application area is located within the Collie River Irrigation District (Sub-Area No 2) proclaimed under the *Rights in Water and Irrigation Act 1914* (RIWI Act). The application area is not located within any Groundwater Areas proclaimed under the RIWI Act. The application area does not intersect any rivers proclaimed under the RIWI Act. No beds or banks of any watercourse will be impacted, groundwater will not be intercepted, abstraction of groundwater or surface water will not be undertaken, and additional permitting under the RIWI Act will not be required.

The application area is not located within any *Country Areas Water Supply Act 1947* (CAWS Act) Clearing Control Catchments, Public Drinking Water Source Areas (PDWSA), or within any wellhead or reservoir protection zones.

A Registered Native Title Claim encompasses the application area. That is, Gnaala Karla Booja (WAD6274/1998), and the associated Gnaala Karla Booja Indigenous Land Use Agreement (ILUA) (WI2015/005). A Native Title Claim has also been filed that encompasses the application area. That is, the Single Noongar Claim - Area 1 (WAD6006/2003).

Spatial data indicates that no Registered Aboriginal Heritage sites occur within the proposed clearing area. Place ID 4806 (other heritage place - Saline Pipeline 1) intersects the application area at the extreme east of the application area. Registered Place ID 16713 (Collie River Waugal) and Registered Place ID 19796 (Ferguson River) are located approximately 540 metres to the north and approximately 240 metres to the south-west of the application area. It is the permit holder's responsibility to comply with the *Aboriginal Heritage Act 1972* (WA) and ensure that no Aboriginal Sites of Significance are damaged through the clearing process.

Appendix A – Site maps (A to F)

Figure 1

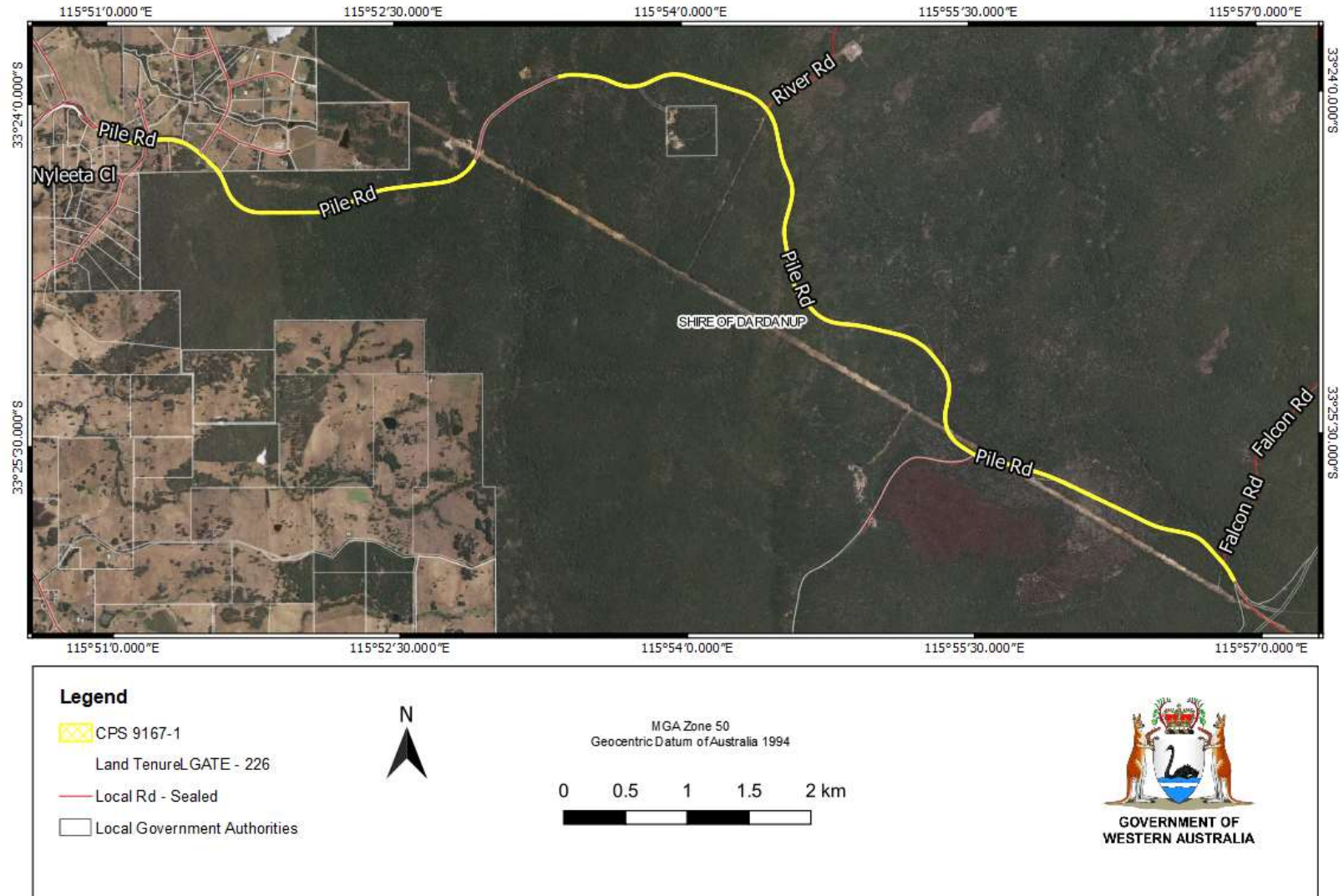


Figure 1: Map A










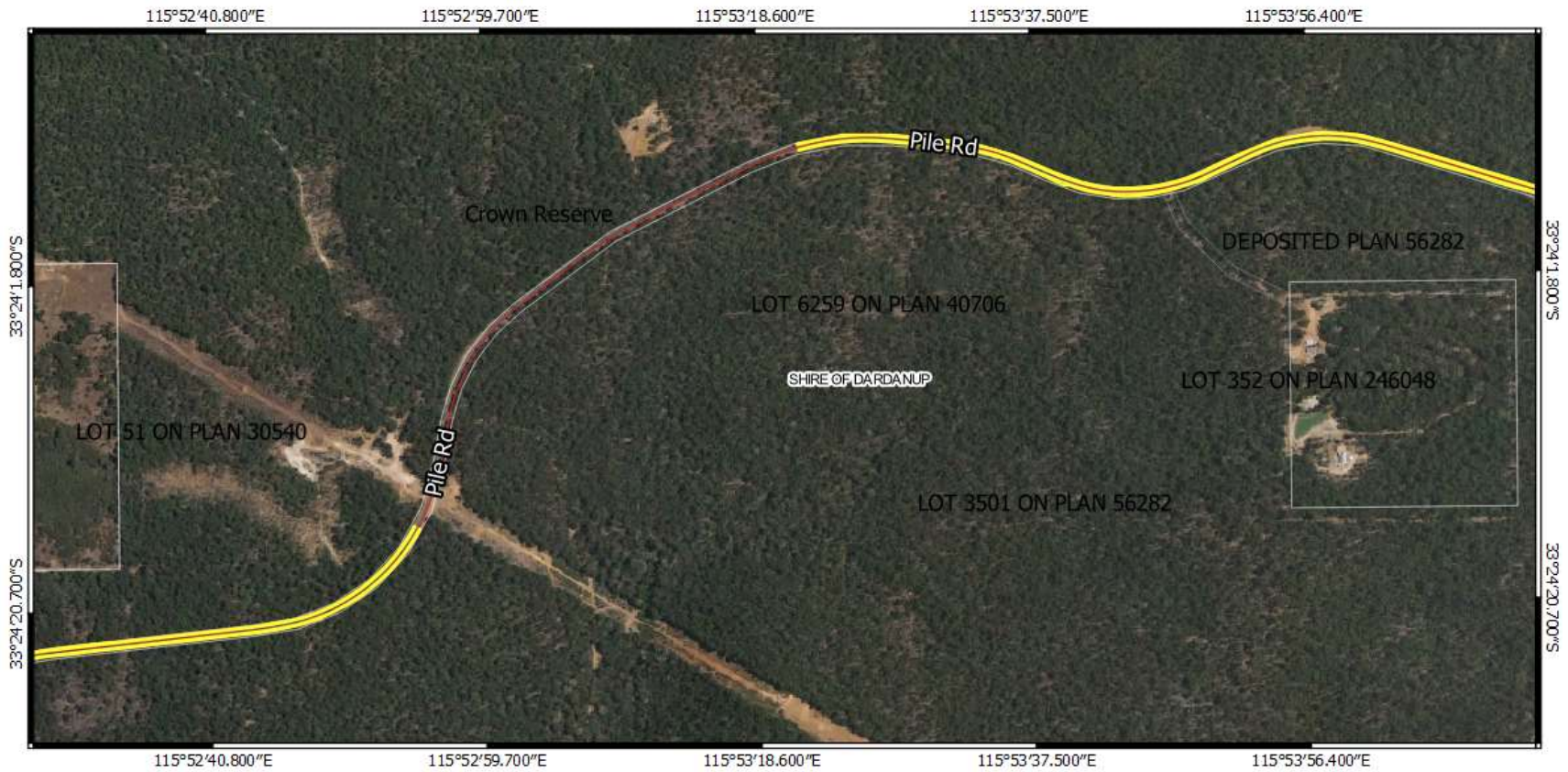
<p>Legend</p> <ul style="list-style-type: none">  CPS 9167-1  Land Tenure L.G.A.T.E - 226  Local Rd - Sealed  Local Government Authorities 	<p>N</p> 	<p>MGA Zone 50 Geocentric Datum of Australia 1994</p>	 <p>GOVERNMENT OF WESTERN AUSTRALIA</p>
<p>0 250 500 750 m</p> 			

