



# Clearing Permit Decision Report

## 1 Application details and outcome

### 1.1. Permit application details

<b>Permit number:</b>	CPS 9592/1
<b>Permit type:</b>	Area permit
<b>Applicant name:</b>	Ryan Edward Bown
<b>Application received:</b>	7 February 2022
<b>Application area:</b>	10 hectares of native vegetation
<b>Purpose of clearing:</b>	Pasture and Grazing
<b>Method of clearing:</b>	Mechanical
<b>Property:</b>	Lot 102 on Deposited Plan 64617
<b>Location (LGA area/s):</b>	Murray
<b>Localities (suburb/s):</b>	Meelon

### 1.2. Description of clearing activities

The application is to clear 10 hectares of native vegetation for the purpose of establishing grazing paddocks, shade houses for horticulture, hazard reduction and future buildings (Bown, 2022). The areas proposed to be cleared are distributed over nine separate areas, most of which are adjacent to each other (see Figure 1, Section 1.5).

### 1.3. Decision on application

<b>Decision:</b>	Refused
<b>Decision date:</b>	14 November 2024

### 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 three submissions were received. Consideration of matters raised in the public submissions is summarised in Appendix B.

In making this decision, the Delegated Officer had regard for:

- the site characteristics (see Appendix C),
- relevant datasets (see Appendix G.1),
- photographs and supporting information provided by the applicant (see Appendix F),
- the clearing principles set out in Schedule 5 of the EP Act (see Appendix D), and
- relevant planning instruments and any other matters considered relevant to the assessment (see Section 3).

The assessment identified that the proposed clearing may result in:

- the potential introduction and spread of weeds and dieback into adjacent vegetation, which could impact on the quality of the adjacent vegetation and its habitat values,
- the loss of 10 ha of native vegetation that include rock outcrops which are a restricted habitat often supporting high biodiversity;

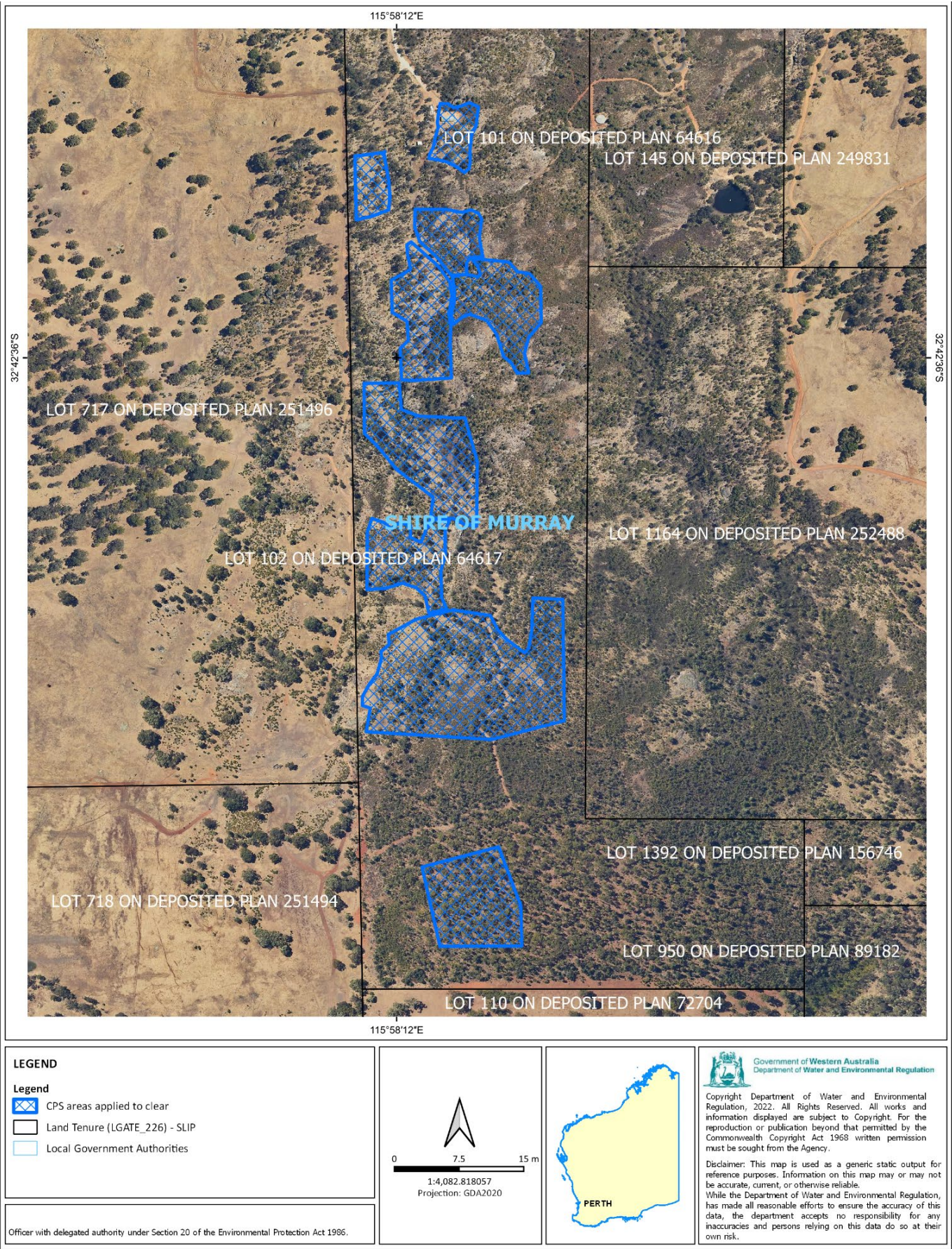
- the loss of 10 ha of native vegetation that contains suitable foraging habitat for threatened black cockatoo species;
- the loss of 10 ha of native vegetation that is suitable habitat for the chuditch;
- the loss of native vegetation that supports a formal regional ecological linkage;
- the loss of 10 ha of native vegetation that is suitable habitat for threatened and priority flora species, and
- appreciable land degradation in the form of water erosion and phosphorous export.

