



CLEARING PERMIT

Granted under section 51E of the Environmental Protection Act 1986

PERMIT DETAILS

Area Permit number: CPS 9754/1
File Number: DWERVT10319
Duration of Permit: From 6 November 2023 to 6 November 2025

ADVICE NOTE

The conservation covenant referred to in condition 5 of this permit is intended to contribute towards the conservation in perpetuity of 1.95 hectares of remnant native vegetation in Very Good (Keighery, 1994) condition within Lot 108 on Plan 13653, Toodyay, that comprises high-quality foraging habitat and potential breeding habitat for Carnaby's cockatoo (*Zanda latirostris*) and forest red-tailed black cockatoo (*Calyptrorhynchus banksii naso*).

PERMIT HOLDER

The Shire of Toodyay

LAND ON WHICH CLEARING IS TO BE DONE

Julimar Road reserve (PIN 1259746, 11744598, 1259744 and 1259749), Julimar

AUTHORISED ACTIVITY

The permit holder must not clear more than 0.22 hectares of *native vegetation* within the area cross-hatched yellow in Figures 1, 2, 3, and 4 of Schedule 1.

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. Weed and dieback management

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

- (a) clean earth-moving machinery of soil and vegetation prior to entering and leaving the area to be cleared;
- (b) ensure that no known dieback or *weed*-affected soil, *mulch*, *fill*, or other material is brought into the area to be cleared; and
- (c) restrict the movement of machines and other vehicles to the limits of the areas to be cleared.

3. Wind erosion management

The permit holder must commence sealing of the road no later than three (3) months after undertaking the authorised clearing activities to reduce the potential for wind erosion.

4. Fauna management – retain *black cockatoo habitat trees*

- (a) Prior to undertaking any clearing authorised under this permit in relation to the area cross-hatched yellow in Figures 1-4 of Schedule 1, the permit holder must demarcate the five *black cockatoo habitat trees* at the locations in Table 1.

Table 1: Locations of habitat trees to be retained.

Species	Longitude	Latitude
Eucalyptus sp. (dead)	116.3242213	-31.5097919
<i>Eucalyptus wandoo</i>	116.319862	-31.5085725
<i>Eucalyptus accedens</i>	116.3201774	-31.508787
<i>Eucalyptus wandoo</i>	116.3216506	-31.5097253
<i>Eucalyptus accedens</i>	116.3188695	-31.5079337

- (b) The permit holder must not clear the trees as described in *condition* 4(a).

5. Offsets – Native vegetation conservation (conservation covenant)

In respect to the area cross-hatched red on Figure 5 of Schedule 1, the Permit Holder must, within 12 months of the commencement of clearing authorised under this Permit, and no later than 6 November 2024:

- a) give a conservation covenant under section 30B of the *Soil and Land Conservation Act 1945* for the protection and management of vegetation in perpetuity; and
- b) Within one (1) month of executing the conservation covenant, provide a copy of the executed conservation covenant to the *CEO*.

PART III - RECORD KEEPING AND REPORTING

6. 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 2.

Table 2: Records that must be kept

No.	Relevant matter	Specifications
1.	In relation to the authorised clearing activities generally	<ul style="list-style-type: none">(a) the species composition, structure, and density of the cleared area;(b) the location where the clearing occurred, recorded using a Global Positioning System (GPS) unit set to GDA2020, expressing the geographical coordinates in Eastings and Northings;(c) the date that the area was cleared;(d) the size of the area cleared (in hectares);(e) actions taken to avoid, minimise, and reduce the impacts and extent of clearing in accordance with condition 1;(f) actions taken to minimise the risk of the introduction and spread of <i>weeds</i> and <i>dieback</i> in accordance with condition 2;(g) actions taken to manage and mitigate impacts to reduce the potential for wind erosion in accordance with condition 3;(h) actions taken in accordance with condition 4; and(i) actions taken in accordance with condition 5.

7. Reporting

The permit holder must provide to the *CEO* the records required under condition 6 of this permit when requested by the *CEO*.

DEFINITIONS

In this permit, the terms in Table 3 have the meanings defined.

Table 3: Definitions

Term	Definition
black cockatoo habitat trees	means trees that have a diameter, measured at 130 centimetres from the base of the tree, of 50 centimetres or greater (or 30 centimetres or greater for <i>Eucalyptus salmonophloia</i> or <i>Eucalyptus wandoo</i>) that contain hollows suitable for breeding by black cockatoo species.
CEO	Chief Executive Officer of the department responsible for the administration of the clearing provisions under the <i>Environmental Protection Act 1986</i> .
clearing	has the meaning given under section 3(1) of the EP Act.
condition	a condition to which this clearing permit is subject under section 51H of the EP Act.
conservation covenant	has the meaning given under section 30B(2) of the <i>Soil and Land Conservation Act 1945</i>
dieback	means the effect of <i>Phytophthora</i> species on native vegetation.
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.
EP Act	<i>Environmental Protection Act 1986</i> (WA)
native vegetation	has the meaning given under section 3(1) and section 51A of the EP Act.
weeds	means any plant – (a) that is a declared pest under section 22 of the <i>Biosecurity and Agriculture Management Act 2007</i> ; or (b) published in a Department of Biodiversity, Conservation and Attractions species-led ecological impact and invasiveness ranking summary, regardless of ranking; or (c) not indigenous to the area concerned.

END OF CONDITIONS



Meenu Vitarana
MANAGER
NATIVE VEGETATION REGULATION

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

13 October 2023

Schedule 1

The areas crosshatched yellow indicate the boundary of the area authorised to be cleared, shown in Figures 1-4, below.



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

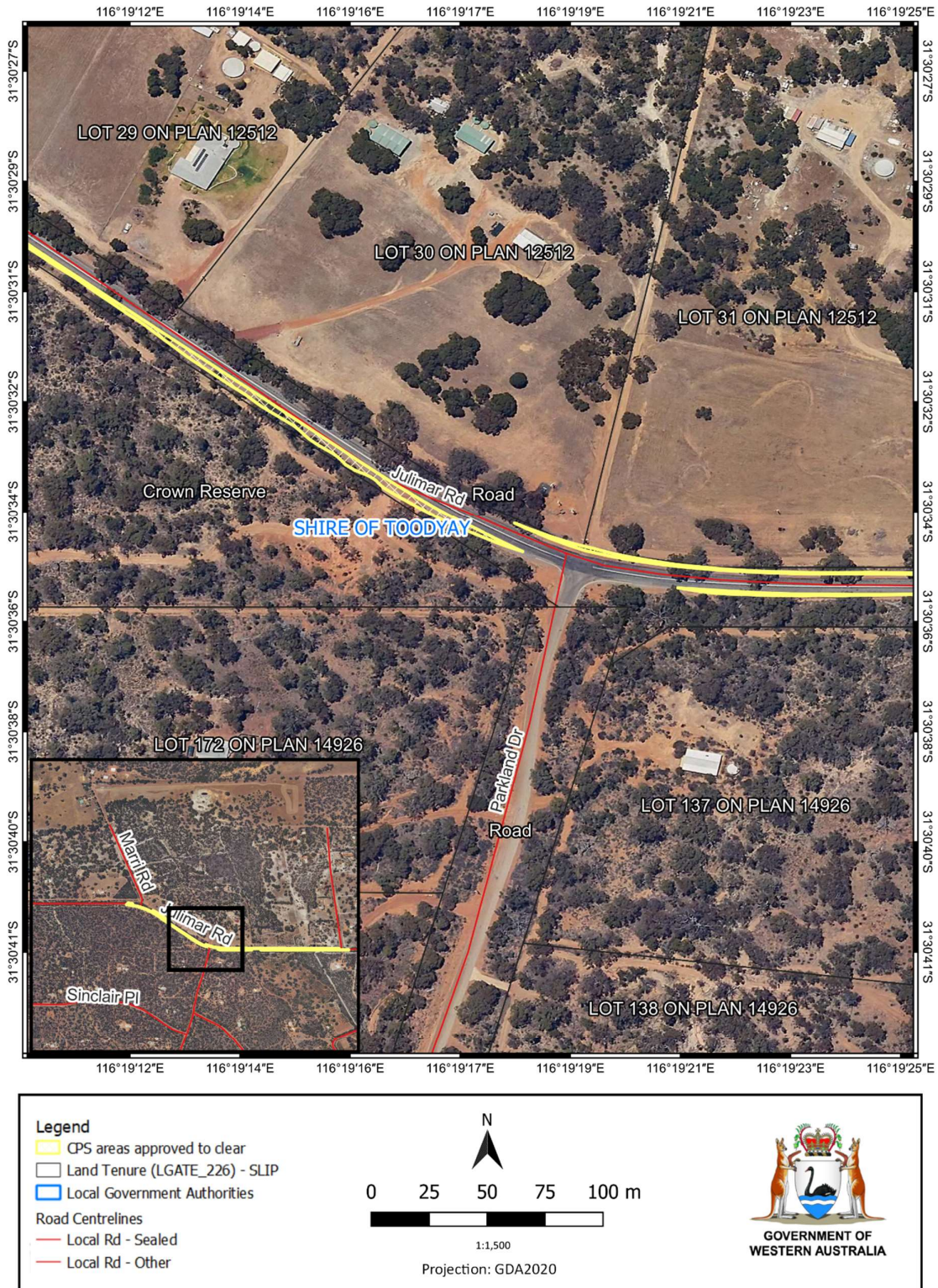


Figure 2: Map of the boundary of the area within which clearing may occur.