Figure 1: Map B



Legend

- CPS 9167-1
- Land Tenure L GATE - 226
- Local Rd - Sealed
- Local Government Authorities

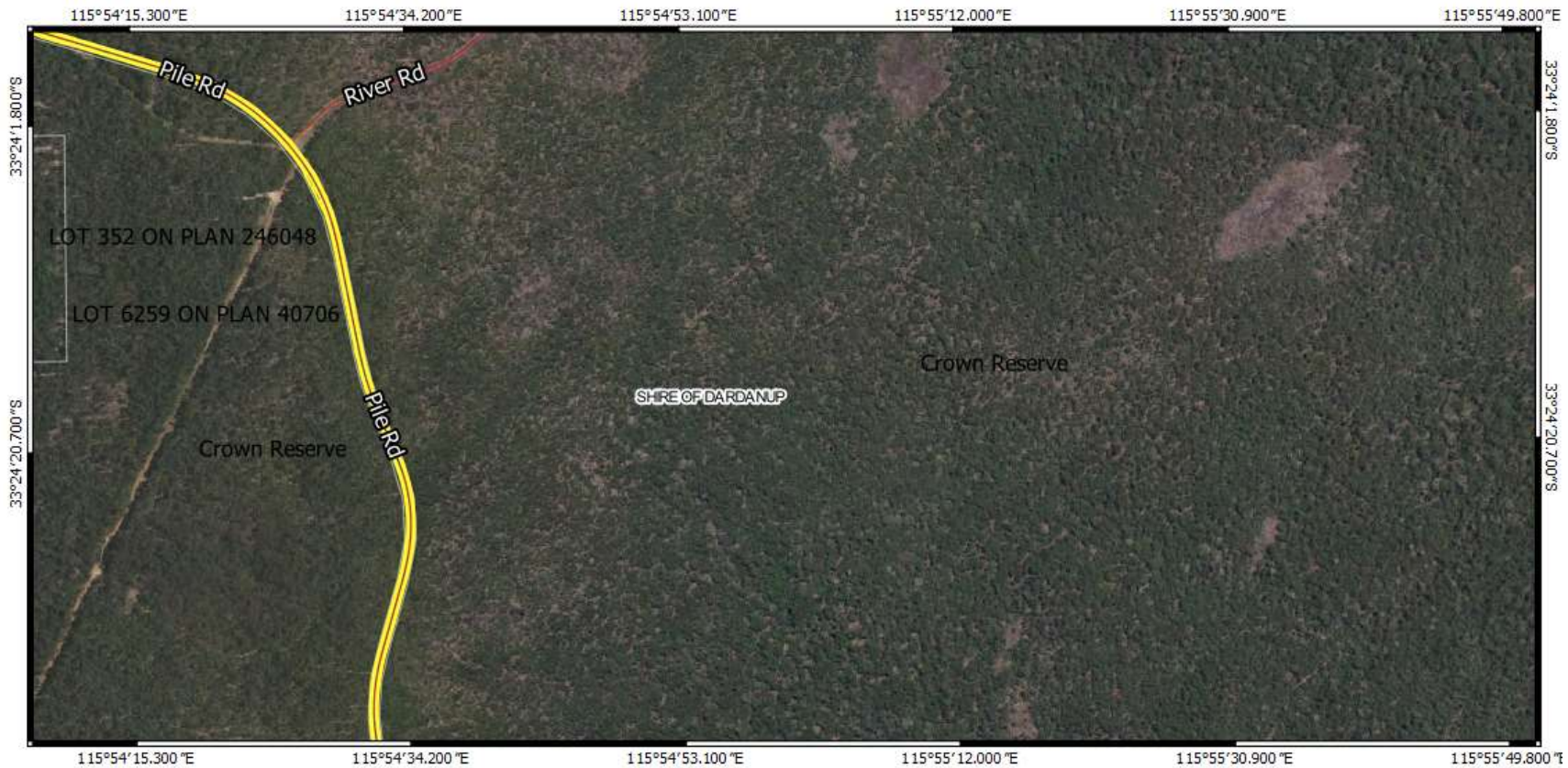
N

MGA Zone 50
Geocentric Datum of Australia 1994





0 250 500 750 m


GOVERNMENT OF
WESTERN AUSTRALIA

Figure 1: Map C




Legend


-  CPS 9167-1
-  Land TenureLGATE - 226
-  Local Rd - Sealed
-  Local Government Authorities



MGA Zone 50
Geocentric Datum of Australia 1994



0 250 500 750 m






**GOVERNMENT OF
WESTERN AUSTRALIA**

Figure 1: Map D




Legend

-  CPS 9167-1
- Land Tenure LGATE - 226
-  Local Rd - Sealed
-  Local Government Authorities

N

MGA Zone 50
Geocentric Datum of Australia 1994

0 250 500 750 m



**GOVERNMENT OF
WESTERN AUSTRALIA**

Figure 1: Map E



Legend		MGA Zone 50 Geocentric Datum of Australia 1994			
CPS 9167-1 Land Tenure L.G.A.T.E - 226					GOVERNMENT OF WESTERN AUSTRALIA
Local Rd - Sealed					
Local Government Authorities					

Figure 1: Map F



Legend

- CPS 9167-1
- Land Tenure LGATE - 226
- Local Rd - Sealed
- Local Government Authorities

N

MGA Zone 50
Geocentric Datum of Australia 1994

0 250 500 750 m

GOVERNMENT OF
WESTERN AUSTRALIA

Appendix B – Information provided by applicant

Summary	Reference
Supporting information for clearing permit application CPS 9167/1 including a description of clearing activities, with a revised clearing area provided.	Shire of Dardanup (2020)
Supporting information for clearing permit application CPS 9167/1 including justification and avoidance and minimisation strategies.	Shire of Dardanup (2021)
Supporting information for clearing permit application CPS 9167/1 that included a detailed flora and vegetation survey and a fauna survey that included an identification of all black cockatoo habitat trees within the application area and an assessment of black cockatoo breeding, roosting, and foraging habitat.	Natural Areas (2020)
Supporting information for clearing permit application CPS 9167/1 that included a detailed inspection of five habitat trees that Natural Areas (2020) described as providing potential hollows of a size that could be used by endangered black cockatoos (with no evidence of use apparent).	Harewood (2021)

