



CLEARING PERMIT

Granted under section 51E of the Environmental Protection Act 1986

PERMIT DETAILS

Area Permit Number: CPS 9029/1
File Number: DWERVT6399
Duration of Permit: From 06/02/2021 to 06/02/2023

PERMIT HOLDER

Shire of Serpentine Jarrahdale

LAND ON WHICH CLEARING IS TO BE DONE

Lot 164 on Deposited Plan 202726 (Crown Reserve R 25911)

AUTHORISED ACTIVITY

- (a) The permit holder must not mechanically *clear* more than 0.44 hectares of *native vegetation* within the area cross-hatched yellow in Figure 1 of Schedule 1.
- (b) The permit holder is authorised to implement a *prescribed burn* to reduce fuel loads to less than two tonnes per hectare over 80 per cent of the 11.95 hectare area cross-hatched red in Figure 1 of Schedule 1.
- (c) This permit authorises the permit holder to clear native vegetation to the extent that the permit holder has the right under the *Bush Fires Act 1954* or any other written law.

CONDITIONS

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

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

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

2. Dieback and weed control

When undertaking any clearing or other activity 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*:

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

- (b) ensure that no dieback or weed-affected soil, *mulch, fill* or other material is brought into the area to be cleared;
- (c) restrict the movement of machines and other vehicles to the limits of the areas to be cleared;
- (d) only move soils in *dry conditions*; and
- (e) where dieback or *weed*-affected soil, *mulch, fill* or other material is to be removed from the area to be cleared, ensure it is transferred to areas of comparable *soil disease status*.

3. 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 activity (a)	<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) actions taken to avoid, minimise, and reduce the impacts and extent of <i>clearing</i> in accordance with <i>condition 1</i>; and (e) actions taken to minimise the risk of the introduction and spread of <i>weeds</i> and <i>Dieback</i> in accordance with <i>condition 2</i>.
2.	In relation to the authorised activity (b)	<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) actions taken to avoid, minimise, and reduce the impacts and extent of <i>clearing</i> in accordance with <i>condition 1</i>; and (e) actions taken to minimise the risk of the introduction and spread of <i>weeds</i> and <i>Dieback</i> in accordance with <i>condition 2</i>.

4. Reporting

The permit holder must provide to the *CEO* the records required under *condition 5* of this permit when requested by the *CEO*.

DEFINITIONS

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

Table 2: Definitions

Term	Definition
<i>CEO</i>	Chief Executive Officer of the Department responsible for the administration of the clearing provisions under the <i>Environmental Protection Act 1986</i> (WA).
<i>clearing</i>	has the meaning given under section 3(1) of the EP Act.
<i>condition</i>	a condition to which this clearing permit is subject under section 51H of the EP Act.
<i>Department</i>	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.
<i>Dieback</i>	means the effect of <i>Phytophthora</i> species on native vegetation.
<i>dry conditions</i>	means when soils (not dust) do not freely adhere to rubber tyres, tracks, vehicle chassis or wheel arches.
<i>fill</i>	means material used to increase the ground level, or to fill a depression.
<i>EP Act</i>	<i>Environmental Protection Act 1986</i> (WA).
<i>mulch</i>	means the use of organic matter, wood chips or rocks to slow the movement of water across the soil surface and to reduce evaporation.
<i>native vegetation</i>	has the meaning given under section 3(1) and section 51A of the EP Act.
<i>prescribed burn</i>	is the process of planning and applying fire to a predetermined area, under specific environmental conditions, to minimise the size and intensity of fire on life, property and critical infrastructure.
<i>soil disease status</i>	means soil types either infested, not infested, uninterpretable or not interpreted with a pathogen.
<i>weeds</i>	means any plant – (a) that is a declared pest under section 22 of the <i>Biosecurity and Agriculture Management Act 2007</i> ; or (b) published in a Department of Biodiversity, Conservation and Attractions species-led ecological impact and invasiveness ranking summary, regardless of ranking; or (c) not indigenous to the area concerned.

END OF CONDITIONS



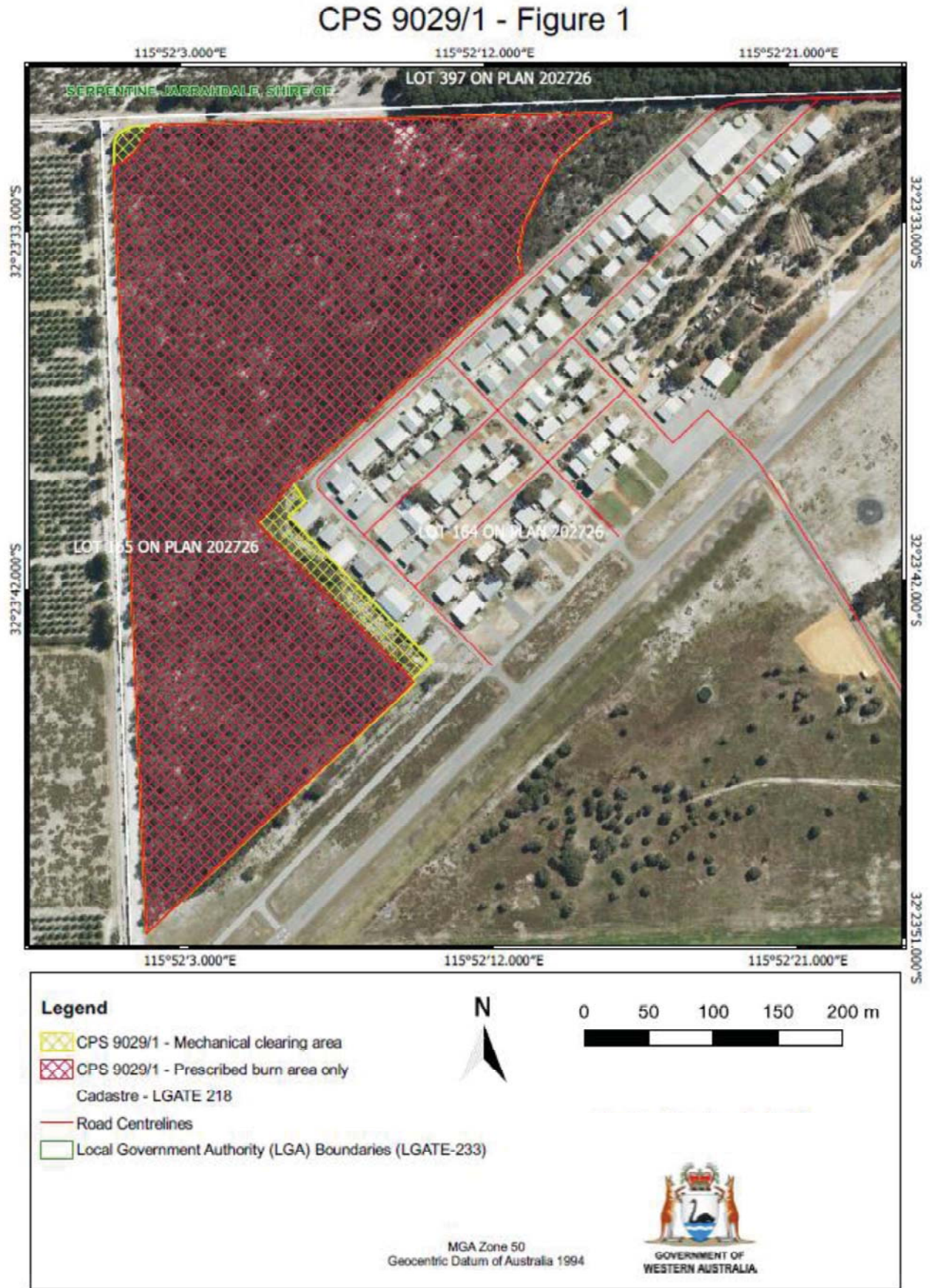
Erika Eto
A/MANAGER
NATIVE VEGETATION REGULATION

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

14 January 2021
CPS 9029/1, 14 January 2021

SCHEDULE 1

Figure 2: Map of the boundaries of the areas within which clearing may occur





Clearing Permit Decision Report

1. Application details and outcome

1.1. Permit application details

Permit number:	CPS 9029/1
Permit type:	Area permit
Applicant name:	Shire of Serpentine Jarrahdale
Application received:	31 August 2020
Application area:	12.39 hectares of native vegetation
Purpose of clearing:	Hazard reduction or fire control
Method of clearing:	Mechanical clearing and prescribed burning
Property:	Lot 164 on Deposited Plan 202726 (Crown Reserve R 25911)
Location (LGA area/s):	Shire of Serpentine Jarrahdale
Localities (suburb/s):	Hopeland

1.2. Description of clearing activities

The application is to clear up to 12.39 hectares of native vegetation to facilitate fire mitigation at Yangedi Reserve, which is managed by the Shire of Serpentine Jarrahdale (the Shire) for the purpose of recreation. The reserve includes Yangedi Airfield (Serpentine Airfield), and a lease in the north-west corner of the reserve where a Bureau of Meteorology (BOM) facility has been established.

The protection of the assets within the reserve is a component of the Shire's bushfire mitigation strategy. The Shire proposes to slash and mulch 20 metres of native vegetation around the BOM infrastructure (Appendix F1) and remove vegetation from 20 metres from the rear of airfield hangers (Appendix F2). This combined cleared area of 0.44 hectares is intended to remain cleared for fire mitigation purposes, with a limestone track constructed behind the hangers to create a solid barrier between the hangers and native vegetation.

The remainder of the application area (11.95 hectares, 96.4 per cent of the application area) is proposed to be a prescribed burn only (Figure 1).

1.3. Decision on application and key considerations

Decision:	Granted
Decision date:	14 January 2021
Decision area:	12.39 hectares of native vegetation as depicted in Section 1.5 (Figure 1)

1.4. Reasons for decision

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

In making this decision, the Delegated Officer had regard for the site characteristics (Appendix A), relevant datasets (Appendix F), supporting information and representative photographs provided by the applicant (Appendix E), the clearing principles set out in Schedule 5 of the EP Act (see Appendix C), relevant planning instruments, and any other matters considered relevant to the assessment (Section 3). The Delegated Officer also took into consideration the purpose of the clearing to reduce the risk of wildfire to the critical infrastructure of the Yangedi Airfield, as well as the conservation significant Banksia Woodland present over the application area.