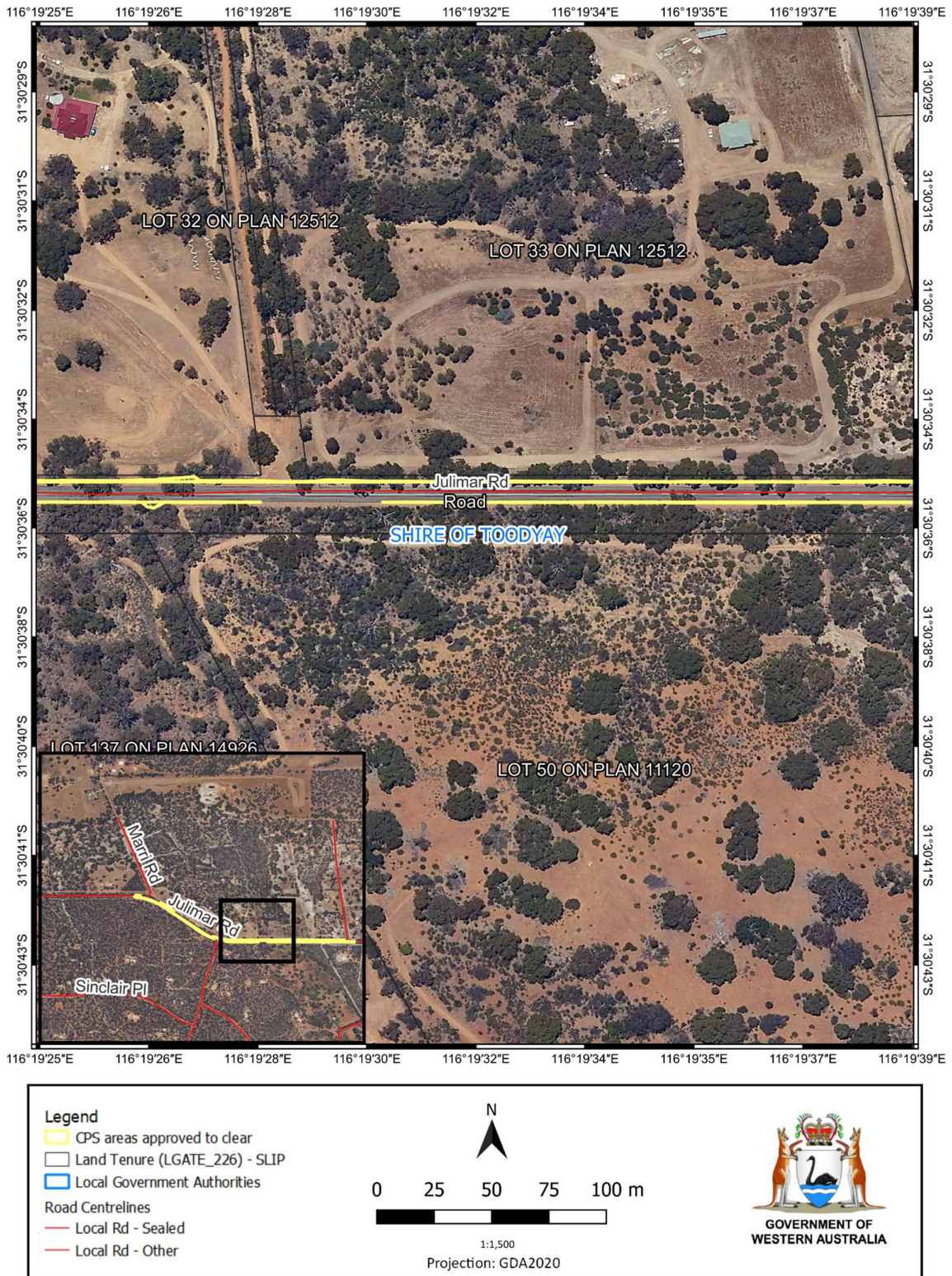


Figure 3: Map of the boundary of the area within which clearing may occur.

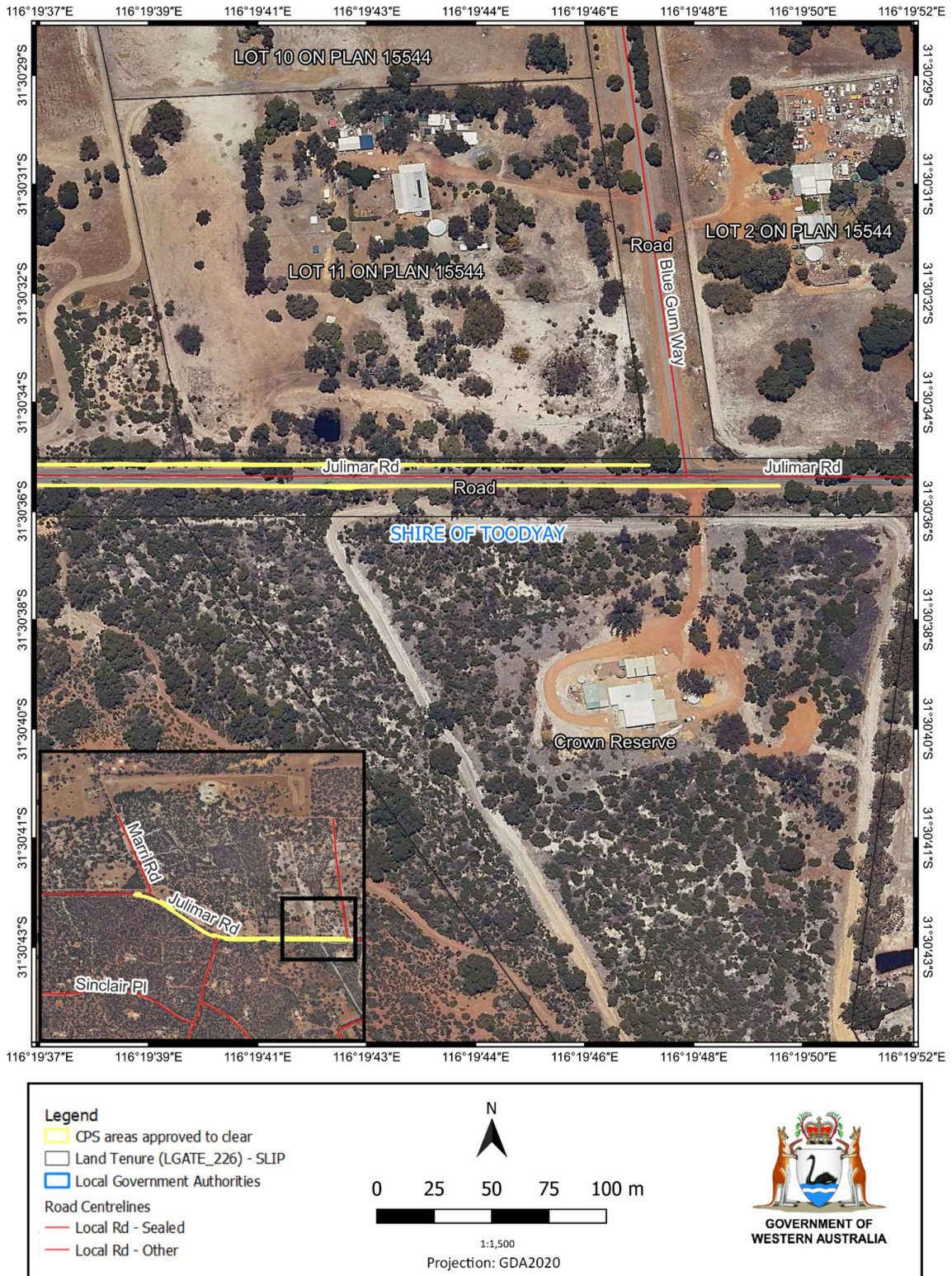


Figure 4: Map of the boundary of the area within which clearing may occur.

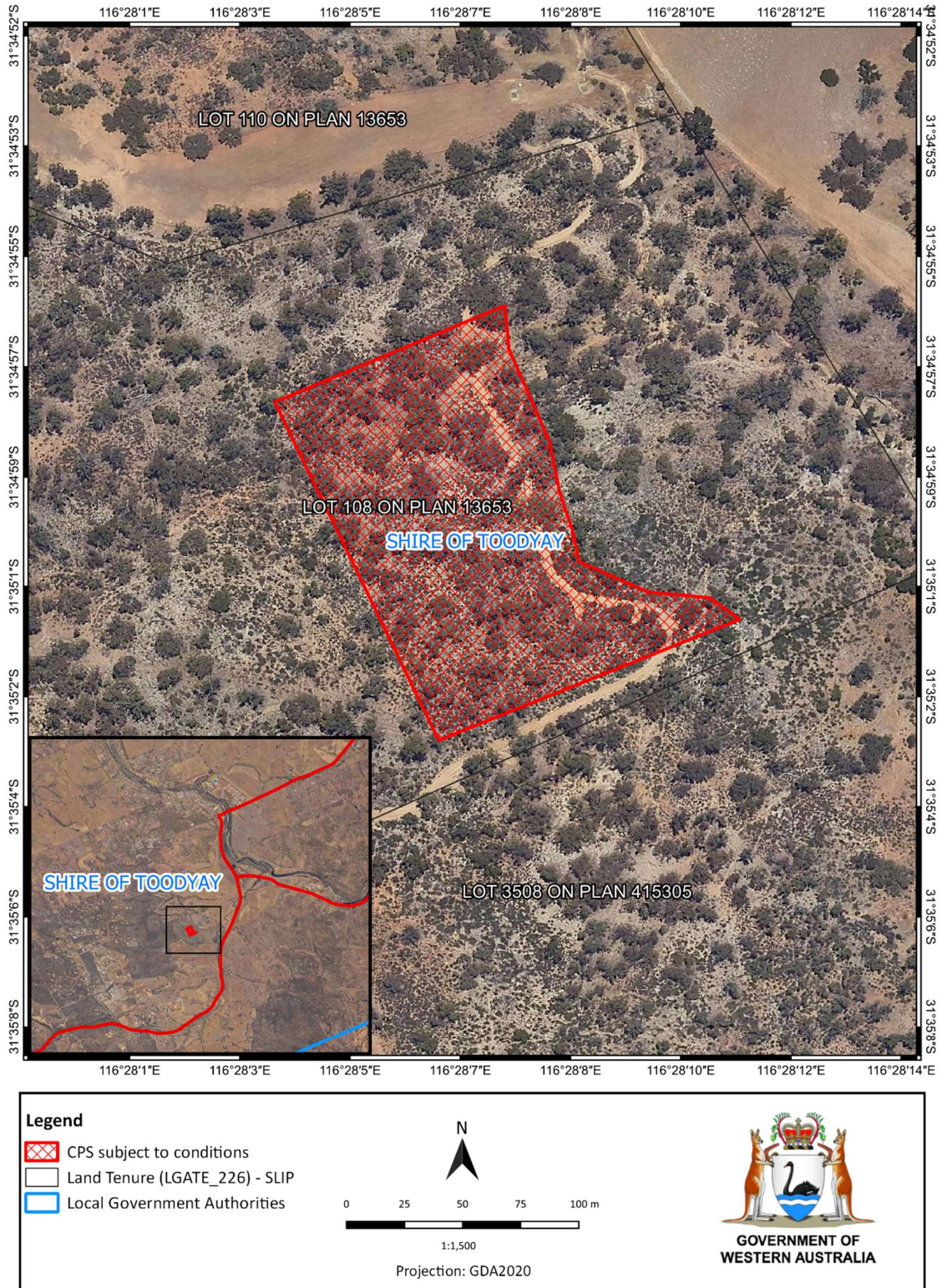


Figure 5: The area crosshatched red indicates the area within which Condition 8 applies.



