



Clearing Permit Decision Report

1. Application details and outcomes

1.1. Permit application details

Permit number:	9654/2
Permit type:	Purpose Permit
Applicant name:	Premier Coal Limited
Application received:	16 January 2023
Application area:	12 hectares
Purpose of clearing:	Coal Exploration
Method of clearing:	Mechanical Removal
Tenure:	<i>Collie Coal (Western Collieries) Agreement Act 1979</i> , Mining Lease 262SA (AML 70/262)
Location (LGA area/s):	Shire of Collie
Colloquial name:	Premier Coal Pit 7

1.2. Description of clearing activities

Premier Coal Limited (PCL) proposes to clear up to 12 hectares of native vegetation within a boundary of approximately 387.31 hectares, for the purpose of coal exploration. The project is located approximately 10 kilometres east-south-east of Collie, within the Shire of Collie.

The application is to allow for drilling and exploration in the area known as Pit 7. This area falls outside of the current approved disturbance area under Ministerial Statement 416.

Clearing permit CPS 9654/1 was granted by the Department of Mines, Industry Regulation and Safety on 18 November 2023 and was valid from 13 December 2022 to 12 December 2029. The permit authorised the clearing of up to 10 hectares of native vegetation within a boundary of approximately 387.31 hectares, for the purpose of coal exploration.

On 16 January 2023, the Permit Holder applied to amend CPS 9654/1 to increase the amount of clearing to 12 hectares, to amend conditions 3, 4, 7, 12, 13 and 15, and amend a definition in the permit.

1.3. Decision on application and key considerations

Decision:	Grant
Decision date:	23 March 2023
Decision area:	10 hectares of native vegetation

1.4. Reasons for decision

This clearing permit application was made in accordance with section 51E of the *Environmental Protection Act 1986* (EP Act) and was received by the Department of Mines, Industry Regulation and Safety (DMIRS) on 16 January 2023. DMIRS advertised the application for a public comment for a period of 21 days, and one submission was received.

In making this decision, the Delegated Officer had regard for the site characteristics (Appendix C), relevant datasets (Appendix G), supporting information provided by the applicant (Appendix A) including the results of a flora and vegetation survey (Appendix F), the clearing principles set out in Schedule 5 of the EP Act (Appendix D), proposed avoidance and minimisation measures (Section 3.1), relevant planning instruments and any other matters considered relevant to the assessment (Section 3.3).

After consideration of the available information, as well as the applicant's minimisation and mitigation measures (see Section 3.1), the Delegated Officer determined the proposed amendment is unlikely to lead to an unacceptable risk to environmental values.

The assessment has not changed since the assessment for CPS 9654/1. The Delegated Officer determined that the proposed amendments to the conditions of the permit are not likely to lead to an unacceptable risk to environmental values.

1.5. Site map

A site map of proposed clearing is provided in Figure 1 below.

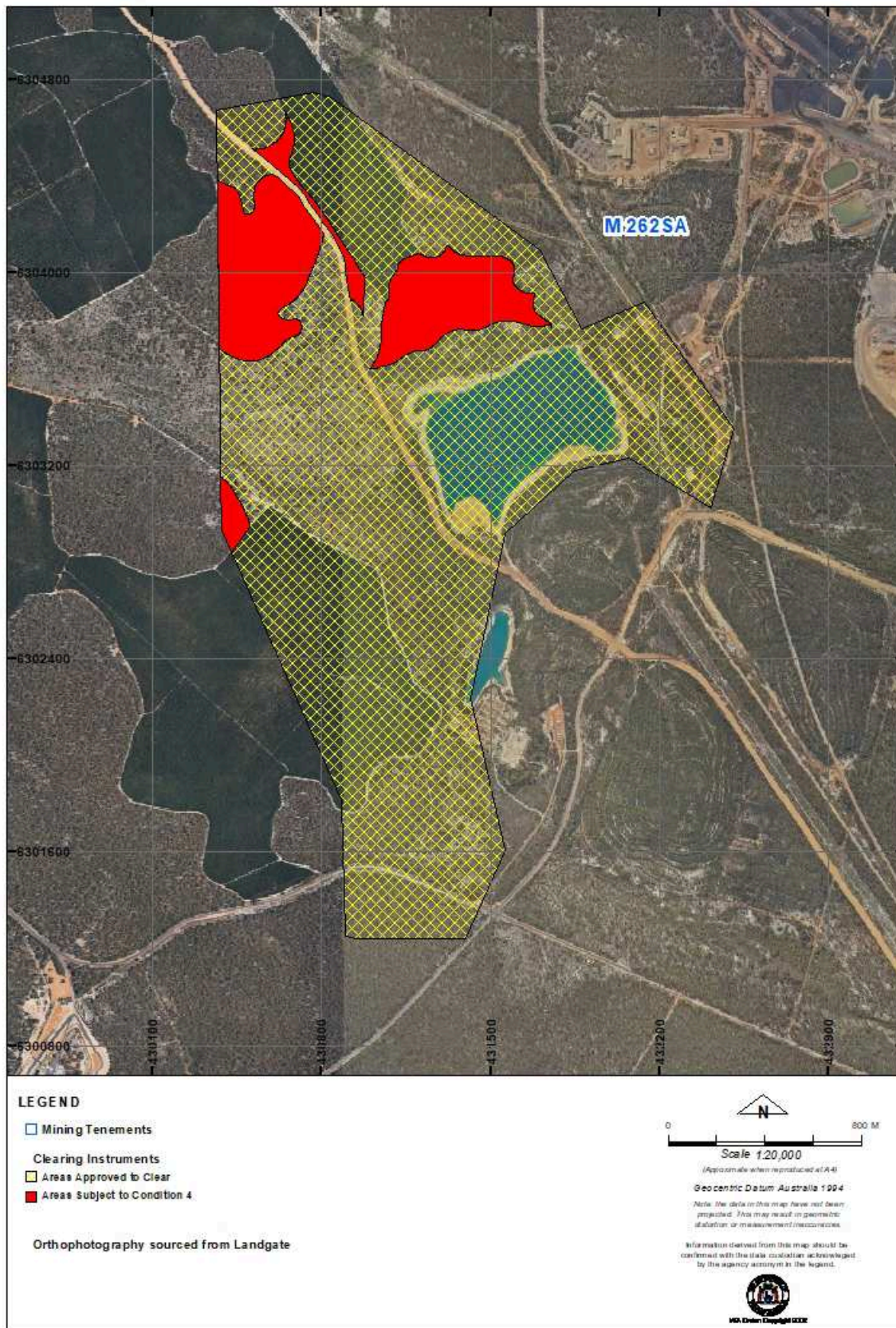
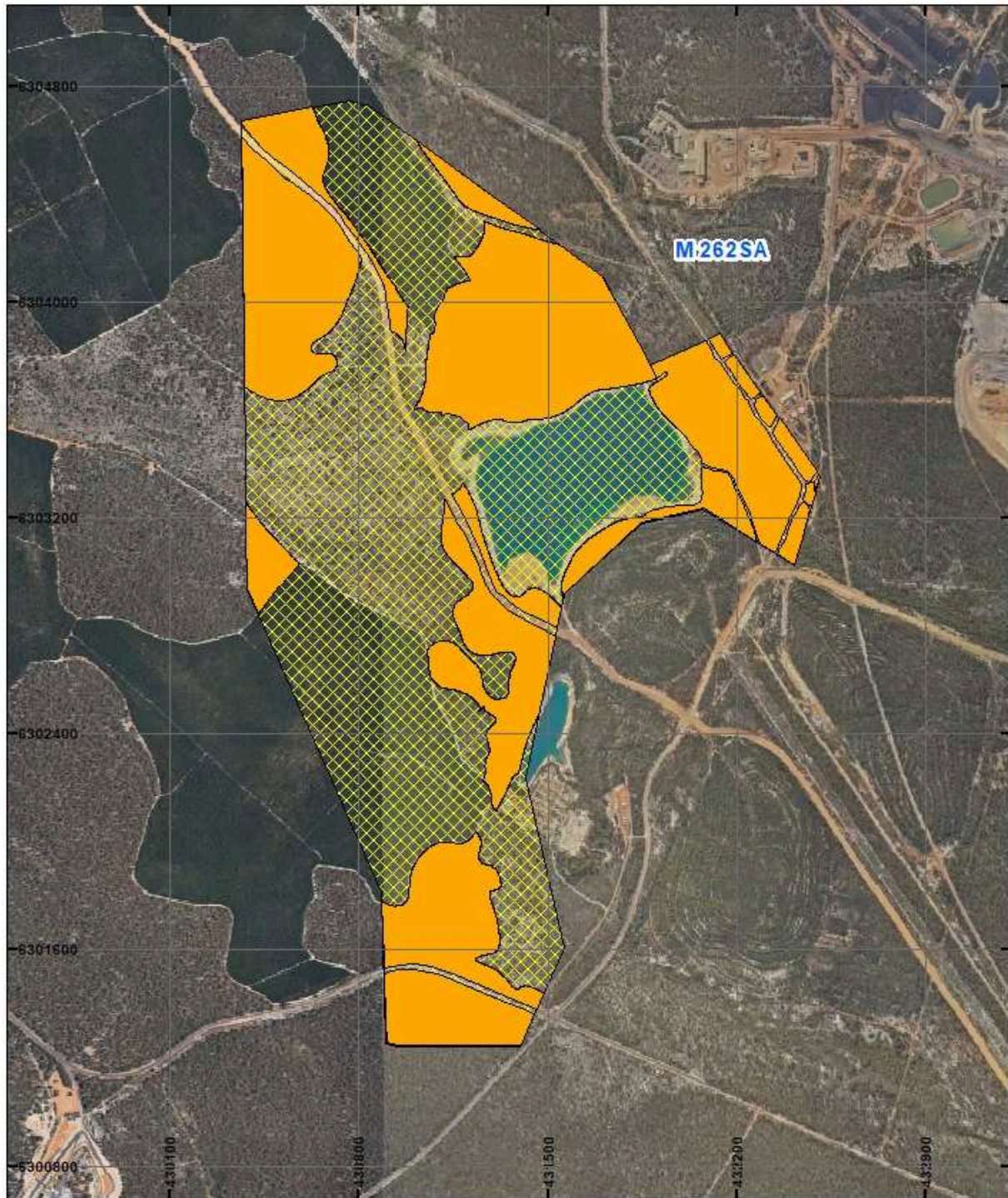


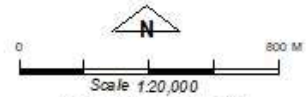
Figure 1. Map of the application area. The yellow area indicates the area within which conditional authorised clearing can occur under the granted clearing permit. Areas shaded red are subject to condition 4 of the permit.



LEGEND

- Mining Tenements
- Clearing Instruments**
- Areas Approved to Clear
- Areas Subject to Condition 13

Orthophotography sourced from Landgate



(Applicable when reproduced at A4)

Geocentric Datum Australia 1994

Note: the data in this map have not been projected. This may result in geometric distortion or measurement inaccuracies.

Information derived from this map should be confirmed with the state coordinates acknowledged by the agency acronym in the legend.



DEH Design Copyright 2002

Figure 2. Map of the application area. The yellow area indicates the area within which conditional authorised clearing can occur under the granted clearing permit. Areas shaded orange represent areas of Jarrah/Marri Forest on Hillslopes fauna habitat subject to condition 13 of the 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)
- *Conservation and Land Management Act 1984* (WA) (CALM Act)
- *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act)
- *Collie Coal (Western Collieries) Agreement Act 1979* (WA)
- *Country Areas Water Supply Act 1947* (WA) (CAWS Act)

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)
- 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

Evidence was submitted by the applicant, demonstrating that when clearing for access tracks, drill pads and seismic survey lines, trees with a diameter at breast height (DBH) of greater than 500 mm will be avoided to ensure potential hollow-bearing trees are not disturbed. Other trees and large fallen timber that appears habitable for fauna will also be avoided wherever possible (Premier Coal Limited, 2022). The application has also provided the following avoidance, mitigation and management measures:

- Exploration activities will utilise existing access tracks and disturbed areas wherever possible to minimise native vegetation clearing;
- The maximum extent of clearing is 10 hectares to be undertaken between 2022 and 2027, which was reduced from 12 hectares;
- Areas cleared which are no longer required will be rehabilitated within 6 months;
- Areas identified in the flora survey conducted by Onshore Environmental (2022a) containing priority flora will be avoided;
- All earthmoving machinery will be cleaned and inspected for weeds and dieback prior to entry to the project area; and
- Clear pine plantation over native vegetation, where practicable.