The assessment identified that the proposed clearing will result in:

- the potential introduction and/or spread of weeds;
- the potential introduction and/or spread of Dieback disease (*Phytophthora* species);
- the short-term loss of 11.95 hectares of foraging habitat for the Endangered Carnaby's Cockatoo (*Calyptorhynchus latirostris*);

- the permanent loss of 0.44 hectares of vegetation for fire protection purposes within Bush Forever Site 378 consisting of Banksia Woodland, the majority of which (75 percent) is in either Completely Degraded or Degraded (Keighery 1994) condition.

After consideration of the available information, as well as the applicant's minimisation and mitigation measures (Section 3.1), the Delegated Officer determined the proposed clearing can be managed appropriately, and is not likely to lead to an unacceptable risk to environmental values.

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

- avoid, minimise and reduce the impacts and extent of clearing;
- restrict mechanical clearing to 0.44 hectares of the application area; and
- take hygiene steps to minimise the risk of the introduction and spread of weeds and Dieback disease.

1.5. Site maps

CPS 9029/1 - Figure 1

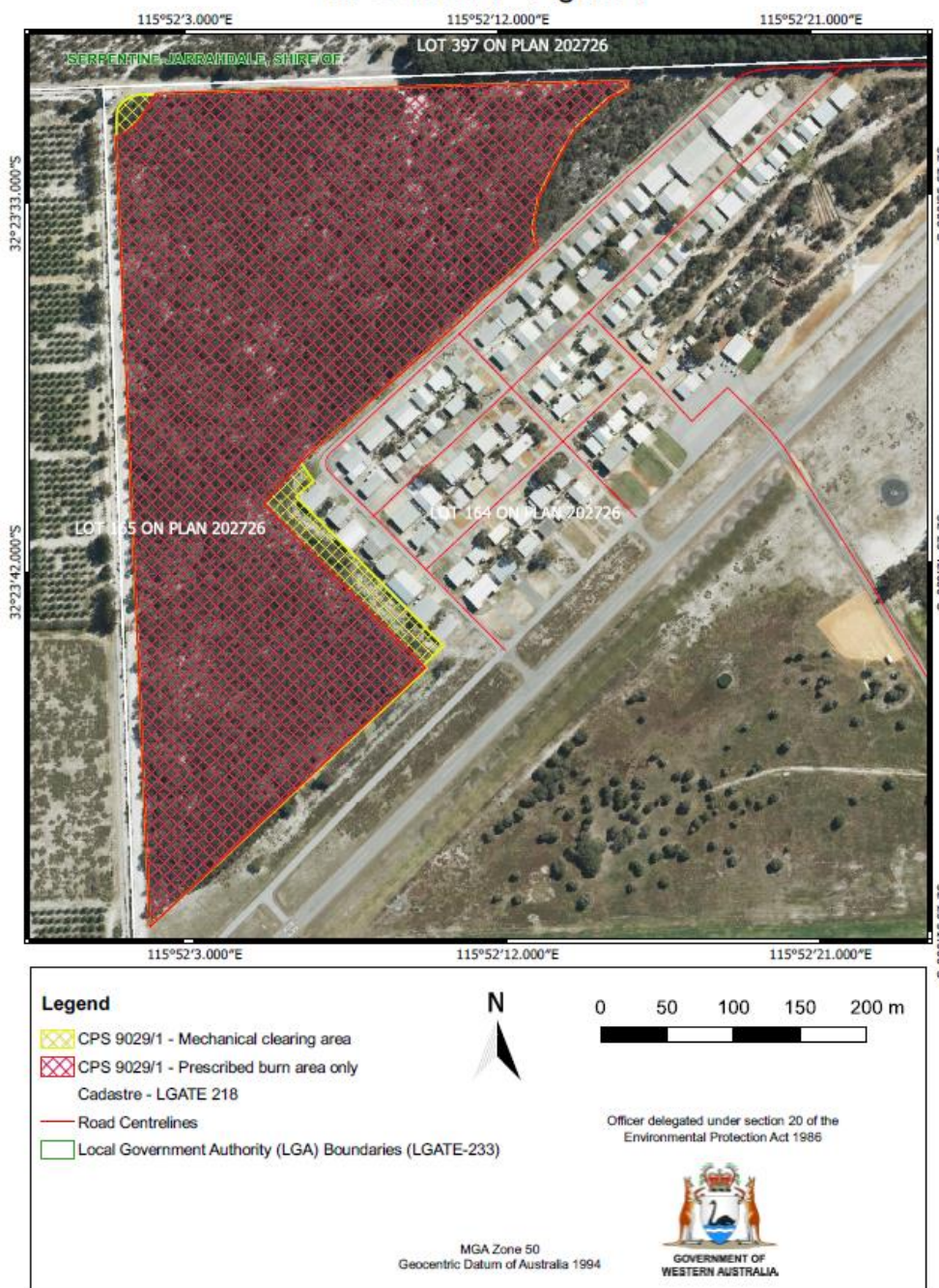


Figure 1. Map of the application area. The areas cross-hatched red indicates the area authorised for a prescribed burn only

2. Legislative context

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

In addition to the matters considered in accordance with section 51O of the EP Act (see Section 1.3), 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 inter-generational equity; and
- the principle of the conservation of biological diversity and ecological integrity.

Other legislation of relevance for this assessment include:

- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act);
- *Biodiversity Conservation Act 2016* (BC Act);
- *Bush Fires Act 1954* (BF Act); and
- *Conservation and Land Management Act 1984* (WA) (CALM Act).

The key guidance documents which inform this assessment are:

- *A guide to the assessment of applications to clear native vegetation* (DWER 2013); and
- *Procedure: Native vegetation clearing permits* (DWER 2019).
- *A guide to burning under the native vegetation clearing provisions. Environmental Protection Act 1986* (DER 2015)
- State Planning Policy 2.8 – Bushland Policy for the Perth Metropolitan Region (SPP 2.8)

3. Detailed assessment of application

3.1. Avoidance and mitigation measures

The clearing application is to protect and reduce the risk of wildfire to the critical infrastructure of the Yangedi Airfield, and the conservation significant Banksia Woodland present over the application area.

Proposed slashing and mulching within the asset protection zone (APZ) of the BOM infrastructure in the north-west corner is considered the only option to protect this critical infrastructure from wildfire damage. The minimum effective distance of 20 metres is proposed with slashing and mulching as opposed to mechanical clearing, to reduce impacts to adjacent Banksia Woodland (Shire of Serpentine Jarrahdale 2020a).

Proposed clearing immediately adjacent to the aircraft hangers is within an area that has been previously cleared and consists of regrowth native vegetation that is either in Completely Degraded or Degraded (Keighery 1994) condition. The minimum effective distance of 20 metres is proposed to be cleared with the inclusion of a limestone track to form a solid barrier, thereby enhancing the protection zone (Shire of Serpentine Jarrahdale 2020a). Mulching and/or mechanical clearing within the APZ of the airfield hangers is considered the only option to protect this critical infrastructure.

Proposed Prescribed Burn

The initial application CPS 9029/1 proposed an application area of 12.59 hectares. The application area was reduced during the assessment process to exclude from the prescribed burn a mapped conservation category wetland in the north-west corner (Shire of Serpentine Jarrahdale 2021). The exclusion of the mapped conservation category wetland revised the application area down to 12.39 hectares, of which 11.95 hectares (96.4 per cent of the application area) is proposed to be incorporated within a prescribed burn only (Figure 1).

The objective for the prescribed burn is to:

- reduce fuel loads to less than two tonnes per hectare over 80 per cent of the burn cell, minimising the size and intensity of fire on:
 - life, property and critical infrastructure; and
 - the Banksia Woodland,
- prior to the 2021 fire season (Shire of Serpentine Jarrahdale 2020b).

Prescribed burning with the objective of creating a mosaic of burnt and unburnt areas has been selected as a wildfire mitigation strategy over the majority of the application area. A large area has been selected as there are no available burn boundaries such as roads, fire breaks, or tracks. Prescribed burning would require less clearing than alternative mitigation measures such as mechanical removal or the establishment of strategic firebreaks. Mosaic burning by

means of a low intensity burn is proposed that facilitates refuges for plants and animals. Post-fire weed control will also be implemented as a strategy to mitigate potential vegetation degradation by the invasion of non-native species (Shire of Serpentine Jarrahdale 2020b).

The Shire has consulted widely with staff of Department of Fire and Emergency Services (DFES) and the Department of Biodiversity Conservation and Attractions (DBCA) in regard to the Banksia Woodland and fire management in Yangedi Reserve (Shire of Serpentine Jarrahdale 2020b). The current fuel loads in the identified burn cell indicate that the area has not had fire for approximately 25 plus years. Typically, fire intervals for Banksia Woodland are around the 12 to 16 year range (Shire of Serpentine Jarrahdale 2020b). The proposed burn will be a low intensity prescribed fire, which will be applied in a mosaic pattern. This will allow for habitat refuge, minimising environmental, ecological and sociological impacts, while maximising biodiversity outcomes within the Banksia Woodland.

The prescribed burn proposed under this application will be undertaken in autumn and will be conducted as a cool, slow burn with minimal scorch height. The autumn seasonality will allow the seed bank to be dispersed prior to any application of fire. To allow for altered fire regimes, it is recommended that the following fire be applied as a spring burn (Shire of Serpentine Jarrahdale 2020b).

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 A) and considered whether the clearing poses a risk to biological, conservation, or land and water resource values. The assessment against the Clearing Principles is contained in Appendix C.

This assessment identified that the clearing may pose a risk to environmental values of significant ecosystems, fauna, and conservation areas, and that these values required further consideration. The detailed consideration and assessment of the clearing impacts against the specific environmental values is provided below. Where the assessment found that the clearing presents an unacceptable risk to environmental values, conditions aimed at controlling and/or ameliorating the impacts have been imposed under sections 51H and 51I of the EP Act. These are also identified below.

3.2.1. Environmental value: Biological values (flora and vegetation) – Clearing Principles (a) to (d)

Assessment: The majority of the application area consists of the Banksia Dominated Woodlands of the Swan Coastal Plain, listed by the DBCA as a Priority 3 Priority Ecological Community (PEC) and synonymous with the Commonwealth-listed Banksia Woodlands of the Swan Coastal Plain Threatened Ecological Community (TEC) listed as Endangered under the EPBC Act. Banksia Woodlands are characterised by a high species richness and high species geographic turnover, particularly in the shrub and herbaceous layers (TSSC 2016). Banksia Woodlands also provide foraging habitat for the Endangered Carnaby's Cockatoo (*Calyptorhynchus latirostris*).