Clearing Permit Decision Report

1 Application details and outcome

1.1. Permit application details

Permit number:	CPS 9754/1
Permit type:	Area permit
Applicant name:	Shire of Toodyay
Application received:	26 May 2022
Application area:	0.22 hectares of native vegetation
Purpose of clearing:	Widening and sealing the existing roads for safety improvements
Method of clearing:	Mechanical
Property:	Julimar road reserve (Pins: 1259746, 11744598, 1259744 and 1259749)
Location (LGA area/s):	Toodyay
Localities (suburb/s):	Julimar

1.2. Description of clearing activities

The Shire of Toodyay are proposing to clear a revised area of 0.22 hectares of native vegetation along a 1.3-kilometre stretch of Julimar road reserve. The section of road is deemed to be of poor standard with high potential for traffic accidents and fatalities and has consequently attracted Black Spot funding. The road is subject to increasing volumes of large vehicles including heavy haulage and caravan tourist traffic. The proposed clearing is required for the purpose of widening and sealing the existing roads for safety improvements.

The application area was revised from 0.7 hectares to 0.22 hectares during assessment, which included the avoidance of six potential black cockatoo breeding trees.

1.3. Decision on application

Decision:	Granted
Decision date:	13 October 2023
Decision area:	0.22 hectares of native vegetation, as depicted in Section 1.5, below.

1.4. Reasons for decision

This clearing permit application was submitted, accepted, assessed, and determined in accordance with sections 51E and 51O of the *Environmental Protection Act 1986* (EP Act). The Department of Water and Environmental Regulation (DWER) advertised the application for 21 days and no submissions were received.

In making this decision, the Delegated Officer had regard for the site characteristics (see Appendix A), relevant datasets (see Appendix G.1), the findings of a biological survey (see Appendix E), the clearing principles set out in Schedule 5 of the EP Act (see Appendix B), relevant planning instruments and any other matters considered relevant to the assessment (see Section 3). The Delegated Officer also took into consideration the purpose of the clearing is to improve safety for road users.

The assessment identified that the proposed clearing will result in:

- The loss of 0.22 hectares of native vegetation that is suitable foraging habitat and future breeding habitat for Carnaby's black cockatoo (*Zanda latirostris*, EN) and forest red-tailed black cockatoo (*Calyptorhynchus banksii naso* VU),
- the potential introduction and spread of weeds and dieback into adjacent vegetation, which could impact on the quality of the adjacent vegetation and its habitat values, and
- potential land degradation in the form of wind erosion.

After consideration of the available information, as well as the applicant's proposed minimisation and mitigation measures (see Section 3.1), the Delegated Officer determined the proposed clearing is unlikely to lead to appreciable land degradation however, the clearing of black cockatoo habitat constitutes a significant residual environmental impact. In accordance with the *Western Australian Offsets Policy* (2011), the proposed clearing must be offset (see Section 4).

The Shire of Toodyay proposed the use of a banked offset site, Lot 108 on Plan 13653, Toodyay. The site is owned by the Shire and situated approximately 14 km south-east of the application area. The site contains 123 hectares of vegetation in very good to excellent condition. The majority of the vegetation is *Eucalyptus loxophleba* woodland on the slopes and over outcrops, with some areas of *Eucalyptus wandoo* dominated woodland (see Appendix F), providing breeding, roosting, and foraging habitat for black cockatoos in close proximity to known recorded roosting and breeding sites. Within this site, 2.4 hectares is currently used to offset the significant residual impacts of CPS 9376/1. The site has been placed under a conservation covenant as per the conditions of the clearing permit for CPS 9376/1. An area of 1.95 hectares will be used (see Section 4) to counterbalance the significant residual impacts of the proposed clearing for CPS 9754/1 (this application).

Given the above, the Delegated Officer is satisfied that the environmental impacts associated with this project have been appropriately avoided, minimised, mitigated and the significant residual impacts offset. The Delegated Officer has therefore decided to grant this clearing permit subject to conditions to:

- avoid, minimise to reduce the impacts and extent of clearing,
- take hygiene steps to minimise the risk of the introduction and spread of weed and dieback,
- sealing the road within three months of approved clearing activities to minimise wind erosion,
- retention of 5 black cockatoo habitat trees that contain suitable hollows mapped within the application area (see Section 3.2),
- provide an environmental offset to mitigate impacts to clearing of black cockatoo habitat (see Section 4).

1.5. Site map

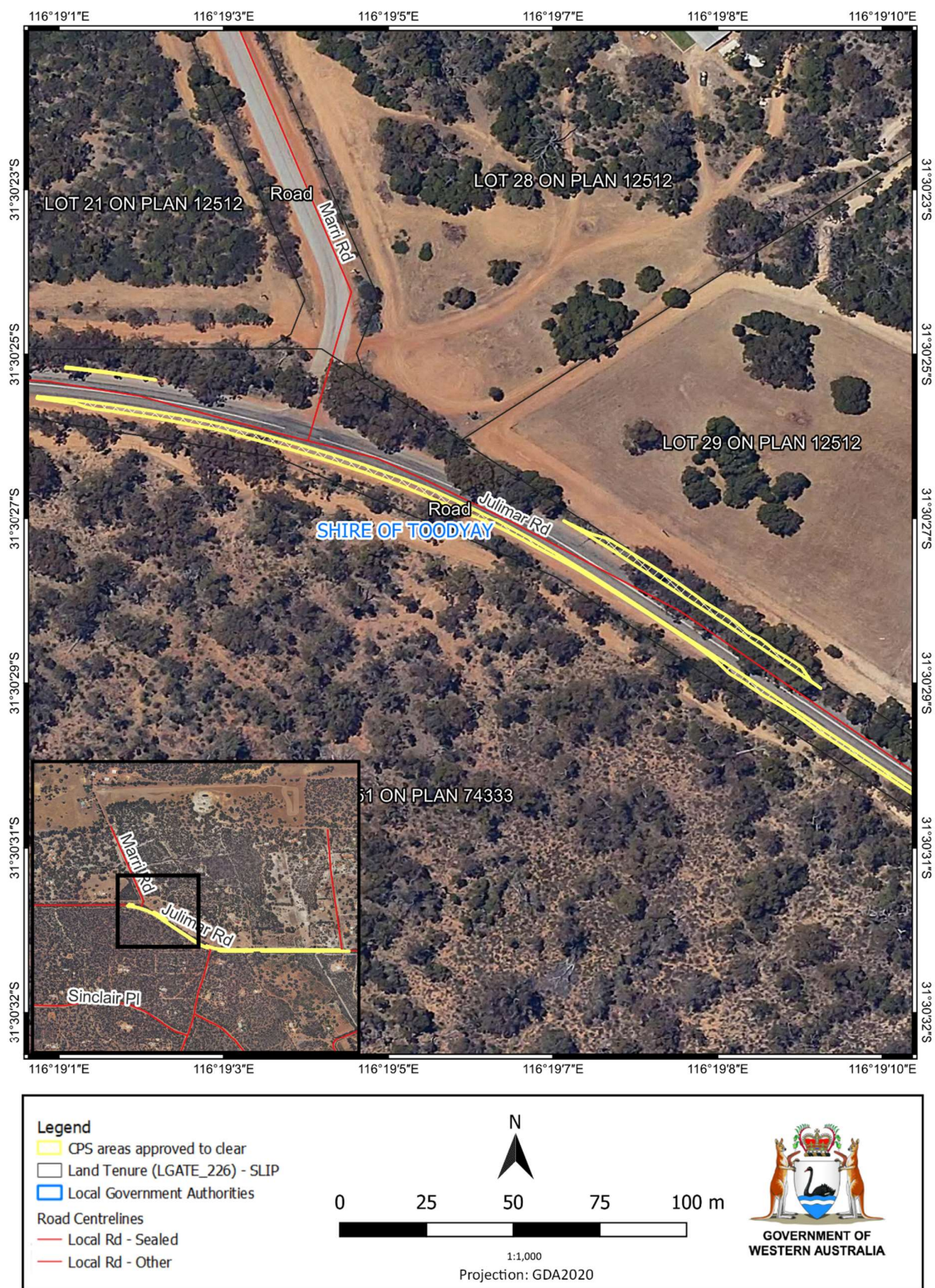


Figure 1 Map of the boundary of the area within which *clearing* may occur
 The areas crosshatched yellow indicate the area authorised to be cleared under the granted clearing permit.