Appendix C – Details of public submissions

Summary of comments	Consideration of comment
Objection to the granting of clearing permit application CPS 9167/1 due to unknown impacts on conservation-significant flora and fauna, and inadequate demonstration of avoidance and minimisation measures.	Potential impacts to conservation-significant flora and fauna species is addressed in Sections 3.2.1 and 3.2.2, and Appendix E. The Shire of Dardanup provided additional avoidance and minimisation strategies during the assessment that are summarised in Section 3.1.
Primary concerns are a lack of adequate avoidance and minimisation options, and no environmental surveys conducted.	The Shire of Dardanup provided additional avoidance and minimisation strategies during the assessment that are summarised in Section 3.1. A detailed flora and vegetation survey, as well as a fauna survey, was provided by the applicant during the assessment (Natural Areas 2020). A detailed inspection of five habitat trees that Natural Areas (2020) described as providing hollows of a size that could be potentially used by endangered black cockatoos was undertaken and reported in Harewood (2021) (Appendix G4).
Environmental surveys should be mandated by DWER before the clearing impact is assessed (should it occur beyond the current maintenance zone).	Environmental surveys were provided by the applicant prior to the assessment of the clearing impact: Natural Areas (2020), and Harewood (2021) (Appendix B).
Avoidance and minimisation	
Some areas of the existing road maintenance zone supports native vegetation. It is not stated in the application that clearing is intended to clear only in the current maintenance zone, or extend the width of the existing maintenance zone by five to six metres.	The applicant provided additional information during the assessment including avoidance and minimisation strategies (Shire of Dardanup 2021). The Shire of Dardanup propose to upgrade Pile Road by widening the road to seven metres of sealed width (that is two 3.5 metre lanes), with 0.5 metre partially-sealed shoulders on each side, and installing audible edge lines (Section 3.1).
If the clearing is to extend outside of the existing maintenance zone clear demonstration of avoidance and minimisation measures should be made.	Proposed clearing will extend outside of the existing maintenance zone. The applicant has provided justification and avoidance and minimisation measures (Section 3.1).
If clearing is only intended in the current road maintenance zone there is no objection to the granting of the permit.	Noted.
Conservation-signification taxa	
No surveys for flora of fauna have been conducted. With potential impact on flora and fauna of environmental value it is imperative that environmental surveys be performed before assessment of the application can be concluded.	Adequate environmental surveys were provided by the applicant prior to the assessment of the clearing impact including the surveys of Natural Areas (2020), and Harewood (2021) (Appendix B).
Fifteen conservation-significant flora have been recorded within a 10 kilometre radius of the centre of the Pile Road area, including the Threatened <i>Synaphea</i> sp. Fairbridge Farm and two Priority 1 species, one of which is endemic to the area (<i>Stylidium perplexum</i>).	Nineteen Priority flora taxa have been recorded within ten kilometres of the application area including <i>Synaphea</i> sp. Fairbridge Farm and <i>Stylidium perplexum</i> . (Appendix D2). A spring flora and vegetation survey was undertaken over the application area by Natural Areas (2020) (Section 3.2.1 and Appendix G2). No Priority flora were identified during the survey.

Summary of comments	Consideration of comment
Threatened black cockatoo species use the area for foraging and habitat.	Natural Areas (2020) and Harewood (2021) undertook black cockatoo habitat assessments. Impacts to black cockatoos is discussed in Section 3.2.2.

Appendix D – Site characteristics

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

1. Site summary

Site characteristic	Details						
Local context	<p>The application area is situated within the Jarrah Forest bioregion (JAF) of Thackway and Cresswell (1995), and the Southern Jarrah Forest subregion (JAF02). The proposed clearing area comprises 3.8 hectares in two sections totalling 11.38 kilometres in length on both sides of Pile Road in the Shire of Dardanup.</p> <p>Spatial data indicates that the local area (ten kilometre radius of the proposed clearing area) retains over 54 per cent of the original native vegetation cover.</p>						
Vegetation description (Mattiske and Havel 1998)	<p>Mattiske and Havel (1998) as updated by Webb <i>et al.</i> (2016) have described and mapped the application area as:</p> <ul style="list-style-type: none"> • Major portion <ul style="list-style-type: none"> ○ Hester, HR (SWF 140): Tall open forest to open forest of <i>Eucalyptus marginata</i> subsp. <i>marginata</i>-<i>Corymbia calophylla</i> on lateritic uplands in perhumid and humid zones. • Minor portion <ul style="list-style-type: none"> ○ Darling Scarp, DS2 (SWF 104): Mosaic of open forest of <i>Eucalyptus marginata</i> subsp. <i>marginata</i>-<i>Corymbia calophylla</i>, with some admixtures with <i>Eucalyptus laeliae</i> in the north (subhumid zone), with occasional <i>Eucalyptus marginata</i> subsp. <i>elegantella</i> (mainly in subhumid zone) and <i>Corymbia haematoxylon</i> in the south (humid zone) on deeper soils adjacent to outcrops, woodland of <i>Eucalyptus wandoo</i> (subhumid and semiarid zones), low woodland of <i>Allocasuarina huegeliana</i> on shallow soils over granite outcrops, closed heath of Myrtaceae-Proteaceae species and lithic complex on or near granite outcrops in all climate zones. • Minor portion <ul style="list-style-type: none"> ○ Yarragil 1, Yg1 (SWF 318): Open forest of <i>Eucalyptus marginata</i> subsp. <i>marginata</i>-<i>Corymbia calophylla</i> on slopes with mixtures of <i>Eucalyptus patens</i> and <i>Eucalyptus megacarpa</i> on the valley floors in humid and subhumid zones. <p>The flora and vegetation survey of Natural Areas (2020) recorded a single vegetation type, namely Jarrah-Marri Woodland, with <i>Corymbia calophylla</i> and <i>Eucalyptus marginata</i> over a middle storey of <i>Bossiaea aquifolium</i> subsp. <i>aquifolium</i> and an understorey of <i>Patersonia umbrosa</i>, <i>Acacia lateriticola</i>, <i>Conostylis serrulata</i> and <i>Lepidosperma pubisquameum</i> (Appendix G).</p> <p>The vegetation over the application area aligns with the regional vegetation description for Hester (above).</p>						
Vegetation condition (Keighery 1994)	<p>Natural Areas (2020) recorded the condition of the application area as 0.69 hectares (or 10 per cent) Degraded in the western portion of the application area and Excellent in the remainder utilising the scale of Keighery (1994).</p> <p>The full Keighery condition rating description is provided in Appendix F.</p>						
Soil description (Schoknecht, <i>et al.</i> 2004)	<p>Five soil types have been mapped over the 11.38 kilometres of the application area.</p> <table border="1"> <thead> <tr> <th>Symbol</th> <th>Name</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>255DpHRi</td> <td>Hester ironstone gravel ridges Phase</td> <td>Soil parent material is laterite. Soils are gravels with some sands and loams.</td> </tr> </tbody> </table>	Symbol	Name	Description	255DpHRi	Hester ironstone gravel ridges Phase	Soil parent material is laterite. Soils are gravels with some sands and loams.
Symbol	Name	Description					
255DpHRi	Hester ironstone gravel ridges Phase	Soil parent material is laterite. Soils are gravels with some sands and loams.					