After consideration of the available information, the Delegated Officer concluded that the proposed clearing was likely to result in significant residual impacts to the environment. In the absence of further avoidance and mitigation measures to reduce the impacts of the proposed clearing (see Section 3.1), as well as biological surveys to determine the environmental values present within the area, the Delegated Officer was not confident that impacts could be mitigated and managed to an acceptable level. The Delegated Officer notes that the applicant was provided with multiple opportunities to provide the required information, however, this has not been received by the Department to date.

The Delegated Officer also noted that the Shire of Murray (the Shire) advised that the proposed activities require planning approvals under the Shire's local town planning scheme (Shire of Murray, 2022). To date, the applicant has not obtained a valid development approval (DA) for the proposed clearing activities. The Delegated Officer determined the absence of a valid DA from the Shire is a relevant consideration since if no approval is obtained, there would be no reason for the clearing to occur.

Having had regard to the above information, the Delegated Officer formed the view that, in this case and in the context of the relevant planning and other matters, the severity of the environmental impacts outweighed the necessity of the proposed clearing. Given this, the Delegated Officer determined that the environmental impacts of the proposed clearing are unacceptable, and it would not be appropriate to manage them through conditions on a clearing permit (including environmental offsets). The Delegated Officer therefore decided that, on balance, it would not be appropriate to grant a clearing permit and, accordingly, refused Mr Bown's application.

1.5. Site map



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Figure 1. Map of the application area.

## 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)
- *Planning and Development Act 2005* (WA) (P&D Act)
- *Soil and Land Conservation Act 1945* (WA)

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)

## 3 Detailed assessment of application

### 3.1. Avoidance and mitigation measures

The applicant advised in their original application that avoiding clearing was not possible as the entire property is currently vegetated (Bown, 2022a).

The applicant proposed the following mitigation and minimisation measures:

- The flattest sections of the property were selected to reduce the risk of impacts to the slopes.
- Clearing locations were selected in areas of less dense vegetation.
- Large trees will be retained within the proposed paddock areas.

Further information was requested from the applicant in May and June 2022 regarding additional avoidance and mitigation measures for impacts to flora, fauna and land degradation. Evidence of planning approvals from the Shire of Murray and a request for biological surveys to be undertaken was also requested.

The applicant provided additional management measures to minimise land degradation including (Bown, 2022b):

- planting a cover crop to produce biomass and provide continuous ground cover that protects the soil from erosion, conserves moisture, suppresses weeds, adds diversity, promotes soil biological activity and increases soil fertility through nutrient cycling,
- installation of swales to slow down water runoff and catch nutrients and topsoil along the western boundary of the proposed clearing areas, along contour, and
- keyline ploughing to try increase water absorption into the soil, rather than running off over the top, causing erosion.