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.

3.2. Assessment of impacts on environmental values

Increased clearing

The Permit Holder has applied to amend the clearing permit to increase the amount of clearing authorised by two hectares to 12 hectares in total. The reason for the increase is due to restrictions from conditions 7 and 12 on CPS 9654/1 (which require the avoidance of habitat trees, threatened and priority flora with a 10 metre buffer) requiring a different less direct route to drilling locations and therefore, more vegetation being cleared. The Permit Holder has also applied to remove the buffers from conditions 7 and 12. It is proposed that the buffer is removed from condition 7 but retained on condition 12 (see further discussion below). Premier Coal Limited agreed that the proposed removal of the buffer from condition would allow for the clearing activities to be undertaken without the requirement to increase the amount of vegetation cleared.

Conclusion

That the amount of clearing authorised under the permit remains at 10 hectares.

Condition 4 – Restricted Clearing Areas

“The Permit Holder shall not clear native vegetation within the areas shaded red in Figure 1 of Schedule 1.”

The Permit Holder has applied to remove condition 4 from the permit. These red areas cover the mapped areas of vegetation type ‘Ls Em Xp Bo – Eucalypt Forest’. Clearing was excluded from these areas as this vegetation type was noted as the only vegetation type in excellent condition and whilst they have not been recorded within the areas, exhibits suitable habitat for numerous threatened and priority flora species (Onshore Environmental, 2022a). It also holds suitable habitat (foraging and potential breeding) for threatened black cockatoo species and holds suitable foraging habitat for priority fauna (Onshore Environmental, 2022b). Premier Coal Limited (2023) has indicated that the current condition will prevent exploration drilling in the centre of the potential coal resource. It will also prevent activities which will support environmental assessments of future

mining such fugitive emissions sampling, waste characterisation, installation of piezometers to inform hydrogeological studies and sampling of stygofauna (Premier Coal Limited, 2023). Premier Coal Limited (2023) noted that the vegetation type is well represented outside of the permit area, has not had Threatened or priority flora recorded within the red areas and has significant dieback infestation. It is also highlighted that impacts to flora and fauna can be managed by conditions 7, 12 and 13 on the permit (Premier Coal Limited, 2023). Whilst there is significant areas of dieback infestation within the Ls Em Xp Bo vegetation type, it also covers two of the three areas of native vegetation within the permit area not infested by dieback and therefore, limiting activities within these areas will help reduce the spread of dieback into uninfested areas (Premier Coal Limited, 2023). As it was the only vegetation type in excellent condition, the areas of Ls Em Xp Bo vegetation represent better quality areas of flora and fauna habitat and impacts should be minimised. The current permit conditions will help minimise impacts within these areas however, clearing should also be limited to ensure that large amounts of this habitat are not cleared.

Conclusion

That condition 4 is amended to allowing clearing activities to occur however, it is limited to 2 hectares of clearing.

Condition 7 – Habitat Trees

“The Permit Holder must ensure that no clearing occurs within 10 metres of any habitat trees.”

The Permit Holder has requested that condition 7 is amended to state that clearing of habitat trees is not to occur however, the 10 metre buffer is removed from the condition. Habitat trees have significant environmental value as they have the potential to contain hollows which can be utilised for breeding by threatened black cockatoo species. They are also likely to provide habitat for other species of fauna in the local area. Premier Coal Limited has requested that the buffer to the trees is removed as there may be situations where the density of habitat trees does not allow for the proposed activities to occur given the 10 metre buffer which would need to be considered. This would result in additional vegetation being cleared to facilitate an alternate route around the dense stand of trees. Premier Coal Limited (2023) also provided examples where clearing activities have been undertaken in similar vegetation directly adjacent to habitat trees and they have not been negatively impacted by the clearing.

The purpose of the condition is to ensure that any habitat trees are not impacted by the proposed clearing activities. The addition of the 10 metre buffer to the condition was to ensure that clearing activities in close proximity to the trees did not have an inadvertent impact on the trees through the severing of roots, soil compaction or any other unintended impact. In the case of more dense areas of Eucalypt forest, the inclusion of the 10 metre buffer may be excessive in trying to achieve this outcome. The removal of the buffer should not prevent this outcome from being achieved provided that an additional part to the condition is included related to impacts from exploration activities, such as drilling and digging sumps, is included in the condition.

The Permit Holder has also requested a change to part of condition 15 which relates to records to be kept for condition 7. Condition 15 currently states:

In relation to habitat tree management pursuant to Condition 7 of this Permit	the name and location of each habitat tree, recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994 (GDA94), expressing the geographical coordinates in Eastings and Northings, in accordance with Condition 6.
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A change to the condition was requested as it is not clear whether the records to be kept relate to every habitat tree in the permit area, whether no habitat trees need to be recorded as none are cleared or whether just habitat trees near clearing areas should be recorded (Premier Coal Limited, 2023). Instead of amending condition 15, it is proposed that condition 7 is amended to clarify the areas which need to be searched for habitat trees prior to clearing. Condition 15 will be amended to correct an incorrect reference to condition 6.

Conclusion

The proposed outcome of protecting habitat trees can be achieved with the removal of the 10 metre buffer and the condition is amended to read:

- “ (a) The Permit Holder shall inspect any areas to be cleared for the presence of habitat trees;
- (b) The Permit Holder shall not clear habitat trees identified in Condition 7(a); and
- (c) The Permit Holder shall not do any other substantial damage to habitat trees identified in Condition 7(a) when undertaking clearing or other activity authorised under this Permit.

Condition 12 – Flora Management

“(a) Prior to undertaking any clearing authorised under this Permit, the Permit Holder shall engage a *botanist* to conduct a *targeted flora survey* of the Permit Area for the presence of threatened flora listed in the *Wildlife Conservation (Rare Flora) Notice* and *priority flora* in accordance with *EPA Technical Guidance*.”

The Permit Holder has requested that condition 12(a) is amended to change the reference from ‘permit area’ to ‘clearing areas’ as it would be unreasonable to survey the whole permit boundary when only a small section is being cleared. It is the intent of the condition that only areas to be cleared need to be searched. The definition of targeted flora survey also requires adjacent areas are surveyed if threatened or priority flora are found:

targeted flora survey	means a field-based investigation, including a review of established literature, of the biodiversity of flora and vegetation of the Permit Area, focusing on habitat suitable for flora species that are being targeted and carried out during the optimal time to identify those species. Where target flora are identified in the Permit Area, the survey should also include sufficient surrounding areas to place the Permit Area into local context.
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This definition was not provided on the previous version of the permit and will be included on the amended permit.

The Permit Holder has also requested to amend part (d) of the flora management condition:

“(d) Where threatened flora or *priority flora* are identified in relation to Condition 12(a) of this Permit, the Permit Holder shall ensure that:

- (i) no clearing occurs within 50 metres of identified threatened flora, unless approved by the *CEO*; and
- (ii) no clearing of identified *priority flora* occurs; and
- (iii) no clearing occurs within 10 metres of identified *priority flora*, unless first approved by the *CEO*.”

The Permit Holder has requested that condition 12(d)(ii) is amended to include the qualifier unless approved by the CEO as per the other parts of the condition. They have also requested that 12(d)(iii) is removed from the permit as the application of the buffer may not allow sufficient space to undertake the proposed exploration activities and could result in additional clearing of vegetation to facilitate an alternate route around a dense population of flora (Premier Coal Limited, 2023). It is also surmised that the impacts to priority flora are effectively avoided by 12(d)(ii) which prevents the clearing of any priority flora (Premier Coal Limited, 2023).

The condition includes the qualifier, unless first approved by the CEO as there may be exceptional circumstances where clearing is allowed in the buffer areas of threatened and priority flora or targeted surveys demonstrate that the impacts on the local populations are not likely to be significant. The inclusion of this qualifier to condition 12(d)(ii) is not likely to have a significant impact on priority flora as any request to clear priority flora will be considered on a case by case basis. The inclusion of condition 12(d)(iii) is to ensure that adequate areas of habitat and potential seed bank are preserved to aid in the survival of these species. If the condition were to be removed, all surrounding areas of habitat could be cleared resulting in reduced chances of the species persistence at that location. The buffer also helps reduce any potential edge effects from dust, erosion or potential competition with weeds.

Conclusion

The proposed amendment of condition 12(a) to change permit area to areas to be cleared and condition 12(d)(ii) to include unless first approved by the CEO are not likely to have any significant impacts. However, condition 12(d)(iii) is still required to manage impacts on priority flora and should not be removed from the permit.

Condition 13 – Fauna Management (Chuditch)

“(a) Up to one week prior to undertaking clearing of any of the area cross-hatched yellow in Figure 1 of Schedule 1, that area shall be inspected by a *fauna specialist* to identify chuditch (*Dasyurus geoffroi*) dens and individuals.”

fauna specialist	means a person who holds a tertiary qualification specialising in environmental science or equivalent, and has a minimum of 2 years work experience in fauna identification and surveys of fauna native to the region being inspected or surveyed, or who is approved by the <i>CEO</i> as a suitable fauna specialist for the bioregion, and who holds a valid fauna licence issued under the <i>Biodiversity Conservation Act 2016</i> .
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The Permit Holder has requested that condition 13(a) is amended to redefine the area requiring inspection from the area cross-hatched yellow to a reduced area of habitat that is likely to contain dens or individuals (see Figure 2). They have also requested that the requirement to use a fauna specialist is replaced with an environmental specialist which is already defined on the permit as:

environmental specialist	means a person who holds a tertiary qualification in environmental science or equivalent, and has experience relevant to the type of environmental advice that an environmental specialist is required to provide under this Permit, or who is approved by the <i>CEO</i> as a suitable environmental specialist.
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There were three broad fauna habitats identified within the permit area; Jarrah/Marri forest on hillslopes, wetland/drainage zones and pine plantation (Onshore Environmental, 2022b). The Chuditch has been previously recorded within the permit area and there have been suitable den sites identified within the Jarrah/Marri forest on hillslopes habitat (Onshore Environmental, 2022b). It is not likely to utilise the pine plantation habitat and whilst it may forage and disperse through the wetland/drainage zone habitat, this habitat supported fewer large trees and was generally in a poorer quality than the Jarrah/Marri forest habitat. Given that potential denning habitat is primarily located within the Jarrah/Marri hillslopes habitat, the amendment of condition 13(a) to target this habitat will still ensure that impacts on the Chuditch are not likely to be significant.

The Permit Holder has requested that in condition 13(a) the inspection is carried out by an environmental specialist rather than a fauna specialist. They have requested this amendment as the requirement to have a licence is only required for the handling and relocation of fauna and would not be required for inspecting areas for dens or individuals (Premier Coal Limited, 2023). Amending the wording of the fauna specialist definition to clarify that a valid fauna licence is only obtained where required for

the activity will ensure that a person of suitable experience is still undertaking the searches for Chuditch dens but not require an unnecessary licence is needed.

Conclusion

Potential impacts to Chuditch can adequately managed by amending condition 13(a) and the definition of fauna specialist to:

13(a) Up to one week prior to undertaking clearing of any of the areas shaded orange in Figure 2 of Schedule 1, that area shall be inspected by a *fauna specialist* to identify chuditch (*Dasyurus geoffroii*) dens and individuals.

fauna specialist	means a person who holds a tertiary qualification specialising in environmental science or equivalent, and has a minimum of 2 years work experience in fauna identification and surveys of fauna native to the region being inspected or surveyed, or who is approved by the CEO as a suitable fauna specialist for the bioregion, and who holds a valid fauna licence issued under the <i>Biodiversity Conservation Act 2016</i> where required for the activity being undertaken.
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A review of current environmental information (Appendix C) reveals that the assessment against the clearing principles has not changed significantly from the Clearing Permit Decision Report CPS 9654/1.

