GOVERNMENT OF
WESTERN AUSTRALIA

CLEARING PERMIT

Granted under section 51E of the Environmental Protection Act 1986

Purpose Permit number:	CPS 9328/1
Permit Holder:	Mardie Minerals Pty Ltd
Duration of Permit:	From 4 November 2021 to 4 November 2028

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

PART I – CLEARING AUTHORISED

1. Clearing authorised (purpose)

The permit holder is authorised to clear *native vegetation* for the purposes of geotechnical investigations, mesquite management and rehabilitation trials, construction of access tracks, and associated activities.

2. Land on which clearing is to be done

Lot 1501 on Deposited Plan 74341 (Pastoral Lease N050076), Karratha
Lot 319 on Deposited Plan 63521 (Crown Reserve 9701), Karratha
Lot 4999 on Deposited Plan 403120 (Pastoral Lease N050076), Karratha
Unallocated Crown Land (PIN 1380154), Karratha
Unallocated Crown Land (PIN 11926376), Karratha
Unnamed Dedicated Road (PIN 11733284), Karratha

3. Clearing authorised

The permit holder must not clear more than 10 hectares of *native vegetation* within the area cross-hatched yellow in Figure 1 of Schedule 1.

4. Period during which clearing is authorised

The permit holder must not clear any *native vegetation* after 4 November 2026.

PART II – MANAGEMENT CONDITIONS

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

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

preference:

(a) avoid the clearing of *native vegetation*;

(b) minimise the amount of *native vegetation* to be cleared; and

(c) reduce the impact of clearing on any environmental value.

6. Weed management

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

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

(b) ensure that no known weed-affected soil, *mulch*, *fill*, or other material is brought into the area to be cleared; and

(c) restrict the movement of machines and other vehicles to the limits of the areas to be cleared.

7. Directional clearing

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

8. Flora management

(a) Prior to undertaking any clearing authorised under this permit within the area cross-hatched yellow in Figure 1 of Schedule 1, the permit holder must engage a *botanist* to conduct a *targeted flora survey* of the permit area to identify possible occurrences of t*hreatened flora* listed under the *Biodiversity Conservation Act 2016* and *priority flora*.

(b) Where *threatened flora* or *priority flora* are identified in relation to condition 8(a) of this permit, the permit holder shall ensure that:

  (i) no clearing occurs within 50 metres of identified *threatened flora* or priority 1 flora, unless approved by the *CEO* in writing;

  (ii) no clearing of identified *threatened flora* occurs unless approved under section 40 of the *Biodiversity Conservation Act 2016*;

  (iii) no clearing occurs within 20 metres of identified priority 2, 3 and 4 flora, unless approved by the *CEO* in writing; and

  (iv) no clearing of identified *priority flora* occurs unless approved by the *CEO* in writing.

(c) Prior to undertaking any clearing authorised under this permit within the area cross-hatched yellow in Figure 1 of Schedule 1, the permit holder must provide the results of the *targeted flora survey* in a report to the *CEO*.

(d) If any *threatened flora* or *priority flora* are identified within the area cross-hatched yellow in Figure 1 of Schedule 1, the *targeted flora survey* report must include the following:

  (i) the location of each *threatened flora* and *priority flora*, identified under condition 8(a), either as the location of individual plants, or where this is not practical, the areal extent of the population and an estimate of the number of plants, recorded using a Global Positioning System (GPS)

unit set to Geocentric Datum Australia 1994 (GDA94), expressing the geographical coordinates in Eastings and Northings or decimal degrees;

(ii) the species name of each *threatened flora* and *priority flora* species identified under condition 8(a); and

(iii) the methodology used to survey the permit area.

9. Fauna management

(a) Prior to undertaking any clearing authorised under this permit within the area cross-hatched yellow on Figure 1 of Schedule 1, the permit holder must engage a *fauna specialist* to conduct a *fauna survey* of the permit area to identify *critical habitat* being utilised by fauna listed in the *Wildlife Conservation (Specially Protected Fauna) Notice* and *priority fauna*.