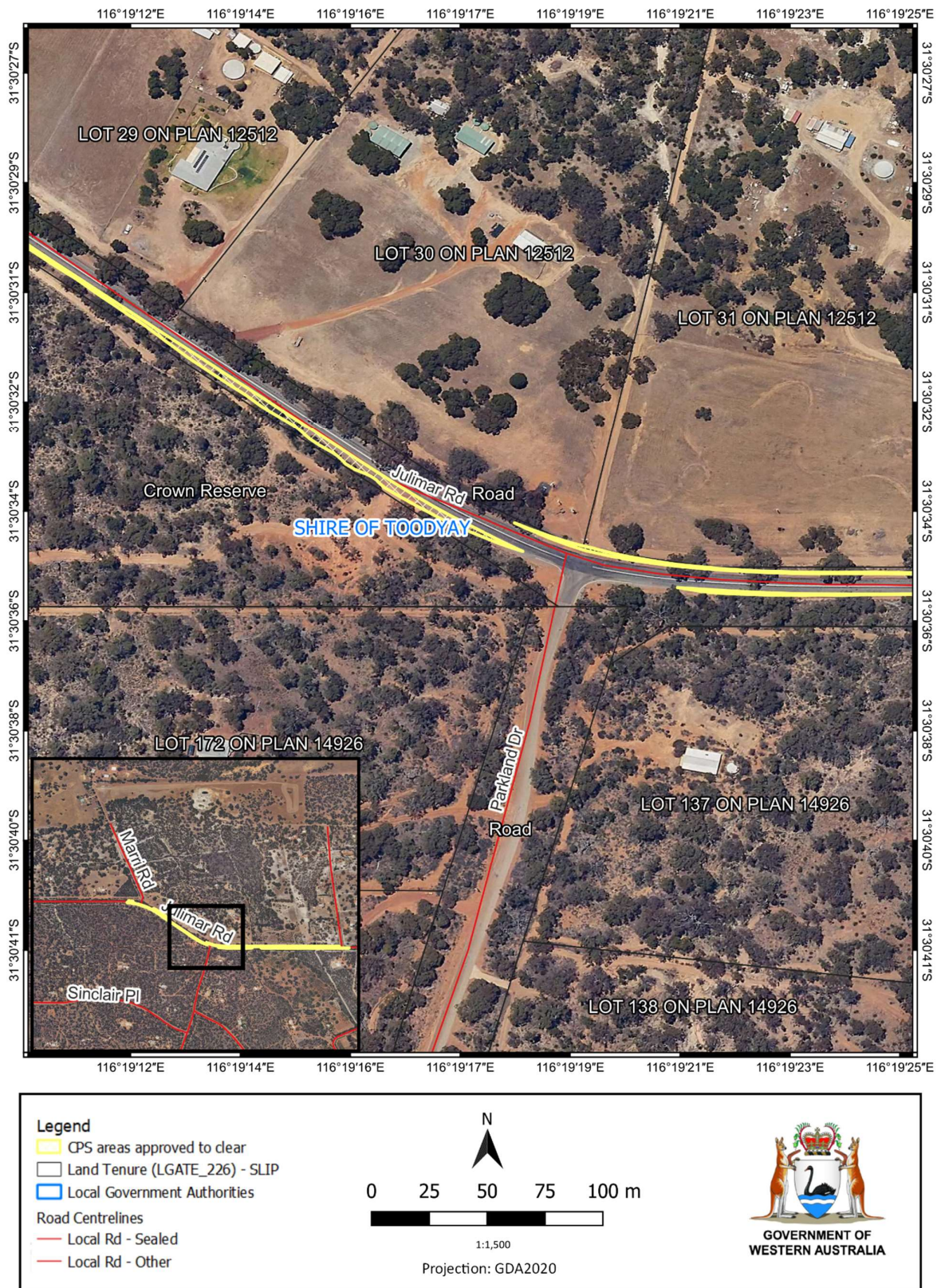


Figure 2 Map of the boundary of the area within which *clearing* may occur
 The areas crosshatched yellow indicate the area authorised to be cleared under the granted clearing permit.

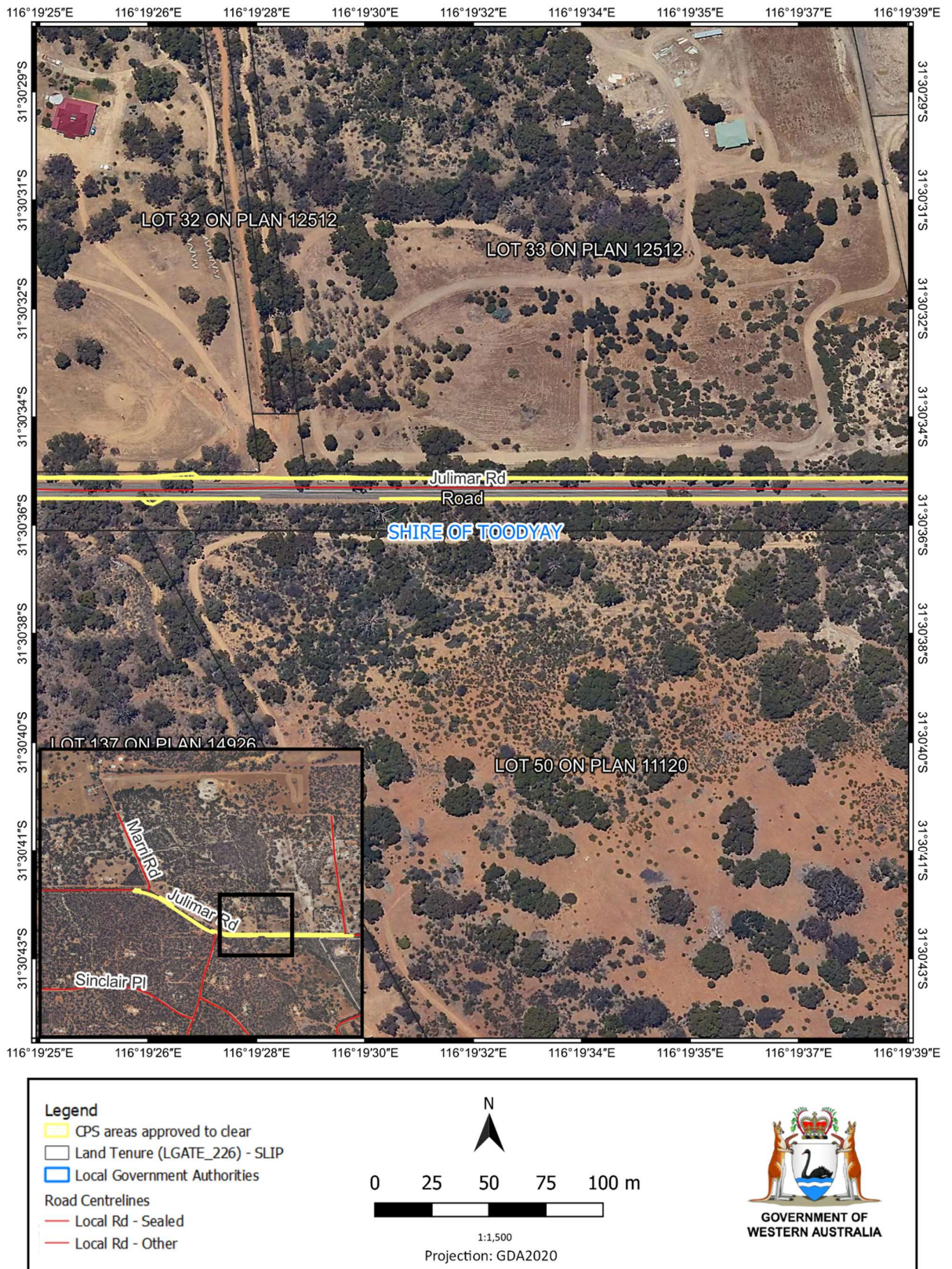


Figure 3 Map of the boundary of the area within which *clearing* may occur
 The areas crosshatched yellow indicate the area authorised to be cleared under the granted clearing permit.