3.3. Relevant planning instruments and other matters

It is noted that the proposed clearing may impact on foraging and potential breeding habitat for black cockatoo species, which are a protected matter under the *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act). The proponent may be required to refer the project to the (Federal) Department of Agriculture, Water and the Environment for environmental impact assessment under the EPBC Act. The proponent is advised to contact the Department of Agriculture, Water and the Environment for further information regarding notification and referral responsibilities under the EPBC Act.

The clearing permit application was advertised on 31 January 2023 by the Department of Mines, Industry Regulation and Safety inviting submissions from the public. One submission was received in relation to this application which is detailed in Appendix B.

The permit area is within the South West Native Title Settlement area (DPLH, 2023). This settlement resolves Native Title rights and interests over an area of approximately 200,000 square kilometres within the south west of Western Australia. The mining tenure has been granted in accordance with the future act regime of the Native Title Act 1993 and the nature of the act (i.e. the proposed clearing activity) has been provided for in that process, therefore the granting of a clearing permit is not a future act under the Native Title Act 1993.

There is one native title claim over the area under application (DPLH, 2023). This claim has been registered with the National Native Title Tribunal on behalf of the claimant group. However, the tenure has been granted in accordance with the future act regime of the *Native Title Act 1993* and the nature of the act (i.e. the proposed clearing activity) has been provided for in that process, therefore, the granting of a clearing permit is not a future act under the *Native Title Act 1993*.

There is one registered Aboriginal Sites of Significance that intersects the application area (DPLH, 2023). It is the proponent's responsibility to comply with the *Aboriginal Heritage Act 1972* and ensure that no Aboriginal Sites of Significance are damaged through the clearing process.

It is the proponent's responsibility to liaise with the Department of Water and Environmental Regulation and the Department of Biodiversity, Conservation and Attractions, to determine whether a Works Approval, Water Licence, Bed and Banks Permit, or any other licences or approvals are required for the proposed works.

End

Appendix A. Additional information provided by applicant

Summary of comments	Consideration of comment
Confirmation that the removal of buffer areas in condition 7 would negate the requirement to increase the amount of clearing authorised and that limiting the amount of clearing within areas subject to condition 4 to 2 hectares would still allow the proposed activities to proceed.	These changes were made to the permit.

Appendix B. Details of public submissions

Summary of comments	Consideration of comment
Consent of the manager/owner of the subject land being sought.	The underlying land use is the Collie State Forest managed by the Department of Biodiversity, Conservation and Attractions (DBCA). Premier Coal will continue to liaise with DBCA regarding activities within the State Forest.
Areas identified to be containing Registered Aboriginal Heritage Sites should be referred to the Department of Planning, Lands and Heritage Branch and consultation with Traditional Landowners must be undertaken prior to approval, where applicable.	There is one registered site within the permit area, associated with the Collie River. Any disturbance of a registered Heritage Site, would first require approval under the <i>Aboriginal Heritage Act 1972</i> .
Habitat trees should be retained an unacceptable impacts to fauna and significant flora should be avoided.	Condition 7 of the permit requires that all habitat trees within the permit area are avoided. Condition 12 of the permit requires that threatened and priority flora are also avoided during clearing. Condition 13 of the permit also requires areas are searched for the presence of Chuditch and no clearing occurs whilst they are present.

Appendix C. Site characteristics

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. The proposed clearing area contains pine plantation, post mining rehabilitation, water filled mine voids and existing infrastructure (GIS Database).</p> <p>The dominant land use in the immediate surrounding area is mainly mining, grazing, dry land agriculture, forestry (of native forest) and conservation. There are smaller areas of forestry, irrigated horticulture, rural residential, and easements (for roads, power lines etc) (Hearn, Williams, Comer and Beecham, 2002).</p>
Ecological linkage	According to available databases, there are no formal ecological linkages within the application area (GIS Database).
Conservation areas	The application area lies within the Collie State Forest, and is nearby the Muja State Forest (Onshore Environmental, 2022; GIS Database).
Vegetation description	<p>The vegetation of the application area is broadly mapped as Beard vegetation association 3: medium forest; jarrah-marri (GIS Database).</p> <p>A flora and vegetation survey was conducted over the application area by Onshore Environmental during October/November 2019 and February 2022. There were 13 vegetation associations were recorded within the application area and are outlined in Appendix F.</p>

Characteristic	Details
Vegetation condition	<p>The vegetation survey (Onshore Environmental, 2022a) indicate the vegetation within the proposed clearing area is in completely degraded to excellent (Keighery, 1994) condition, described as:</p> <ul style="list-style-type: none"> • Completely degraded • Degraded • Good • Very good • Excellent <p>The full Keighery (1994) condition rating scale is provided in Appendix E and the full survey descriptions and mapping are available in Appendix F.</p>
Climate and landform	<p>The climate of south-west Western Australia is Mediterranean, with hot, dry summers and mild, wet winters. The application area has a long-term rainfall average of 927.7 mm (1899 to 2021), with highest monthly rainfall received during June (173 mm) and July (176 mm). Average maximum summer temperatures range between 28.3 and 30.5 degrees Celsius with winter minimum temperatures ranging from 4.2 to 5.0 degrees Celsius (Onshore Environmental, 2022a)</p> <p>The application area lies within the Collie Basin on the Darling Plateau. The Collie Basin is approximately 26 kilometres in length by 13 kilometres wide and stretches southeast from Allanson (to the west of Collie) (Onshore Environmental, 2022a).</p>
Soil description	<p>The soil is mapped as 255CfCF, 255CfX_MINE, 255CfCI and 255DpPNu soil units (DPIRD, 2022). These are described as per below (DPIRD, 2022):</p> <p>255CfCF - Low lying poorly drained flats over coal measures. Soils are deep sands and wet soils.</p> <p>255CfX_MINE - Mine. Disturbed land.</p> <p>255CfCI - Broad lateritic divides over coal measures relief 5-25 m, slopes 2-10%. Soils are deep sands and sandy gravels.</p> <p>255DpPNu - Shallow minor valleys (10-20 m) with gentle side slopes (3-10%) and swampy floors (50-75 m wide). Soils are loamy gravels, and deep sands, and non-saline wet soils on the valley floors.</p>
Land degradation risk	<p>The Department of Primary Industries and Regional Development (DPIRD), provides a series of soil degradation risk mapping at the systems levels (DPIRD, 2022). The land degradation table Error! Reference source not found. below summaries the soil degradation risk within the application area where information is available.</p>
Waterbodies	<p>According to available databases, there are three non-perennial watercourses and associated drainage lines that intersect the application area. There are no natural permanent waterbodies located within the application area, with the nearest permanent waterbody (Collie River South Branch) being approximately 4 kilometres south west of the application area (GIS Database).</p>
Hydrogeography	<p>There are no public drinking water sources within the application area (GIS Database). The application area is within the Collie Groundwater Area, proclaimed under the <i>Rights in Water and Irrigation Act 1914</i> (GIS Database).</p> <p>The application area lies within the Wellington Dam Collie River hydrographic sub-catchment area (GIS Database).</p> <p>Groundwater salinity within the application area ranges between <500-3000 (fresh to saline) milligrams per litre of total dissolved solids (TDS) (GIS Database).</p>
Flora	<p>A total number of 363 plant taxa from 54 families and 173 genera were recorded from the study area (Onshore Environmental, 2022a). Two Priority 4 flora taxa were recorded within the application area; <i>Acacia semitrullata</i> and <i>Pultenaea skinneri</i>. No Threatened flora was identified within the application area (Onshore Environmental, 2022a; GIS Database).</p>
Ecological communities	<p>According to available databases, there are no mapped Threatened or Priority Ecological Communities (TEC/PECs) within the application area or within 40 kilometres of the application area (GIS Database).</p>
Fauna	<p>According to available data bases, there are records of the following conservation significant fauna species within a 20 kilometres radius of the application area (GIS Database) and have been further considered in section Error! Reference source not found.:</p> <ul style="list-style-type: none"> • Woylie (<i>Bettongia penicillata</i>), Cr; • Forest Red-tailed Black-Cockatoo (<i>Calyptorhynchus banksii naso</i>), Vu;

Characteristic	Details
	<ul style="list-style-type: none"> Baudin's Black Cockatoo (<i>Zanda baudinii</i> (formerly <i>Calyptorhynchus baudinii</i>)), En; Carnaby's Black Cockatoo (<i>Zanda latirostris</i> (formerly <i>Calyptorhynchus latirostris</i>)), En Chuditch (<i>Dasyurus geoffroii</i>), Vu Bilby (<i>Macrotis lagotis</i>), Vu Numbat (<i>Myrmecobius fasciatus</i>), En Western Ringtail Possum (<i>Pseudocheirus occidentalis</i>), Cr Quokka (<i>Setonix brachyurus</i>), Vu Darling Range South-west Ctenotus (<i>Ctenotus delli</i>), P4 Peregrine Falcon (<i>Falco peregrinus</i>), OS Western False Pipistrelle (<i>Falsistrellus mackenziei</i>), P4 Pouched lamprey (<i>Geotria australias</i>), P4 Water-rat (<i>Hydromys chrysogaster</i>), P4 Quenda (<i>Isodon fusciventer</i>), P4 Tammar Wallaby (<i>Notamacropus eugenii derbianus</i>), P4 Western brush wallaby (<i>Notamacropus irma</i>), P4 <p>Two Priority 4 fauna species were recorded within the application area including the Quenda (<i>Isodon fusciventer</i>) and the Western Brush Wallaby (<i>Notamacropus Irma</i>). Two Threatened fauna species were recorded adjacent to the application area including Forest red-tailed black cockatoo (<i>Calyptorhynchus banksii naso</i>) listed as Vulnerable, and Baudin's cockatoo (<i>Zanda Calyptorhynchus</i> (formerly <i>Calyptorhynchus baudinii</i>)) listed as Endangered (Onshore Environmental, 2022b).</p>

C.2. Vegetation extent

	Pre-European area (ha)	Current extent (ha)	Extent Remaining %	Current extent in all DBCA managed land (ha)	Current proportion (%) of pre-European extent in all DBCA Managed Lands
IBRA Bioregion - Jarrah Forest	4,506,660.25	2,399,838.15	53.25	1,673,614.25	39.43
IBRA Subregion - Southern Jarrah Forest	2,607,879.52	1,291,457.94	49.52	904,027.54	34.67
Beard vegetation associations - State					
Veg Assoc No. 3	2,661,404.62	1,803,437.48	67.76	1,469,765.60	58.39
Beard vegetation associations - Bioregion					
Veg Assoc No. 3	2,390,591.54	1,604,101.56	67.10	1,299,263.74	57.71

Government of Western Australia (2019)

C.3. Flora analysis table

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

Species name	Conservation status	Habitat	Suitable habitat features ? [Y/N]	Distance of closest record to application area (km)	Number of known records (total)	Likelihood in application area
<i>Acacia semitrullata</i>	Priority 4	Sandplains, swampy area	Y	0	150 within application area	Confirmed
<i>Adenanthos cygnorum</i> subsp. <i>chamaephyton</i>	Priority 3	Grey sand, lateritic gravel	Y	5.5	2*	Unlikely