(b) Prior to undertaking any clearing authorised under this permit within the area cross-hatched yellow on Figure 1 of Schedule 1, the permit holder must provide the results of the *fauna survey* in a report to the *CEO*.

(c) The *fauna survey* report must include the following:

(i) the location of the *critical habitat* recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994 (GDA94), expressing the geographical coordinates in Eastings and Northings or decimal degrees;

(ii) the location of any fauna species, recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994 (GDA94), expressing the geographical coordinates in Eastings and Northings or decimal degrees;

(iii) the species name of each fauna species identified;

(iv) the methodology used to survey the permit area and to establish the *critical habitat*;

(v) the extent of the *critical habitat* of the identified *threatened* or *priority fauna* shown on a map; and

(vi) a description of the *critical habitat* of *threatened* or *priority fauna* found.

(d) Where fauna are identified under condition 9(a) of this permit, the permit holder must ensure that:

(i) No clearing of *critical habitat* of the identified fauna occurs, unless first approved by the *CEO*; and

(ii) No taking of the identified *threatened fauna* occurs, unless approved under section 40 of the *Biodiversity Conservation Act 2016*.

(iii) No taking of the identified *priority fauna* occurs, unless first approved by the *CEO*.

10. Vegetation management - watercourses

The permit holder must not clear *riparian vegetation* within 30 metres of non-perennial tributary *watercourses* of the Fortescue River System that intersect the area cross-hatched yellow on Figure 1 of Schedule 1.

11. Revegetation and rehabilitation (temporary works)

The permit holder must *revegetate* and *rehabilitate* areas cleared for *temporary works* within the area cross-hatched yellow on Figure 1 of Schedule 1, by laying stockpiled clean vegetative material and topsoil on the cleared area(s) within six months of the area

no longer being required for the purpose for which it was cleared, unless the *CEO*, in writing, advises the permit holder to the contrary.

PART III - RECORD KEEPING AND REPORTING

12. Records that must be kept

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

Table 1: Records that must be kept

No.	Relevant matter	Specifications
1.	In relation to the authorised clearing activities generally	(a) the species composition, structure, and density of the cleared area; (b) the location where the clearing occurred, recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994 (GDA94), expressing the geographical coordinates in Eastings and Northings; (c) the date that the area was cleared; (d) the size of the area cleared (in hectares); (e) actions taken to avoid, minimise, and reduce the impacts and extent of clearing in accordance with condition 5; (f) actions taken to minimise the risk of the introduction and spread of weeds in accordance with condition 6; (g) actions taken to undertake directional clearing in accordance with condition 7; and (h) actions taken to avoid *riparian vegetation* in accordance with condition 10.
2.	In relation to flora management pursuant to condition 8	(a) the name and location of each *threatened flora* and/or *priority flora* species, recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994 (GDA94), expressing the geographical coordinates in Eastings and Northings; (b) actions taken to demarcate each *threatened flora* and/or *priority flora* species recorded and their relevant *buffers*; and (c) actions taken to avoid the clearing of *threatened flora* and/or *priority flora* species and their relevant *buffers*.
3.	In relation to fauna	(a) the name and location of each

No.	Relevant matter	Specifications
	management pursuant to condition 9	*threatened* or *priority* fauna species identified, recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994 (GDA94), expressing the geographical coordinates in Eastings and Northings; and (b) actions taken to avoid the clearing of *critical habitat* of the identified fauna.
4.	In relation to the *revegetation* and *rehabilitation* of areas pursuant to condition 11 of this Permit	(a) the size of the area *revegetated* and *rehabilitated*; (b) the date(s) on which the *revegetation* and *rehabilitation* was undertaken; and (c) the boundaries of the area *revegetated* and *rehabilitated* (recorded digitally as a shapefile).

13. Reporting

(a) The permit holder must provide to the *CEO*, on or before 30 June of each calendar year, a written report containing:

(i) The records required to be kept under condition 12; and

(ii) Records of activities done by the permit holder under this permit between 1 January and 31 December of the preceding calendar year.

(b) If no clearing authorised under this permit has been undertaken, a written report confirming that no clearing under this permit has been undertaken, must be provided to the *CEO* on or before 30 June of each calendar year.