One hundred and nine native flora species (and 19 non-native flora species) have been recorded within the application area and within the immediate vicinity of the application area (Shire of Serpentine Jarrahdale 2011; Shire of Serpentine Jarrahdale 2020b) (Appendix E1). The closest Threatened flora record is approximately 6.6 kilometres distant, and the closest Priority flora record is approximately three kilometres distant (Appendix A3). No Priority or Threatened flora species have been recorded within the application area, and the application area is unlikely to include, or be necessary for the continued existence of, Priority or Threatened flora.

Approximately 0.39 hectares of Banksia Woodland in a 20 metre strip is proposed to be cleared adjacent to the hangers. This area represents three per cent of the application area and consists of regrowth native vegetation in a predominantly Completely Degraded to Degraded (Keighery 1994) condition (Appendix E2). Noting this area was previously cleared, available databases does not map this area as Banksia Dominated Woodlands of the Swan Coastal Plain, nor as remnant vegetation. A very small area of approximately 0.06 hectares furthest from the hangers is in Good (Keighery 1994) condition (Shire of Serpentine Jarrahdale 2020b) (Appendix E2).

Approximately 0.05 hectares of native vegetation adjacent to the BOM infrastructure in the north-west corner of the application area consists of Banksia Woodland in Very Good (Keighery 1994) condition.

In total approximately 0.44 hectares of Banksia Woodland is proposed to be mechanically cleared or slashed. Approximately 75 per cent of this area is either Completely Degraded or Degraded, with the remainder in Good or Very Good condition. The loss of 0.11 hectares of Banksia Woodland in Good to Very Good (less than one per cent of the application area) is unlikely to significantly impact the Banksia Dominated Woodlands of the Swan Coastal Plain ecological community of the Yangedi Road Airfield Reserve.

Approximately 11.95 hectares of native vegetation is proposed to be burnt for wildfire protection purposes. Fire regimes, are determined by four major factors: intensity, frequency, season, and scale (the extent and patchiness of a fire) (Wilson, *et al.* 2010). Habitats from a range of fire ages is required to maximise biodiversity (Valentine *et al.* 2012).

Banksia Woodland is an ecosystem maintained by fire (Barrett *et al.* 2018). However, the Banksia Woodland ecosystem also supports many “re-seeders” which are vulnerable to being burnt too frequently (Barrett *et al.* 2018), and burning rotations longer than those required for fuel reduction purposes may be necessary to maximise conservation values (DER 2015; Hobbs and Atkins 1990).

A minimum fire interval in Banksia Woodland based on the slowest maturing species killed by fire is recommended, with plant diversity maximised after five to ten years since fire, with many shrub species being most abundant after two to five years (Barrett, *et al.* 2018).

The current fuel loads over the majority of the application area indicate that the area has not had fire for approximately 25 years (Shire of Serpentine Jarrahdale 2020b). Consistent with relevant guidance (Barrett, *et al.* 2018; Enright, *et al.* 1996; Hobbs and Atkins 1990; TSSC 2016; Wilson, *et al.* 2010) the proposed burn is designed to be of low intensity (that is cool) with minimal scorch height, and applied in a mosaic application (Shire of Serpentine Jarrahdale 2020b). The burn is proposed to be conducted in autumn to allow for the seed bank to be dispersed prior to any application of fire. The Shire of Serpentine Jarrahdale (2020b) have advised that to allow for altered fire regimes it is recommended that the subsequent prescribed burn should be applied as a spring burn.

No Priority or Threatened flora species have been recorded in the application area or immediate surrounds (Shire of Serpentine Jarrahdale 2011; Shire of Serpentine Jarrahdale 2020b). Mechanical clearing or mulching of 0.11 hectares of Banksia Woodland in Good to Very Good (less than one per cent of the application area) is unlikely to significantly impact the Banksia Woodlands present over the application area.

Fire management is crucial for effective bushland management, and based on the information provided the prescribed burn proposed is based upon the current knowledge of Banksia Woodland and aimed at maximising biodiversity outcomes. However, nineteen non-native flora species (weeds) are known from the vicinity and mechanical clearing, mulching and/or burning has the potential to introduce or exacerbate the distribution and impact of weeds. The Banksia Woodland is also susceptible to Dieback disease (*Phytophthora* species) (Barber, *et al.* 2013), that may be inadvertently introduced via mechanical clearing and prescribed burning activities. Post-fire weed control and Dieback management will be implemented by the Shire to mitigate potential vegetation degradation (Shire of Serpentine Jarrahdale 2020b).

Outcome: Based on the above assessment, the Delegated Officer has determined that the proposed clearing is considered acceptable subject to relevant conditions in relation to this environmental value.

Conditions: To address the above impacts, the following conditions will be added to the permit:

- Restrict mechanical clearing to 0.44 hectares of the application area.
- Implement weed and Dieback management measures to mitigate impacts to native vegetation.

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

Assessment: A total of 18 birds, three mammals and two reptiles of conservation significance have been recorded from the local area (Appendix A3). The Vulnerable Chuditch (*Dasyurus geoffroii*) and Conservation Dependant Brush-tailed Phascogale (*Phascogale tapoatafa wambenger*) have large home ranges (DEC 2012; Soderquist *et al.* 2008) and require large areas of contiguous habitat to support populations and are unlikely to occur. The Priority 4 Quenda (*Isoodon fusciventer*) may occur in smaller remnants with areas of dense vegetation (van Dyck *et al.* 2008). Numerous sightings of the Quenda have been made in the local area, with the closest within 600 metres, and this species is likely to be present.

Of the birds, 15 are shorebirds and waterbirds protected under International Agreements including Priority and Threatened species (particularly the Families: Scolopacidae, Charadriidae, and Glareolidae) (DBCA 2007-). These species have been recorded on shorelines in wetland areas over eight kilometres to the west. The small area of dampland adjacent to the application area to the north-west does not provide that habitat required (Appendix E2). Similarly, the two reptiles recorded are from areas over eight kilometres to the west.

The remaining birds recorded within the local area are the three species of black cockatoo known from the Perth metropolitan area; the Endangered Carnaby's Cockatoo (*Calyptorhynchus latirostris*), Endangered Baudin's Cockatoo (*Calyptorhynchus baudinii*), and the Vulnerable Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*). Baudin's Cockatoo is commonly associated with Jarrah-Marri forest of the Jarrah Forest bioregion approximately 11 kilometres to the east and is unlikely to be present.

Black cockatoo habitat can be considered in terms of breeding habitat, night roosting habitat, and foraging habitat. Breeding habitat (in the form of tree hollows) is not present over the application area. Black cockatoo night roosts are usually located in the tallest trees of an area (Commonwealth of Australia 2017; DAWE 2020). The closest known roosts are located approximately 5.4 kilometres to the west and south of the application area, however, the application area itself does not consist of large trees typically utilised for roosts.

The application area provides foraging habitat for Carnaby's Cockatoo (Banksia Woodland) (Bamford 2013; Commonwealth of Australia 2017; DEC 2011; DSEWPaC 2012), but not for the Forest Red-tailed Black Cockatoo that prefers Jarrah and Marri as well as *Allocasuarina* (Bamford 2013; Commonwealth of Australia 2017). Food resources within the range of roosting sites are important to sustain populations, and foraging resources are therefore viewed in the context of known roosts (Commonwealth of Australia 2017). The application area consists of foraging resources within the foraging distance for Carnaby's Cockatoo from these known roosting sites.

Over 6,700 hectares of native vegetation occurs within the local area and mechanical clearing or slashing of 0.11 hectares of Banksia Woodland in Good or better condition (that is, less than one per cent of the application area) is unlikely to significantly impact the foraging resource the Banksia Woodland provides for Carnaby's Cockatoo.

Based on the information provided the prescribed burn proposed is based upon the current knowledge of Banksia Woodland and aimed at maximising biodiversity outcomes. The proposed autumn burn of low intensity applied in a mosaic application during autumn (Shire of Serpentine Jarrahdale 2020b) is unlikely to result in a reduced resource for Carnaby's Cockatoo in the medium to long term. Over 6,700 hectares of native vegetation occurs within the local area, the majority of which is likely to provide foraging habitat for Carnaby's Cockatoo. Given that the prescribed burn is not likely to reduce foraging habitat in the medium to long term, and the availability of foraging habitat in the local area during the short term, impacts to Carnaby's Cockatoo due to a reduction in foraging habitat are unlikely.

Similarly, the mosaic nature of the proposed burn, and the availability of unburnt habitat to the north and north-west, provides unburnt areas to be used as refuge areas for the Quenda and other ground fauna.

The native vegetation that functions as habitat for conservation significant fauna is susceptible to Dieback disease (*Phytophthora* species) (Barber, *et al.* 2013) as well as weed invasion (Barrett, *et al.* 2018), and post-fire weed control and Dieback management will be implemented to mitigate potential vegetation degradation (Shire of Serpentine Jarrahdale 2020b).

Outcome: Based on the above assessment, the Delegated Officer has determined that the proposed clearing is considered acceptable subject to relevant conditions in relation to this environmental value.

Conditions: To address the above impacts, the following conditions will be added to the permit:

- Restrict mechanical clearing to 0.44 hectares of the application area.
- Implement weed and Dieback management measures to mitigate impacts to native vegetation.

3.2.3. Environmental value: Significant remnant vegetation and conservation areas – Clearing Principles (e) and (h)

Assessment: The national objectives and targets for biodiversity conservation in Australia has a target to prevent clearance of ecological communities with an extent below 30 per cent of that present pre the year 1750, below which species loss appears to accelerate exponentially at an ecosystem level (Commonwealth of Australia, 2001). The application area is located within the Swan Coastal Plain bioregion as described by Thackway and Cresswell (1995). The Swan Coastal Plain (IBRA) bioregion retains approximately 38.6 per cent of its pre-European vegetation extent.

Utilising the regional vegetation of Heddle *et al.* (1980) as updated by Webb *et al.* (2016) the application occurs over the vegetation type of Bassendean Complex-Central and South (System 6 ID 44) described as a woodland of *Eucalyptus marginata* (Jarrah) - *Allocasuarina fraseriana* (Sheoak) - *Banksia* species to low woodland of *Melaleuca* species, and sedgelands on the moister sites. This description is broadly analogous to the vegetation occurring over the application area.

The Bassendean Complex-Central and South has approximately 26.9 per cent of its pre-European vegetation extent remaining (Government of Western Australia 2019). This is below the 30 per cent threshold of the Government of Western Australia (2019b). However, the Environmental Protection Authority (EPA) recognises the Perth Metropolitan Region as a constrained area, which provides for the reduction of vegetation complexes to a minimum of 10 per cent of their pre-European extent (EPA 2008). At the local scale of a 10 kilometre radius, approximately 6,709 hectares of native vegetation remains, representing 20.2 per cent of native vegetation cover. If regrowth vegetation over 20 per cent cover is included this figure increases to 25.6 per cent.