To date, the remaining outstanding information has not been provided. Given this, the Delegated Officer is not satisfied that the applicant has made a reasonable effort to avoid and minimise potential impacts of the proposed clearing on environmental values.

### 3.2. Assessment of impacts on environmental values

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

The assessment against the clearing principles (see Appendix D) identified that the impacts of the proposed clearing present a risk to biological values (fauna, adjacent flora and vegetation), and land 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 vegetation) - Clearing Principles (a) and (c)

#### Assessment

Based on the mapped vegetation types and soil types, in addition to the photographs provided by the applicant (see Appendix F), the native vegetation proposed to be cleared is likely to contain suitable habitat for the following conservation significant flora that have been mapped within the local area:

- *Anthocercis gracilis* (T), and
- *Hibbertia acrotoma* (P1)

The photographs of the proposed clearing areas show that the application areas contain outcrops. Outcrops are a significant habitat for both flora and fauna. The flora assemblages of rocky outcrops are often markedly different than surrounding vegetation and support high biodiversity due to the presence of varying soil gradients and microhabitats (Michael & Lindenmayer, 2018). Vegetation growing in association with outcrops also tend to contain disproportionately more threatened flora than other vegetation types, likely due to the high number of endemic species, relative isolation of habitats and small population sizes (Michael & Lindenmayer, 2018). Therefore, it is likely that the vegetation within the proposed clearing area supports high biodiversity.

#### ***Anthocercis gracilis* (T)**

*Anthocercis gracilis* (slender tailflower) is a spindly shrub that has only been recorded within the Darling Scarp in Western Australia and is listed as Threatened under the BC Act and Vulnerable under the EPBC Act.

The slender tailflower grows in habitats associated with granite outcrops and shallow humus-rich sandy soils or loamy soils (DEWHA, 2008). This species has been recorded several times within the local area. Based on the mapped vegetation and soil types, and the photographs of the vegetation, it is considered likely that the proposed clearing area contains suitable habitat for this species. A targeted flora survey is required to confirm the presence of this species within the application areas.

#### ***Hibbertia acrotoma* (P1)**

*Hibbertia acrotoma* is an open, spreading shrub characterised by its bright yellow flowers and is listed as a Priority 1 species in Western Australia by the Department of Biodiversity, Conservation and Attractions (DBCA). This species has been recorded in the Peel and Busselton Regions; however, few records of the species are available (Florabase, 1998-). According to available records, *H. acrotoma* is generally associated with jarrah/marri woodland or forest in loamy soils and granite outcropping (Florabase, 1998-), like the proposed clearing area. Therefore, it is considered likely the proposed clearing area contains suitable habitat for the species.

#### Conclusion

Based on the above assessment, the proposed clearing may result in the loss of vegetation that supports high biodiversity and the loss of suitable habitat and/or individuals of threatened and priority flora. An appropriately timed flora survey is required to determine the significance of the vegetation and the presence or absence of suitable habitat for the conservation significant flora species listed above.

The applicant advised that a flora and vegetation survey has been completed in October 2023, however, as of the date of this refusal, this has not been provided by the applicant.

### 3.2.2. Biological values (fauna) - Clearing Principle (b)

#### Assessment

According to available databases 19 species of conservation significant fauna species have been recorded in the local area composed of seven birds, one invertebrate and 11 mammals. Based on the mapped vegetation types and the photographs provided by the applicant, the following species were determined to require further assessment:

- Baudin's cockatoo (*Zanda baudinii*) (EN)
- Carnaby's cockatoo (*Zanda latirostris*) (EN)
- chuditch (*Dasyurus geoffroii*) (VU)
- forest red-tailed black cockatoo (*Calyptorhynchus banksii naso*) (VU)
- quenda (*Isoodon fusciventer*) (P4)
- western brush wallaby (*Notamacropus irma*) (P4)

#### **Black cockatoos**

Carnaby's cockatoo, Baudin's cockatoo and the Forest red-tailed black cockatoo were recorded within the local area. The nearest records are 3.46 km, 5.42 km and 0.44 km from the proposed clearing area, respectively.