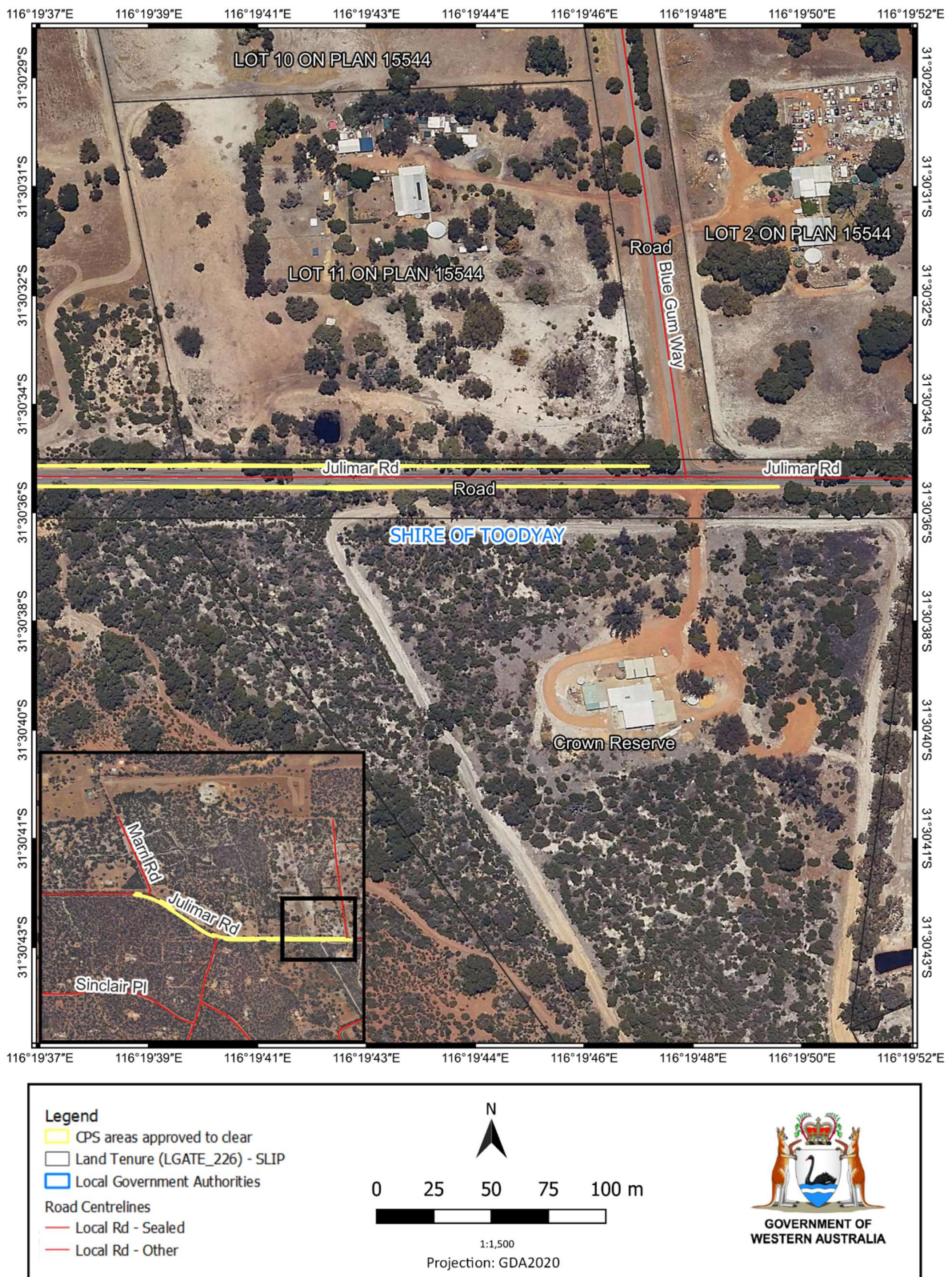


Figure 4 Map of the boundary of the area within which *clearing* may occur
 The areas crosshatched yellow indicate the area authorised to be cleared under the granted clearing permit.

2 Legislative context

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

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

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

Other legislation of relevance for this assessment include:

- *Biodiversity Conservation Act 2016* (WA) (BC Act)
- *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act)

Relevant policies considered during the assessment include:

- *Environmental Offsets Policy* (2011)

The key guidance documents which inform this assessment are:

- *A guide to the assessment of applications to clear native vegetation* (DER, December 2013)
- *Procedure: Native vegetation clearing permits* (DWER, October 2019)
- *Environmental Offsets Guidelines* (August 2014)
- Technical guidance – *Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA, 2016)
- Technical guidance – *Terrestrial Fauna Surveys for Environmental Impact Assessment* (EPA, 2016)

3 Detailed assessment of application

3.1. Avoidance and mitigation measures

The Shire advised the department that the section of road proposed to be cleared is deemed to be of poor standard with high potential for traffic accidents and fatalities. Evidence was submitted by the Shire, demonstrating that avoidance and mitigation measures had been considered (Shire of Toodyay 2022a; 2023):

- The proposed roadworks were extensively surveyed by the Shire Engineering Technical Officer and the Shire Reserves Management Officer.
- A member of Toodyay Naturalists was invited to inspect the proposed clearing area. Significant trees were identified and all design measures to achieve avoidance and mitigation were included into the design phase of the road works.
- The application area has been reduced from 0.7 hectares to 0.22 hectares which included the avoidance of six potential black cockatoo breeding trees (DBH of suitable size and hollows >100mm).
- Engineering design work was carried out with every effort applied to minimise the clearing of native vegetation.
- It was determined that to achieve the road widening necessary to gain the safety improvements that the proposed clearing was necessary and any further reduction in the proposed clearing would severely compromise the benefits and indeed increase the hazardous nature of the road.

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

After consideration of avoidance and mitigation measures, it was determined that an offset to counterbalance the significant residual impacts to black cockatoo habitat was necessary. In accordance with the Government of Western Australia's *Environmental Offsets Policy* and *Environmental Offsets Guidelines*, these significant residual impacts have been addressed through the conditioning of environmental offset requirements on the permit. The nature and suitability of the offset provided are summarised in Section 4.

3.2. Assessment of impacts on environmental values

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

The assessment against the clearing principles (see Appendix B) identified that the impacts of the proposed clearing present a risk to biological values (fauna and flora) and land and water resources. The consideration of these impacts,

and the extent to which they can be managed through conditions applied in line with sections 51H and 51I of the EP Act, is set out below.

3.2.1. Biological values (flora and fauna) - Clearing Principles (a), (b) and (c)

Assessment

Flora and vegetation

A detailed flora and vegetation survey was conducted across 0.71 hectares of the Julimar Road reserve (Natural Area, 2022b). Across the application area, four vegetation types were identified (2022b):

- *Corymbia calophylla* low open forest: an open forest comprised of an overstorey of *Corymbia calophylla* (height < 10 m), with a sparse mid-storey of native shrubs and an understorey of mixed native herbs and sedges and introduced grasses.
- *Melaleuca preissiana* closed forest: a forest of dense *Melaleuca preissiana* as well as *Corymbia calophylla* and *Eucalyptus rudis*, over sparse native shrubs and an understorey dominated by introduced grasses.
- *Eucalyptus accedens* and *E. wandoo* woodland: A woodland of *Eucalyptus accedens* and *E. wandoo* over mixed native bushland shrubs and herbs.

The condition of the vegetation ranged from Degraded to Very Good, with the majority of the survey area being in Very Good (65.37%) condition (Keighery, 1994) (Natural Area, 2022b).

A desktop assessment identified 12 priority flora and four threatened flora records within the local area (10 kilometres from the application area). Based on the similarities between the soil and vegetation types within the application area, 15 flora species are considered possible to occur within the road reserve (Appendix A.2).

The flora and vegetation survey recorded a combined total of 252 flora species from 51 families, including 46 introduced and 206 native species. One conservation significant species was identified, *Persoonia sulcata* which is listed as Priority 4. Thirteen individuals were recorded within the survey area; one was located within the application area and the remaining 12 were recorded within 10 metres of the application area. Since the survey was conducted, the application area was reduced and revised to avoid all individuals of *Persoonia sulcata* (P4) (Shire of Toodyay, 2023).

The application area intersects a mapped Environmentally Sensitive Area associated with the edge of a buffer to a threatened flora record. The survey did not identify any threatened flora within the application area. No threatened flora are unlikely to be impacted by the proposed clearing.

One Declared Pest and Weed of National Significance (WoNS) was identified within the survey area, Bridal Creeper (**Asparagus asparagoides*). This classification requires the landowner/land manager to control the population to limit damage as a result of the presence of these species (Natural Area, 2022b).

Conclusion

Given the above assessment and the revised application area, the proposed clearing is unlikely to impact on threatened and priority flora species, however it will increase risk of spreading weeds into adjacent vegetation.

Conditions

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

- implement weed control measures to minimise the risk of the introduction and spread of weeds and dieback into adjacent remnant vegetation.

Fauna

According to available databases, a total of 14 conservation significant fauna species are recorded within the local area. Taking into consideration the preferred habitat types, proximity of records to the application area, and the type and condition of the vegetation within the application area, two of these species were considered possible to occur within the application area:

- *Zanda latirostris* (Carnaby's cockatoo), listed as Endangered under the EPBC Act and BC Act;
- *Calyptorhynchus banksii naso* (forest red-tailed black cockatoo), listed as Vulnerable under the EPBC Act and BC Act;

Black cockatoos

The application area is located within the known distribution of Endangered Carnaby's black cockatoo and the Vulnerable forest red-tailed black cockatoo and located 16.5 kilometres from the extent of the mapped distribution for Baudin's black cockatoos. Records of all three species occur within the local area, including one record of a black cockatoo known roost site (4.8 kilometres from the application area) and one confirmed white tailed black cockatoo (either Carnaby's black cockatoo or Baudin's black cockatoo) breeding site (1.5 kilometres from the application area).

The black cockatoo habitat assessment conducted across the application area recorded (Natural area, 2022) suitable breeding and foraging habitat within the survey area.

The targeted Black Cockatoo Habitat Assessment was undertaken in conjunction with other survey activities. Key data recorded using Mappt software on a handheld tablet. The habitat assessment involved:

- Recording location and evidence of breeding, roosting and foraging activities (chew marks, feathers).
- Marking with GPS location of each habitat tree with a diameter at breast height (DBH) greater or equal to 300 mm.
- Recording evidence of hollows, including size, type, and location within the tree as well as tree species
- Recording opportunistic sighting of black cockatoo species

A total of 121 trees that satisfied the Commonwealth guidelines for potential black cockatoo habitat trees (trees with DBH greater than 300 mm) were recorded within the survey area at Julimar Road (DAWE, 2022a). The majority of the trees recorded were marri (*Corymbia calophylla*; 39.67%), powderbark wandoo (*Eucalyptus accedens*; 21.49%), and wandoo (*Eucalyptus wandoo*; 17.36%). The majority of the trees recorded were from species which are considered to be high priority species for black cockatoo nesting, roosting and foraging; marri (*Corymbia calophylla*; 39.67%) and wandoo (*Eucalyptus wandoo*; 17.36%) (DEC, 2011).

High quality foraging resources for black cockatoos are present within the survey area and surrounding bushland areas in the form of mature and fruiting marri (*Corymbia calophylla*) and wandoo (*Eucalyptus wandoo*) trees, Hakea species and Banksia species. Recent black cockatoo foraging was identified at a total of 17 locations, and historic foraging was observed surrounding a further seven trees. All foraging was observed within the eastern portion of the survey area (Natural area, 2022).

The application area was reduced within the assessment stage to avoid potential breeding trees; the reduced application area contains approximately 15 potential breeding trees (trees with DBH greater than 300 mm), of which five of these contain suitable hollows. Through discussions with the applicant (Shire of Toodyay, 2023), the applicant has agreed to not clear the breeding trees located in Table 1 below which will be conditioned on the permit.