The vegetation under application is located wholly within Bush Forever Site 378; the Henderson Road Bushland - Peel Estate (Government of Western Australia 2000). There are no DBCA managed lands within three kilometres of the application area with the closest approximately 3.2 kilometres to the west (un-named Nature Reserve R37090), and the Rockingham Lakes Regional Park is located over 7.5 kilometres to the west.

Section 5.1.2.3 of *State Planning Policy 2.8 – Bushland Policy for the Perth Metropolitan Region (SPP 2.8)* outlines specific policy measures for government lands or public infrastructure. In respect to Bush Forever sites (existing or proposed), clause 5.1.2.1(i)(e)) of SPP 2.8 states that decision-making should support a general presumption against the clearing of regionally significant bushland, or other degrading activities, except where consistent with the overall purpose and intent of the relevant Crown reserve, or can be reasonably justified with regard to wider environmental,

social, economic or recreational needs. All reasonable alternatives should be considered in order to avoid or minimise any direct loss of regionally significant bushland, and where appropriate and practical reasonable offset strategies secured to offset any loss of regionally significant bushland.

Approximately 0.39 hectares of native vegetation within Bush Forever Site 378 is proposed to be cleared adjacent to the aircraft hangers for fire protection purposes. This area represents 3.1 per cent of the application area, consisting of regrowth native vegetation in a predominantly Degraded to Completely Degraded (Keighery 1994) condition (Appendix E2). This area has not been mapped regionally as remnant vegetation. Approximately 0.05 hectares of native vegetation in Very Good condition adjacent to the BOM infrastructure in the north-west corner of the application area is proposed to be slashed and mulched for fire protection purposes.

Noting the above, approximately 0.44 hectares of native vegetation will be permanently lost for fire protection purposes, of which 75 per cent is either Completely Degraded or Degraded with just 0.11 hectares in Good or better condition. With regard to the extent of the proposed clearing and the composition and condition of the vegetation to be cleared, it is considered that the proposed clearing will not result in fragmentation, sever any ecological connectivity, nor significantly impact upon the viability of Bush Forever Site 378. The proposed clearing is not likely to significantly impact the environmental values of a significant remnant in an area that has been extensively cleared. On this basis, it is considered that the proposed clearing does not constitute a significant residual impact, and that an offset is not required. Nevertheless, the application area consists of native vegetation associated with Bush Forever Site 378 that is susceptible to weed infiltration and Dieback disease.

Outcome: Based on the above assessment, the Delegated Officer has determined that the proposed clearing is considered acceptable subject to relevant conditions (see below) in relation to this environmental value.

Conditions: To address the above impacts, the following conditions will be added to the permit:

- Restrict mechanical clearing to 0.44 hectares of the application area.
- Implement weed and Dieback management measures to mitigate impacts to native vegetation.

3.2.4. Environmental value: Wetlands – Clearing Principle (f)

The application area is located within the Bennett Brook Consanguineous Wetland Suite (DBCA-020). Depressions intersect the water table and precipitation may be ponded by clay lenses in the sub-surface.

A small mapped Geomorphic Wetland of the Swan Coastal Plain of approximately 0.68 hectares is located adjacent to the north-west of the application area (Appendix F3). This is a Conservation Category Wetland (CCW) consisting of a dampland (UFI 14444). A dampland is a seasonally water-logged basin, therefore open water is not present but the soils become water-logged seasonally after rainfall. The small area of dampland occurring is described as a *Melaleuca pressiana* low open woodland over *Kunzea* sp. and *Regalia ciliata* (Government of Western Australia 2000) (Appendix E2).

CCWs have high conservation value with the management objective being the preservation of the wetlands natural attributes and functions (EPA 2004; EPA 2008; Water and Rivers Commission 2001). The dampland is an expression of the groundwater table (Shire of Serpentine Jarrahdale 2011) and therefore any activities that affect the groundwater table could impact the wetland. This includes any alteration to water levels and leaching of nutrients and other pollutants into the water table.

The adjacent dampland area is small, and disjunct from other wetlands, and the applicant has advised that the dampland was burnt approximately two years ago. The dampland is outside of the application area and will not be included within the prescribed burn. The applicant has advised that this low fuel area will allow for a diversity in fuel types and ages post-burn providing strategic management zones.

Based on the information provided the prescribed burn proposed is based upon the current knowledge and aimed at maximising biodiversity outcomes. Post-fire weed control and Dieback management will be implemented to mitigate potential vegetation degradation (Shire of Serpentine Jarrahdale 2020b), and the low intensity prescribed burn within the Banksia Woodland is unlikely to impact the CCW.

Outcome: Based on the above assessment, the Delegated Officer has determined that the proposed clearing is considered acceptable in relation to this environmental value.

3.3. Relevant planning instruments and other matters

The application was advertised on the DWER website for a 21 day public comment period commencing 16 September 2020 and one public submission was received in relation to this application (Appendix B).

The land under application is located on Lot 164 on Deposited Plan 202726 (Crown Reserve R 25911), with the Shire of Serpentine Jarrahdale being the Primary Interest Holder. Crown Reserve R 25911 is reserved for the Purpose of

Recreation. The subject lot is zoned Rural under the Metropolitan Region Scheme (MRS), and Public Open Space (1097) under the Shire of Serpentine Jarrahdale Town Planning Scheme (TPS) 02.

Land has been leased to the Sport Aircraft Builders Club of Western Australia Inc (Registered 23/9/2002) (I243533) to support the Yangedi Road Airfield. A change of reserve purpose has also been amended to incorporate "Recreation and weather radar activities" (registered 27/2/2019; (O099238). This was undertaken to support the Bureau of Meteorology (BOM) facility in the north-west corner.

The majority of the reserve, and the entire application area, is located within Bush Forever Site 378 - Henderson Road Bushland, Peel Estate. The land Bush Forever implementation category is government lands or public infrastructure. The Department of Planning, Lands and Heritage (DPLH) have advised they have no objections to the proposal but recommend certain conditions, including (DPLH 2020):

- that an offset package be prepared and approved by DWER in accordance with the WA Environmental Offsets Policy (2011) and Appendix 4 of SPP 2.8;
- no additional disturbance or clearing within Bush Forever area 378 is to occur;
- and no rubbish or any other deleterious matter to be deposited in Bush Forever area 378.

With regard to the extent of the proposed clearing and the composition and condition of the vegetation to be cleared, it is considered that the proposed clearing will not result in fragmentation or sever any ecological connectivity, nor significantly impact upon the viability of Bush Forever Site 378. On this basis, it is considered that the proposed clearing does not constitute a significant residual impact, and that an offset under the WA Environmental Offsets Policy (2011) or Appendix 4 of SPP 2.8 is not required.

A number of agencies are involved in the management and regulation of fire for areas of native vegetation in Western Australia, and several Acts have relevance to this issue (DER 2015). The *Bush Fires Act 1954* empowers fire control officers the ability to issue permits to landholders to undertake fire hazard reduction burning during the restricted fire period. Dependent upon the timing of the proposed prescribed burn authorisation and permitting under the *Bush Fires Act 1954* may be required.

The application area is not located within any *Country Areas Water Supply Act 1947* (CAWS Act) clearing control catchments, or Public Drinking Water Source Areas (PDWSA). The application area is located in the Serpentine River System surface water area and Serpentine Groundwater Area, proclaimed under the *Rights in Water and Irrigation Act 1914* (RIWI Act). No rivers proclaimed under the RIWI Act occur within 10 kilometres of the application area. No watercourses will be disturbed, or groundwater abstracted, and additional licencing by DWER will not be required.

The application area is located within the boundaries of the Gnaala Karla Booja Native Title Registered Claim and associated Gnaala Karla Booja Indigenous Land Use Agreement (ILUA) (WI2015/005). There are many Aboriginal Heritage Places recorded within the local area with the closest being the Serpentine River (Place ID 3582) approximately one kilometre north-west, and Nyitting Booya Binja (Place ID 28186) approximately 2.2 kilometres to the west of the application area. It is the applicant's responsibility to comply with the *Aboriginal Heritage Act 1972* and ensure that no Aboriginal Sites of Significance are damaged through the clearing process.

Appendix A – 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 C.

1. Site summary

Site characteristic	Details																								
Local context	The application area is situated within the Swan Coastal Plain (SWA) bioregion of Thackway and Cresswell (1995), and the Perth subregion (SWA02). The application area is situated within the Shire of Serpentine Jarrahdale approximately 45 kilometres south of Perth.																								
Landform and climate	The application is located within the Bassendean Dunal System of gently undulating dunes made up of well-bleached white-grey sands. The climate of the area is warm and temperate. The winter months have higher rainfall than summer months with an annual rainfall of approximately 755 millimetres (BOM 2020).																								
Vegetation description Heddle <i>et al.</i> (1980)	Utilising the regional vegetation of Heddle <i>et al.</i> (1980) as updated by Webb <i>et al.</i> (2016) the application occurs over the vegetation type of Bassendean Complex-Central and South (System 6 ID 44). Vegetation ranges from a woodland of <i>Eucalyptus marginata</i> (Jarrah) - <i>Allocasuarina fraseriana</i> (Sheoak) - <i>Banksia</i> species to low woodland of <i>Melaleuca</i> species, and sedgelands on the moister sites. This area includes the transition of <i>Eucalyptus marginata</i> (Jarrah) to <i>Eucalyptus todtiana</i> (Pricklybark) in the vicinity of Perth. Vegetation over the application area is described predominantly as a Banksia Woodland (Shire of Serpentine Jarrahdale 2011a; Appendix E2), with the Shire of Serpentine Jarrahdale (2011) describing the vegetation as a Woodland of <i>Banksia menziesii</i> , <i>Banksia ilicifolia</i> and <i>Banksia attenuata</i> over <i>Jacksonia furcellata</i> , <i>Dasyogon bromeliifolius</i> and <i>Patersonia occidentalis</i> over <i>Loxocarya cinerea</i> .																								
Vegetation condition (Keighery 1994)	The majority of the application area is in Excellent (Keighery 1994) condition with the area surrounding the BOM infrastructure in Very Good (Keighery 1994) condition and the area immediately adjacent to the hangers in Completely Degraded to Good (Keighery 1994) condition (Shire of Serpentine Jarrahdale 2020b) (Appendix E2).																								
Soil description	The soil consists of the Bassendean Sands of the Bassendean B1 Phase (212Bs_B1) described as extremely low to very low relief dunes, undulating sandplain and discrete sand rises with deep bleached grey sands sometimes with a pale yellow B horizon or a weak iron-organic hardpan at depths generally greater than 2 metres; Banksia dominant.																								
Land degradation risk	The Department of Primary Industries and Regional Development (DPIRD), provides a series of soil degradation risk mapping at the sub-system level (DPIRD 2017). The table below summaries the soil degradation risk within the application area. <table border="1" data-bbox="448 1554 1461 1899"> <thead> <tr> <th>Aspect</th> <th colspan="3">Hazard rating</th> </tr> </thead> <tbody> <tr> <td>Wind Erosion</td> <td>High</td> <td>(H1)</td> <td>50-70% of mapped unit has a high to extreme risk</td> </tr> <tr> <td>Water Erosion</td> <td>Low</td> <td>(L1)</td> <td><3% of mapped unit has a high to extreme risk</td> </tr> <tr> <td>Salinity</td> <td>Low</td> <td>(L1)</td> <td><3% of mapped unit has a high to extreme risk</td> </tr> <tr> <td>Phosphorus export</td> <td>High</td> <td>(H2)</td> <td>>70% of mapped unit has a high to extreme risk</td> </tr> <tr> <td>Acid Sulphate Soils</td> <td colspan="3">Moderate to Low (Class 2)</td> </tr> </tbody> </table>	Aspect	Hazard rating			Wind Erosion	High	(H1)	50-70% of mapped unit has a high to extreme risk	Water Erosion	Low	(L1)	<3% of mapped unit has a high to extreme risk	Salinity	Low	(L1)	<3% of mapped unit has a high to extreme risk	Phosphorus export	High	(H2)	>70% of mapped unit has a high to extreme risk	Acid Sulphate Soils	Moderate to Low (Class 2)		
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Conservation areas	The entire application area is located wholly within Bush Forever Site 378 (Henderson Road Bushland, Peel Estate) (Government of Western Australia 2000).																								