Black cockatoos are known to nest in hollows of live and dead trees, including marri (*Corymbia calophylla*), jarrah (*Eucalyptus marginata*), karri (*Eucalyptus diversicolor*), wandoo (*Eucalyptus wandoo*), tuart (*Eucalyptus gomphocephala*), flooded gum (*Eucalyptus rudis*), and other *Eucalyptus* spp. (DAWE, 2022). 'Breeding habitat' for

black cockatoos includes trees of these species that either have a suitable nest hollow or are of a suitable diameter at breast height (DBH) to develop a nest hollow, where suitable DBH for nest hollows is 500 millimetres for most tree species (DAWE, 2022).

Based on the photographs of the proposed clearing area, most of the trees appear to be too narrow to support black cockatoo breeding hollows, however, this cannot be confirmed without further assessment. Given that the Jarrah Forest Bioregion is the preferred breeding area for Baudin's and forest red-tailed black cockatoos, and the proposed clearing is mapped within the known breeding distribution for Carnaby's, it is considered that the application area may contain suitable breeding habitat for black cockatoos.

According to available databases, there are eight known roosting sites within the local area. Without additional information, it is unknown if the proposed clearing area is a roosting site for black cockatoos, however, given that roosting has been recorded several times in the local area, the proposed application area may be used for roosting by black cockatoos.

Significant foraging habitat for black cockatoo species includes foraging material that is within an approximate 6–12 kilometre radius of breeding trees and within six kilometres of a night roosting site (DAWE, 2022). The preferred foraging habitat for each of the species is described as (DAWE, 2022):

- Carnaby's cockatoo – native shrubland, kwongan heathland and woodland dominated by proteaceous plant species such as *Banksia* spp., *Hakea* spp. and *Grevillea* spp. The species also forages in pine plantations and eucalypt woodland,
- Forest red-tailed black cockatoo – jarrah and marri woodlands and forest, edges of karri forests including wandoo and blackbutt within the range of the species, and
- Baudin's cockatoo – eucalypt woodlands and forest, proteaceous woodland, and heath. Primarily feeding on marri during the breeding season and non-native species outside of the breeding season.

Without additional information, it is unknown if the proposed clearing area is used for foraging by black cockatoos, however, given the presence of jarrah/marri woodland, it is considered that the proposed clearing is likely suitable foraging habitat for black cockatoos. A black cockatoo habitat tree assessment was requested by the Department however, to date this information has not been received.

### **Chuditch**

The chuditch (*Dasyurus geoffroii*) is listed as vulnerable under both BC Act and the EPBC Act. According to available databases, the chuditch has been recorded in the local area 18 times, the nearest record being 2.14 km from the proposed clearing.

Chuditch are present in approximately five per cent of their former range, with most chuditch now found in varying densities in jarrah forests and woodlands in the southwest corner of Western Australia, in woodlands, mallee shrublands and heaths along the south coast, east to the Ravensthorpe area, and at lower densities in drier woodland and mallee shrubland in the Wheatbelt and Goldfield regions (DEC, 2012a). Chuditch require large areas of intact habitat to survive and are rarely found where habitat is severely fragmented by clearing, except as transient visitors (DEC, 2012a).

Given that the proposed clearing is contained within a larger, mostly intact remnant of native vegetation composed of jarrah/marri woodland, it is likely that the application area contains suitable habitat for the species.

### **Priority fauna**

Quenda (*Isoodon fusciventer*) require a dense understorey for cover and are often found digging in leaf litter for invertebrates, earthworms, beetles and plant material, generally inhabiting dense understorey vegetation of forests, woodlands, shrubland and heathland (DBCA, 2017). According to available databases, there are 12 records of quenda in the local area, the nearest being 1.63 km from the proposed clearing. Noting the species preference for dense understorey and wetland habitats, the proposed clearing is not likely to impact on significant habitat for quenda.

The western brush wallaby (*Notamacropus irma*) inhabits open forest or woodland, particularly favouring open, seasonally wet flats with low grasses and open scrubby thickets. It is also found in some areas of mallee and heathland (DEC, 2012b). According to available databases, there are six records of the western brush wallaby in the local area, the nearest being 5.81 km from the proposed clearing. Noting that this species is highly mobile and does not rely on specialist niche habitats, the proposed clearing is not likely to impact on significant habitat for this species.

### **Ecological linkage**

The southern portion of the proposed clearing area is mapped on the axis line of a Southwest Regional Ecological linkage (SWREL). Ecological linkage axis lines are used to identify the whole of patches of remnant vegetation that have edges which touch or come in proximity of an ecological linkage. Having used the ecological linkage axis line to identify patches of remnant vegetation with connectivity or linkage values, value can be identified and assigned (in consideration of other conservation planning initiatives and values) (Molloy et al, 2009).