(c) The permit holder must provide to the *CEO*, no later than 90 calendar days prior to the expiry date of the permit, a written report of records required under condition 12, where these records have not already been provided under condition 13(a).

DEFINITIONS

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

Table 2: Definitions

Term	Definition
botanist	means a person who holds a tertiary qualification specialising in environmental science or equivalent, and has a minimum of two (2) years' work experience in Western Australian flora identification and undertaking surveys of flora native to the bioregion being inspected or surveyed, or who is approved by the *CEO* as a suitable botanist for the bioregion, and who holds a valid flora licence issued under the *Biodiversity Conservation Act 2016*.
buffer/s	means 50 metres for *threatened flora*, and 20 metres for *priority flora*.
CEO	Chief Executive Officer of the department responsible for the administration of the clearing provisions under the *Environmental*

Term	Definition
	Protection Act 1986.
clearing	has the meaning given under section 3(1) of the EP Act.
condition	a condition to which this clearing permit is subject under section 51H of the EP Act.
critical habitat	means any part of the permit area comprising of the habitat of flora or fauna species and its population, that is critical for the health and long term survival of the flora or fauna species and its population;
department	means the department established under section 35 of the *Public Sector Management Act 1994* (WA) and designated as responsible for the administration of the EP Act, which includes Part V Division 3.
direct seeding	means a method of re-establishing vegetation through the establishment of a seed bed and the introduction of seeds of the desired plant species.
EP Act	*Environmental Protection Act 1986* (WA)
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 *Biodiversity Conservation Act 2016*.
fauna survey	means a field-based investigation, including a review of established literature, of the biodiversity of fauna and/or fauna habitat of the permit area and where conservation significant fauna are identified in the permit area, also includes a fauna survey of surrounding areas to place the permit area into local context.
fill	means material used to increase the ground level, or to fill a depression.
local provenance	means native vegetation seeds and propagating material from natural sources within 50 kilometres and the same IBRA subregion of the area cleared.
mulch	means the use of organic matter, wood chips or rocks to slow the movement of water across the soil surface and to reduce evaporation.
native vegetation	has the meaning given under section 3(1) and section 51A of the EP Act.
planting	means the re-establishment of vegetation by creating favourable soil conditions and planting seedlings of the desired species.
priority fauna	means those fauna taxa describes as priority fauna, classes 1, 2, 3, 4 or 5 in the *Department of Biodiversity, Conservation and Attractions Threatened and Priority Fauna List for Western Australia* (as amended);
priority flora	means those plant taxa described as priority flora classes 1, 2, 3, or 4 in the *Department of Biodiversity, Conservation and Attractions Threatened and Priority Flora List for Western Australia* (as amended).
regenerate/ed/ion	means revegetation that can be established from in situ seed banks contained either within the topsoil or seed-bearing mulch.
rehabilitate/ed/ion	means actively managing an area containing native vegetation in order to improve the ecological function of that area.
revegetate/ed/ion	means the re-establishment of a cover of *local provenance* native vegetation in an area using methods such as natural *regeneration*, *direct seeding* and/or *planting*, so that the species composition, structure and density is similar to pre-clearing vegetation types in that area.

Term	Definition
riparian vegetation	has the meaning given to it in Regulation 3 of the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*.
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 must also include a minimum of a 10 metre radius of the surrounding areas to place the permit area into local context.
temporary works	means access tracks, spoil areas, side tracks, site offices, storage areas, laydown areas, extraction sites, camps, project surveys, pre-construction activities, and similar works associated with a project activity that are temporary in nature.
threatened flora	means those plant taxa listed as threatened flora under the *Biodiversity Conservation Act 2016.*
threatened fauna	means those fauna species listed as threatened fauna under the *Biodiversity Conservation Act 2016.*
watercourse/s	has the meaning given to it in section 3 of the *Rights in Water and Irrigation Act 1914*.
weeds	means any plant – (a) that is a declared pest under section 22 of the *Biosecurity and Agriculture Management Act 2007*; or (b) published in a Department of Biodiversity, Conservation and Attractions species-led ecological impact and invasiveness ranking summary, regardless of ranking; or (c) not indigenous to the area concerned.
Wildlife Conservation (Specially Protected Fauna) Notice 2018	means those fauna taxa gazetted as *threatened fauna* pursuant to section 19(1) of the *Biodiversity Conservation Act 2016*.