Table 1. Locations of habitat trees to be retained

Species	Longitude	Latitude
Eucalyptus sp. (dead)	116.3242213	-31.5097919
<i>Eucalyptus wandoo</i>	116.319862	-31.5085725
<i>Eucalyptus accedens</i>	116.3201774	-31.508787
<i>Eucalyptus wandoo</i>	116.3216506	-31.5097253
<i>Eucalyptus accedens</i>	116.3188695	-31.5079337

Conclusion

Based on the above assessment, the proposed clearing will result in a significant residual environmental impact of the loss of 0.22 hectares of high-quality foraging habitat and future breeding habitat for Carnaby's cockatoo (*Zanda latirostris*), which is listed as endangered under the EPBC Act and BC Act and forest red-tailed black cockatoo (*Calyptorhynchus banksii naso*), listed as vulnerable under the EPBC Act and BC Act.

Conditions

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

- Offsets – conservation covenant (as described in Section 4)
- Fauna management – retain black cockatoo habitat trees (as described in Table 1)

3.2.2 Land and water resources - Clearing Principle (g)

Assessment

The mapped soils are highly susceptible to land degradation from wind erosion and subsurface acidification. The risk of land degradation from water erosion, waterlogging, salinity and flooding is low.

Noting the extent of the application area, and the final purpose being a sealed road, the proposed clearing is not likely to have an appreciable impact on land degradation.

Conclusion

Based on the above assessment, the proposed clearing is unlikely to cause a significant environmental impact to land degradation.

Conditions

To further mitigate the risk of land degradation, the following management measure will be required as a condition on the clearing permit:

- The permit holder must commence sealing of the road within three months of undertaking authorised clearing activities.

3.3. Relevant planning instruments and other matters

Several Aboriginal sites of significance have been mapped within the local area. It is the permit holder's responsibility to comply with the relevant legislation and ensure that no Aboriginal Sites of Significance are damaged through the clearing process.

4 Suitability of offsets

Through the detailed assessment outlined in Section 3.2 above, the Delegated Officer has determined that the following significant residual impacts remain after the application of the avoidance and mitigation measures summarised in Section 3.1:

- The loss of 0.22 hectares of native vegetation that is suitable foraging habitat and future breeding habitat for Carnaby's black cockatoo (*Zanda latirostris*, EN) and forest red-tailed black cockatoo (*Calyptorhynchus banksii naso* VU).

The Shire of Toodyay proposed the use of a banked offset site, Lot 108 on Plan 13653, Toodyay. The site is owned by the Shire and situated approximately 14 km south-east of the application area. The site contains 123 hectares of vegetation in very good to excellent condition. The majority of the vegetation is *Eucalyptus loxophleba* woodland on the slopes and over outcrops providing breeding, roosting, and foraging habitat for black cockatoos (DCCEEW, 2022) in close proximity to known recorded roosting and breeding sites. Within this site, 2.4 hectares is currently used to offset the significant residual impacts of CPS 9376/1. The site has been placed under a conservation covenant as per the conditions of the clearing permit for CPS 9376/1. An area of 1.95 hectares will be used (see Section 4) to counterbalance the significant residual impacts of the proposed clearing for CPS 9754/1 (this application). This area consists of a *Eucalyptus wandoo* dominated overstorey (see Appendix F), similar to the foraging habitat present within the application area.

To counterbalance the above impacts, the following offset has been proposed by the applicant:

- 1.95 hectares of remnant native vegetation in very good condition on Lot 108 on Plan 13653, which has already been secured under a conservation covenant.

In assessing whether the proposed offset is adequately proportionate to the significance of the environmental values being impacted, calculations using the WA Offsets calculator were undertaken. These calculations indicate that 1.95 hectares within Lot 108 placed under conservation covenant, is sufficient to adequately counterbalance the significant residual impacts of the proposed clearing. Justification for the values used in the offset calculation are provided in Appendix D.

The Delegated Officer considers that this adequately counterbalances the significant residual impacts listed above.

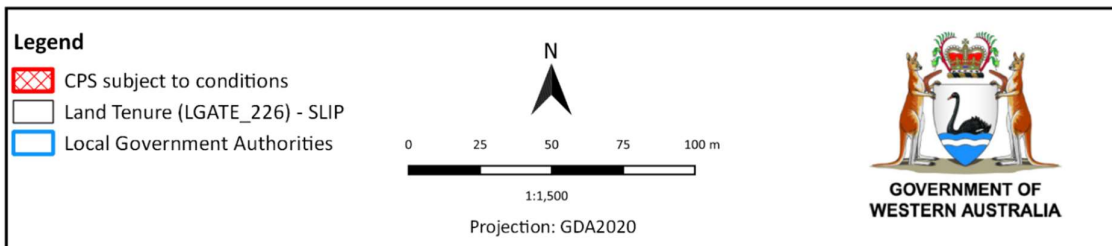


Figure 5. Location of offset site.

End

Appendix A. Site characteristics

A.1. Site characteristics

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

Characteristic	Details
Local context	<p>The area proposed to be cleared consists of native vegetation along the left and right verge of an approximately 1.3 kilometre stretch of the Julimar road. It is surrounded by cleared farmland and remnant vegetation. The proposed clearing area contributes to an ecological linkage in an east west direction between parcels of native vegetation.</p> <p>Spatial data indicates the local area (10-kilometre radius from the centre of the area proposed to be cleared) retains approximately 69.74 per cent of the original native vegetation cover.</p>
Ecological linkage	<p>The proposed clearing area is not a part of any formal ecological linkages. It is mapped within a roadside conservation area, as a Medium-Low conservation value roadside:</p> <ul style="list-style-type: none"> • Natural structure disturbed (shrubs and / or ground cover absent) • Low diversity of native flora – mostly weeds • Medium to low value as biological corridor
Conservation areas	<p>The application area does not occur within any conservation areas, the nearest conservation area is the Julimar state Forest located 2 kilometres north of the application area. An area under management by the shire of Toodyay for conservation abuts the western edge of the application area.</p>
Vegetation description	<p>Photographs supplied by the applicant and a vegetation survey (natural area, 2022) indicate the vegetation within the proposed clearing area consists of three vegetation types:</p> <ul style="list-style-type: none"> • <i>Corymbia calophylla</i> low open forest • <i>Melaleuca preissiana</i> closed forest • <i>Eucalyptus accedens</i> and <i>E. wandoo</i> woodland <p>Representative photos, survey descriptions and maps are available in Appendix E.</p> <p>This is consistent with the mapped vegetation types:</p> <ul style="list-style-type: none"> • Coolakin (51): Woodland of <i>Eucalyptus wandoo</i> with mixtures of <i>Eucalyptus patens</i>, <i>Eucalyptus marginata</i> subsp. <i>thalassica</i> and <i>Corymbia calophylla</i> on the valley slopes in arid and perarid zones. • Yalanbee (312): Woodland of <i>Eucalyptus wandoo-Eucalyptus accedens</i>, less consistently open forest of <i>Eucalyptus marginata</i> subsp. <i>thalassica-Corymbia calophylla</i> on lateritic uplands and breakaway landscapes in arid and perarid zones. <p>The mapped vegetation types retain approximately 39.15 and 46.54 per cent of the original extent respectively (Government of Western Australia, 2019).</p>
Vegetation condition	<p>Photographs supplied by the applicant /and a vegetation survey (Natural areas, 2022) indicate the vegetation within the proposed clearing area ranges from Degraded to Very Good, with the majority of the survey area being in Very Good (65.37%) condition (Keighery, 1994).</p> <p>The full Keighery (1994) condition rating scale is provided in Appendix CC. Representative photos, survey descriptions and mapping are available in Appendix E.</p>
Climate and landform	<p>The climate experienced in the area is Mediterranean, with dry, hot summers and cool, wet winters. The application area ranges from 266 metres Australian Height Datum (AHD) gently rises to 292 metres AHD in the eastern portion.</p>

Characteristic	Details
Soil description	The soil is mapped as: <ul style="list-style-type: none"> • Yalanbee subsystem described as: residual plateau at the top of the landscape shallowly dissected by Pindalup valleys. Pisolitic gravelly, yellowish brown soils that vary in texture from loamy sands to clays, with pockets of pale sands and areas of outcropping laterite • Wundowie Kokeby subsystem described as: very gentle sloping areas located in small pockets on summits and at breaks of slope. White and deeply bleached sand over laterite at greater than a metre depth, and • Pindalup subsystem (Boyagin) described as: shallow upper gently to sloping valleys. Alluvial red and yellow duplex and uniform fine soils which are often gravelly
Land degradation risk	The soils across the application area have a high susceptibility of land degradation from wind erosion and Subsurface Acidification. The risk of land degradation from water erosion, waterlogging, salinity and flooding is low.
Waterbodies	The desktop assessment and aerial imagery indicated that no watercourses or wetlands intersect the application area. The nearest waterbody is a perennial river located 5.6 kilometres south of the application area.
Hydrogeography	The application area is located within the Avon River catchment area proclaimed under the RIWI Act. It is not located within any groundwater areas, public drinking water areas or CAWS areas.
Flora	A total of 16 conservation significant flora records occur in local area, including 12 priority species and four threatened species. There are two records of priority flora within 1 kilometre, 15 of which are found on the same soil type as the application area. The flora and vegetation survey recorded one priority four flora species, <i>Persoonia sulcata</i> within the survey area (Natural area, 2022).
Ecological communities	One Ecological community, the Wheatbelt woodlands, is recorded within the local area. The nearest occurrence is 7.3 kilometres east of the application area.
Fauna	14 fauna records in local area. The nearest record is Carnaby's cockatoo. The application area occurs within the known distribution of Carnaby's cockatoo and forest red-tailed black cockatoo. The black cockatoo habitat assessment conducted across the application area recorded (Natural area, 2022) suitable breeding and foraging habitat within the survey area.