<i>Angianthus drummondii</i>	Priority 3	Grey or brown clay soils, ironstone. Seasonally wet flats	Y	12	1*	Unlikely
<i>Banksia subpinnatifida</i> var. <i>imberbis</i>	Priority 2	Laterite	Y	20	2*	Possible
<i>Blennospora doliiformis</i>	Priority 3	Grey or red clay soils over ironstone. Seasonally-wet flats	Y	13.5	1*	Unlikely
<i>Caladenia leucochila</i>	Threatened	Undulating lateritic hills	Y	20	32*	Possible
<i>Caladenia validinervia</i>	Priority 1	Sandy gravelly soil in Jarrah-Marri forest	Y	11	2*	Unlikely
<i>Calochilus</i> sp. <i>Boyup Brook</i>	Priority 1	Sand and well-drained sand	Y	20	1*	Unlikely
<i>Calothamnus graniticus</i> subsp. <i>leptophyllus</i>	Priority 4	Clay over granite, lateritic soils, hillsides	N	2	3*	Unlikely
<i>Calytrix pulchella</i>	Priority 3	Grey or white sands over laterite. Ridges, flats	Y	4	2*	Possible
<i>Commersonia erythrogyna</i>	Threatened	Lateritic ridge with Jarrah-Marri woodland	Y	17.5	1*	Unlikely
<i>Drakaea confluens</i>	Threatened	White-grey sands	Y	6.5	1*	Possible
<i>Eryngium</i> sp. <i>Ferox</i>	Priority 3	Seasonally wet areas, brown clay	Y	12.5	1*	Unlikely
<i>Eucalyptus rudis</i> subsp. <i>cratyantha</i>	Priority 4	Loam. Flats, hillsides	Y	5.5	1*	Possible
<i>Gastrolobium tomentosum</i>	Priority 4	Gravelly loam or clay, sometimes over sandier substrates. Hills, road verges	Y	20	1*	Possible
<i>Grevillea prominens</i>	Priority 3	Gravelly loam, creek lines	Y	13.5	1*	Unlikely
<i>Grevillea rara</i>	Threatened	Lateritic loam. Creeklines	Y	20	6*	Unlikely
<i>Grevillea ripicola</i>	Priority 4	Swampy flats, granite outcrops, along water courses	N	5	32*	Unlikely
<i>Hypolaena robusta</i>	Priority 4	River edge, Collie Basin	N	11	1*	Unlikely
<i>Jacksonia velveta</i>	Threatened	Laterite, on slight slopes in low woodland area	Y	6	7*	Possible
<i>Juncus meianthus</i>	Priority 3	Black sand or sandy clay; creeks, seepage area	N	15	1*	Unlikely
<i>Lasiopetalum cardiophyllum</i>	Priority 4	Flats, hillslopes	Y	10	4*	Unlikely
<i>Leucopogon extremus</i>	Priority 2	Low-lying, seasonally wet sites on sandy loam or sandy clay	Y	1.5	2*	Likely
<i>Logania sylvicola</i>	Priority 2	Mid-slope of laterite rises with brown clay to clayey sand	Y	7	1*	Possible
<i>Lomandra whicherensis</i>	Priority 3	Loamy sand	Y	19	1*	Possible
<i>Meionectes tenuifolia</i>	Priority 3	Wetland margins, swamps	Y	12.5	1*	Unlikely
<i>Pultenaea skinneri</i>	Priority 4	Winer-wet depressions	Y	0	50 within the application area	Confirmed

<i>Sphaerolobium benetectum</i>	Priority 2	Ridges, swamps, undulating rises	Y	5.5	2*	Possible
<i>Stylidium acuminatum subsp. acuminatum</i>	Priority 2	Clayey sand over laterite; hillslopes, ridges and valleys	Y	17	1*	Unlikely
<i>Stylidium lepidum</i>	Priority 3	Gravelly sand, loam or clay, winter-wet depressions	Y	12.5	2*	Unlikely
<i>Stylidium rhipidium</i>	Priority 3	Wet creek flats, swamps, granite outcrops	Y	6	1*	Possible
<i>Stylidium squamellosum</i>	Priority 2	Brown to red-brown clay loam. Winter-wet habitats and depressions, open woodland, shrubland	Y	19.5	2*	Possible
<i>Synaphea decumbens</i>	Priority 3	Sand over laterite	Y	6.5	2*	Possible
<i>Synaphea hians</i>	Priority 3	Sandy soils, rises	Y	9	1*	Possible
<i>Synaphea petiolaris subsp. simplex</i>	Priority 3	Flats, winter-wet areas	Y	7	2*	Unlikely
<i>Synaphea trinacriformis</i>	Priority 1	Bare white sand to grey-brown loamy sand and laterite gravel. Undulating landscape, roadsides	Y	20	1*	Unlikely
<i>Tetrateca parvifolia</i>	Priority 3	Near river bank, heavy alluvial soil	N	13	3*	Unlikely
<i>Thysanotus unicipensis</i>	Priority 3	Laterite, grey brown sandy loam	Y	17	1*	Unlikely

Onshore Environmental (2022a), GIS Database.

*within 20 kilometres of the application area (GIS Database)

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

C.4. Fauna analysis table

Scientific Name	Common Name	EPBC Act	BC Act	DBCA	Habitat Preference	Suitable Habitat Present	Likelihood in the study area	Rationale
BIRDS								
<i>Actitis hypoleucos</i>	Common Sandpiper	MI			Edge of sheltered waters, salt or fresh, estuaries, river pools, claypans, drying swamps (Johnstone & Storr 1998)	Yes	Unlikely	Suitable habitat present. An uncommon migrant species which may occasionally utilise parts of the study area.
<i>Apus pacificus</i>	Fork-tailed Swift	MI			Entirely aerial species (Johnstone & Storr 1998)	Yes	Possible	May fly over study area.
<i>Atrichornis clamorosus</i>	Noisy Scrub-bird, Tjimiluk	EN	EN		Dense, long-unburnt vegetation characterised as low forest (5-15 m high), scrub/thicket and (rarely) heath	No	Unlikely	Protected matters search indicated species or species habitat may occur within the search area. A translocated population occurs 60 km north. Nearest natural population is 250km south-east.
<i>Botaurus poiciloptilus</i>	Australasian Bittern	EN	EN		Reedbeds, and other vegetation in water such as cumbungi, lignum and sedges	No	Unlikely	Habitat largely unsuitable. May fly over.
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	MI			Coastal and inland areas saline and fresh or brackish wetlands (Geering et al. 2007)	Yes	Unlikely	Suitable habitat present. A migrant species which may occasionally utilise parts of the study area.
<i>Calidris canutus</i>	Red Knot	EN & MI	CR		Coastal habitats including intertidal mudflats, sandflats, beaches, estuaries, bays, inlets, lagoons and harbours	No	Unlikely	No suitable habitat.
<i>Calidris ferruginea</i>	Curlew Sandpiper	CR	CR		Intertidal mudflats and ephemeral and permanent lakes	Yes	Unlikely	Suitable habitat present. A migrant species which may occasionally utilise parts of the study area.
<i>Calidris melanotos</i>	Pectoral Sandpiper	MI			Shallow fresh to saline wetlands	Yes	Unlikely	Suitable habitat present. An uncommon migrant species which may occasionally utilise parts of the study area.
<i>Calyptorhynchus banksii naso</i>	Forest Red-tailed Black-Cockatoo, Karrak	VU	VU		Eucalypt forests, areas of seeding Marri, Jarrah, Blackbutt, Karri and Sheoak (Johnstone & Storr 1998)	Yes	Likely	Recorded 300m south of the study area and numerous locations in close proximity. Roosting occurs in close proximity (DBCA 2022).
<i>Calyptorhynchus baudinii</i>	Baudin's Black Cockatoo	EN	EN		Eucalypt forest, areas of Marri, Karri and Wandoo (Johnstone & Storr, 1998, Johnstone & Kirkby 2008)	Yes	Likely	Recorded 300m south of the study area and numerous locations in close proximity. Breeding and roosting occur in close proximity (DBCA 2022).
								Recorded 2km NW of the study area and numerous locations in close proximity. Breeding and roosting occur in close proximity (DBCA 2022).
<i>Calyptorhynchus latirostris</i>	Carnaby's Black-cockatoo	EN	EN		Eucalypt woodlands and forests and adjacent area of <i>Proteaceous</i> scrubs and heaths (Johnstone & Storr 1998)	Yes	Likely	Recorded 2km NW of the study area and numerous locations in close proximity. Breeding and roosting occur in close proximity (DBCA 2022).
<i>Charadrius leschenaultii</i>	Greater Sand Plover	VU & MI	VU		Coastal or estuarine habitats including beaches, mudflats, sandbanks and lagoons	No	Unlikely	No suitable habitat.
<i>Falco hypoleucos</i>	Grey Falcon	VU	VU		Shrubland, grassland and wooded watercourses, wetlands	Yes	Unlikely	Protected matters search indicated species or species habitat may occur within the search area. No records from nearby.
<i>Falco peregrinus</i>	Peregrine Falcon			OS	Will utilise most habitats prefers coastal and inland cliffs or open woodlands near water, and also city buildings	Yes	Likely	Recorded 3km NE of the study area (DBCA 2022).
<i>Ixobrychus dubius</i>	Australian Little Bittern			P4	Swamps, lakes and rivers with well vegetated margins	Yes	Possible	DBCA database search indicated that this species may occur within the search area (DBCA 2022).
<i>Ixobrychus flavicollis australis</i> (southwest subpop.)	Black Bittern			P2	Dense vegetation and trees at the edges of water bodies	No	Unlikely	Nearby record is historical (DBCA 2022).
<i>Leipoa ocellata</i>	Malleefowl	VU	VU		Semi-arid mallee scrub on the fringes of the relatively fertile areas of southern Australia	No	Unlikely	No suitable habitat.
<i>Motacilla cinerea</i>	Grey Wagtail	MI			Various habitats with open waterbodies (Johnstone & Storr 2004)	Yes	Unlikely	Protected matters search indicated species or species habitat may occur within the search area. No records from nearby.
<i>Ninox connivens connivens</i>	Barking Owl			P3	Open country with tree lined water courses, open woodlands and forest edges	Yes	Possible	DBCA database search indicated that this species may occur within the search area (DBCA 2022).
<i>Numenius madaqascariensis</i>	Eastern Curlew	CR & MI	CR		Tidal mudflats, also reef flats, sandy beaches (Johnstone & Storr 1998)	No	Unlikely	No suitable habitat.
<i>Pandion haliaetus</i>	Osprey	MI			Sheltered seas around islands, tidal creeks, estuaries and saltwork ponds, and large river pools (Johnstone et al. 2013)	No	Unlikely	No suitable habitat.