END OF CONDITIONS

Meenu Vitarana
A/MANAGER
NATIVE VEGETATION REGULATION

Officer delegated under Section 20
of the Environmental Protection Act 1986

12 October 2021

Schedule 1

The boundary of the area authorised to be cleared is shown in the map below (Figure 1).

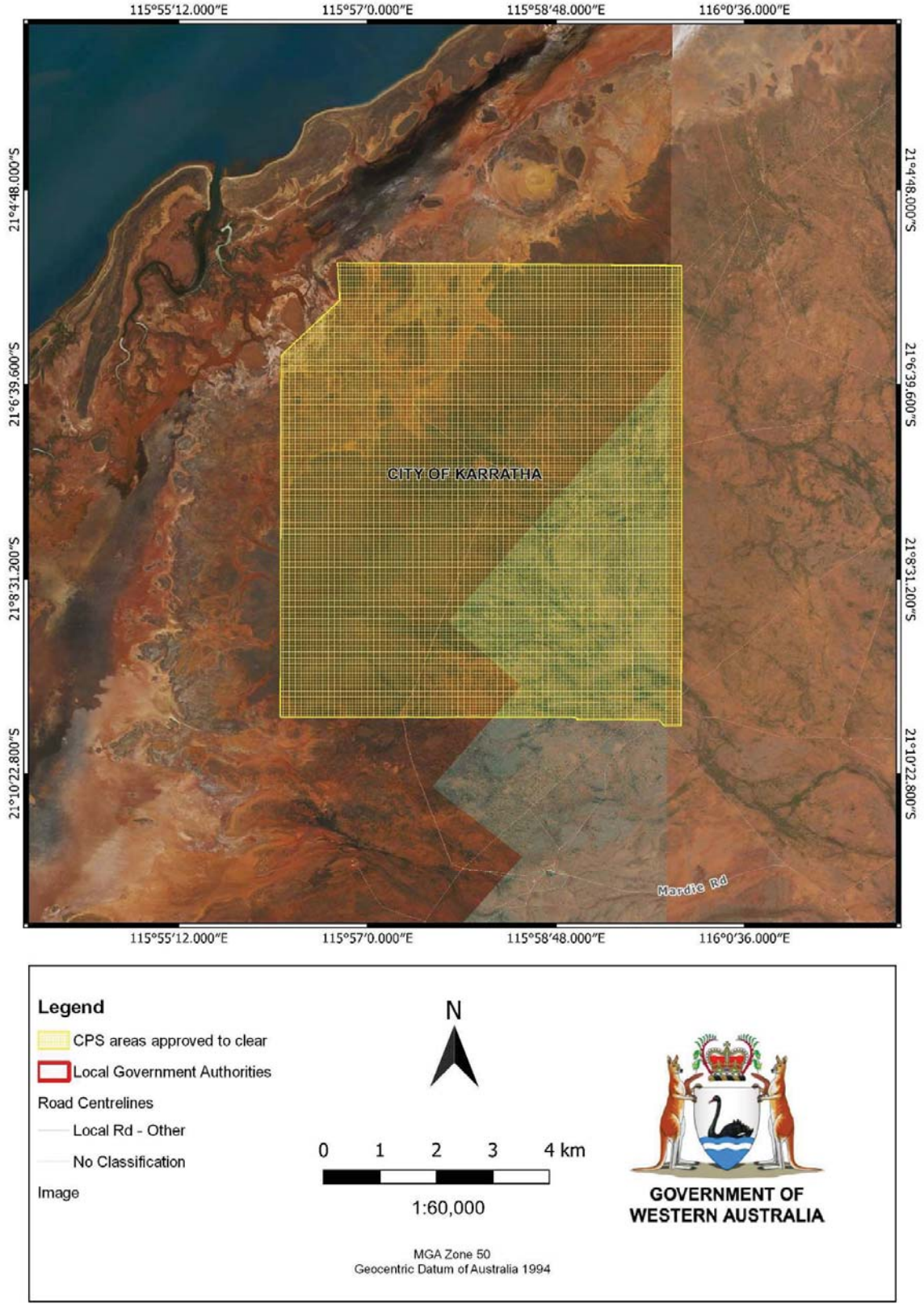

Figure 1: Map of the boundary of the area within which clearing may occur

Government of Western Australia
Department of Water and Environmental Regulation

Clearing Permit Decision Report

1 Application details and outcome

1.1. Permit application details

Permit number:	CPS 9328/1
Permit type:	Purpose permit
Applicant name:	Mardie Minerals Pty Ltd
Application received:	16 June 2021
Application area:	10 hectares of native vegetation
Purpose of clearing:	Geotechnical investigations
Method of clearing:	Mechanical
Property:	Lot 1501 on Deposited Plan 74341 (Pastoral Lease N050076) Lot 319 on Deposited Plan 63521 (Crown Reserve 9701) Lot 4999 on Deposited Plan 403120 (Pastoral Lease N050076) Unallocated Crown Land (PINs 1380154 and 11926376) Unnamed Dedicated Road (PIN 11733284)
Location (LGA area/s):	City of Karratha
Localities (suburb/s):	Karratha

1.2. Description of clearing activities

The vegetation proposed to be cleared is contained within a single contiguous area of remnant native vegetation (see Figure 1, Section 1.5). The application is to selectively clear 10 hectares of native vegetation within a total footprint of 5,189 hectares to facilitate geotechnical investigations, associated access tracks, mesquite (*Prosopis* spp.) management and rehabilitation trials, that are required to inform the potential expansion of the adjacent greenfields high quality solar salt and sulphate of potash (SOP) production project and associated export facility at Mardie (the Mardie Project).

1.3. Decision on application

Decision:	Granted
Decision date:	12 October 2021
Decision area:	10 hectares of native vegetation, as depicted in Section 1.5, below.

1.4. Reasons for decision

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

In making this decision, the Delegated Officer had regard for the site characteristics (see Appendix A), relevant datasets (see Appendix E.1), the clearing principles set out in Schedule 5 of the EP Act (see Appendix B), relevant planning instruments and any other matters considered relevant to the assessment (see Section 3). The Delegated