Site characteristic	Details																		
	There are no DBCA managed lands within three kilometres of the application area with the closest approximately 3.2 kilometres to the west (un-named Nature Reserve R37090). The Rockingham Lakes Regional Park is located approximately 7.8 kilometres to the west.																		
Environmentally sensitive areas	The entire application area is located within an Environmentally Sensitive Area (ESA) related to the Bush Forever Site 378.																		
Ecological linkages	The application area is not located in a recognised formal ecological linkage.																		
Waterbodies	<p>A Geomorphic Wetland of Swan Coastal Plain is located adjacent to the application area in the north-west. This is a Conservation Category Wetland (CCW) consisting of a Dampland (UFI 14444) of 0.68 hectares.</p> <p>There are no defined watercourses within 400 metres of the application area. The Serpentine River (within a modified drain) is located approximately 3.1 kilometres to the west and Karnet Brook is located approximately 1.8 kilometres distant with Dirk Brook approximately 2.6 kilometres to the south.</p> <table border="1"> <thead> <tr> <th>Aspect</th> <th colspan="3">Hazard rating</th> </tr> </thead> <tbody> <tr> <td>Flood Risk</td> <td>Low</td> <td>(L1)</td> <td><3% of mapped unit has a high to extreme risk</td> </tr> <tr> <td>Waterlogging</td> <td>Low</td> <td>(L2)</td> <td>3-10% of mapped unit has a high to extreme risk</td> </tr> <tr> <td>Floodplains</td> <td colspan="3">None in the vicinity</td> </tr> </tbody> </table>	Aspect	Hazard rating			Flood Risk	Low	(L1)	<3% of mapped unit has a high to extreme risk	Waterlogging	Low	(L2)	3-10% of mapped unit has a high to extreme risk	Floodplains	None in the vicinity				
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2. Vegetation extent

2a) Regional vegetation mapping (Government of Western Australia 2019a and 2019b)

		Pre-European extent (ha)	Current extent (ha)	Extent remaining (%)	Current extent in all DBCA managed land (ha)	Current proportion of pre-European extent in all DBCA managed land (%)
Swan Coastal Plain Bioregion	SWA	1,501,222	579,814	38.6	153,955	10.26
Bassendean Complex-Central and South	44	87,476	23,509	26.9	4,377	5.0

2b) Remnant vegetation within ten kilometres of the application area

Remnant Vegetation	Hectares (ha)	Remaining %
Total Area (10 km radius)	33,282	(100 %)
Remnant vegetation remaining	6,709	20.2
Remnant vegetation and regrowth vegetation over 20% cover remaining	8,510	25.6

3. Ecosystem, flora, and fauna analysis

With consideration for the site characteristics set out above and relevant datasets (see Appendix G) the following conservation significant ecological communities, flora, and fauna species may be impacted by the clearing.

3a) Ecological Communities

No currently listed Threatened Ecological Communities (TEC) endorsed by the Western Australian Minister for Environment, are mapped within three kilometres of the application area. The closest listed TEC endorsed by the Western Australian Minister for Environment is SCP08 (below)

ID	Common name	State status	Commonwealth status	Closest record
SCP08	Herb rich shrublands in clay pans (floristic community type 8 as originally described in Gibson <i>et al.</i> (1994))	Vulnerable	Critically Endangered	3,163 west

The Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region (Banksia Woodlands) is mapped over the application area and has been verified to occur over the application area.

ID	Common name	State status	Commonwealth status	Closest record
73	Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region	P3(iii)	Endangered	Over the application area

3b) Conservation significant flora recorded within 10 kilometres of the application area

Threatened flora taxa	Status	No. of Records	Closest Record
<i>Diuris drummondii</i>	VU	1	7,372
<i>Tetraria australiensis</i>	VU	4	6,621

Priority flora taxa	Status	No. of Records	Closest Record
<i>Acacia lasiocarpa</i> var. <i>bracteolata</i> long peduncle variant (G.J. Keighery 5026)	P1	2	4,767
<i>Stachystemon exilis</i>	P1	1	5,140
<i>Acacia benthamii</i>	P2	4	7,722
<i>Cardamine paucijuga</i>	P2	3	8,783
<i>Johnsonia pubescens</i> subsp. <i>cygnorum</i>	P2	6	6,549
<i>Acacia horridula</i>	P3	1	9,349
<i>Acacia oncinophylla</i> subsp. <i>ocnophylla</i>	P3	1	9,925
<i>Amanita fibrillosa</i>	P3	4	8,986
<i>Beyeria cinerea</i> subsp. <i>cinerea</i>	P3	3	7,465
<i>Carex tereticaulis</i>	P3	1	6,927
<i>Dillwynia dillwynioides</i>	P3	13	3,849
<i>Eryngium pinnatifidum</i> subsp. <i>Palustre</i> (G.J. Keighery 13459)	P3	1	7,360
<i>Isopogon autumnalis</i>	P3	2	9,824
<i>Schoenus capillifolius</i>	P3	2	4,081
<i>Sphaerolobium calcicola</i>	P3	2	8,757
<i>Styphelia filifolia</i>	P3	1	5,129
<i>Caladenia speciosa</i>	P4	1	9,870
<i>Eucalyptus rudis</i> subsp. <i>cratyantha</i>	P4	1	7,099
<i>Jacksonia sericea</i>	P4	4	7,465
<i>Parsonsia diaphanophleba</i>	P4	4	6,735
<i>Senecio leucoglossus</i>	P4	2	9,349
<i>Stylidium longitubum</i>	P4	7	3,649
<i>Verticordia lindleyi</i> subsp. <i>lindleyi</i>	P4	4	6,423

3c) Conservation significant fauna recorded within 10 kilometres of the application area

Common Name	Taxon	Status	No. of Records	Closest Record
BIRDS				
Carnaby's Cockatoo	<i>Calyptorhynchus latirostris</i>	EN	170	82
Baudin's Cockatoo	<i>Calyptorhynchus baudinii</i>	EN	4	9,351
Forest Red-tailed Black Cockatoo	<i>Calyptorhynchus banksii naso</i>	VU	24	4,594
Curlew Sandpiper	<i>Calidris ferruginea</i>	CR	4	8,037
Eastern Curlew	<i>Numenius madagascariensis</i>	CR	4	9,601
Common Sandpiper	<i>Actitis hypoleucos</i>	IA	1	5,508
Sharp-tailed Sandpiper	<i>Calidris acuminata</i>	IA	5	8,037
Red-necked Stint	<i>Calidris ruficollis</i>	IA	2	9,391
Long-toed Stint	<i>Calidris subminuta</i>	IA	2	8,037
Caspian Tern	<i>Hydroprogne caspia</i>	IA	1	6,653
Bar-tailed Godwit	<i>Limosa lapponica</i>	IA	1	9,590
Glossy Ibis	<i>Plegadis falcinellus</i>	IA	2	8,037

Common Name	Taxon	Status	No. of Records	Closest Record
Grey Plover	<i>Pluvialis squatarola</i>	IA	1	9,590
Crested Tern	<i>Thalasseus bergii</i>	IA	1	9,590
Wood Sandpiper	<i>Tringa glareola</i>	IA	5	8,037
Common Greenshank	<i>Tringa nebularia</i>	IA	11	5,508
Marsh Sandpiper	<i>Tringa stagnatilis</i>	IA	2	8,037
Blue-billed Duck	<i>Oxyura australis</i>	P4	20	2,719
MAMMALS				
Chuditch	<i>Dasyurus geoffroii</i>	VU	14	6,770
Brush-tailed Phascogale	<i>Phascogale tapoatafa wambenger</i>	CD	31	1,201
Quenda	<i>Isodon fusciventer</i>	P4	190	584
REPTILES				
Jewelled Southwest Ctenotus (SCP)	<i>Ctenotus gemmula (SCP)</i>	P3	1	8,467
Perth Slider	<i>Lerista lineata</i>	P3	6	8,353
INVERTEBRATES				
Carter's Freshwater Mussel	<i>Westralunio carteri</i>	VU	3	6,400
Shield-Backed Trapdoor (SCP)	<i>Idiosoma sigillatum</i>	P3	1	5,962
Graceful Sunmoth	<i>Synemon gratiosa</i>	P4	12	9,271