<i>Oxyura australis</i>	Blue-billed Duck			P4	Well vegetated dams, lakes and swamps	Yes	Possible	Birddata search indicates has been recorded in the area. The date of the record is uncertain.
<i>Rostratula australis</i>	Australian Painted Snipe	EN	EN		Shallow inland wetlands, either freshwater or brackish	Yes	Possible	Protected matters search indicated species or species habitat likely to occur within the search area. No records from nearby.
<i>Sternula nereis nereis</i>	Australian Fairy Tern	VU	VU		Sheltered sandy beaches, spits and banks above the high tide line and below vegetation	No	Unlikely	No suitable habitat.
<i>Tringa nebularia</i>	Common Greenshank	MI			Intertidal mudflats and ephemeral and permanent lakes	Yes	Possible	Protected matters search indicated species or species habitat likely to occur within the search area. No records from nearby.
<i>Tyto novaehollandiae novaehollandiae</i>	Masked Owl			P3	Forests, woodlands, timbered waterways and open country	Yes	Possible	DBCA database search indicated that this species may occur within the search area (DBCA 2022).
FISH								
<i>Galaxiella nigrostriata</i>	Black-stripe Minnow	EN	EN		Ephemeral wetlands of the south-west (Bray and Gomon 2020)	Yes	Possible	Protected matters search indicated species or species habitat likely to occur within the search area. No records from nearby.
<i>Geotria australis</i>	Pouch Lamprey			P3	Rivers and streams, estuaries and coastal waters	No	Unlikely	No suitable habitat. Historical record in close proximity (DBCA 2022).
<i>Nannatherina balstoni</i>	Balston's Pygmy Perch	VU	VU		Coastal peat flats, rivers	No	Unlikely	No suitable habitat within the study area. Known from the nearby Collie River.
MAMMALS								
<i>Bettongia penicillata ogilbyi</i>	Woylie	EN	CR		Woodlands and adjacent heaths with a dense understorey of shrubs (Woinarski et al. 2014)	No	Likely	Recorded 3km SE in 2015 with numerous additional records nearby (DBCA 2022).
<i>Dasyurus geoffroii</i>	Chuditch, Western Quoll	VU	VU		Jarrah forest, in moist, densely vegetated, steeply sloping forest and drier, open, gently sloping forest particularly in riparian vegetation (Orell & Morris 1994)	Yes	Likely	Previous record within the study area (2006). Additional recent records nearby (DBCA 2022).
<i>Falsistrellus mackenziei</i>	Western False Pipistrelle			P4	Wet sclerophyll forests of Karri, Jarrah and Tuart eucalypts	Yes	Likely	Recently recorded from Collie (EcoEdge 2019).
<i>Hydromys chrysogaster</i>	Water-rat			P4	Permanent bodies of fresh or brackish water, subalpine streams to lakes and farm dams (Van Dyck & Strahan 2008)	Yes	Likely	Recent record 4km ESE (DBCA 2022).
<i>Isoodon fusciventer</i>	Quenda			P4	Jarrah forest and swamp habitats, preferring dense vegetation around wetland fringes and heathland (Cooper 1998, Woinarski et al. 2014).	Yes	Likely	Recent record 10km NE (DBCA 2022).
<i>Macrotis lagotis</i>	Bilby	VU	VU		Mixture of woodland including Jarrah, Marri and Wandoo in the south-west (Abbott 2001).	Yes	Unlikely	Nearby records are historical (DBCA 2022).
<i>Myrmecobius fasciatus</i>	Numbat	EN	EN		Eucalypts forests and woodland, notably wandoo and jarrah woodland (Van Dyck & Strahan 2008)	Yes	Unlikely	Nearby records are historical (DBCA 2022).
<i>Notamacropus eugenii derbianus</i>	Tammar Wallaby			P4	Dense, low vegetation for daytime shelter and open grassy areas for feeding. This species inhabits coastal scrub, heath, dry sclerophyll forest and thickets in mallee and woodland (Maxwell et al. 1996)	Yes	Likely	Recorded 15km NE of the study area (DBCA 2022)
<i>Notamacropus irma</i>	Western Brush Wallaby			P4	Wide-range of habitats including low Banksia woodlands, Jarrah/Marri woodlands and moist Melaleuca lowlands, favours open, grassy areas (Wann & Bell 1997, Woinarski et al. 2014)	Yes	Likely	Recent record 500m east of the study area (DBCA 2020)
<i>Phascogale calura</i>	Red-tailed Phascogale	VU	CD		Wandoo-rock sheoak uplands, and lowland habitat with riverine fringing vegetation of swamp sheoak, York Gum and Wandoo (Short et al. 2011)	Yes	Unlikely	No records within 50km.
<i>Phascogale tapoatafa wambenger</i>	South-western Brush-tailed Phascogale				Dry sclerophyll forests and open woodlands that contain hollow-bearing trees with a sparse ground cover (Woinarski et al. 2014).	Yes	Likely	Numerous recent records in close proximity (DBCA 2022).
<i>Pseudocheirus occidentalis</i>	Western Ringtail Possum	CR	CR		Coastal <i>Agonis flexuosa</i> forest or eucalypt woodland or forest with a mid-story of <i>Agonis flexuosa</i> (DPaW 2017, Jones et al. 1994). Additionally, inland forest areas that have been unlogged and unburnt for long periods (Wayne et al. 2006)	Yes	Likely	Recent record 10km NE (DBCA 2022).
<i>Setonix brachyurus</i>	Quokka	VU	VU		Habitat varies, but prefer <i>Acacia</i> and <i>Melaleuca</i> thickets. Associated with <i>Taxandria linearifolia</i> in Jarrah Forest (de Tores 2008)	Yes	Possible	Recorded 17km north (2011). However nearby records are historical (DBCA 2022).
REPTILES								
<i>Ctenotus delli</i>	Darling Range South-west Ctenotus			P4	Jarrah and Marri woodlands with shrub dominated understorey on laterite, sand or clay soils (Bush et al 2010).	Yes	Likely	Recent record within 20km (ALA 2022).

(Onshore Environmental, 2022b)

C.5. Land degradation risk table

Risk categories	Coalfields System
Wind erosion	30-50% of the map unit has a high to extreme hazard
Water erosion	1% of the map unit has a very high to extreme hazard
Flood risk	1% of the map unit has a moderate to high hazard
Water logging	60% of the map unit has a moderate to very high to risk
Phosphorus export risk	0% of the map unit has a high to extreme hazard

(GIS Database)

Appendix D. Assessment against the clearing principles

Assessment against the clearing principles	Variance level	Is further consideration required?
Environmental value: biological values		
<p><u>Principle (a):</u> "Native vegetation should not be cleared if it comprises a high level of biodiversity."</p> <p><u>Assessment:</u></p> <p>The area proposed to be cleared is situated within the Collie State Forest; contains foraging and potential breeding habitat for Threatened and Priority fauna species; may contain suitable habitat for Threatened flora and contains two Priority flora species (Onshore Environmental, 2022a; Onshore Environmental, 2022b; GIS Database).</p>	<p>At variance</p> <p>(as per CPS 9654/1)</p>	<p>Yes</p> <p>Refer to Section 3.2, above.</p>
<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></p> <p>The area proposed to be cleared contains foraging and potential breeding habitat for conservation significant fauna (Onshore Environmental, 2022b).</p>	<p>At variance</p> <p>(as per CPS 9654/1)</p>	<p>Yes</p> <p>Refer to Section 3.2, above.</p>
<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> <p>The area proposed to be cleared may contain habitat for flora species listed under the BC Act (Onshore Environmental, 2022a).</p>	<p>May be at variance</p> <p>(as per CPS 9654/1)</p>	<p>No</p>
<p><u>Principle (d):</u> "Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a threatened ecological community."</p> <p><u>Assessment:</u></p> <p>The area proposed to be cleared does not contain species that can indicate a threatened ecological community (Onshore Environmental, 2022b; GIS Database).</p>	<p>Not likely to be at variance</p> <p>(as per CPS 9654/1)</p>	<p>No</p>
Environmental value: significant remnant vegetation and conservation areas		
<p><u>Principle (e):</u> "Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared."</p> <p><u>Assessment:</u></p> <p>The application area occurs within the Jarrah Forrest Interim Biogeographic Regionalisation of Australia (IBRA) bioregion, in which approximately 53.25% of the pre-European vegetation remains (GIS Database; Government of Western Australia, 2019).</p> <p>The vegetation within the application area has been mapped as Beard vegetation association 3 (GIS Database; Onshore Environmental, 2022a). This vegetation association is well represented at both a state and bioregional level (>60% Pre-European extent remaining) (Government of Western Australia, 2019). Given the amount of vegetation remaining in the local area and bioregion, the vegetation proposed to be cleared is not considered to represent remnant vegetation.</p>	<p>Not likely to be at variance</p> <p>(as per CPS 9654/1)</p>	<p>No</p>
<p><u>Principle (h):</u> "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."</p> <p><u>Assessment:</u></p>	<p>May be at variance</p> <p>(as per CPS 9654/1)</p>	<p>No</p>

Assessment against the clearing principles	Variance level	Is further consideration required?
The application area is situated within the Collie State Forest (GIS Database). The Collie State Forest is managed by the Department of Biodiversity, Conservation and Attractions.		
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>There are no permanent watercourses or wetlands within the area proposed to clear (GIS Database). There are three ephemeral watercourses within the application area, however there has been no riparian vegetation identified within the application area (GIS Database; Onshore Environmental, 2022a).</p> <p>Given there are no permanent watercourses or wetlands and associated riparian vegetation recorded within the application area, the proposed clearing is unlikely to impact on native vegetation growing in, or in association with, a watercourse or wetland.</p>	Not likely to be at variance (as per CPS 9654/1)	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 considered moderately susceptible to wind or water erosion and nutrient export. To minimise potential land degradation in the form of erosion, a staged clearing condition has been applied to the permit.</p>	May be at variance (as per CPS 9654/1)	No
<p><u>Principle (i):</u> <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.”</i></p> <p><u>Assessment:</u></p> <p>The application area is within a Country Areas Water Supply Area (GIS Database), however the majority of the application area is within the low salinity risk Zone D and is unlikely to impact on groundwater quality provided rehabilitation is enacted at the end of each drilling program (which has been applied to this permit) (DWER, 2022; GIS Database).</p> <p>The Collie River South (a major river) is located approximately 4 kilometres south east of the application area and there are several ephemeral drainage lines within the application area that link to the Collie River South (GIS Database), there is a potential to impact on the quality of surface water during periods of high rainfall. As such, a watercourse condition is required to manage potential surface water quality impacts.</p>	May be at variance (as per CPS 9654/1)	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>There are two water filled mining voids within the application area, which may cause flooding in periods of high rainfall. Overflow of these voids are predicated to flow to lower elevations, where ephemeral drainage lines occur and may cause of exacerbate the incidence of flooding. As such, a surface water flow condition is required to minimise the likelihood of flooding or water logging.</p>	May be at variance (as per CPS 9654/1)	No

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. Vegetation Associations and descriptions (Onshore Environmental, 2022a)

Code	Broad Floristic Formation	Vegetation Description	Quadrats	Condition	Area (ha)	% of Study Area
		Hill Crests				
HC AfEm BoHamHr Bg	Allocasuarina Forest	Forest of <i>Allocasuarina fraseriana</i> and <i>Eucalyptus marginata</i> subsp. <i>marginata</i> over Dwarf Scrub D of <i>Bossiaea ornata</i> , <i>Hibbertia amplexicaulis</i> and <i>Hibbertia vaginata</i> , with Open Low Woodland B of <i>Allocasuarina fraseriana</i> , <i>Eucalyptus marginata</i> subsp. <i>marginata</i> and <i>Banksia grandis</i> on grey sand on hill crests and upper hill slopes	PC02, PC06, PC08	Very Good	38.01	9.81
		Hill Slopes				
HS Em XgBoBd	<i>Eucalyptus</i> Forest	Forest of <i>Eucalyptus marginata</i> subsp. <i>marginata</i> Dwarf Scrub D of <i>Xanthorrhoea gracilis</i> , <i>Bossiaea ornata</i> and <i>Banksia dallaneyi</i> (<i>Trymalium ledifolium</i>) on grey sand on upper hill slopes	PC20	Very Good	1.34	0.35
		Lower Slopes				
LS Em Xp Bo	<i>Eucalyptus</i> Forest	Forest of <i>Eucalyptus marginata</i> subsp. <i>marginata</i> (+/- <i>Allocasuarina fraseriana</i>) over Low Scrub A of <i>Xanthorrhoea preissii</i> over Dwarf Scrub D of <i>Bossiaea ornata</i> (mid slopes) or <i>Bossiaea eriocarpa</i> (lower slopes) on brown loamy sand on mid and lower hill slopes	PC04, PC12, PC14	Excellent	50.15	12.95
LS Em BeCfHr XpXoPl	<i>Eucalyptus</i> Forest	Forest of <i>Eucalyptus marginata</i> subsp. <i>marginata</i> (<i>Allocasuarina fraseriana</i>) over Low Heath D of <i>Bossiaea eriocarpa</i> , <i>Calytrix flavescens</i> and <i>Hibbertia vaginata</i> (<i>Babingtonia camphorosmae</i> , <i>Styphelia erubescens</i>), with Open Scrub of <i>Xanthorrhoea preissii</i> , <i>Xylomelum occidentale</i> and <i>Persoonia longifolia</i> (<i>Leptospermum erubescens</i> , <i>Allocasuarina humilis</i>) on grey sand on lower slopes	PC10, PC26, PC30, PC32, PC34	Very Good	15.51	4.00
LS EvEd XpHpKg BeHa	<i>Eucalyptus</i> Woodland	Tree Mallee of <i>Eucalyptus decipiens</i> subsp. <i>decipiens</i> over Open Low Scrub A of <i>Xanthorrhoea preissii</i> , <i>Hakea prostrata</i> and <i>Kunzea glabrescens</i> (<i>Acacia saligna</i>) over Open Dwarf Scrub D of <i>Bossiaea eriocarpa</i> and <i>Hypocalymma angustifolium</i> on brown sand on lower slopes	PC18, PC33	Good	2.51	0.65
LS Ep Kg BiBa	<i>Eremaea</i> Heath B	Heath B of <i>Eremaea pauciflora</i> with Scrub of <i>Kunzea glabrescens</i> and Open Low Woodland A of <i>Banksia ilicifolia</i> and <i>Banksia attenuata</i> on grey deep sand on sandy lower slopes	PC24, PC25	Good	8.68	2.24
LS Db MpEmIf KgKr PeAoHa	<i>Dasypogon</i> Low Heath D	Low Heath D of <i>Dasypogon bromeliifolius</i> with Open Low Woodland A of <i>Melaleuca preissiana</i> , <i>Eucalyptus marginata</i> subsp. <i>marginata</i> and <i>Nuytsia floribunda</i> , Open Scrub of <i>Kunzea glabrescens</i> and <i>Kunzea recurva</i> , and Open Dwarf Scrub C of <i>Pericalymma ellipticum</i> var. <i>ellipticum</i> , <i>Adenanthos obovatus</i> and <i>Hypocalymma angustifolium</i> on grey sand on lower slopes	PC16, PC31, PC36	Good	3.88	1.00
		Sandy Flats				