Officer also took into consideration that the purpose of the proposed clearing is for temporary works relating to geotechnical investigations, access tracks, mesquite management and rehabilitation trials, and that all areas cleared for temporary works will be revegetated and rehabilitated after clearing.

The assessment identified that the proposed clearing has the potential to facilitate the spread of weeds into adjacent vegetation and will result in the loss of vegetation that may provide significant habitat for conservation significant flora and fauna species. However, after consideration of the available information, as well as the applicant's minimisation and mitigation measures (see Section 3.1), the Delegated Officer determined that the proposed clearing is unlikely to have long-term adverse impacts on biological, conservation, or land and water resource values, given the temporary nature of the clearing and the extent of the proposed clearing in the context of available habitat within the greater application area and the local area. The Delegated Officer determined that the impacts of the proposed clearing can be minimised and managed to be unlikely to lead to an unacceptable risk to environmental values through the implementation of flora management, fauna management, vegetation management and revegetation conditions.

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

- avoid, minimise to reduce the impacts and extent of clearing,
- take hygiene steps to minimise the risk of the introduction and spread of weeds,
- undertake slow, progressive one-directional clearing to allow terrestrial fauna to move into adjacent habitat ahead of the clearing activity,
- engage a botanist to undertake a pre-clearing flora survey and avoid any individual threatened or priority flora identified and their relevant buffers,
- engage a fauna specialist to undertake a pre-clearing fauna survey and avoid any critical habitat identified,
- ensure no clearing of native vegetation occurs within 30 metres of any non-perennial tributary of the Fortescue River System, and
- revegetate and rehabilitate areas cleared for temporary works by laying stockpiled vegetative material and topsoil on the cleared areas.