Appendix B – Details of public submissions

Summary of comments	Consideration of comment
The applicant has not checked the box for assessment under the EPBC Act.	The applicant has been informed by DWER that an ecological community and fauna species protected under the EPBC Act are likely to be found in, or in proximity to, the application area with a recommendation to contact the Department of Agriculture, Water and the Environment (DAWE) to discuss responsibilities (DWER 2020).
"A guide to burning under the native vegetation clearing provisions" (DER 2015) should be considered.	Information in DER (2015) publication has been considered in the decision report (Section 3).
If ecological factors are not taken into account, burning will result in degradation.	Ecological factors have been considered during the assessment (Sections 3.1 and 3.2). The proposed burning parameters, and weed management, are discussed in Sections 3.1 and 3.2.
The quality of the bushland is required to be known, and environmental conditions prior to a planned burn should be considered.	The Shire of Serpentine Jarrahdale (2020b) have provided vegetation condition ratings based on Keighery (1994) scale (Appendix A). Environmental conditions that occur prior to any planned burn have been considered in the decision report (Section 3.1 and 3.2). The current fuel loads indicate that the area has not had fire for approximately 25 plus years.
Burning in Banksia Woodland increases weeds.	The proposed burning parameters and associated weed management are discussed in Sections 3.1 and 3.2.
It is not stated at what time of year the area is to be burnt.	The proposed prescribed burn will be undertaken in autumn (Shire of Serpentine Jarrahdale 2020b). The proposed burning parameters are discussed in Sections 3.1 and 3.2.
Fire should not occur more frequently than the time required for plants to reach reproductive capacity.	A minimum fire interval in Banksia Woodland should be based on the slowest maturing species killed by fire, with plant diversity maximised after five to ten years since fire, with many shrub species being most abundant after two to five years (Barrett, <i>et al.</i> 2018). See Section 3.2.1.
Cool burns for hazard reduction purposes are of low-to-moderate intensity.	The prescribed burn is proposed to be undertaken in autumn and conducted as a cool, slow burn with minimal scorch height (Section 3.1 and 3.2)
Biodiversity is greatest where a variety of fire ages is exhibited.	The proposed burn is designed to be of low intensity and applied in a mosaic application (Section 3.1 and 3.2). Adjacent native vegetation will also contribute a mosaic of fire ages.
Limestone should not be used in close proximity to Banksia Woodland.	Banksia Woodland occurs on alkaline soils (e.g. Spearwood Dunes). Banksia is particularly susceptible to Dieback disease, and limestone is considered a preferable material for pathways and driveways as it is more alkaline, and its higher pH suppresses <i>Phytophthora</i> with a lower risk of harbouring <i>Phytophthora</i> spores (Dieback Working Group, no date). The 20 metre APZ will provide separation distance between the track and adjacent vegetation. The establishment of a limestone track is considered a low risk to adjacent native vegetation.
20 metres is an excessive width to mitigate against wildfire.	The applicant has demonstrated avoidance and mitigation measures (Section 3.1). 20 metres is the assessed APZ required for effective protection of infrastructure.
The availability of firefighting capability must be addressed.	The availability of firefighting capability is out of the scope of the clearing application assessment.
An offset should be required for areas identified as woodland.	The decision report considered that proposed clearing does not constitute a significant residual impact, and that an offset is not required (Section 3).

Appendix C – 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> Over 100 native flora species and 19 non-native flora species have been recorded within the application area and within the immediate vicinity of the application area (Shire of Serpentine Jarrahdale 2011; Shire of Serpentine Jarrahdale 2020b) (Appendix E1). No Priority or Threatened flora species have been recorded. The majority of the application area consists of the Banksia Dominated Woodlands of the Swan Coastal Plain listed by the DBCA as a Priority 3 Priority Ecological Community (PEC) and synonymous with the Commonwealth-listed Banksia Woodlands of the Swan Coastal Plain Threatened Ecological Community (TEC) listed as Endangered under the EPBC Act. Banksia Woodlands are characterised by a high species richness and high species geographic turnover, particularly in the shrub and herbaceous layers (TSSC 2016). Banksia Woodlands also provide foraging habitat for the Endangered Carnaby’s Cockatoo (<i>Calyptorhynchus latirostris</i>).</p>	May be at variance	Further consideration required, 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> The application area consists predominantly of Banksia Woodlands that provide foraging habitat for the Endangered Carnaby’s Cockatoo (<i>Calyptorhynchus latirostris</i>). The Priority 4 listed Quenda (<i>Isoodon fusciventer</i>) is also known from the vicinity of the application area.</p>	May be at variance	Further consideration required, 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> 109 native flora species have been recorded within the application area and within the immediate vicinity of the application area (Shire of Serpentine Jarrahdale 2011; Shire of Serpentine Jarrahdale 2020b) (Appendix E1). No Threatened flora species have been recorded within the application and no Threatened flora taxa have been recorded within 6.5 kilometres of the application area. 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 further consideration required.
<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> No currently listed Threatened Ecological Communities (TEC) endorsed by the Western Australian Minister for Environment, are mapped within three kilometres of the application area. The closest listed TEC is SCP08: The Vulnerable Herb rich shrublands in clay pans (floristic community type 8 as originally described in Gibson <i>et al.</i> (1994)). No TECs endorsed by the Western Australian Minister for Environment are likely to occur over the application area.</p>	Not at variance	No further consideration required.
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</p>	May be at variance	Further consideration required, see Section 3.2.3

Assessment against the Clearing Principles	Variance level	Is further consideration required?
<p>an 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). Utilising the regional vegetation of Hedde <i>et al</i> (1980) as updated by Webb <i>et al.</i> (2016) the application occurs over the vegetation type of Bassendean Complex-Central and South (System 6 ID 44). The Bassendean Complex-Central and South has approximately 26.9 per cent of its pre-European vegetation extent remaining (Government of Western Australia 2019).</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> The application area is located wholly within Bush Forever Site 378; the Henderson Road Bushland - Peel Estate (Government of Western Australia 2000). There are no DBCA managed lands within three kilometres of the application area with the closest approximately 3.2 kilometres to the west (un-named Nature Reserve R37090). The Rockingham Lakes Regional Park is located approximately 7.8 kilometres to the west.</p>	May be at variance	Further consideration required, 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> A mapped Geomorphic Wetland of the Swan Coastal Plain is located adjacent to the application area to the north-west. That is, a Conservation Category Wetland (CCW) consisting of a Dampland (UFI 14444). This mapped wetland area was excluded from the application area by the applicant during the assessment process. There are no watercourses, drainage lines, or wetlands within the application area.</p>	Not likely to be at variance	Further consideration required, see Section 3.2.4
<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> Due to the presence of Bassendean Sands the potential for wind erosion and phosphorus export over the application area is rated high (DPIRD 2017) if not managed appropriately. Vegetation cover will be retained over the 11.95 hectares proposed to be burnt. The area around the BOM infrastructure will be mulched only, and the area adjacent to the hangers is proposed to be sealed with the establishment of a sealed track. Wind erosion is not considered a risk under these land management actions, and no additions of nutrients are proposed that could initiate phosphorus export.</p>	Not at variance	No further consideration required.
<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> A mapped wetland occurs adjacent to the application area to the north-west, however, there are no drainage lines within the application area, or within the vicinity of the proposed clearing. Groundwater is mapped at 1,000 to 3,000 TDS mg/L (that is, fresh to brackish). There is a moderate to low risk of acid sulphate soils occurring within three metres of the natural soil surface, but a high to moderate risk of acid sulphate soils beyond three metres of the natural soil surface. Soils will not be excavated at depth and the mechanical clearing of 0.39 hectares and mulching of 0.05 hectares, is unlikely to cause deterioration in the quality of surface or underground water. The proposed burn has been designed to be low intensity prescribed fire, which will be applied in a mosaic application minimising impacts to the mapped wetland.</p>	Not likely to be at variance	No further consideration required.

Assessment against the Clearing Principles	Variance level	Is further consideration required?
<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>: Both flood risk and water-logging risk are rated low (L1) over the application area, and proposed clearing is not located within a mapped floodplain. There are no drainage lines within the application area, or within the vicinity of the proposed clearing. Mechanical clearing of 0.39 hectares, mulching of 0.05 hectares, and prescribed burning is unlikely to cause, or exacerbate, the incidence or intensity of flooding.</p>	Not at variance	No further consideration required.

Appendix D – Vegetation condition rating scale

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

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

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

Appendix E – Biological survey information and photographs of the application area

1. Flora species recorded from Yangedi Road Airfield Reserve (Shire of Serpentine Jarrahdale 2020a)

Yangedi Road Airfield Reserve (R25911) 2017

One permanent monitoring quadrat was set upon 17/12/08, in the banksia woodland. This was resurveyed on 15/10/09, and additional species from near the quadrat were added to the list. The 2009 species count from the quadrat was 28% greater than in 2008 (due to the timing of the survey, being carried out earlier in the season), and the total number of species recorded (including those from outside the quadrat) was 61% greater. The number of recorded weed species also increased.

The 2010 surveys occurred on 12/10/10. 2010 was an extremely dry winter and spring; many ephemeral species were missing, and the surveys were carried out early due to rapid heating and drying. The dieback front was observed to be approaching closer to the quadrat. The 2010 species count from the quadrat was 2% greater than in 2009 (despite the poor season), and the total number of species recorded (including those from outside the quadrat) was 16% greater.

The 2012 surveys occurred on 5/10/12. The wet spring has led to substantial extension of flowering period, and an observed second flowering in some species (e.g. *Phlebocarya ciliata*). There was an unusual abundance of *Podotheca gnaphaloides* along the edge of the firebreak.

The 2017 surveys occurred on 30/11/17. The quadrat could not be located due to substantial new growth of spearwood (*Kunzea glabrescens*) so a spot survey was carried out and GPS coordinates recorded. The vegetation was very dry due to the late season, and the annuals were no longer apparent. There was considerable evidence of rabbit and kangaroo activity.

General comments: Yangedi Road Airfield Reserve has areas of remnant vegetation belonging to several floristic communities, only one of which is regularly surveyed. The vegetation is generally in good condition, with substantial threat from weed invasion around the edges, and is also under threat from dieback (*Phytophthora cinnamomi*). Further threat exists from the use of the reserve as an airfield, including the desire for expansion and concern about fire hazard. Weed and dieback control programs are valuable in managing the biodiversity value of this area, and signs have been erected warning vehicles to not park in the remnant vegetation. Consultants' reports concerning past developments, including flora assessments, are available and should be consulted for further information.