Remnant vegetation within the SWREL boundary can be assigned a 'proximity analysis' group. The remnant vegetation within the application area is considered to have a proximity value of 1(a) (the highest proximity value) as the vegetation overlaps the axis line and the remaining application area is within the same remnant of vegetation (Molloy et al, 2009). Areas within proximity group 1 are the highest value in terms of contributing to ecological linkage function. This is because many small mammals, insects and amphibians often avoid venturing into cleared areas except for crossing small gaps into other patches of vegetation (Molloy et al., 2009).

Whilst the application area may not sever the linkage corridor, the reduction in vegetation (especially width wise) and edge effect of continued clearing will, in the long-term, impact negatively on the viability and resilience of the vegetation corridor. Over time, the edge effect of proposed land use (pasture and grazing) may also lead to the further loss of the integrity of the ecological linkage.

#### Conclusion

Based on the above assessment, the proposed clearing is likely to result in significant impacts to habitat for black cockatoos and chuditch and will impact on a significant regional ecological linkage. A black cockatoo habitat assessment is required to determine the significance of the black cockatoo habitat within the application areas, for breeding roosting and foraging.

### **3.2.3. Land and water resources (land degradation) - Clearing Principle (g)**

#### Assessment

Advice was sought from the Commissioner of Soil and Land Conservation (CSLC) on the potential land degradation impacts from the proposed clearing. A representative of the CSLC undertook an inspection of the application area in March 2022 and noted the following (CSLC, 2022):

- Due to soil type's present, there is a high risk of water erosion occurring as a result of the proposed clearing and with the proposed end land use, especially under heavy grazing pressure. Surface water run-off reduces the potential for nutrient management and the high risk of manure etc being washed off-site
- The areas proposed to be cleared have very shallow soils, with variable depth, in-between larger common rock outcrops. Although the soil is capable of retaining nutrients, run-off reduces the potential for nutrient management. Surrounding native vegetation may provide a sufficient buffer.

The CSLC concludes that the identified risks of water erosion and eutrophication may be managed by the construction of conservation earthworks to control surface water flows and by implementing a nutrient management plan (CSLC, 2022).

Further information was requested from the applicant as to how the above land degradation risks from the proposed clearing could be minimised and mitigated which is discussed in Section 3.1 of this report.

#### Conclusion

Based on the above assessment, the proposed clearing is likely to result in appreciable land degradation in the form of eutrophication and water erosion.

### **3.3. Relevant planning instruments and other matters**

The Shire of Murray (the Shire) advised DWER that local government approvals are required as the site is a "Place of Heritage and Landscape Value" (Shire of Murray, 2022). The Shire advised that they were unlikely to support any development that requires 10 ha of clearing on the property (Shire of Murray, 2022).

To the Department's knowledge, the applicant has not submitted a Development Application to the Shire.

Two Aboriginal sites of significance have been mapped within the application area. It is the applicant's responsibility to comply with the *Aboriginal Heritage Act 1972* (WA) and ensure that no Aboriginal Sites of Significance are damaged through the clearing process.

**End**

## Appendix A. Additional information provided by applicant

Summary of comments	Consideration of comment
Supplementary information about the vegetation within the proposed clearing and broader property, including avoidance and mitigation measures for land degradation risks.	See Section 3.1. for Avoidance and mitigation measures. See "CPS 9592-1 – Clearing Permit Supplemental Information" (Bown, 2022b) for additional supporting information and Appendix F. for additional photographs of the vegetation.