Site characteristic	Details																																			
	255DpYGd	Yarragil downstream valleys Phase	Shallow, narrow valleys. Relief 20-40 m, slopes 3-10%. Valley floor is narrower than upstream phase. Soil parent materials are laterite, granite and gneiss. Soils are loamy gravels, loamy earths and deep sandy gravels.																																	
	255DpMH	Mornington Hill Subsystem	Low hills on laterite overlying granite, relief 40-80 m, slope 5-20%. Soils are sandy and loamy gravels with some deep sands and loamy earths.																																	
	255DpYGu	Yarragil upstream valleys Phase	Relief 5-20 m, slopes 3-10%. Valley floor is broader than downstream phase. Soil parent material is mainly laterite. Soils are gravels and sands.																																	
	255LvGR	Grimwade Subsystem	Moderately deep valleys (30-70 m) in granite. Soils are loamy earths and loamy gravels.																																	
Land degradation risk (DPIRD 2017)	<p>Land degradation risk ratings are provided in the table below.</p> <table border="1" data-bbox="505 701 1338 1268"> <thead> <tr> <th data-bbox="505 701 808 747">Aspect</th> <th data-bbox="808 701 1062 747">Soil Type</th> <th data-bbox="1062 701 1338 747">Mapped risk</th> </tr> </thead> <tbody> <tr> <td data-bbox="505 747 808 804">Wind Erosion</td> <td data-bbox="808 747 1062 804">255DpHRi</td> <td data-bbox="1062 747 1338 804">High (others Low to Medium)</td> </tr> <tr> <td data-bbox="505 804 808 848">Water Erosion</td> <td data-bbox="808 804 1062 848">All mapped soil types</td> <td data-bbox="1062 804 1338 848">Low to Medium</td> </tr> <tr> <td data-bbox="505 848 808 892">Water-logging</td> <td data-bbox="808 848 1062 892">All mapped soil types</td> <td data-bbox="1062 848 1338 892">Low to Medium</td> </tr> <tr> <td data-bbox="505 892 808 936">Water repellance</td> <td data-bbox="808 892 1062 936">All mapped soil types</td> <td data-bbox="1062 892 1338 936">Low to Medium</td> </tr> <tr> <td data-bbox="505 936 808 980">Phosphorus export</td> <td data-bbox="808 936 1062 980">All mapped soil types</td> <td data-bbox="1062 936 1338 980">Medium</td> </tr> <tr> <td data-bbox="505 980 808 1024">Salinity</td> <td data-bbox="808 980 1062 1024">All mapped soil types</td> <td data-bbox="1062 980 1338 1024">Low</td> </tr> <tr> <td data-bbox="505 1024 808 1068">Sub surface acidification</td> <td data-bbox="808 1024 1062 1068">All mapped soil types</td> <td data-bbox="1062 1024 1338 1068">High</td> </tr> <tr> <td data-bbox="505 1068 808 1113">ASS</td> <td data-bbox="808 1068 1062 1113">Not mapped</td> <td data-bbox="1062 1068 1338 1113">Not mapped</td> </tr> <tr> <td data-bbox="505 1113 808 1226">Flood Risk</td> <td data-bbox="808 1113 1062 1226">255DpYGd</td> <td data-bbox="1062 1113 1338 1226">Portions in east within L2: 3-10% of the map unit has a moderate to high flood risk</td> </tr> <tr> <td data-bbox="505 1226 808 1268">FPM Floodplain</td> <td data-bbox="808 1226 1062 1268">None in vicinity</td> <td data-bbox="1062 1226 1338 1268"></td> </tr> </tbody> </table>			Aspect	Soil Type	Mapped risk	Wind Erosion	255DpHRi	High (others Low to Medium)	Water Erosion	All mapped soil types	Low to Medium	Water-logging	All mapped soil types	Low to Medium	Water repellance	All mapped soil types	Low to Medium	Phosphorus export	All mapped soil types	Medium	Salinity	All mapped soil types	Low	Sub surface acidification	All mapped soil types	High	ASS	Not mapped	Not mapped	Flood Risk	255DpYGd	Portions in east within L2: 3-10% of the map unit has a moderate to high flood risk	FPM Floodplain	None in vicinity	
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Flood Risk	255DpYGd	Portions in east within L2: 3-10% of the map unit has a moderate to high flood risk																																		
FPM Floodplain	None in vicinity																																			
Waterbodies	<p>The application area is located in the Western Darling Range hydrological zone. No wetlands bisect the application area, and there are no geomorphic wetlands within the vicinity of the application area, with the closest located approximately 1.5 kilometres to the north.</p> <p>The Collie River parallels the application area to the north-east, approximately 2.7 kilometres from the application area, and the Ferguson River parallels the application area to the south-west, approximately 3.3 kilometres from the application area. Two minor drainage lines traverse the application area.</p>																																			
Hydrogeography	<p>The application area:</p> <ul style="list-style-type: none"> • Is located within Collie River Irrigation District (Sub-Area No 2) proclaimed under the RIWI Act • Is <u>not</u> located within any Groundwater Areas proclaimed under the RIWI Act; • Is not located within any CAWS Act Clearing Control Catchments; and • Is not located within any Public Drinking Water Source Areas. • Groundwater has been mapped at 500-1,000 TDS/Mg/L (that is, fresh) 																																			

Site characteristic	Details
Conservation areas	<p>The application area is located wholly within the Pile Road Reserve (PIN 1334102; PIN 1334103; PIN 1280690 (Ferguson and Henty), and PIN 11232671 (Wellington Forest).</p> <p>Immediately adjacent to the Pile Road Reserve along approximately 90 per cent of the application area, and on both sides of the road, are DBCA lands managed for conservation purposes. That is, Wellington National Park (R 46213 – vested in the Western Australian Conservation and Parks Commission) and Wellington Discovery Forest (R 48049 – vested in the Western Australian Conservation and Parks Commission)</p>
Climate and landform	<p>The climate of the Collie area is warm and temperate. The winter months have higher rainfall than summer months with an annual rainfall of approximately 927 millimetres (BOM 2020).</p> <p>The application area is predominantly located within the Darling Plateau sub-system. That is, a lateritic plateau with duplex sandy gravels, loamy gravels and wet soils supporting an open forest of Jarrah-Marri.</p>

2. Ecosystem, flora, and fauna analysis

With consideration for the site characteristics set out above, and relevant datasets (Appendix H2), an analysis of relevant ecosystem, flora, and fauna factors are presented below.

2a) Ecological Linkages

There are no formal Regional Ecological Linkages within 2.4 kilometres of the application area.

2b) Ecological Communities

There are no mapped Threatened Ecological Communities (TECs) endorsed by the Western Australian Minister for the Environment within the local area of a ten kilometre radius on the application area. There are no Priority Ecological Communities (PECs) listed by DBCA within four kilometres of the application area.

Priority Ecological Communities		WA status	Commonwealth status	Closest record
Whicher Scarp C5	Dardanup Jarrah and Mountain Marri woodland on laterite	P1		5.3 km south-west
Banksia WL SCP	Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region	P3	EN	4.7 km west

2c) Conservation significant flora recorded within ten kilometres of the application area

Two Threatened flora taxa have been recorded within ten kilometres of the application area.

Nineteen Priority flora taxa have been recorded within ten kilometres of the application area; three P1; three P2; eight P3 and five P4.

A likelihood of occurrence assessment was undertaken by Natural Areas (2020) and is presented in Appendix G2. Natural Areas (2020) have undertaken a flora and vegetation survey of the application area where no Threatened or Priority flora were identified.