1.5. Site map

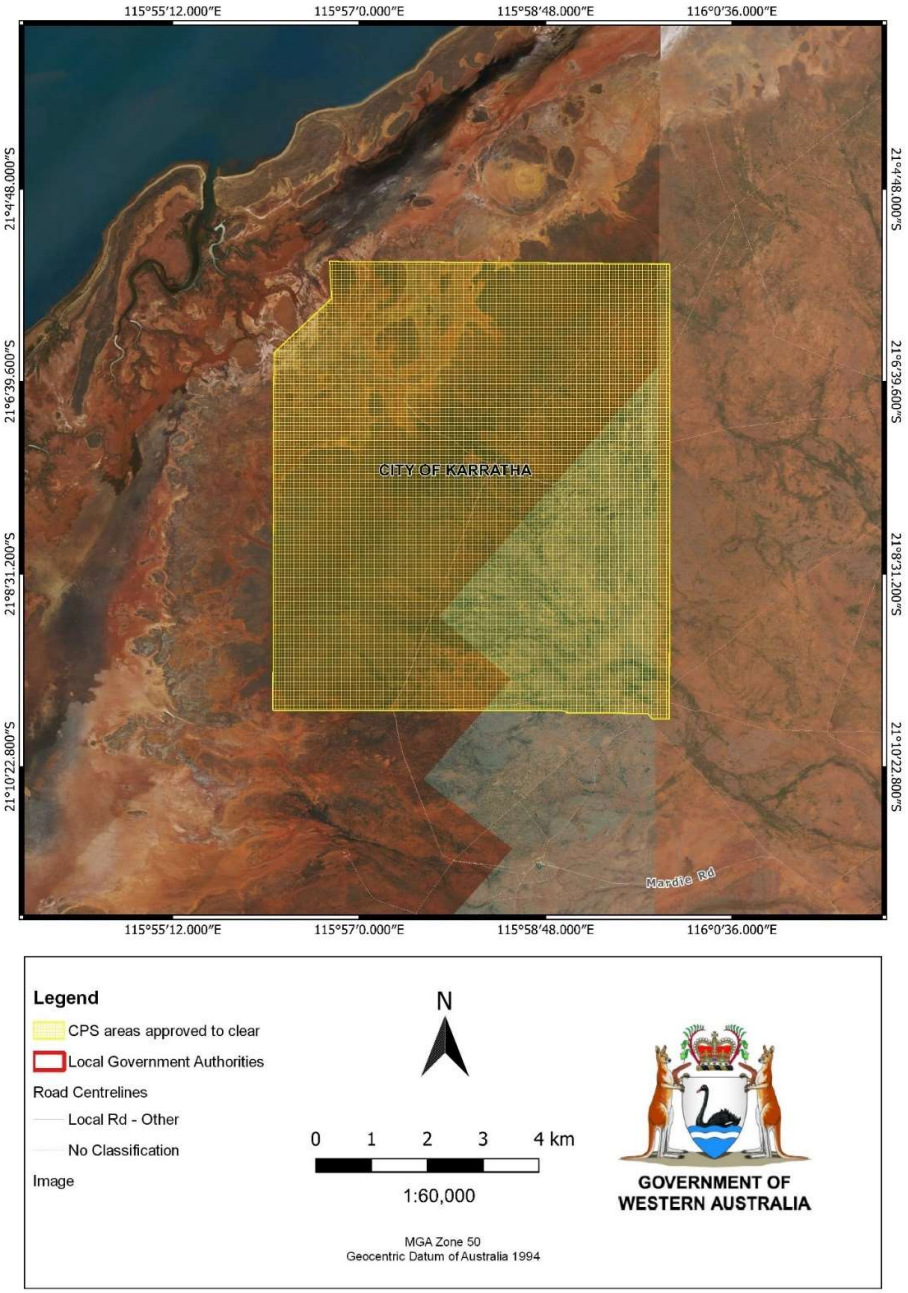

Figure 1 The area crosshatched yellow indicates the area authorised to be cleared under the granted clearing permit.