## Appendix B. Details of public submissions

Summary of comments	Consideration of comment
<u>Submission 1 (2022a)</u>	
Actions to minimise impacts not appropriately considered by the applicant.	See Section 3.1 Avoidance and mitigation measures for consideration of the applicant's proposed measures.
Any clearing required for access ways has not been considered in the clearing area.	It is the responsibility of the applicant to determine whether a clearing footprint includes all the area required for a proposal.
Botanical surveys should be required.	Both flora and fauna surveys were requested from the applicant. To date, no biological surveys have been received by the Department.
The proposed clearing will contribute to cumulative impacts.	The assessment determined that the proposed clearing would likely result in significant impacts to environmental values and therefore determined to refuse the application.
The presence of outcropping may have significantly different habitat and species composition.	See Section 3.2.1 of this report for consideration of the significance of rock outcrops.
The areas avoided may be suitable for rehabilitation rather than just retaining the vegetation.	See Section 3.1. Avoidance and Mitigation which determined that offsets were not appropriate to mitigate potential impacts of this proposal.
<u>Submission 2 (2022b)</u>	
Within the Swan Coastal Plain which has been extensively cleared.	The assessment identified that the proposed clearing is located within the Jarrah Forest IBRA bioregion and that the extent of remnant vegetation within the local area and mapped vegetation types is consistent with the national objectives and targets for biodiversity conservation in Australia.
Lack of detailed information such as surveys.	Both flora and fauna surveys were requested from the applicant. To date, no biological surveys have been received by the Department.
The necessity of clearing has not been justified and the land may be unsuitable for agricultural use and the loss of 10 ha of native vegetation is unacceptable	See Section 1.4 Reasons for decision which states that the significance of impacts outweighs the necessity of clearing.
The proposed clearing will contribute to cumulative impacts.	The assessment determined that the proposed clearing would likely result in significant impacts to environmental values and therefore determined to refuse the application.
No offset has been proposed.	See Section 3.1. Avoidance and Mitigation which determined that offsets were not appropriate to mitigate potential impacts of this proposal.
<u>Submission 3 (2022c)</u>	
The proposed clearing is mapped within two registered Aboriginal Heritage sites.  Aboriginal values of the subject area must be given regard through the application, site works and proposed land use in accordance with the <i>Aboriginal Heritage Act 1972</i> in consultation with the local Noongar community.	See Section 3.3. Relevant planning instruments and other matters. It is the applicant's responsibility to comply with the <i>Aboriginal Heritage Act 1972</i> (WA) and ensure that no Aboriginal Sites of Significance are damaged through the clearing process.



Summary of comments	Consideration of comment
At a minimum, a level 1 fauna and flora assessment should be undertaken (preferably a level 2 assessment), by a qualified person/s, for occurrences of conservation significant flora and fauna species, with impacts avoided, managed or mitigated.	Both flora and fauna surveys were requested from the applicant. To date, no biological surveys have been received by the Department.
Applications to clear, fragment and degrade areas of native vegetation on this scale, outside clearing exemptions, should not be granted without an assessment.	The assessment determined that the proposed clearing would likely result in significant impacts to environmental values and therefore determined to refuse the application.
No clearing or livestock grazing should be permissible for clearing within the ecological linkage in the south of the subject area.	See Section 3.2.2. of this report for consideration of ecological linkage values within the proposed clearing area.
No clearing should be permissible for livestock grazing. Erosion prevention and management must be included in any clearing and site works.	See Section 3.2.3. of this report for consideration of potential impacts to land degradation.

## Appendix C. Site characteristics

The information provided below describes the key characteristics of the area proposed to be cleared and is based on the best information available to 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 D.

### C.1. Site characteristics

Characteristic	Details
Local context	<p>The area proposed to be cleared is part of an expansive tract of native vegetation in the intensive land use zone of Western Australia. It is surrounded by remnant native vegetation with a partially cleared area to the west of the proposal.</p> <p>Spatial data indicates the local area (10-kilometre radius from the centre of the area proposed to be cleared) retains approximately 46.28 per cent of the original native vegetation cover.</p>
Ecological linkage	The southern section of the proposed clearing is mapped on the axis line of a South West Regional Ecological Linkage (SWREL).
Conservation areas	The proposed clearing is not mapped within any conservation areas. The nearest conservation area is Marrinup State Forest which is located 0.47 km from the proposed clearing.
Vegetation description	<p>Photographs supplied by the applicant indicate the vegetation within the proposed clearing area consists of open Jarrah and Marri woodland with granite outcropping. Representative photos are available in Appendix F.</p> <p>This is somewhat consistent with the mapped vegetation types:</p> <ul style="list-style-type: none"> <li>Darling Scarp, DS2 which is described as a mosaic of open forest of <i>Eucalyptus marginata</i> subsp. <i>marginata</i>-<i>Corymbia calophylla</i>, with some admixtures with <i>Eucalyptus laeliae</i> in the north (subhumid zone), with occasional <i>Eucalyptus marginata</i> subsp. <i>elegantella</i> (mainly in subhumid zone) and <i>Corymbia haematoxylon</i> in the south (humid zone) on deeper soils adjacent to outcrops, woodland of <i>Eucalyptus wandoo</i> (subhumid and semiarid zones), low woodland of <i>Allocasuarina huegeliana</i> on shallow soils over granite outcrops, closed heath of <i>Myrtaceae-Proteaceae</i> species and lithic complex on or near granite outcrops in all climate zones (Government of Western Australia, 2019), and</li> <li>Dwellingup, D1, which is described as an open forest of <i>Eucalyptus marginata</i> subsp. <i>marginata</i>-<i>Corymbia calophylla</i> on lateritic uplands in mainly humid and subhumid zones (Government of Western Australia, 2019).</li> </ul> <p>The mapped vegetation types retain approximately 41.87 per cent and 86.83 per cent of their original extent respectively (Government of Western Australia, 2019).</p>
Vegetation condition	Photographs supplied by the applicant indicate the vegetation within the proposed clearing area is in good to very good (Keighery, 1994) condition.