Threatened flora taxon	WA Status	Count	Closest record	Habitat suitable
<i>Synaphea</i> sp. Fairbridge Farm (D. Papenfus 696)	CR	2	4,066	
<i>Eleocharis keigheryi</i>	VU	3	8,084	

Priority flora taxa	WA Status	Count	Closest record	Habitat suitable
<i>Stylidium perplexum</i>	P1	9	518	
<i>Gastrolobium</i> sp. Yoongarillup (S.Dilkes s.n. 1/9/1969)	P1	3	4,393	
<i>Orianthera wendyae</i>	P1	2	6,266	
<i>Stylidium acuminatum</i> subsp. <i>acuminatum</i>	P2	4	2,068	Yes
<i>Gastrolobium whicherense</i>	P2	7	4,567	
<i>Grevillea rosieri</i>	P2	3	7,615	
<i>Stylidium paludicola</i>	P3	1	3,341	
<i>Acacia oncinophylla</i> subsp. <i>oncinophylla</i>	P3	4	3,722	
<i>Lomandra whicherensis</i>	P3	4	4,567	
<i>Synaphea polypodioides</i>	P3	7	5,724	Yes
* <i>Pithocarpa corymbulosa</i>	P3	*1	5,873	Yes
<i>Carex tereticaulis</i>	P3	5	6,691	
<i>Lasiopetalum laxiflorum</i>	P3	1	7,493	
<i>Synaphea hians</i>	P3	1	7,728	
<i>Caustis</i> sp. Boyanup (G.S. McCutcheon 1706)	P3	1	9,901	
<i>Senecio leucoglossus</i>	P4	2	717	Yes
<i>Boronia tenuis</i>	P4	1	1,940	Yes
<i>Acacia semitrullata</i>	P4	2	3,695	
<i>Chamelaucium erythrochlorum</i>	P4	2	5,529	
<i>Aponogeton hexatepalus</i>	P4	2	7,591	

* Naturebase record

2d) Conservation significant fauna recorded within ten kilometres of the application area:

Eight birds and ten mammals of conservation significance have been recorded in the local area.

Common name	Taxon	WA Status	Count	Closest record	Habitat suitable
Birds					
Carnaby's Cockatoo	<i>Calyptorhynchus latirostris</i>	EN	11	285	Yes
Baudin's Cockatoo	<i>Calyptorhynchus baudinii</i>	EN	22	3,289	Yes
White-tailed Black Cockatoo	'white-tailed black cockatoo'	EN	44	197	Yes
Forest Red-tailed Black Cockatoo	<i>Calyptorhynchus banksii naso</i>	VU	28	2,187	Yes
Peregrine Falcon	<i>Falco peregrinus</i>	OS	2	285	
Blue-billed Duck	<i>Oxyura australis</i>	P4	2	7,930	
Fork-tailed Swift	<i>Apus pacificus</i>	MI	1	197	
Glossy Ibis	<i>Plegadis falcinellus</i>	MI	1	285	
Mammals					
Woylie	<i>Bettongia penicillata ogilbyi</i>	CR	62	451	Yes
Western Ringtail Possum	<i>Pseudocheirus occidentalis</i>	CR	211	2,173	
Numbat	<i>Myrmecobius fasciatus</i>	EN	2	7,736	
Quokka	<i>Setonix brachyurus</i>	VU	478	1	Yes
Chuditch	<i>Dasyurus geoffroi</i>	VU	64	766	Yes
Brush-tailed Phascogale (SW)	<i>Phascogale tapoatafa wambenger</i>	CD	32	16	Yes
Quenda	<i>Isodon fusciventer</i>	P4	72	1,123	Yes
Water-Rat	<i>Hydromys chrysogaster</i>	P4	4	3,321	
Western Brush Wallaby	<i>Notamacropus irma</i>	P4	7	3,786	Yes
Western False Pipistrelle	<i>Falsistrellus mackenziei</i>	P4	3	4,086	Yes

3. Vegetation extent

3a) Regional vegetation mapping (Government of Western Australia 2019a; Government of Western Australia 2019b)

	Pre-European extent (ha)	Current extent (ha)	Remaining (%)	Current extent in all DBCA managed land (ha)	Current extent in all DBCA managed land (%)
IBRA bioregion:					
JAF	4,506,660	2,399,838	53.3	1,673,614	69.7
Vegetation complex:					
SWF 140	32,250	23,763	73.7	21,647	67.1
SWF 104	32,448	13,586	41.9	3,288	10.1
SWF 318	80,203	64,927	81.0	59,064	73.6

Local Area	Pre-European extent (ha)	Current extent (ha)	Remaining (%)
10 km radius	53,247	30,446	57.2

Appendix E – Assessment against the Clearing Principles

Assessment against the Clearing Principles	Variance level	Is further consideration required?
Environmental value: biological values		
<p><u>Principle (a):</u> “Native vegetation should not be cleared if it comprises a high level of biodiversity.”</p> <p><u>Assessment:</u> Vegetation is along an existing road verge and in Degraded to Excellent condition using the values of Keighery (1994). There are no TECs endorsed by the Western Australian Minister for the Environment or listed under the EPBC Act, nor any PECs listed by the DBCA mapped within four kilometres of the application area. Two Threatened flora taxa, and nineteen Priority flora taxa listed by the DBCA have been recorded within ten kilometres of the application area of which habitat is suitable for five Priority taxa. No flora taxa of conservation significance were recorded by Natural Areas (2020).</p>	Not likely to be at variance	Yes See Section 3.2.1
<p><u>Principle (b):</u> “Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna.”</p> <p><u>Assessment:</u> Eight birds and ten mammals of conservation significance have been recorded in the local area, of which habitat is suitable for three species of black cockatoos and six ground-dwelling mammals. No trees utilised for roosting, or providing hollows necessary for breeding by black cockatoos were recorded in the application area (Harewood 2021). However, foraging habitat is present. The distribution of six ground-dwelling mammals of conservation significance is likely to extend into extensive adjoining areas managed for conservation purposes.</p>	May be at variance	Yes See Section 3.2.2
<p><u>Principle (c):</u> “Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora.”</p> <p><u>Assessment:</u> Two Threatened flora taxa have been recorded within ten kilometres of the application area. The Critically Endangered <i>Synaphea</i> sp. Fairbridge Farm (D. Papenfus 696) occurs in sandy soils with lateritic pebbles, near winter-wet flats, and in low woodland with weedy grasses (WAHerb 1998-). The Vulnerable <i>Eleocharis keigheryi</i> (K.L.Wilson) occurs in clays and sandy loam, and is emergent in freshwater creeks, claypans (WA Herb 1998). Habitat is not suitable over the application area for either species and were not recorded by Natural Areas (2020). The application area is unlikely to include, or be necessary for, the continued existence of Threatened flora.</p>	Not likely to be at variance	No
<p><u>Principle (d):</u> “Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a threatened ecological community.”</p> <p><u>Assessment:</u> There are no any mapped Threatened Ecological Communities (TECs) endorsed by the Western Australian Minister for the Environment within the local area of a ten kilometre radius on the application area. Vegetation over the application area does not align with any TECs (Natural Areas 2020), and the application area is unlikely to comprise the whole or a part of, or be necessary for the maintenance of a Threatened Ecological Community.</p>	Not at variance	No
Environmental values: significant remnant vegetation and conservation areas		
<p><u>Principle (e):</u> “Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.”</p> <p><u>Assessment:</u> The national objectives and targets for biodiversity conservation in Australia has a target to prevent clearance of ecological communities with an</p>	Not at variance	No