2 Legislative context

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

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

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

Other legislation of relevance for this assessment include:

- *Biodiversity Conservation Act 2016* (WA) (BC Act)
- *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act)
- *Land Administration Act 1997* (WA)
- *Rights in Water and Irrigation Act 1914* (WA) (RIWI 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)

3 Detailed assessment of application

3.1. Avoidance and mitigation measures

Supporting documentation was submitted by the applicant, demonstrating that the 10-hectare estimate represents the worst-case scenario for clearing, in which all identified disturbance areas will contain native vegetation and require clearing for geotechnical investigations (BCI Minerals Limited, 2021b). The applicant indicated that some of the proposed disturbance is likely to occur on mud flats or within areas of less than 20 per cent native vegetation cover, such as within mesquite-infested areas, that may not require the removal of native vegetation (BCI Minerals Limited, 2021b). The applicant also advised that native vegetation will only be cleared where necessary and, where possible, areas of cleared land or degraded vegetation will also be targeted for drill locations, test pits and access tracks, to limit impacts to native vegetation (BCI Minerals Limited, 2021b).

However, the applicant advised that clearing may not be able to be avoided in some instances during investigation activities including geotechnical investigations, mesquite management and rehabilitation trials, and construction or re-establishment of access tracks to enable access to the investigation areas (BCI Minerals Limited, 2021b). The applicant advised that the geotechnical activities that may require clearing of native vegetation include drilling of bore holes and the excavation of tests pits, as these activities require a cleared laydown area immediately adjacent to the excavated hole to facilitate the manoeuvring of machinery, stockpiling of topsoil, and temporary storage of cuttings and equipment (BCI Minerals Limited, 2021b). Although existing access tracks will be utilised or re-established where possible, the applicant has also advised that some clearing of native vegetation may be undertaken to provide access to the investigation areas and mesquite management/rehabilitation sites (BCI Minerals Limited, 2021b). Where clearing of native vegetation cannot be avoided during the construction of access tracks, bore holes and test pits, the applicant has advised that low disturbance clearing techniques will be implemented, including track rolling, drilling and topsoil stockpiling, to ensure the impacts resulting from investigation activities are minimised (BCI Minerals Limited, 2021b). The applicant has also advised that the clearing proposed is temporary and that all areas cleared under the permit will be revegetated and rehabilitated once they are no longer in use for geotechnical investigations and access tracks (BCI Minerals Limited, 2021b).

In regard to mesquite management, mesquite is a Weed of National Significance and Declared Pest under the *Biosecurity and Agriculture Management Act 2007*. The supporting documentation submitted by the applicant indicates that mesquite is widespread across the investigation area and now covers approximately 150,000 hectares at Mardie Station (BCI Minerals Limited, 2021b). The applicant has advised that the Pilbara Mesquite Management Committee (PMMC) acknowledges that the eradication of mesquite from Mardie Station is unachievable due to the degree of infestation and has instead prioritised preventing the spread of the pest into neighbouring areas (BCI Minerals Limited, 2021b). The applicant has advised that mesquite management at Mardie Station will involve the clearing of areas of vegetation that are heavily infested with mesquite (70-90 per cent coverage), through use of a specialised plough that removes the upper 30 centimetres of the soil profile and all vegetation (BCI Minerals Limited, 2021b). The applicant proposes to undertake further trials of the specialised plough in heavily infested areas to refine the process of mesquite removal and inform the potential for site rehabilitation following mesquite removal (BCI Minerals Limited, 2021b). To facilitate these trials, the applicant has advised that clearing of mesquite-infested vegetation will occur within a 100m^2 area, which will be rehabilitated and monitored for success following clearing (BCI Minerals Limited, 2021b).

In considering the above, the Delegated Officer was satisfied that the applicant has made a reasonable effort to avoid and minimise the potential impacts of the proposed clearing on environmental values. The Delegated Officer determined that a revegetation condition will be applied to the permit, requiring the applicant to revegetate and rehabilitate all areas cleared for temporary works, to ensure the applicant's proposed mitigation measures are adhered to.