Code	Broad Floristic Formation	Vegetation Description	Quadrats	Condition	Area (ha)	% of Study Area
SF MpnfEm Xp BeHaCf	Melaleuca Low Woodland A	Low Woodland A of Melaleuca preissiana, Nuytsia floribunda and Eucalyptus marginata subsp. marginata over Open Scrub of Xanthorrhoea preissii over Open Dwarf Scrub C of Bossiaea eriocarpa, Hypocalymma angustifolium, Allocasuarina humilis and Calytrix flavescens over Open Dwarf Scrub D of Dasypogon bromeliifolius on grey sand on sandy flats	PC13, PC15, PC22	Very Good	16.86	4.35
		Drainage Flats				
DF DbHa Mp Ao	Dasypogon Dwarf Scrub D	Dwarf Scrub D of Dasypogon bromeliifolius and Hypocalymma angustifolium with Open Low Woodland A of Melaleuca preissiana and Open Dwarf Scrub C of Adenanthos obovatus (Kunzea recurva) on grey loamy sand on open drainage flats	PC05, PC07, PC17	Very Good	35.76	9.23
		Wetland				
WE Mp Ha Pa	Melaleuca Forest	Forest of Melaleuca preissiana over Low Heath D of Hypocalymma angustifolium over Open Tall Sedges of Tremula tremulina on grey clay on wetland	PC19, PC27, PC28, PC35	Very Good	17.82	4.60
WE Ha PaCa MpEr	Hypocalymma Dwarf Scrub D	Dwarf Scrub D of Hypocalymma angustifolium over Open Tall Sedges of Tremula tremulina and Cyathochaeta avenacea with Open Low Woodland A of Melaleuca preissiana and Eucalyptus rudis subsp. rudis, Open Scrub of Taxandria linearifolia and Hakea varia, and Open Low Scrub B of Astartea scoparia, Taxandria linearifolia and Melaleuca incana subsp. incana on grey clay / clayey sand on wetland	PC01, PC09, PC29	Very Good	4.06	1.05
WE Pa PeAoHa Mp	Tremula Tall Sedges	Tall Sedges of Tremula tremulina with Dwarf Scrub C/D of Pericalymma ellipticum, Adenanthos obovatus and Hypocalymma angustifolium, Open Low Woodland A/B of Melaleuca preissiana, and Open Scrub of Xanthorrhoea preissii, Kunzea glabrescens and Kunzea recurva on grey clayey sand on wetland	PC21, PC23	Very Good	2.92	0.75
		Minor Drainage Line				
MI Mp AsMihv Ca	Melaleuca Low Woodland A	Low Woodland A of Melaleuca preissiana over Low Scrub B of Astartea scoparia, Melaleuca incana subsp. incana and Hakea varia over Very Open Low Sedges of Cyathochaeta avenacea on cream / grey silty clay loam narrowly incised minor drainage lines	PC03, PC11	Very Good	3.51	0.91
		Cleared			2.60	0.67
		Plantation (Pine Trees)			76.36	19.72
		Powerline Corridors			1.67	0.43
		Native Rehabilitation (post-mining)			51.90	13.40
		Roads			9.74	2.51
		Water Filled Mining Voids			44.01	11.36

Code	HC AfEm BoHamHr Bg
Broad Floristic Formation	Allocasuarina Forest
Vegetation Type	Forest of <i>Allocasuarina fraseriana</i> and <i>Eucalyptus marginata</i> subsp. <i>marginata</i> over Dwarf Scrub D of <i>Bossiaea ornata</i> , <i>Hibbertia amplexicaulis</i> and <i>Hibbertia vaginata</i> , with Open Low Woodland B of <i>Allocasuarina fraseriana</i> , <i>Eucalyptus marginata</i> subsp. <i>marginata</i> and <i>Banksia grandis</i> on grey sand on hill crests and upper hill slopes



Quadrats Sampled	PC02, PC06, PC08
Area	38.01 ha or 9.81% of the study area
Soils and Geology	Grey sand (skeletal), laterite, prominent outcropping
Land Form	Laterised hill crests
Priority Ecological Community	No
Conservation Significant Flora	<i>Acacia semitrullata</i> (P4) was recorded as 2 plants from one spot location in the southwest corner of the study area, but was more common on sandy lower slopes and flats nearby to the northeast
Introduced (Weed) Species	* <i>Aira caryophyllea</i>
Vegetation Condition	Very Good
Disturbances	Historical logging
Average Fire Age	Recent (0-2 years) to Moderate (3-5 years)

Code HS Em XgBoBd
Broad Floristic Formation *Eucalyptus* Forest
Vegetation Type Forest of *Eucalyptus marginata* subsp. *marginata* Dwarf Scrub D of *Xanthorrhoea gracilis*, *Bossiaea ornata* and *Banksia dallaneyi* (*Trymalium ledifolium*) on grey sand on upper hill slopes



Quadrats Sampled	PC20
Area	1.34 ha or 0.35% of the study area
Soils and Geology	Grey sand, laterite
Land Form	Upper hill slopes
Priority Ecological Community	No
Conservation Significant Flora	None
Introduced (Weed) Species	* <i>Aira caryophyllea</i>
Vegetation Condition	Very Good
Disturbances	Historical logging
Average Fire Age	Recent (0-2 years)

Code LS Em Xp Bo
Broad Floristic Formation *Eucalyptus* Forest
Vegetation Type Forest of *Eucalyptus marginata* subsp. *marginata* (+/- *Allocasuarina fraseriana*) over Low Scrub A of *Xanthorrhoea preissii* over Dwarf Scrub D of *Bossiaea ornata* (mid slopes) or *Bossiaea eriocarpa* (lower slopes) on brown loamy sand on mid and lower hill slopes



Quadrats Sampled	PC04, PC12, PC14
Area	50.15 ha or 12.95% of the study area
Soils and Geology	Brown loamy sand
Land Form	Mid and lower hill slopes
Priority Ecological Community	No
Conservation Significant Flora	None
Introduced (Weed) Species	* <i>Hypochaeris glabra</i>
Vegetation Condition	Excellent to Very Good
Disturbances	Historical mine exploration, frequent fire
Average Fire Age	Recent (0-2 years) to Moderate (3-5 years)

Code LS Em BeCfHr XpXoPl
Broad Floristic Formation *Eucalyptus* Forest
Vegetation Type Forest of *Eucalyptus marginata* subsp. *marginata* (*Allocasuarina fraseriana*) over Low Heath D of *Bossiaea encarpa*, *Calytrix flavescens* and *Hibbertia vaginata* (*Babingtonia camphorosmae*, *Styphelia erubescens*), with Open Scrub of *Xanthorrhoea preissii*, *Xylomelum occidentale* and *Persoonia longifolia* (*Leptospermum erubescens*, *Allocasuarina humilis*) on grey sand on lower slopes



Quadrats Sampled	PC10, PC26, PC30, PC32, PC34
Area	15.51 ha or 4.00% of the study area
Soils and Geology	Grey sand
Land Form	Lower hill slopes
Priority Ecological Community	No
Conservation Significant Flora	None
Introduced (Weed) Species	* <i>Aira caryophyllea</i> , * <i>Disa bracteata</i> , * <i>Hypochaeris glabra</i> , * <i>Ursinia anthemoides</i>
Vegetation Condition	Excellent - Very Good
Disturbances	Historical logging, frequent fire, access tracks
Average Fire Age	Recent (0-2 years) to Moderate (3-5 years)

Code LS EwEd XpHpKg BeHa
Broad Floristic Formation *Eucalyptus* Woodland
Vegetation Type Woodland of *Eucalyptus wandoo* (±Tree Mallee of *Eucalyptus decipiens* subsp. *decipiens*) over Open Low Scrub A of *Xanthorrhoea preissii*, *Hakea prostrata* and *Kunzea glabrescens* (*Acacia saligna*) over Open Dwarf Scrub D of *Bossiaea encarpa* and *Hypocalymma angustifolium* (*Hakea lissocarpha*, *Banksia bipinnatifida*) on grey/brown sand on lower slopes



Quadrats Sampled	PC18, PC33
Area	2.51 ha or 0.065% of the study area
Soils and Geology	Brown loamy sand
Land Form	Lower hill slopes, footslopes
Priority Ecological Community	No
Conservation Significant Flora	None
Introduced (Weed) Species	* <i>Aira caryophyllea</i> , * <i>Asparagus asparagoides</i> , * <i>Lysimachia arvensis</i>
Vegetation Condition	Good
Disturbances	Pigs, weeds, access track, powerline corridor, pine plantation adjacent
Average Fire Age	Moderate (3 to 5 yr)

Code LS Ep Kg BiBa
 Broad Floristic Formation Eremaea Heath B
 Vegetation Type Heath B of *Eremaea pauciflora* with Scrub of *Kunzea glabrescens* and Open Low Woodland A of *Banksia ilicifolia* and *Banksia attenuata* on grey deep sand on sandy lower slopes



Quadrats Sampled	PC24, PC25
Area	8.68 ha or 2.24% of the study area
Soils and Geology	Deep grey sand
Land Form	Lower hill slopes, footslopes, sandy flats
Priority Ecological Community	No
Conservation Significant Flora	The largest proportion of the <i>Acacia semitrullata</i> (P4) population occurred within this vegetation type in the southeast corner of the study area. Also present at the same location was the range extension <i>Aotus procumbens</i>
Introduced (Weed) Species	* <i>Aira caryophylla</i> , * <i>Aira cupaniana</i> , * <i>Hypochaeris glabra</i> , * <i>Pentameris airoides</i> , * <i>Ursinia anthemoides</i> , * <i>Vulpia bromoides</i> ,
Vegetation Condition	Good to Very Good
Disturbances	Historical mine exploration, ground disturbance, access tracks
Average Fire Age	Old (6+ years)

Code LS Db MpEmNf KgKr PeAohA
 Broad Floristic Formation *Dasyopogon* Low Heath D
 Vegetation Type Low Heath D of *Dasyopogon bromeliifolius* with Open Low Woodland A of *Melaleuca preissiana*, *Eucalyptus marginata* subsp. *marginata* and *Nuytsia floribunda*, Open Scrub of *Kunzea glabrescens* and *Kunzea recurva*, and Open Dwarf Scrub C of *Pericalymma ellipticum* var. *ellipticum*, *Adenanthos obovatus* and *Hypocalymma angustifolium* on grey sand on lower slopes



Quadrats Sampled	PC16, PC31, PC36
Area	3.88 ha or 1.00% of the study area
Soils and Geology	Grey sand, loamy sand
Land Form	Lower slopes, footslopes
Priority Ecological Community	No
Conservation Significant Flora	The entire population of <i>Pultenaea skinneri</i> (P4) was recorded within this vegetation type in the northeast sector of the study area
Introduced (Weed) Species	* <i>Aira caryophylla</i> , * <i>Hypochaeris glabra</i> , * <i>Pentameris airoides</i> , * <i>Pinus radiata</i> , <i>Ursinia anthemoides</i>
Vegetation Condition	Good to Very Good
Disturbances	Historical mine exploration, logging, access tracks, heavy grazing by kangaroos
Average Fire Age	Old (6+ years)