Assessment against the Clearing Principles	Variance level	Is further consideration required?
<p>extent below 30 per cent of that present pre the year 1750, below which species loss appears to accelerate exponentially at an ecosystem level (Commonwealth of Australia 2001). All three mapped complexes have retained over 40 per cent of their original extent and exceed national targets (Government of Western Australia 2019b).</p> <p>Within the local area of a ten kilometre radius of the application area, 30,446 hectares or over 57 per cent of the area supports native vegetation, much of which is in lands managed for conservation purposes. The application area is not considered significant as a remnant of native vegetation in an area that has been extensively cleared.</p>		
<p><u>Principle (h):</u> <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.”</i></p> <p><u>Assessment:</u> Immediately adjacent to the Pile Road Reserve, within which the application area is located, are DBCA lands managed for conservation purposes. That is, Wellington National Park (R 46213 – vested in the Western Australian Conservation and Parks Commission and managed by the DBCA) and Wellington Discovery Forest (R 48049 – vested in the Western Australian Conservation and Parks Commission and managed by the DBCA). These lands occur on both sides of the Pile Road Reserve along approximately 90 per cent of the 11.38 kilometre long application area.</p>	Not likely to be at variance	Yes See Section 3.2.3
Environmental values: land and water resources		
<p><u>Principle (f):</u> <i>“Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.”</i></p> <p><u>Assessment:</u> The application area is located in the Western Darling Range hydrological zone. There are no mapped geomorphic wetlands within the vicinity of the application area. Two minor drainage lines traverse the application area that are culverted. No riparian vegetation was recorded by Natural Areas (2020) and native vegetation proposed for clearing is not growing in, or in association with, an environment associated with a watercourse or wetland.</p>	Not at variance	No
<p><u>Principle (g):</u> <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.”</i></p> <p><u>Assessment:</u> Five soil types have been mapped over the 11.38 kilometres of the application area, however, one soil type dominates. That is, the Hester ironstone gravel ridges phase of laterite with soils of gravels with some sands and loams. All of the mapped soils are generally resistant water erosion, water-logging, water repellence, and salinity. Standard and staged road construction methodologies will be implemented including strategies for drainage controls and wind and water erosion. Soils will not be excavated at depth, and any impacts to surrounding landscapes, soils, or drainage systems can also be managed through appropriate design. Noting the minor extent of proposed clearing along an existing road, the proposed clearing is not likely to cause appreciable land degradation.</p>	Not likely to be at variance	No
<p><u>Principle (i):</u> <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.”</i></p> <p><u>Assessment:</u> No significant surface water intersects the application area with just two small culverted drainage lines crossing Pile Road. The proposed clearing of the Pile Road roadside may cause some short term water quality issues in terms of localised surface water sedimentation during works. Standard and staged road construction methodologies will be implemented including strategies for drainage</p>	Not likely to be at variance	No

Assessment against the Clearing Principles	Variance level	Is further consideration required?
<p>control and water erosion. Soils will not be excavated at depth, and any impacts to surrounding landscapes, soils, or drainage systems can be managed through design to appropriate standards and guidance. The proposed clearing of native vegetation is not likely to cause deterioration in the quality of surface or underground water.</p>		
<p><u>Principle (j)</u>: <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.”</i></p> <p><u>Assessment</u>: Five soil types have been mapped over the 11.38 kilometres of the application area. They are generally rated at a low flood risk. There are no FPM (Flood Plain Management) floodplains mapped in the vicinity.</p> <p>The hydrology of the area is altered due to existing roadside infrastructure. Surface flow may occur over short distances for short periods during, and immediately after, very intense rainfall. Standard road construction methodologies will be implemented including strategies for drainage controls and water erosion and any potential for flooding can be managed through appropriate drainage design to appropriate standards and guidance. Given the small scale and linear nature of the proposed clearing, and the standard construction methodologies employed, the proposed clearing is unlikely to cause, or exacerbate, the incidence or intensity of flooding.</p>	Not at variance	No

Appendix F – Vegetation condition rating scale

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

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

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

Appendix G – Biological survey information

1. Representative photograph of the application area (Natural Areas 2020)

Shire of Dardanup

Detailed Flora and Basic Fauna Survey: SLK 4.54 – 16.94 Pile Road Ferguson

4.2.2 Vegetation Type

A single vegetation type was recorded within the survey site, namely Jarrah-Marri Woodland, with *Corymbia calophylla* and *Eucalyptus marginata* over a middle storey of *Bpssiaea aquifolium* subsp. *aquifolium* and an understorey of *Patersonia umbrosa*, *Acacia lateriticola*, *Conostylis serrulata* and *Lepidosperma pubisquameum* (Figure 6).



Figure 6: Jarrah-Marri Woodland, Pile Road



4.2.3 Vegetation Condition

Vegetation condition ranged from Excellent to Degraded, with majority of the site in Excellent condition.



2. Flora and vegetation survey excerpts (Natural Areas 2020)

Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood (Y/N)	Comment
	<i>Acacia ocnophylla</i> subsp. <i>ocnophylla</i>	Shrub, 0.9-2.5 m high, 'minni-ritchi' bark, phyllodes mostly 8-13 cm long, 1-2 mm wide. Fl. yellow	Aug to Oct	Granitic soils	P3	N	Soils not suitable
		Slender, erect, pungent shrub, (0.1-) 0.2-0.7(-1.5) m high. Fl. cream-white	May to Oct	White/grey sand, sometimes over laterite, clay. Sandplains, swampy areas	P4	N	Soils not suitable
	Swamp Honeypot	Shrubs, 0.5-1.5 m high; branchlets hairy. Leaves petiolate, alternate, 150-455 mm long, 3-10 mm wide, hairy; petiole 14-35 mm long; lamina flat, once divided, pinnately divided, divided to the midrib, with 30-102 lobes on each side, the margins revolute. Inflorescences hirsute (with long, rough, and coarse hairs), brown; innermost bracts 23-24 mm long, hairy. Perianth 26-29 mm long, hairy, all over, limb apex hirsute	Aug to Sep	Sandy clay, gravel	T, En	N	Soils not suitable




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Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood (Y/N)	Comment
		(with long, rough, and coarse hairs), without awns; pistil 35-45 mm long, curved, style glabrous. Follicles glabrous, obovate, 9-13 mm long					
	Whicher Range Dryander	Erect, open, non-lignotuberous shrub, 1.2-4 m high. Fl. yellow	Jun to Nov	White/grey sand, gravelly clay or loam. Winter-wet flats, clay flats	T, Vu	N	Soils not suitable
	Blue Boronia	Procumbent or erect & slender shrub, 0.1-0.5 m high. Fl. blue/pink-white	Aug to Nov	Laterite, stony soils, granite	P4	Y	Soils suitable Recorded within Shire of Dardanup
	<i>Brachyscias verecundus</i> Ironstone Brachyscias	Annual (or ephemeral), herb, 0.012-0.022 m high, entirely glabrous. Fl. white/cream; may be a disturbance opportunist the requires fire for seed germination	Nov	In a moss sward on a granite outcrop; winter wet clay over ironstone in open to tall shrubland	T, CE	N	Soils not suitable



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Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood (Y/N)	Comment
<i>Chamelaucium erythrochlorum</i> (previously <i>Chamelaucium</i> sp. <i>Yoongarillup</i>)					P4	U	Recorded within Shire of Dardanup
<i>Chamelaucium roycei</i> (previously <i>Chamelaucium</i> sp. <i>S coastal plain</i>)					T, Vu	U	Not recorded in Shire of Dardanup
	Tall Donkey Orchid	Tuberous, perennial, herb, 0.5-1.05 m high. Fl. yellow	Nov to Dec or Jan	Low-lying depressions, swamps	T, Vu	N	Soils not suitable
	Dwarf Bee-Orchid	Tuberous, perennial, herb, 0.3-0.6 m high. Fl. yellow and brown.	Sep - Oct	Brown loamy clay. Winter-wet swamps, in shallow water.	T, Vu	N	Soils not suitable


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Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood (Y/N)	Comment
	Purdie's Donkey Orchid	Tuberous, perennial, herb, 0.15-0.35 m high. Fl. yellow	Sep to Oct	Grey-black sand, moist. Winter-wet swamps	T, En	N	Soils not suitable
		Tuberous, perennial, herb, 0.15-0.3 m high. Fl. red & yellow	Sep to Oct	White-grey sand	T, Vu	N	Soils not suitable
		Rhizomatous, clumped perennial, grass-like or herb (sedge), to 0.4 m high. Fl. green	Aug to Nov	Clay, sandy loam. Emergent in freshwater: creeks, claypans	T, Vu	N	Soils not suitable
<i>Gastrolobium</i> sp. <i>Yoongarillup</i>					P1	U	Recorded within Shire of Dardanup