Characteristic	Details
	The full Keighery (1994) condition rating scale is provided in Appendix E. Representative photos are available in Appendix F.
Climate and landform	The proposed clearing is in the Peel Region of Western Australia which has a temperate climate characterised by warm summers and cold winters. The nearest town to the proposed clearing is Dwellingup which has an average maximum temperature of 22.0 degrees Celsius and a mean annual rainfall of 1216.2 mm.  Landform within the proposed clearing area varies between gentle to moderate slopes of scarp face (5-25%) with common rock outcrop and undulating ridges and hillcrests.
Soil description	The proposed clearing is mapped across two different soil types: <ul style="list-style-type: none"> <li>Hester subsystem, described as ridges and hill crests on laterite and gneiss, relief 5-40 m, slopes 5-15%. Soils are sandy gravels, loamy gravels and loamy earths.</li> <li>Murray Valleys DR1 phase, described as gentle to moderate slopes of scarp face (5-25%) with red and yellow gradational earths and duplex soils with variable depth and common rock outcrop.</li> </ul>
Land degradation risk	Both mapped soil types are at high risk of land degradation from subsurface acidification. The Murray Valleys DR1 Phase is also at high risk of land degradation from phosphorous export and the Hester subsystem is at high risk of land degradation from wind erosion.
Waterbodies	The desktop assessment and aerial imagery indicated that no waterbodies intersect the proposed clearing area. The nearest waterbody is a minor, non-perennial tributary of Marrinup Brook, located approximately 50 m west of the proposed clearing.
Hydrogeography	The proposed clearing is located within the Murray River System Surface Water Area and Murray Groundwater Area, both Proclaimed under the RIWI Act. The Murray Valleys DR1 Phase is mapped as high risk for water erosion.
Flora	There are 183 records across 35 species of conservation significant flora in the local area (10-kilometre radius), 30 of which are Priority and five are listed as Threatened. No records are recorded within one kilometre, with nearest being a Priority species located approximately 1.31 km from the proposed clearing.
Ecological communities	The proposed clearing is not mapped within a threatened or priority ecological community (TEC/PEC). Seven TECs/PECs are recorded within the local area (10-kilometre radius), the nearest being the "Banksia Woodlands of the Swan Coastal Plain ecological community" (P3 by DBCA and EN under the EPBC Act), located approximately 1.11 km from the proposed clearing.
Fauna	There are 149 records across 19 species of conservation significant fauna within the local area (10-kilometre radius). One species was recorded within one kilometre, the forest red-tailed black cockatoo ( <i>Calyptorhynchus banksii naso</i> ) (VU), located approximately 0.44 km from the proposed clearing.

## C.2. Flora analysis table

With consideration for the site characteristics set out above, relevant datasets (see Appendix G.1), 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>Anthocercis gracilis</i>	T	Y	Y	Y	5.53	17	N/A
<i>Hibbertia acrotoma</i>	P1	Y	Y	Y	5.81	4	N/A

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

**C.3. Fauna analysis table**

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	0.44	37	N/A
<i>Dasyurus geoffroii</i> (chuditch, western quoll)	VU	Y	Y	2.14	18	N/A
<i>Isoodon fusciventer</i> (quenda, southwestern brown bandicoot)	P4	N	Y	1.63	12	N/A
<i>Notamacropus irma</i> (western brush wallaby)	P4	Y	Y	5.81	6	N/A
<i>Zanda baudinii</i> (Baudin's cockatoo)	EN	Y	Y	5.42	4	N/A
<i>Zanda latirostris</i> (Carnaby's cockatoo)	EN	Y	Y	3.46	28	N/A
<i>Zanda</i> sp. 'white-tailed black cockatoo' (white-tailed black cockatoo)	EN	Y	Y	2.51	6	N/A