Location of 2017 spot survey (UTM WGS84):

Summary – number of species recorded

Year	Quadrat A (included weeds)	Additional species nearby (included weeds)
2008	43 (8)	-
2009	52 (7)	13 (1)
2010	54 (8)	23 (2)
2012	67 (8)	21 (1)
2017 spot survey	-	61 (7)

Flora List for Monitoring Quadrat in Yangedi Road Airfield Reserve (numbers refer to year of survey)

Plant species	Quadrat A	Nearby	2017 Spot Survey
<i>Acacia lasiocarpa</i>	09	10, 12	
<i>Adenanthos cygnorum</i>		09, 10, 12	17
<i>Amphipogon turbinatus</i>	09, 10, 12		17
<i>Anigozanthos manglesii</i>	09, 12	10	17
<i>Austrostipa compressa</i>		09, 10, 12	17
<i>Baeckea camphorosmae</i>	08, 09, 10, 12		17

Plant species	Quadrat A	Nearby	2017 Spot Survey
<i>Banksia attenuata</i>	08, 09, 10, 12		17
<i>Banksia ilicifolia</i>		09, 10, 12	17
<i>Banksia menziesii</i>	08, 09, 10, 12		17
<i>Bossiaea eriocarpa</i>	08, 09, 10, 12		17
* <i>Briza maxima</i>	08, 09, 10, 12		17
<i>Burchardia congesta</i>	08, 09, 10, 12		17
<i>Caesia micrantha</i>	08, 12		17
<i>Caladenia flava</i>		09, 12	
<i>Calytrix angulata</i>	08, 09, 10, 12		17
<i>Calytrix fraseri</i>	12		
* <i>Carpobrotus edulis</i>	08, 12	10	
<i>Centrolepis drummondiana</i>	09, 12		
<i>Chamaescilla corymbosa</i>	09, 10, 12		
<i>Conostephium pendulum</i>	10, 12		17
<i>Conostephium preissii</i>	09, 10, 12		17
<i>Conostylis aculeata</i>	08, 09, 10, 12		17
<i>Conostylis juncea</i>	08, 09, 10, 12		17
<i>Crassula colorata</i>	12		
<i>Dampiera linearis</i>		09, 10, 12	17
<i>Dasyogon bromeliifolius</i>	08, 09, 10, 12		17
<i>Desmodcladus flexuosus</i>	08, 09, 10, 12		17
* <i>Disa bracteata</i>	08, 09, 10		
<i>Drakaea glyptodon</i>	09, 10, 12		
<i>Drosera erythrorhiza</i>	09, 10, 12		17
<i>Drosera menziesii</i>	09, 10, 12		
<i>Drosera nitidula</i>	08, 09, 10		
* <i>Ehrharta calycina</i>	08	09, 10, 12	17
<i>Eremaea pauciflora</i>		09, 10, 12	17
<i>Euchilopsis linearis</i>		10, 12	17
<i>Gastrolobium capitatum</i>	10, 12		
* <i>Gladiolus caryophyllaceus</i>	08, 09, 10, 12		17
<i>Gompholobium tomentosum</i>	08, 09, 10, 12		
<i>Hibbertia ferruginea</i>	08, 10, 12		
<i>Hibbertia huegelii</i>	09, 10, 12		17
<i>Hibbertia vaginata</i>		09, 10, 12	17
<i>Hovea trisperma</i>	08, 09, 10, 12		
* <i>Hypochaeris glabra</i>	08, 09, 10, 12		17
* <i>Hypochaeris radicata</i>	08, 09, 10, 12		17
<i>Hypolaena exsulca</i>		09, 10, 12	17
<i>Isolepis cernua</i>	12		
<i>Jacksonia furcellata</i>		09, 10, 12	17
<i>Johnsonia pubescens</i>	09, 10, 12		
<i>Kunzea glabrescens</i>	12	09, 10	17
<i>Kunzea recurva</i>	10, 12		17
<i>Lachnagrostis filiformis</i>	12		
<i>Laxmannia squarrosa</i>	08, 09, 10, 12		17
<i>Lechenaultia floribunda</i>	08, 09, 10, 12		17
<i>Lepidosperma pubisquameum</i>	08, 10, 12	09	17
<i>Leucopogon</i> sp.	08, 10, 12		
<i>Lomandra</i> sp.	08, 09, 10, 12		17
<i>Loxocarya cinerea</i>	08, 09, 10, 12		17
<i>Lyginia barbata</i>	09, 10, 12		17
<i>Lyginia imberbis</i>	08, 09, 10, 12		17
<i>Lysinema ciliatum</i>		10, 12	17
<i>Macarthuria australis</i>	08, 09, 10, 12		17
<i>Macrozamia riedlei</i>		10, 12	17

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Plant species	Quadrat A	Nearby	2017 Spot Survey
<i>Melaleuca thymoides</i>	08, 09, 10, 12		17
<i>Microtis media</i>	12		
<i>Neurachne alopecuroidea</i>	08		17
<i>Nuytsia floribunda</i>	08, 09	10, 12	17
<i>Patersonia occidentalis</i>	08, 09, 10, 12		17
<i>Petrophile linearis</i>	09, 10, 12		17
<i>Philothea spicata</i>	09, 10, 12		17
<i>Phlebocarya ciliata</i>	08, 09, 10, 12		17
* <i>Pinus radiata</i>		10, 12	17
<i>Podotheca chrysantha</i>	09, 10, 12		17
<i>Podotheca gnaphalioides</i>	12		17
<i>Pterostylis nana</i>	12		
<i>Pterostylis vittata</i>		10, 12	
<i>Pyrorchis nigricans</i>	09, 12	10	
<i>Quinetia urvillei</i>	12		
* <i>Romulea rosea</i>	08, 09, 10, 12		
<i>Schoenus curvifolius</i>		09, 10, 12	
<i>Scholtzia involucrata</i>	09, 10, 12		
<i>Siloxerus humifusus</i>	08, 12		
<i>Stirlingia latifolia</i>	08	12	17
<i>Stylidium brunonianum</i>	08, 09, 10, 12		
<i>Stylidium repens</i>	08, 10		17
<i>Stylidium schoenoides</i>	08, 09, 10, 12		
<i>Tetragia octandra</i>	09, 10, 12		17
<i>Thysanotus manglesianus</i>	09, 10, 12		17
<i>Thysanotus triandrus</i>	08, 12		17
<i>Thysanotus sparteus</i>	08		17
<i>Trachymene pilosa</i>	09, 10, 12		
* <i>Ursinia anthemoides</i>	09, 10, 12		17
<i>Xanthorrhoea preissii</i>		10, 12	17
<i>Xanthosia huegelii</i>		10, 12	

* Introduced species

Yangedi Road Airfield Reserve (R25911)

Flora surveys of bushland-hangar boundaries (approx. 10m strip)

Short (southern) boundary surveyed 30/11/17, long (northern) boundary and wetland (northern end) boundary surveyed 15/12/17.

Species	Short (southern) boundary	Long (northern) boundary	Wetland (northern end) boundary
<i>Acacia huegelii</i>	X		
* <i>Acacia iteaphylla</i>	X		
<i>Acacia stenoptera</i>		X	X
<i>Adenanthos cygnorum</i>		X	X
<i>Allocasuarina fraseriana</i>	X		
<i>Allocasuarina humilis</i>			X
<i>Amphipogon turbinatus</i>	X		
<i>Anigozanthos manglesii</i>	X	X	
<i>Arnocrinum preissii</i>	X	X	X
<i>Austrodanthonia acerosa</i>	X	X	
<i>Austrostipa compressa</i>	X	X	
<i>Austrostipa elegantissima</i>		X	
* <i>Avena barbata</i>	X	X	X
<i>Baeckea camphorosmae</i>		X	X
<i>Banksia attenuata</i>	X	X	X
<i>Banksia ilicifolia</i>	X	X	X
<i>Banksia menziesii</i>	X	X	X
<i>Bossiaea eriocarpa</i>	X	X	
* <i>Brassicaceae</i> sp.		X	
* <i>Briza maxima</i>	X	X	X
* <i>Briza minor</i>			X
<i>Burchardia congesta</i>	X	X	X
<i>Caesia micrantha</i>	X	X	
<i>Calytrix angulata</i>	X	X	X
<i>Calytrix fraseri</i>	X	X	
* <i>Carpobrotus edulis</i>	X	X	X
<i>Cassytha</i> sp.		X	
<i>Chamaescilla corymbosa</i>	X		
<i>Conostephium pendulum</i>		X	
<i>Conostylis aculeata</i>		X	X
<i>Cyathochaeta avenacea</i>		X	
<i>Dampiera linearis</i>	X		
<i>Dasyopogon bromeliifolius</i>	X	X	X
<i>Daviesia preissii</i>			X
<i>Desmocladius flexuosus</i>	X	X	X
* <i>Disa bracteata</i>	X		
* <i>Ehnharta calycina</i>	X	X	X
* <i>Eragrostis curvula</i>		X	X
<i>Eremaea asterocarpa</i>	X	X	
<i>Euchilopsis linearis</i>			X
<i>Gompholobium capitatum</i>	X		
<i>Gompholobium tomentosum</i>	X		X
<i>Haemodorum spicatum</i>	X	X	
<i>Hibbertia huegelii</i>	X	X	
<i>Hibbertia hypericoides</i>	X		

Species	Short (southern) boundary	Long (northern) boundary	Wetland (northern end) boundary
<i>Hibbertia subvaginata</i>		X	
<i>Hibbertia vaginata</i>	X	X	
<i>Hypocalymma robustum</i>		X	X
* <i>Hypochaeris glabra</i>	X		
* <i>Hypochaeris radicata</i>	X	X	
<i>Hypolaena exsulca</i>		X	X
<i>Jacksonia furcellata</i>	X	X	X
<i>Johnsonia pubescens</i>	X		
<i>Kunzea glabrescens</i>	X	X	X
<i>Laxmannia squarrosa</i>	X		
<i>Lechenaultia floribunda</i>	X		X
<i>Lepidosperma pubisquamum</i>	X	X	X
<i>Lepidosperma squamatum</i>		X	X
<i>Lomandra</i> sp.	X	X	
<i>Loxocarya cinerea</i>	X	X	X
<i>Lyginia barbata</i>	X	X	X
<i>Lyginia imberbis</i>	X	X	X
<i>Macarthuria australis</i>	X		
<i>Macrozamia riedlei</i>	X	X	
<i>Melaleuca preissiana</i>			X
<i>Melaleuca thymoides</i>	X	X	X
<i>Microtis media</i>		X	
<i>Neurachne alopecuroidea</i>	X	X	
<i>Nuytsia floribunda</i>	X	X	
* <i>Orobanche minor</i>		X	
<i>Patersonia occidentalis</i>	X	X	X
<i>Persoonia saccata</i>	X		
<i>Petrophile linearis</i>	X	X	
<i>Phlebocarya ciliatum</i>	X	X	X
<i>Podotheca chrysantha</i>	X		
<i>Podotheca gnaphalioides</i>	X		
<i>Regelia ciliata</i>			X
<i>Scholtzia involucrata</i>	X	X	
* <i>Sonchus oleraceus</i>		X	
<i>Sowerbaea laxiflora</i>		X	
<i>Stachystemon vermicularis</i>		X	X
<i>Stirlingia latifolia</i>	X	X	
<i>Stylidium brunonianum</i>	X	X	
<i>Stylidium repens</i>	X		
<i>Thelymitra</i> sp.	X		
<i>Thysanotus manglesianus</i>	X		
<i>Thysanotus sparteus</i>	X	X	X
<i>Thysanotus triandrus</i>	X	X	X
<i>Tricoryne elatior</i>		X	
* <i>Ursinia anthemoides</i>	X	X	X
* <i>Watsonia meriana</i>	X		
<i>Xanthorrhoea brunonis</i>	X	X	X
<i>Xanthorrhoea preissii</i>		X	X
* <i>Zantedeschia aethiopica</i>		X	

2. Photographs of the vegetation in the application area (Shire of Serpentine Jarrahdale 2020a)

Yangedi Airfield

Area to be cleared.