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Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood (Y/N)	Comment
		Slender, open shrub, to 1.6 m high. Fl. orange/yellow/red	Oct	Red-grey sandy clay over quartzite. Steep westerly slopes	P2	N	Soils not suitable
		Shrubs, 0.50 m high; branchlets hairy, not glaucous. Leaves alternate, 15-35 mm long, 0.5-1.5 mm wide, hairy, on the adaxial or abaxial surface, the hairs straight; lamina flat, more or less the same width throughout, entire, the margins revolute, enclosing the lower surface of the leaf blade, forming a single groove. Inflorescences axillary, red or brown; pedicels 3-5 mm long. Perianth 6.5-8 mm long; tepals all free after flower opens, hairy, simple-hairy; ovary hairy, stipitate, the stipe 1-2 mm long; pistil 15-20 mm long, red, pollen presenter	July, August, or September	Sandy soils	P2	N	Soils not suitable


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Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood (Y/N)	Comment
		lateral or oblique, style glabrous. Follicles hairy, not viscid, dehiscent, 6-10 mm long					
		Shrubs; branchlets hairy. Leaves whorled, 10-30 mm long, 5-8 mm wide, hairy or glabrous; lamina flat, widest around the middle or clearly widest above the middle, once divided, pinnately divided, entire or shallowly divided, the margins flat; apex pungent, 1.2-2 mm long. Inflorescences yellow; innermost bracts 22-27 mm long. Perianth 40-42 mm long, glabrous; pistil 42-45 mm long, style hairy	February, March, April, or December	White sandy soils over laterite, orange/brown-red clay over ironstone. Flats to foothills, winter-wet sites	T, En	N	Soils not suitable
	<i>Lasiopetalum laxiflorum</i>				P3	U	Recorded within Shire of Dardanup
	<i>Lomandra whicherensis</i>				P3	U	Recorded within Shire of Dardanup
	<i>Orianthera wendyae</i>				P1	U	Recorded within Shire of Dardanup


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Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood (Y/N)	Comment
	Corymbosa Pithocarpa	Erect to scrambling perennial, herb, 0.5-1 m high. Fl. white	Jan to Apr	Gravelly or sandy loam. Amongst granite outcrops	P3	Y	Soils suitable Recorded within Shire of Dardanup
<i>Senecio leucoglossus</i>		Erect annual, herb, to 1.3 m high. Fl. white	Aug to Dec	Gravelly lateritic or granitic soils. Granite outcrops, slopes	P4	Y	Soils suitable Recorded within Shire of Dardanup
<i>Stylidium acuminatum</i> (Carlquist) Wege subsp. <i>acuminatum</i> (previously <i>Stylidium acuminatum</i> subsp. <i>acuminatum</i>)					P2	Y	Recorded within 2 km of Pile Rd
<i>Stylidium paludicola</i>		Reed-like perennial, herb, 0.35-1 m high, Leaves tufted, linear or subulate or narrowly oblanceolate, 0.5-4 cm long, 0.5-1.5 mm wide, apex acute, margin entire, glabrous. Scape mostly glabrous, inflorescence axis glandular. Inflorescence racemose. Fl. pink,	Oct to Dec	Peaty sand over clay. Winter wet habitats. Marri and Melaleuca woodland, Melaleuca shrubland	P3	N	Soils not suitable
<i>Stylidium perplexum</i>					P3	U	Recorded in Shire of Dardanup

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Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood (Y/N)	Comment
		Shrubs; branchlets hairy. Leaves alternate, 90-220 mm long, hairy; petiole hairy; lamina flat, clearly widest above the middle, once divided, divided only at the apex, shallowly divided, indumentum spreading; terminal leaf lobe 5-7 mm long, 3-5 mm wide. Inflorescences yellow; scape 90-320 mm long; floral bracts 1.5-2 mm long. Perianth 7-8 mm long, hairy; adaxial tepal 7-8 mm long; abaxial tepal 6-6.5 mm long; ovary hairy, style glabrous; style including stigmatic disc 3.5-4 mm long, horned; stigma 2-2.2 mm long, 1.2-1.3 mm wide. Follicles 6-7 mm long	July, August, September, October, or November	Sandy soils. Rises	P3	N	Soils not suitable



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Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood (Y/N)	Comment
		Shrubs; branchlets hairy. Leaves alternate, (140-)170-225 mm long, glabrous; petiole glabrous; lamina flat, once divided, tripartitely divided, deeply divided; distance from base of leaf to lowest lobe 30-140 mm; terminal leaf lobe 10-40 mm long, 4-7 mm wide; lowest lobes 25-75 mm long. Inflorescences yellow; scape 155-400 mm long; floral bracts 2-2.2 mm long. Perianth 5-7 mm long, glabrous; adaxial tepal 5-7 mm long; abaxial tepal 4.5-6.5 mm long; ovary hairy, style glabrous; style including stigmatic disc 2.7-3 mm long, strongly concave; stigma 1.5 mm long, 1-1.5 mm wide. Follicles NaN mm (?) long	September, October, or November	Light brown loam, red-brown sandy loam, gravelly, brown sandy clay over laterite. In undulating areas	P3	Y	Soils suitable Recorded within Shire of Dardanup

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Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood (Y/N)	Comment
		Shrubs; branchlets hairy. Leaves alternate, 120-240 mm long, hairy; petiole hairy; lamina terete or flat, once divided or twice or more divided, pinnately divided or tripartitely divided, deeply divided or divided to the midrib, indumentum appressed; distance from base of leaf to lowest lobe 75-150 mm; terminal leaf lobe 10-50 mm long, 1.5-8 mm wide; lowest lobes 20-70 mm long. Inflorescences yellow; scape 105-420 mm long; floral bracts 2-3 mm long. Perianth 5-6 mm long, hairy; adaxial tepal 5-6 mm long; abaxial tepal 4-5.2 mm long; ovary hairy, style glabrous; style including stigmatic disc 3-3.5 mm long, lobed; stigma 0.8-1 mm long, 0.6-0.8 mm wide. Follicles 6.5-8.5 mm long	September or October	Sandy with lateritic pebbles. Near winter-wet flats, in low woodland with weedy grasses	T, CE	N	Soils not suitable

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Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood (Y/N)	Comment
					T	U	Not recorded in Shire of Dardanup
		<p>Shrubs; branchlets hairy. Leaves alternate, 150-280 mm long, glabrous; petiole glabrous; lamina terete or flat, twice or more divided, pinnately divided, deeply divided or divided to the midrib; distance from base of leaf to lowest lobe 100-160 mm; terminal leaf lobe 5-55 mm long, 2-4 mm wide; lowest lobes 45-90 mm long. Inflorescences yellow; scape 220-330 mm long; floral bracts 1.5-2 mm long. Perianth 5-6 mm long, glabrous; adaxial tepal 5-6 mm long; abaxial tepal 4.2-4.5 mm long; ovary hairy, style glabrous; style including stigmatic disc 3.5-4 mm long, horned; stigma 1-1.2 mm long, 1-1.5 mm wide. Follicles 5-6 mm long</p>	Aug to Oct	Sandy or sandy clay soils. Winter-wet flats, granite	T, En	N	Soils not suitable