A.2. Flora analysis table

With consideration for the site characteristics set out above, relevant datasets (see Appendix G.1), and biological survey information (Natural area, 2022), impacts to the following conservation significant flora required further consideration.

Species name	Conservation status	Suitable habitat features ? [Y/N]	Suitable vegetation type? [Y/N]	Suitable soil type? [Y/N]	Distance of closest record to application area (km)	Number of known records (total)	Are surveys adequate to identify? [Y, N, N/A]
<i>Grevillea candolleana</i>	2	Y	Y	Y	4.48	2	Y
<i>Grevillea flexuosa</i>	T	Y	Y	Y	5.43	2	Y
<i>Hibbertia miniata</i>	4	Y	Y	Y	2.09	10	Y
<i>Persoonia sulcata</i>	4	Y	Y	Y	6.37	3	Y
<i>Stylidium vinosum</i>	1	Y	Y	Y	0.19	1	Y
<i>Styphelia brevicuspis</i>	2	Y	Y	Y	6.19	74	Y
<i>Thelymitra stellata</i>	T	Y	Y	Y	0.04	3	Y
<i>Verticordia citrella</i>	2	Y	Y	Y	5.19	6	Y

Species name	Conservation status	Suitable habitat features ? [Y/N]	Suitable vegetation type? [Y/N]	Suitable soil type? [Y/N]	Distance of closest record to application area (km)	Number of known records (total)	Are surveys adequate to identify? [Y, N, N/A]
<i>Cyanicula ixioides</i> subsp. <i>ixioides</i>	4	N	Y	N	8.06	3	Y
<i>Drosera sewelliae</i>	2	N	Y	N	6.56	2	Y
<i>Gastrolobium nudum</i>	2	N	Y	N	9.45	2	Y
<i>Grevillea corrugata</i>	T	N	Y	N	7.57	1	Y
<i>Grevillea curviloba</i>	T	N	Y	N	7.79	3	Y

T: threatened, CR: critically endangered, EN: endangered, VU: vulnerable, P: priority

A.3. Fauna analysis table

With consideration for the site characteristics set out above, relevant datasets (see Appendix G.1), and biological survey information (Natural area, 2022), impacts to the following conservation significant fauna required further consideration.

Species name	Conservation status	Suitable habitat features? [Y/N]	Suitable vegetation type? [Y/N]	Distance of closest record to application area (km)	Number of known records (total)	Are surveys adequate to identify? [Y, N, N/A]
<i>Calyptorhynchus banksii naso</i> (Forest red-tailed black cockatoo)	VU	Y	Y	0.22	-	Y
<i>Zanda latirostris</i> (Carnaby's black cockatoo)	EN	Y	Y	0.01	-	Y

T: threatened, CR: critically endangered, EN: endangered, VU: vulnerable, P: priority

A.4. Land degradation risk table

Risk categories	Land Unit 1	
Wind erosion	M1: 10-30% of the map unit has a high to extreme hazard	H2 >70
Water erosion	L2: 3-10% of the map unit has a very high to extreme hazard	Small portion H2, majority low <3%
Salinity	L2: 3-10% of the map unit has a moderate or high hazard or is presently saline	Small portion H2, majority low <3%
Subsurface Acidification	M2: 30-50% of the map unit has a high susceptibility	H2 >70
Flood risk	L1: <3% of the map unit has a moderate to high hazard	Small portion H2, majority low <3%
Water logging	L2: 3-10% of the map unit has a moderate to very high to risk	Small portion H2, majority low <3%
Phosphorus export risk	L2: 3-10% of the map unit has a high to extreme hazard	Small portion H2, majority low <3%

Appendix B. 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> <i>“Native vegetation should not be cleared if it comprises a high level of biodiversity.”</i></p> <p><u>Assessment:</u></p> <p>The area proposed to be cleared is not likely to contain local or regionally significant flora, however the area does contain locally and regionally significant habitat for Carnaby’s black cockatoos and forest red-tailed black cockatoos.</p>	May be at variance	Yes <i>Refer to Section 3.2.1, above.</i>
<p><u>Principle (b):</u> <i>“Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna.”</i></p> <p><u>Assessment:</u></p> <p>The area proposed to be cleared contains foraging habitat for Carnaby’s black cockatoos and forest red-tailed black cockatoos.</p>	At variance	Yes <i>Refer to Section 3.2.1, above.</i>
<p><u>Principle (c):</u> <i>“Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora.”</i></p> <p><u>Assessment:</u></p> <p>The area proposed to be cleared is unlikely to contain habitat for flora species listed under the BC Act.</p>	Not likely to be at variance	Yes <i>Refer to Section 3.2.1, above.</i>
<p><u>Principle (d):</u> <i>“Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a threatened ecological community.”</i></p> <p><u>Assessment:</u></p> <p>According to available databases, the closest occurrence of a threatened ecological community (TEC) is the Eucalypt Woodlands of the Western Australian Wheatbelt TEC. While the application area contains dominant species associated with this TEC, the vegetation within the application area is not considered representative of this TEC due to its geographic location within the Jarrah Forest IBRA region and not the Avon Wheatbelt.</p>	Not likely to be at variance	No
Environmental value: significant remnant vegetation and conservation areas		
<p><u>Principle (e):</u> <i>“Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.”</i></p> <p><u>Assessment:</u></p> <p>The extent of the mapped vegetation types and native vegetation in the local area is consistent with the national objectives and targets for biodiversity conservation in Australia. The vegetation proposed to be cleared is not considered to be part of a significant ecological linkage in the local area.</p>	Not likely to be at variance	No
<p><u>Principle (h):</u> <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.”</i></p> <p><u>Assessment:</u></p> <p>Given the distance to the nearest conservation area is over 5 kilometres, the proposed clearing is not likely to have an impact on the environmental values of nearby conservation areas.</p>	Not likely to be at variance	No

Assessment against the clearing principles	Variance level	Is further consideration required?
Environmental value: land and water resources		
<p><u>Principle (f):</u> <i>"Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland."</i></p> <p><u>Assessment:</u></p> <p>Given no water courses or wetlands are recorded within the application area, and the distance from any waterbody within the local area, the proposed clearing is unlikely to impact 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></p> <p>The mapped soils are highly susceptible to land degradation from wind erosion and subsurface acidification. The risk of land degradation from water erosion, waterlogging, salinity and flooding is low.</p> <p>Noting the extent of the application area, and the final purpose being a sealed road, the proposed clearing is not likely to have an appreciable impact on land degradation.</p>	Not likely to be at variance	Yes <i>Refer to Section 3.2.2, above.</i>
<p><u>Principle (i):</u> <i>"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water."</i></p> <p><u>Assessment:</u></p> <p>Given no water courses, wetlands or Public Drinking Water Sources Areas are recorded within five kilometres of the application area, the proposed clearing is unlikely to impact surface or ground water quality.</p>	Not likely to be at variance	No
<p><u>Principle (j):</u> <i>"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding."</i></p> <p><u>Assessment:</u></p> <p>The mapped soils and topographic contours in the surrounding area do not indicate the proposed clearing is likely to contribute to increased incidence or intensity of flooding.</p> <p>Given no water courses or wetlands are recorded within five kilometres of the application area, the proposed clearing is unlikely to contribute to waterlogging.</p>	Not likely to be at variance	No

Appendix C. Vegetation condition rating scale

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

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

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

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

Appendix D. Offset calculator value justification.

D.1. Environmental value: Carnaby's black cockatoo habitat

Calculation	Score (Area)	Rationale
Conservation significance		
Description	Black cockatoo habitat	The application area is located within the known distribution of Carnaby's and forest Red-tailed cockatoo habitat with suitable foraging and future breeding habitat identified within the application area.
Type of environmental value	Species (flora/fauna)	Roadside vegetation comprises 0.22 hectares of suitable foraging habitat
Conservation significance of environmental value	Rare/threatened species – endangered	Endangered
Landscape level value impacted	Yes/no	yes
Significant impact		
Description	Habitat for Carnaby's black cockatoo	Natural Areas survey report 2022 recorded suitable BC foraging habitat and evidence of BC foraging habitat within the road reserve
Significant impact (hectares)	0.22	Application area contains 0.22 hectares of suitable foraging habitat and future breeding habitat
Quality (scale)	7.00	Patchy roadside vegetation, black cockatoo foraging evidence within application area, application area within less than 12 kms of known roost and breeding records
Rehabilitation credit		
Description	-	
Offset		
Description	0	An offset site was proposed that is in the process of being secured through a conservation covenant. The site is a banked offset, a portion has been used for CPS 9376/1. The covenant will require the protection and management of the vegetation in perpetuity. The calculated offset site is a part of a 123 ha of land reserved with the Shire of Toodyay for recreation.
Proposed offset (area in hectares)	1.95	Calculated area
Current quality of offset site	8.00	The proposed offset area is in Very Good to Excellent condition
Future quality WITHOUT offset	8.00	The area is currently managed for recreation with no development proposed. The site's conditions with outcrops would limit future development. It is proposed the condition will not readily change
Future quality WITH offset	8.00	Placing a conservation covenant to the area would retain the site's current vegetation condition
Time until ecological benefit (years)	1.00	The ecological benefit of conserving the site to offset the loss of roadside vegetation being removed
Confidence in offset result (%)	0.95	There is a high level of confidence that the offset will reduce the risk of loss of native vegetation cover in the local and regional context
Duration of offset implementation (maximum 20 years)	20.00	An irrevocable conservation covenant is or has been placed on the site (as per the conditions of CPS 9376-1), therefore the maximum 20 years was used
Time until offset site secured (years)	1.00	The area has already been placed under a Conservation Covenant
Risk of future loss WITHOUT offset (%)	15.0	Whilst it is zoned as recreation, the landscape and outcrops make it unsuitable for development and is not likely to be cleared
Risk of future loss WITH offset (%)	5.0	Conservation covenant reduces the potential impact of development
Offset ratio (Conservation area only)	N/A	
Landscape level values of offset?	N/A	