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

**C.4. Land degradation risk table**

Risk categories	Murray Valleys DR1 phase	Hester subsystem
Water erosion	H1: 50-70% of map unit has a high to extreme water erosion risk	L2: 3-10% of map unit has a high to extreme water erosion risk
Phosphorus export risk	H2: >70% of map unit has a high to extreme phosphorus export risk	M2: 30-50% of map unit has a high to extreme phosphorus export risk

**Appendix D. Assessment against the clearing principles**

Assessment against the clearing principles	Variance level	Is further consideration required?
<b>Environmental value: biological values</b>		
<p><u>Principle (a):</u> "Native vegetation should not be cleared if it comprises a high level of biodiversity."</p> <p><u>Assessment:</u> The area proposed to be cleared may contain locally and regionally significant flora, fauna, habitats and assemblages of plants.</p> <p>Specifically, the proposed clearing may contain suitable habitat for black cockatoos and several other conservation significant fauna in the local area and the photographs provided by the applicant shows outcropping within the proposed clearing area, which often contain high biodiversity, support various conservation significant flora species and are a restricted habitat type.</p>	May be at variance	Yes <i>Refer to Section 3.2.1, above.</i>
<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> Based on the photographs provided by the applicant and the mapped vegetation type, the proposed clearing may contain significant fauna habitat for threatened black cockatoos and chuditch.</p> <p>The southern section of the proposed clearing is also mapped along the axis line of a South West Regional Ecological Linkage.</p>	May be at variance	Yes <i>Refer to Section 3.2.2, above.</i>
<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></p>	May be at variance	Yes

Assessment against the clearing principles	Variance level	Is further consideration required?
Based on the mapped vegetation type and soil type, in addition to photographs provided by the applicant, the proposed clearing may have suitable habitat for the threatened flora species <i>Anthocercis gracilis</i> .		Refer to Section 3.2.1, above.
<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>: The proposed clearing is not mapped as a threatened ecological community and based on the photographs provided by the applicant, is not likely to be representative of a threatened ecological community.</p>	Not likely to be at variance	No
<b>Environmental value: significant remnant vegetation and conservation areas</b>		
<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>: 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.</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>: Given the distance to the nearest conservation area, the proposed clearing is not likely to have an impact on the environmental values of nearby conservation areas.</p>	Not likely to be at variance	No
<b>Environmental value: land and water resources</b>		
<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>: Given no water courses or wetlands are recorded within the application area, the proposed clearing is unlikely to impact on- or off-site hydrology and water quality.</p>	Not likely to be 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>: The mapped soils are not highly susceptible to wind erosion, water erosion, subsurface acidification and phosphorous export. Advice received from the Commissioner for Soil and Land Conservation (2022) noted that the soils are high risk for eutrophication and very high risk of water erosion. Noting the extent and location of the application, the proposed clearing is likely to have an appreciable impact on land degradation.</p>	At variance	Yes  Refer to Section 3.2.3, above.
<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>: Given no waterbodies are recorded within 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>	Not likely to be at variance	No

Assessment against the clearing principles	Variance level	Is further consideration required?
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.		

### Appendix E. Vegetation condition rating scale

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

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

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

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

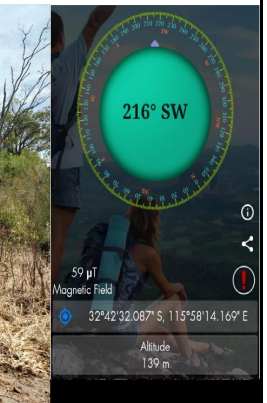
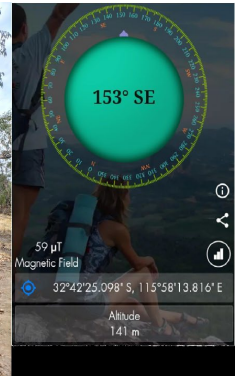
**Appendix F. Supporting information**

**Photographs of the application area (Bown, 2022a).**



**Additional photographs of the application area and surrounding area (Bown, 2022b).**

Northern area of Lot 102:



Central areas of Lot 102:Southern areas of Lot 102:

## Appendix G. Sources of information

### G.1. GIS databases

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

- 10 Metre Contours (DPIRD-073)
- 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

#### 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)

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