3. Habitat tree data (Natural Areas 2020)

Easting	Northing	Tree species	Common name	Comments
393060.17	6303525.96	<i>Corymbia calophylla</i>	Marri	
393094.85	6303508.22	<i>Corymbia calophylla</i>	Marri	
393106.21	6303501.76	<i>Corymbia calophylla</i>	Marri	
393137.59	6303491.96	<i>Corymbia calophylla</i>	Marri	
393141.14	6303486.82	<i>Corymbia calophylla</i>	Marri	Dead tree
393153.56	6303483.88	<i>Corymbia calophylla</i>	Marri	
393190.26	6303466.72	<i>Corymbia calophylla</i>	Marri	
393193.06	6303464.86	<i>Corymbia calophylla</i>	Marri	
393253.90	6303450.72	<i>Corymbia calophylla</i>	Marri	
393568.67	6303478.25	<i>Corymbia calophylla</i>	Marri	
393817.48	6303353.26	<i>Corymbia calophylla</i>	Marri	
393921.71	6303280.72	<i>Corymbia calophylla</i>	Marri	
394573.64	6302889.13	<i>Corymbia calophylla</i>	Marri	
395642.02	6303115.17	<i>Eucalyptus marginata</i>	Jarrah	
395847.66	6303150.62	<i>Eucalyptus marginata</i>	Jarrah	
396976.07	6303990.34	<i>Eucalyptus marginata</i>	Jarrah	
397023.58	6303983.18	<i>Corymbia calophylla</i>	Marri	
397321.76	6303907.23	<i>Eucalyptus marginata</i>	Jarrah	Dead tree
397462.79	6303950.10	<i>Corymbia calophylla</i>	Marri	
398478.22	6303467.12	<i>Corymbia calophylla</i>	Marri	
398498.21	6303395.55	<i>Corymbia calophylla</i>	Marri	
398579.97	6303142.65	<i>Corymbia calophylla</i>	Marri	
399187.42	6301963.51	<i>Eucalyptus marginata</i>	Jarrah	
399947.20	6301012.66	<i>Eucalyptus marginata</i>	Jarrah	
400015.49	6300960.28	<i>Eucalyptus diversicolor</i>	Karri	
400102.07	6300916.34	<i>Eucalyptus marginata</i>	Jarrah	
400536.21	6300800.67	<i>Eucalyptus marginata</i>	Jarrah	Potential hollows
400892.24	6300654.80	<i>Corymbia calophylla</i>	Marri	
401203.15	6300506.70	<i>Corymbia calophylla</i>	Marri	
401230.22	6300495.80	<i>Eucalyptus marginata</i>	Jarrah	
401729.79	6300318.65	<i>Eucalyptus marginata</i>	Jarrah	
401768.76	6300296.61	<i>Eucalyptus marginata</i>	Jarrah	
401809.40	6300300.59	<i>Eucalyptus marginata</i>	Jarrah	
401817.17	6300283.73	<i>Eucalyptus marginata</i>	Jarrah	Potential hollows
401915.32	6300245.35	<i>Corymbia calophylla</i>	Marri	Potential hollows
401966.16	6300180.22	<i>Corymbia calophylla</i>	Marri	Potential hollows
402024.34	6300133.56	<i>Corymbia calophylla</i>	Marri	
402101.02	6300050.22	<i>Corymbia calophylla</i>	Marri	Potential hollows
402101.63	6300032.82	<i>Corymbia calophylla</i>	Marri	
402114.84	6300011.80	<i>Corymbia calophylla</i>	Marri	
402168.89	6299920.17	<i>Corymbia calophylla</i>	Marri	
402177.40	6299907.54	<i>Corymbia calophylla</i>	Marri	
402181.40	6299897.09	<i>Corymbia calophylla</i>	Marri	
402191.80	6299880.01	<i>Corymbia calophylla</i>	Marri	
402206.98	6299861.27	<i>Corymbia calophylla</i>	Marri	

4. Habitat tree summary (Harewood 2021)

CPS 9167/1 – BLACK COCKATOO HABITAT TREE ASSESSMENT - JULY 2021 – V1

SUMMARY

The Shire of Dardanup (the Shire) are seeking permission to selectively clear up to 6.93 hectares of native vegetation from within the Pike Road Reserve between SLK 4.54 – 16.94 from the Department of Water and Environmental Regulation (DWER) (ref: CPS 9167/1).

Natural Area Consulting Management Services (Natural Area) were commissioned by the Shire to undertake a detailed flora and vegetation survey and a basic fauna assessment of the road reserve in September 2020 with information being provided to DWER.

During a detailed flora and vegetation survey and a basic fauna assessment of the road reserve in September 2020 Natural Area Consulting Management Services (Natural Area) identified five trees within the survey area as containing what they considered to be "hollows of a size that could be used by endangered black cockatoos, with no evidence of use by these species apparent" (Natural Area 2020). Apart from a map showing their location, no other information relating to the trees or the hollows they contained was provided in the report.

Upon review of the information DWER have advised the Shire that in order to assist in determining the impacts to black cockatoos a more detailed habitat tree assessment of the five previously identified hollow bearing trees was required. This report details the results of an assessment carried out to satisfy this request.

Primary Findings

None of the previously identified "hollow bearing" trees were found to contain hollows that were considered by the Author to be suitable for black cockatoos to use for nesting purposes. This conclusion was in most cases based on the hollows actually being non-existent or being too small/shallow/open.

Details of each tree and the hollows they contain can be found in Appendix A.

Based on these observations the trees in question can, if required, be removed without impacting on breeding black cockatoos that may be frequenting the general area.

This report should be forwarded to DWER for their review.

Table 1: Summary of Habitat Tree Observations

Tree ID	Number of Possible Hollows	Status	Justification
432	4	Unsuitable Hollows/No Hollow.	Marri with four possible large spout type hollows. When examined with the drone two of the possible hollows were found to have little or no depth. The other two spouts were found to be solid sawn off branches removed for safety reasons as they would have been overhanging the road.
441	1	Unsuitable Hollow.	Marri with one possible large side entry hollow. When examined with the drone the hollow was found to be too shallow/small to be suitable for a black cockatoo to use for nesting purposes. Some chew marks evident on left side of hollow entrance may be a consequence of black cockatoos visiting the hollow for water which had pooled in the shallow base of the hollow after recent rains.
443	1	No Hollow.	Marri with possible upward facing chimney/spout style hollow. This "hollow" could not be examined with a drone due to dense foliage but appeared, when viewed with binoculars, to be a solid broken off branch/trunk. The branch/trunk was also too small (~20cm diameter) to accommodate a hollow that would be suitable for a nesting black cockatoo in any event.
447	2+	Unsuitable Hollows/No Hollows.	Jarrah that did not appear to have any large hollows. The only possible hollows appeared to be very small "knot holes" with <5cm entrances.
466	4	Unsuitable Hollows/No Hollows.	Jarrah (near dead) with two possible spouts and two possible side entry hollows. Upon closer inspection with a drone all the possible hollows were found to be too shallow or non-existent and unsuitable for black cockatoos to use for nesting purposes.



Appendix H – References and databases

1. References

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2. GIS datasets

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

- Aboriginal Heritage Places (DPLH-001)
- Cadastre (LGATE-218)
- DBCA – Lands of Interest (DBCA-012)
- DBCA Legislated Lands and Waters (DBCA-011)
- Directory of Important Wetlands in Australia – Western Australia (DBCA-045)
- Environmentally Sensitive Areas (DWER-046)
- Flood Risk (DPIRD-007)
- Groundwater Salinity Statewide (DWER-026)
- Hydrography – Inland Waters – Waterlines
- Hydrological Zones of Western Australia (DPIRD-069)
- IBRA Vegetation Statistics
- Imagery
- Local Planning Scheme – Zones and Reserves (DPLH-071)
- Native Title (ILUA) (LGATE-067)
- Offsets Register – Offsets (DWER-078)
- Pre-European Vegetation Statistics
- Public Drinking Water Source Areas (DWER-033)
- Ramsar Sites (DBCA-010)
- Regional Parks (DBCA-026)
- Remnant Vegetation, All Areas
- RIWI Act, Groundwater Areas (DWER-034)
- RIWI Act, Surface Water Areas and Irrigation Districts (DWER-037)
- Soil Landscape Land Quality – Flood Risk (DPIRD-007)
- Soil Landscape Land Quality – Phosphorus Export Risk (DPIRD-010)
- Soil Landscape Land Quality – Subsurface Acidification Risk (DPIRD-011)
- Soil Landscape Land Quality – Water Erosion Risk (DPIRD-013)
- Soil Landscape Land Quality – Water Repellence Risk (DPIRD-014)
- Soil Landscape Land Quality – Waterlogging Risk (DPIRD-015)
- Soil Landscape Land Quality – Wind Erosion Risk (DPIRD-016)
- Soil Landscape Mapping – Best Available
- Soil Landscape Mapping – Systems

Restricted GIS Databases used:

- Threatened Flora (TPFL)
- Threatened Flora (WAHerb)
- Threatened Fauna
- Threatened Ecological Communities and Priority Ecological Communities