Code SF MpNfEm Xp BeHaCf
 Broad Floristic Formation *Melaleuca* Low Woodland A
 Vegetation Type Low Woodland A of *Melaleuca preissiana*, *Nuytsia floribunda* and *Eucalyptus marginata* subsp. *marginata* over Open Scrub of *Xanthorrhoea preissii* over Open Dwarf Scrub C of *Bossiaea eriocarpa*, *Hypocalymma angustifolium*, *Allocasuarina humilis* and *Calytrix flavescens* over Open Dwarf Scrub D of *Dasyopogon bromeliifolius* on grey sand on sandy flats



Quadrats Sampled	PC13, PC15, PC22
Area	16.86 ha or 4.35% of the study area
Soils and Geology	Grey sand
Land Form	Sandy flats
Priority Ecological Community	No
Conservation Significant Flora	Two spot locations for <i>Acacia semitrullata</i> (P4) were recorded within this vegetation type, noting the larger population occurred in the neighbouring association immediately to the south
Introduced (Weed) Species	* <i>Aira caryophylla</i> , * <i>Briza maxima</i> , * <i>Hypochaeris glabra</i> , * <i>Pentameris airoides</i> , <i>Ursinia anthemoides</i>
Vegetation Condition	Good to Excellent
Disturbances	Frequent fire, historical mine exploration, access tracks and haul road nearby, ground disturbance, logging
Average Fire Age	Recent (0-2 years) and Old (6+ years)

Code DF DbHa Mp Ao
 Broad Floristic Formation *Dasyopogon* Dwarf Scrub D
 Vegetation Type Dwarf Scrub D of *Dasyopogon bromeliifolius* and *Hypocalymma angustifolium* with Open Low Woodland A of *Melaleuca preissiana* and Open Dwarf Scrub C of *Adenanthos obovatus* (*Kunzea recurva*) on grey loamy sand on open drainage flats



Quadrats Sampled	PC05, PC07, PC17
Area	35.76 ha or 9.23% of the study area
Soils and Geology	Grey loamy sand
Land Form	Open drainage flats
Priority Ecological Community	No
Conservation Significant Flora	None
Introduced (Weed) Species	* <i>Aira caryophylla</i> , * <i>Aira praecox</i> , * <i>Briza minor</i> , * <i>Disa bracteata</i> , * <i>Hypochaeris glabra</i> , * <i>Parentucellia latifolia</i> , * <i>Pentameris airoides</i> , <i>Ursinia anthemoides</i> , * <i>Vulpia bromoides</i>
Vegetation Condition	Very Good
Disturbances	Access tracks, heavy grazing by kangaroos, frequent fire
Average Fire Age	Recent (0-2 years)

Code WE Mp Ha Pa
 Broad Floristic Formation *Melaleuca* Forest
 Vegetation Type Forest of *Melaleuca preissiana* over Low Heath D of *Hypocalymma angustifolium* over Open Tall Sedges of *Tremula tremulina* on grey clay on wetland



Quadrats Sampled	PC19, PC27, PC28, PC35
Area	17.82 ha or 4.60% of the study area
Soils and Geology	Grey light to heavy clay / loamy sand
Land Form	Wetland / drainage flats
Priority Ecological Community	No
Conservation Significant Flora	Supports two range extension taxa, <i>Aotus procumbens</i> and <i>Acacia trigonophylla</i>
Introduced (Weed) Species	* <i>Aira caryophylla</i> , * <i>Conyza bonariensis</i> , * <i>Disa bracteata</i> , * <i>Hypochaeris glabra</i> , * <i>Pentameris aeroides</i> , * <i>Pinus radiata</i> , * <i>Pseudognaphalium luteoalbum</i> , * <i>Ursinia anthemoides</i> , * <i>Vulpia bromoides</i>
Vegetation Condition	Very Good - Good
Disturbances	Pigs, mine rehabilitation nearby, heavy grazing by kangaroos, access tracks
Average Fire Age	Old (6+ years)

Code WE Ha PaCa MpEr
 Broad Floristic Formation *Hypocalymma* Dwarf Scrub D
 Vegetation Type Dwarf Scrub D of *Hypocalymma angustifolium* over Open Tall Sedges of *Tremula tremulina* and *Cyathochaeta avenacea* with Open Low Woodland A of *Melaleuca preissiana* and *Eucalyptus rudis* subsp. *rudis*, Open Scrub of *Taxandria linearifolia* and *Hakea varia*, and Open Low Scrub B of *Astartea scoparia*, *Taxandria linearifolia* and *Melaleuca incana* subsp. *incana* on grey clay / clayey sand on wetland



Quadrats Sampled	PC01, PC09, PC29
Area	4.06 ha or 1.05% of the study area
Soils and Geology	Grey clay / clayey sand
Land Form	Wetland
Priority Ecological Community	No
Conservation Significant Flora	None
Introduced (Weed) Species	* <i>Aira caryophylla</i> , * <i>Briza maxima</i> , * <i>Briza minima</i> , * <i>Lysimachia arvensis</i> , * <i>Pentameris aeroides</i> , * <i>Pinus radiata</i> , * <i>Sonchus oleraceus</i> , * <i>Ursinia anthemoides</i> , * <i>Vulpia bromoides</i>
Vegetation Condition	Very Good to Excellent
Disturbances	Frequent fire, access tracks
Average Fire Age	Recent (0-2 years) and Old (6+ years)

Code WE Pa PeAoHa Mp
 Broad Floristic Formation *Tremula* Tall Sedges
 Vegetation Type Tall Sedges of *Tremula tremulina* with Dwarf Scrub C/D of *Pericalymma ellipticum*, *Adenanthos obovatus* and *Hypocalymma angustifolium*, Open Low Woodland A/B of *Melaleuca preissiana*, and Open Scrub of *Xanthorrhoea preissii*, *Kunzea glabrescens* and *Kunzea recurva* on grey clayey sand on wetland



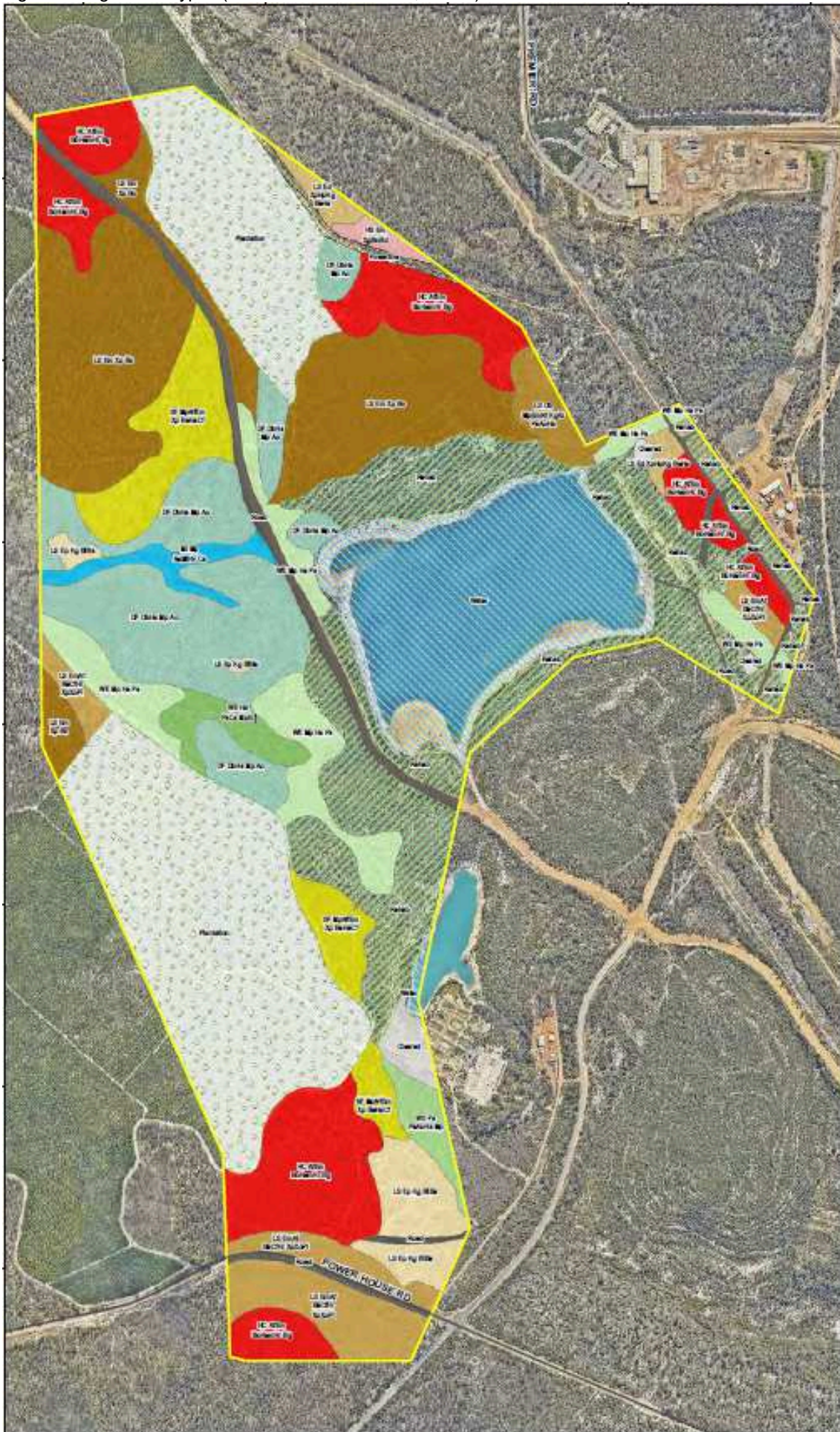
Quadrats Sampled	PC21, PC23
Area	2.92 ha or 0.75% of the study area
Soils and Geology	Grey clayey sand
Land Form	Wetland, flats
Priority Ecological Community	No
Conservation Significant Flora	One spot location for <i>Acacia semitrullata</i> (P4) was recorded within this vegetation type, noting the larger population occurred in the neighbouring association immediately to the west.
Introduced (Weed) Species	* <i>Disa bracteata</i> , * <i>Pinus radiata</i>
Vegetation Condition	Very Good to Excellent
Disturbances	Historical mine exploration, access tracks, logging
Average Fire Age	Old (6+ years)

Code MI Mp AsMiHv Ca
 Broad Floristic Formation *Melaleuca* Low Woodland A
 Vegetation Type Low Woodland A of *Melaleuca preissiana* over Low Scrub B of *Astartea scoparia*, *Melaleuca incana* subsp. *incana* and *Hakea varia* over Very Open Low Sedges of *Cyathochaeta avenacea* on cream / grey silty clay loam narrowly incised minor drainage lines



Quadrats Sampled	PC03, PC11
Area	3.51 ha or 0.91% of the study area
Soils and Geology	Grey silty clay loam / loamy sand
Land Form	Minor drainage lines
Priority Ecological Community	No
Conservation Significant Flora	None
Introduced (Weed) Species	* <i>Aira caryophylla</i> , * <i>Disa bracteata</i> , * <i>Hypochaeris glabra</i> , * <i>Pentameris aeroides</i> , * <i>Ursinia anthemoides</i> , * <i>Vellereophyton dealbatum</i> , * <i>Vulpia bromoides</i>
Vegetation Condition	Very Good to Excellent
Disturbances	Frequent fire, access tracks, heavy grazing by kangaroos
Average Fire Age	Recent (0 to 2 yr)

Figure 1. Vegetation Types (Onshore Environmental, 2022a)



Legend

 Study Area

Vegetation Types

Hillcrest

 HC AfEm BoHamHr Bg

Forest of *Allocasuarina fraseriana* and *Eucalyptus marginata* subsp. *marginata* over Dwarf Scrub D of *Bossiaea ornata*, *Hibbertia amplexicaulis* and *Hibbertia vaginata*, with Open Low Woodland B of *Allocasuarina fraseriana*, *Eucalyptus marginata* subsp. *marginata* and *Banksia grandis* on grey sand on hill crests and upper hill slopes