- 1. Area adjacent to the BOM infrastructure – 20 meters from the infrastructure into the bush**



Yangedi Airfield

Area to be cleared.

2. Area to be cleared behind hangers (20 meters from the hangers) and representation of the quality of bushland on the edge and beyond the clearing- which is in the burning area.







Yangedi Airfield

Area to be Burnt.

3. Representation of the edges of bush to be burnt.







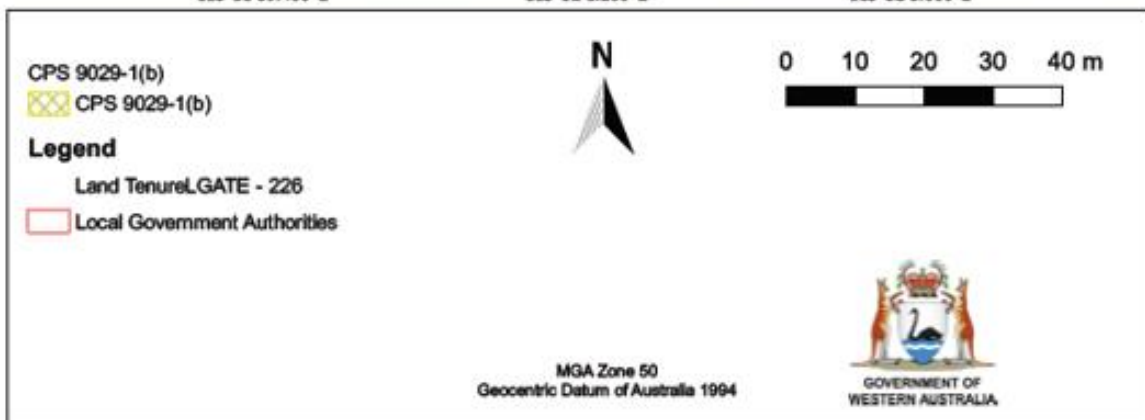


Dampland vegetation immediately adjacent to the application area

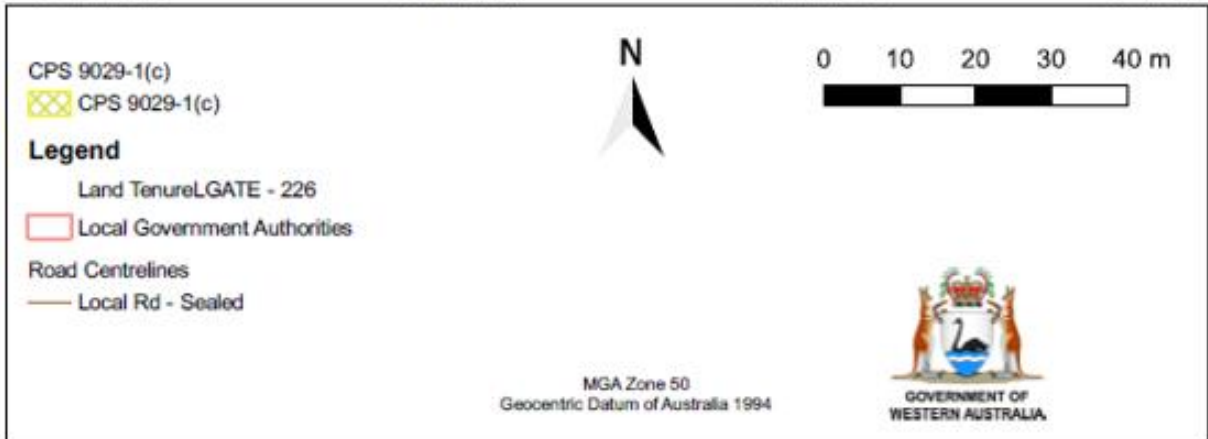


Appendix F – Plans of the application area

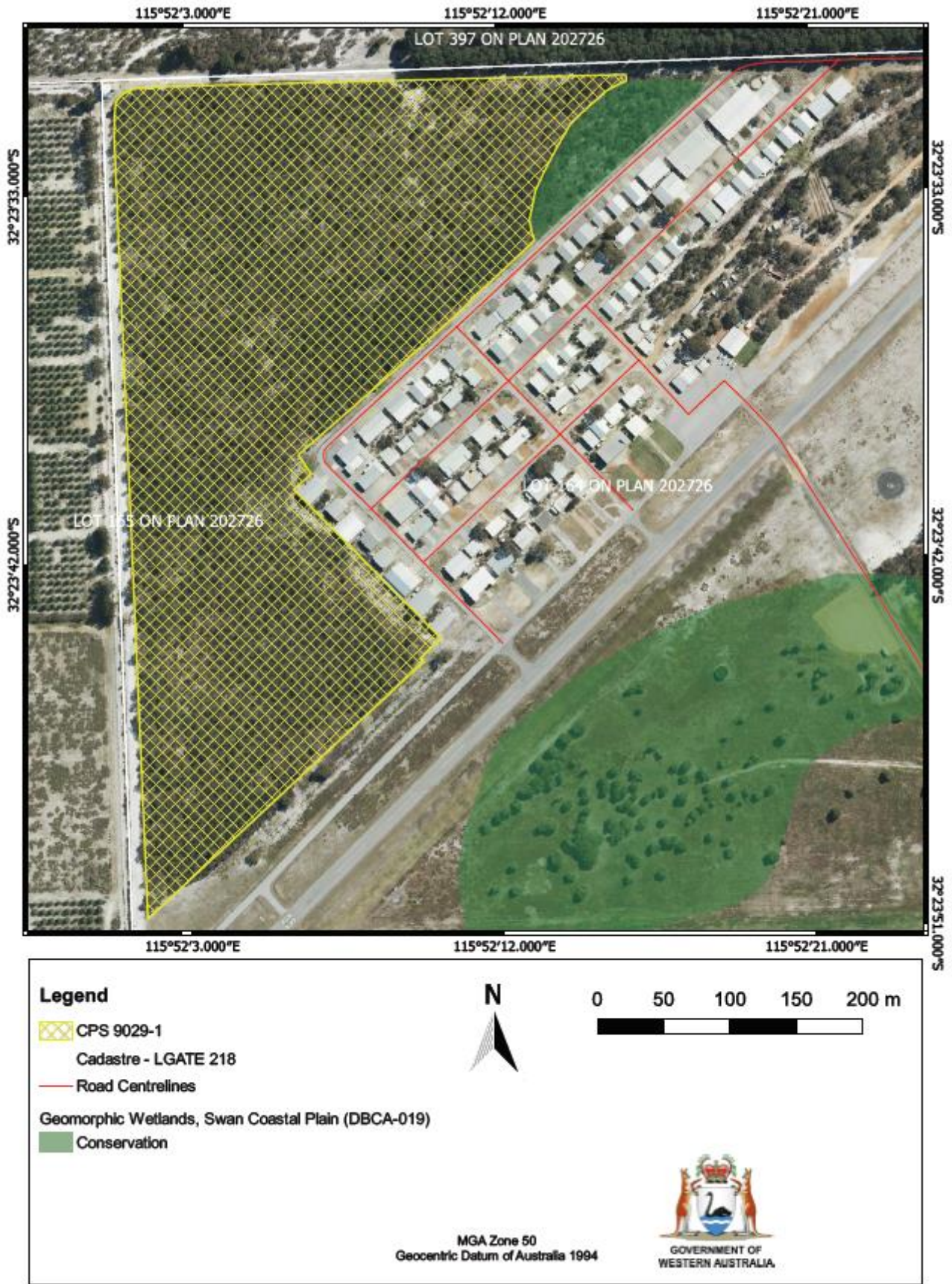
1. BOM infrastructure in the north-west corner of the application area



2. Hanger infrastructure in the south-east of the application area



3. Mapped wetlands in the vicinity of the application area



Appendix G – References and databases

1. References

- Bamford Consulting Ecologists (Bamford) (2013) Plants known to be used for foraging, roosting and nesting by black cockatoos in south-western Western Australia. Data compiled from the literature (Davies, 1966; Saunders, 1974, 1979a, b, 1980; Saunders *et al.* 1982; Saunders, 1986; Johnstone and Storr, 1998; Higgins 1999; Johnstone and Kirkby, 1999, 2008; Groom, 2011; Johnstone *et al.* 2011; DSEWPaC, 2012; Johnstone, R *pers. comm.*) in Bamford (2013) Wedgetail Circle, Parkerville Fauna Assessment. Prepared for Coterra Environment. Bamford Consulting Ecologists. Prepared by Jeff Turpin, Simon Cherriman and Mike Bamford. 14th August 2013.
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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 Address (LGATE-002)
- Contours (DPIRD-073)
- DBCA – Lands of Interest (DBCA-012)
- DBCA Legislated Lands and Waters (DBCA-011)
- Directory of Important Wetlands in Australia – Western Australia (DBCA-045)
- Environmentally Sensitive Areas (DWER-046)
- Flood Risk (DPIRD-007)
- Groundwater Salinity Statewide (DWER-026)
- IBRA Vegetation Statistics
- Local Planning Scheme – Zones and Reserves (DPLH-071)
- Regional Parks (DBCA-026)
- Soil and Landscape Mapping – Best Available

Restricted GIS Databases used:

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