D.2. Environmental value: Forest red-tailed black cockatoo habitat

Calculation	Score (Area)	Rationale
Conservation significance		
Description	FRTBC Habitat	The application area is located within the known distribution of Carnaby's and forest Red-tailed cockatoo habitat with suitable foraging and future breeding habitat identified within the application area.
Type of environmental value	Species (flora/fauna)	Roadside vegetation comprises 0.22 hectares of suitable foraging habitat and future breeding habitat
Conservation significance of environmental value	Rare/threatened species - endangered	Endangered
Landscape level value impacted	Yes/no	yes
Significant impact		
Description	Habitat for Carnaby's black cockatoo	Natural Areas survey report 2022 recorded suitable BC foraging habitat and evidence of BC foraging habitat within the road reserve
Significant impact (hectares)	0.22	Application area contains 0.22 hectares of suitable foraging habitat
Quality (scale)	7.00	Patchy roadside vegetation, black cockatoo foraging evidence within application area, application area within less than 12 kms of known roost and breeding records
Rehabilitation credit		
Description	-	
Offset		
Description	0	An offset site was proposed that is in the process of being secured through a conservation covenant. The site is a banked offset, a portion has been used for CPS 9376/1. The covenant will require the protection and management of the vegetation in perpetuity. The calculated offset site is a part of a 123 ha of land reserved with the Shire of Toodyay for recreation
Proposed offset (area in hectares)	1.93	Calculated area
Current quality of offset site	8.00	The proposed offset area is in Very Good to Excellent condition
Future quality WITHOUT offset	8.00	The area is currently managed for recreation with no development proposed. The site's conditions with outcrops would limit future development. It is proposed the condition will not readily change
Future quality WITH offset	8.00	Placing a conservation covenant to the area would retain the site's current vegetation condition
Time until ecological benefit (years)	1.00	The ecological benefit of conserving the site to offset the loss of roadside vegetation being removed
Confidence in offset result (%)	0.95	There is a high level of confidence that the offset will reduce the risk of loss of native vegetation cover in the local and regional context
Duration of offset implementation (maximum 20 years)	20.00	An irrevocable conservation covenant is or has been placed on the site (as per the conditions of CPS 9376-1), therefore the maximum 20 years was used
Time until offset site secured (years)	1.00	The area has already been placed under a Conservation Covenant
Risk of future loss WITHOUT offset (%)	15.0	Whilst it is zoned as recreation, the landscape and outcrops make it unsuitable for development and is not likely to be cleared
Risk of future loss WITH offset (%)	5.0	Conservation covenant reduces the potential impact of development
Offset ratio (Conservation area only)	N/A	
Landscape level values of offset?	N/A	

Appendix E. Biological survey information excerpts (Natural area, 2022) and photographs of the vegetation (Shire of Toodyay, 2022b)




Vegetation Type	Description	Photograph
<i>Corymbia calophylla</i> Low Open Forest	An Open Forest comprised of an overstorey of <i>Corymbia calophylla</i> (height < 10 m), with a sparse midstorey of native shrubs and an understorey of mixed native herbs and sedges and introduced grasses.	
<i>Melaleuca preissiana</i> Closed Forest	A Forest of dense <i>Melaleuca preissiana</i> as well as <i>Corymbia calophylla</i> and <i>Eucalyptus rudis</i> , over sparse native shrubs and an understorey dominated by introduced grasses.	
<i>Eucalyptus accedens</i> and <i>E. wandoo</i> Woodland	A Woodland of <i>Eucalyptus accedens</i> and <i>E. wandoo</i> over mixed native bushland shrubs and herbs.	

Figure 6. Vegetation Types (Natural Area, 2022)



Figure 7. Photographs of *Persoonia sulcata* (P4) observed within the survey area (Natural Area, 2022)



Eucalyptus wandoo (Wandoo)



Eucalyptus accedens (Powderbark Wandoo)



Corymbia calophylla (Marri)



Eucalyptus marginata subsp. *thalassica* (Blue-leaved Jarrah)

Figure 8. Examples of habitat trees observed within the survey area (Natural area, 2022)



Corymbia calophylla (Marri)



Eucalyptus accedens (Powderbark Wandoo)

Figure 9. Examples of hollows observed within the survey area (Natural area, 2022)



Black Cockatoo foraging on *Corymbia calophylla*



Parrot foraging on *Corymbia calophylla*

Black Cockatoo foraging on *Banksia attenuata*

Figure 10. Examples of foraging evidence by black cockatoo species and parrots within the survey area (Natural Area, 2022)

Tress obstructing culvert crossing headwall



Tress affecting proposed road realignment



Tress obstructing culvert crossing headwall



Tress affecting proposed road realignment



Tress affecting open drain/water flow



Tress affecting proposed road realignment



Figure 11. Trees proposed to be cleared (Shire of Toodyay, 2022b)

Appendix F. Offset site information

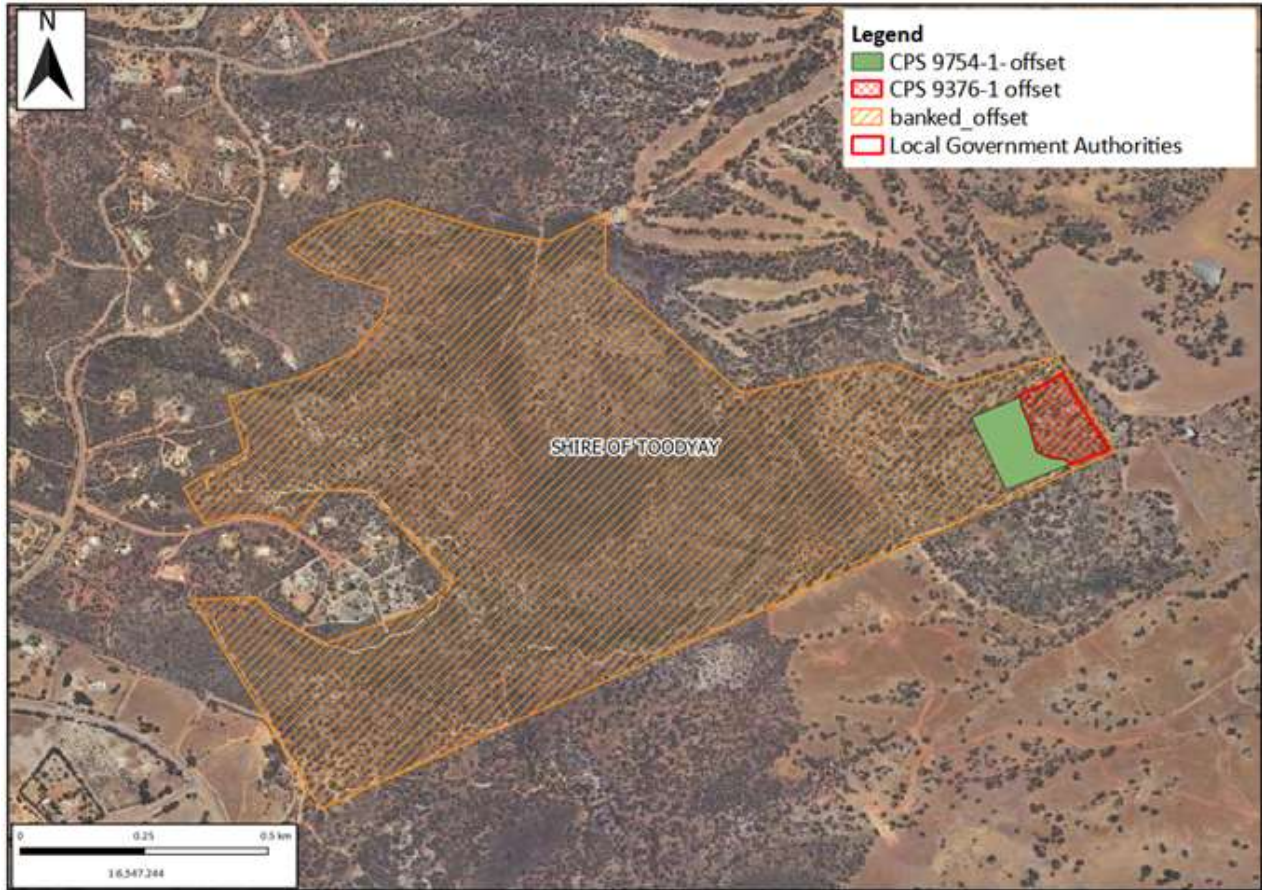


Figure 12. Location of CPS 9754/1 offset site



Figure 13. Photographs of representative vegetation and environment within Lot 108 within which the offset site is located (Shire of Toodyay, 2022).

Appendix G. Sources of information

G.1 GIS databases

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

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

- Offsets Register – Offsets (DWER-078)
- Pre-European Vegetation Statistics
- Public Drinking Water Source Areas (DWER-033)
- Ramsar Sites (DBCA-010)
- Regional Parks (DBCA-026)
- Remnant Vegetation, All Areas
- RIWI Act, Groundwater Areas (DWER-034)
- RIWI Act, Surface Water Areas and Irrigation Districts (DWER-037)
- Soil Landscape Land Quality – Flood Risk (DPIRD-007)
- Soil Landscape Land Quality – Phosphorus Export Risk (DPIRD-010)
- Soil Landscape Land Quality – Subsurface Acidification Risk (DPIRD-011)
- Soil Landscape Land Quality – Water Erosion Risk (DPIRD-013)
- Soil Landscape Land Quality – Water Repellence Risk (DPIRD-014)
- Soil Landscape Land Quality – Waterlogging Risk (DPIRD-015)
- Soil Landscape Land Quality – Wind Erosion Risk (DPIRD-016)
- Soil Landscape Mapping – Best Available
- Soil Landscape Mapping – Systems
- Wheatbelt Wetlands Stage 1 (DBCA-021)

Restricted GIS Databases used:

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

G.2. References

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