Hill Slope

 HS Em XgBoBd

Forest of *Eucalyptus marginata* subsp. *marginata* Dwarf Scrub D of *Xanthorrhoea gracilis*, *Bossiaea ornata* and *Banksia dallanayi* (*Trymalium ledifolium*) on grey sand on upper hill slopes


Lower Slopes

 LS Ep Kg BiBa

Heath B of *Eremaea pauciflora* with Scrub of *Kunzea glabrescens* and Open Low Woodland A of *Banksia ilicifolia* and *Banksia attenuata* on grey deep sand on sandy lower slopes

 LS EwEd XpHpKg BeHa


Woodland of *Eucalyptus wandoo* (\pm Tree Mallee of *Eucalyptus decipiens* subsp. *decipiens*) over Open Low Scrub A of *Xanthorrhoea preissii*, *Hakea prostrata* and *Kunzea glabrescens* (*Acacia saligna*) over Open Dwarf Scrub D of *Bossiaea eriocarpa* and *Hypocalymma angustifolium* on brown sand on lower slopes

 LS Em BeCfHr XpXoPl

Forest of *Eucalyptus marginata* subsp. *marginata* (*Allocasuarina fraseriana*) over Low Heath D of *Bossiaea eriocarpa*, *Calytrix flavescens* and *Hibbertia vaginata*, with Open Scrub of *Xanthorrhoea preissii*, *Xylomelum occidentale* and *Persoonia longifolia* on grey sand on lower slopes

 LS Db MpEmNf KgKr PeAoHa

Low Heath D of *Dasyopogon bromeliifolius* with Open Low Woodland A of *Melaleuca preissiana*, *Eucalyptus marginata* subsp. *marginata* and *Nuytsia floribunda*, Open Scrub of *Kunzea glabrescens* and *Kunzea recurva*, and Open Dwarf Scrub C of *Pericalymma ellipticum* var. *ellipticum*, *Adenanthos obovatus* and *Hypocalymma angustifolium* on grey sand on lower slopes

 LS Em Xp Bo

Forest of *Eucalyptus marginata* subsp. *marginata* (+/- *Allocasuarina fraseriana*) over Low Scrub A of *Xanthorrhoea preissii* over Dwarf Scrub D of *Bossiaea ornata* (mid slopes) or *Bossiaea eriocarpa* (lower slopes) on brown loamy sand on mid and lower hill slopes

Sandy Flats


 SF MpNfEm Xp BeHaCf

Low Woodland A of *Melaleuca preissiana*, *Nuytsia floribunda* and *Eucalyptus marginata* subsp. *marginata* over Open Scrub of *Xanthorrhoea preissii* over Open Dwarf Scrub C of *Bossiaea eriocarpa*, *Hypocalymma angustifolium*, *Allocasuarina humilis* and *Calytrix flavescens* over Open Dwarf Scrub D of *Dasyopogon bromeliifolius* on grey sand on sandy flats

Wetlands

 WE Mp Ha Pa

Forest of *Melaleuca preissiana* over Low Heath D of *Hypocalymma angustifolium* over Open Tall Sedges of *Tremula tremulina* on grey clay on wetland

 WE Pa PeAoHa Mp

Tall Sedges of *Tremula tremulina* with Dwarf Scrub C/D of *Pericalymma ellipticum*, *Adenanthos obovatus* and *Hypocalymma angustifolium*, Open Low Woodland A/B of *Melaleuca preissiana*, and Open Scrub of *Xanthorrhoea preissii*, *Kunzea glabrescens* and *Kunzea recurva* on grey clayey sand on wetland

 WE Ha PaCa MpEr

Dwarf Scrub D of *Hypocalymma angustifolium* over Open Tall Sedges of *Tremula tremulina* and *Cyathochaeta avenacea* with Open Low Woodland A of *Melaleuca preissiana* and *Eucalyptus rudis* subsp. *rudis*, Open Scrub of *Taxandria linearifolia* and *Hakea varia*, and Open Low Scrub B of *Astartea scoparia*, *Taxandria linearifolia* and *Melaleuca incana* subsp. *incana* on grey clay / clayey sand on wetland

Minor Drainage Line

 Ml Mp AsMiHv Ca

Low Woodland A of *Melaleuca preissiana* over Low Scrub B of *Astartea scoparia*, *Melaleuca incana* subsp. *incana* and *Hakea varia* over Very Open Low Sedges of *Cyathochaeta avenacea* on cream / grey silty clay loam narrowly incised minor drainage lines

Drainage Flats

 DF DbHa Mp Ao

Dwarf Scrub D of *Dasyopogon bromeliifolius* and *Hypocalymma angustifolium* with Open Low Woodland A of *Melaleuca preissiana* and Open Dwarf Scrub C of *Adenanthos obovatus* (*Kunzea recurva*) on grey loamy sand on open drainage flats


Other

 Water

 Plantation

 Powerline

 Rehab

 Cleared

 Road

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)
- Bush Forever (Regional Scheme) (DPLH-022)
- Contours (DPIRD-073)
- Clearing Regulations – Schedule One Areas (DWER-057)
- DBCA – Lands of Interest (DBCA-012)
- DBCA Legislated Lands and Waters (DBCA-011)
- Environmentally Sensitive Areas (DWER-046)
- Flood Risk (DPIRD-007)
- Groundwater Salinity Statewide (DWER-026)
- Hydrographic Catchments – Catchments (DWER-028)
- Hydrography – Inland Waters – Waterlines
- Hydrography, Linear (DWER-031)
- Hydrological Zones of Western Australia (DPIRD-069)

- IBRA Vegetation Statistics
- Native Title (ILUA) (LGATE-067)
- Offsets Register – Offsets (DWER-078)
- Pre-European Vegetation Statistics
- 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 (DPIRD-027)
- Soil Landscape Mapping – Rangelands (DPIRD-064)
- WA Now Aerial Imagery

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- Black Cockatoo BC Roosts
- Black Cockatoo BC Feeding SCP
- Black Cockatoo Feeding JF
- Black Cockatoo Baudins Distribution
- Black Cockatoo Forest Red Tail Distribution
- Black Cockatoo Carnabys Distribution
- Threatened Flora (TPFL)
- Threatened Flora (WAHerb)
- Threatened Fauna
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- Threatened Ecological Communities and Priority Ecological Communities (Buffers)
- Western Ringtail Possum Habitat Suitability (DBCA-049)

G.2. References

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4. Glossary

Acronyms:

BC Act	<i>Biodiversity Conservation Act 2016</i> , Western Australia
BoM	Bureau of Meteorology, Australian Government
DAA	Department of Aboriginal Affairs, Western Australia (now DPLH)
DAFWA	Department of Agriculture and Food, Western Australia (now DPIRD)
DAWE	Department of Agriculture, Water and the Environment, Australian Government
DBCA	Department of Biodiversity, Conservation and Attractions, Western Australia
DER	Department of Environment Regulation, Western Australia (now DWER)
DMIRS	Department of Mines, Industry Regulation and Safety, Western Australia
DMP	Department of Mines and Petroleum, Western Australia (now DMIRS)
DoEE	Department of the Environment and Energy (now DAWE)
DoW	Department of Water, Western Australia (now DWER)
DPaW	Department of Parks and Wildlife, Western Australia (now DBCA)
DPIRD	Department of Primary Industries and Regional Development, Western Australia
DPLH	Department of Planning, Lands and Heritage, Western Australia
DRF	Declared Rare Flora (now known as Threatened Flora)
DWER	Department of Water and Environmental Regulation, Western Australia
EP Act	<i>Environmental Protection Act 1986</i> , Western Australia
EPA	Environmental Protection Authority, Western Australia
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Federal Act)
GIS	Geographical Information System
ha	Hectare (10,000 square metres)
IBRA	Interim Biogeographic Regionalisation for Australia
IUCN	International Union for the Conservation of Nature and Natural Resources – commonly known as the World Conservation Union
PEC	Priority Ecological Community, Western Australia
RIWI Act	<i>Rights in Water and Irrigation Act 1914</i> , Western Australia
TEC	Threatened Ecological Community

Definitions:

{DBCA (2019) Conservation Codes for Western Australian Flora and Fauna. Department of Biodiversity, Conservation and Attractions, Western Australia}:-

T **Threatened species:**

Listed by order of the Minister as Threatened in the category of critically endangered, endangered or vulnerable under section 19(1), or is a rediscovered species to be regarded as threatened species under section 26(2) of the *Biodiversity Conservation Act 2016* (BC Act).

Threatened fauna is that subset of 'Specially Protected Fauna' listed under schedules 1 to 3 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for Threatened Fauna.

Threatened flora is that subset of 'Rare Flora' listed under schedules 1 to 3 of the *Wildlife Conservation (Rare Flora) Notice 2018* for Threatened Flora.

The assessment of the conservation status of these species is based on their national extent and ranked according to their level of threat using IUCN Red List categories and criteria as detailed below.

CR **Critically endangered species**

Threatened species considered to be "*facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines*".

Listed as critically endangered under section 19(1)(a) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines. Published under schedule 1 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for critically endangered fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for critically endangered flora.

EN **Endangered species**

Threatened species considered to be "*facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines*".

Listed as endangered under section 19(1)(b) of the BC Act in accordance with the criteria set out in section 21 and the ministerial guidelines. Published under schedule 2 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for endangered fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for endangered flora.

VU **Vulnerable species**

Threatened species considered to be "*facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines*".

Listed as vulnerable under section 19(1)(c) of the BC Act in accordance with the criteria set out in section 22 and the ministerial guidelines. Published under schedule 3 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for vulnerable fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for vulnerable flora.

Extinct Species:

EX Extinct species

Species where “*there is no reasonable doubt that the last member of the species has died*”, and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act).

Published as presumed extinct under schedule 4 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for extinct fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for extinct flora.

EW Extinct in the wild species

Species that “*is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form*”, and listing is otherwise in accordance with the ministerial guidelines (section 25 of the BC Act).

Currently there are no threatened fauna or threatened flora species listed as extinct in the wild. If listing of a species as extinct in the wild occurs, then a schedule will be added to the applicable notice.

Specially protected species:

Listed by order of the Minister as specially protected under section 13(1) of the BC Act. Meeting one or more of the following categories: species of special conservation interest; migratory species; cetaceans; species subject to international agreement; or species otherwise in need of special protection.

Species that are listed as threatened species (critically endangered, endangered or vulnerable) or extinct species under the BC Act cannot also be listed as Specially Protected species.

MI Migratory species

Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth; and listing is otherwise in accordance with the ministerial guidelines (section 15 of the BC Act).

Includes birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and fauna subject to the *Convention on the Conservation of Migratory Species of Wild Animals* (Bonn Convention), an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subset of the migratory animals, that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species.

Published as migratory birds protected under an international agreement under schedule 5 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

CD Species of special conservation interest (conservation dependent fauna)

Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened, and listing is otherwise in accordance with the ministerial guidelines (section 14 of the BC Act).

Published as conservation dependent fauna under schedule 6 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

OS Other specially protected species

Fauna otherwise in need of special protection to ensure their conservation, and listing is otherwise in accordance with the ministerial guidelines (section 18 of the BC Act).

Published as other specially protected fauna under schedule 7 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

P Priority species:

Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened fauna or flora.

Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring.

Assessment of Priority codes is based on the Western Australian distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations.

P1 Priority One - Poorly-known species

Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.

P2 Priority Two - Poorly-known species

Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.

P3 Priority Three - Poorly-known species

Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.

P4 Priority Four - Rare, Near Threatened and other species in need of monitoring

(a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands.

(b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent.

(c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

Principles for clearing native vegetation:

- (a) Native vegetation should not be cleared if it comprises a high level of biological diversity.
- (b) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna.
- (c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora.
- (d) 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.
- (e) Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.
- (f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.
- (g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.
- (h) Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.
- (i) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.
- (j) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.