3.2. Assessment of impacts on environmental values

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

The assessment against the clearing principles (see Appendix B) identified that the impacts of the proposed clearing present a risk to biological values (flora and fauna) and land and water resources. The consideration of these impacts, and the extent to which they can be managed through conditions applied in line with sections 51H and 51I of the EP Act, is set out below.

3.2.1. Biological values (flora) - Clearing Principle (a)

Assessment

A review of available databases indicates that a total of 10 conservation significant flora species have been recorded within the local area (see Appendix A). These species were listed as Priority (P) species by the Department of Biodiversity Conservation and Attractions (DBCA). Based on the habitat preferences of these species, the condition of the vegetation within the application area, and the distribution of existing records, the application area was considered to provide suitable habitat for several priority flora species, with impacts to three species having the potential to be significant based on their current conservation status, the extent of suitable habitat in the local area, and the distribution and extent of existing records:

- *Goodenia nuda* (P4),
- *Goodenia pallida* (P1), and
- *Minuria tridens* (P1).

Goodenia nuda is an erect to ascending herb with yellow flowers that is currently known from 109 Western Australian Herbarium records from Wiluna to Port Hedland and is associated with tussock grassland of *Eriachne* spp., *Triodia* spp., *Eulalia* spp. or *Themeda* spp., in red to brown clay soils (Western Australian Herbarium, 1998-). According to available databases, there is an existing record of *Goodenia nuda* from 2002 that intersects the application area, describing approximately five plants within mesquite scrub adjacent to a management track on Mardie Station. *Goodenia nuda* was also identified during flora and vegetation surveys undertaken in 2019 for the adjacent Mardie Project (Phoenix Environmental Sciences Pty Ltd, 2019a). Given the existing records and the lack of current survey information for the application area, it is considered possible that *Goodenia nuda* occurs within the application area and that the proposed clearing will result in the loss of individuals. While it is acknowledged that *Goodenia nuda* is relatively well-recorded in the Pilbara region and that many of the areas proposed to be cleared are infested with mesquite and may not represent significant habitat long-term, it is noted that *Goodenia nuda* is known from only four records in the local area and that the extent of individuals within the application area is unknown. Given the extent of impacts to *Goodenia nuda* resulting from the proposed clearing is unknown, it is considered possible that the application area includes significant habitat for the species and that the proposed clearing may represent a significant impact to its conservation status.

Goodenia pallida is an erect herb with purple flowers that is currently known from two Western Australian Herbarium records from Karratha and is associated with annual grasslands in Acacia shrubland over red sandy soils (Western Australian Herbarium, 1998-). Given the vicinity of existing records, the lack of current survey information for the application area, and that the application area is likely to include consistent vegetation, it is considered that *Goodenia pallida* may occur within the application area. As *Goodenia pallida* is a poorly recorded Priority 1 species, has typically been identified in small populations of few individuals, and is known from only one record in the local area, the proposed clearing has the potential to represent a significant impact to the species, should individuals be present within the application area.

Minuria tridens is a dwarf virgate shrub with white-blue flowers that is currently known from six Western Australian Herbarium records from Karratha to Cue and is associated with *Triodia epactia* grasslands in coastal sand dunes adjacent to saline mudflats (Western Australian Herbarium, 1998-). *Minuria tridens* was identified during flora and vegetation surveys undertaken in 2019 for the adjacent Mardie Project (Phoenix Environmental Sciences Pty Ltd, 2019a). Given the vicinity of existing records and the lack of current survey information for the application area, it is considered possible that *Minuria tridens* occurs within the coastal dune and mudflat vegetation in the north-west of the application area. As *Minuria tridens* is a Priority 1 species known only from four records in the local area that total approximately 60 mature plants, the proposed clearing may represent a significant impact to the species, if individuals are present within the application area.

Given the above, the proposed clearing may result in the loss of significant habitat for three priority flora species. The applicant has advised that ecological surveys have been undertaken for the application area in 2021, but that the findings of the surveys are yet to be formally reported (BCI Minerals Limited, 2021b). The applicant has

committed to avoiding any areas of significant flora or vegetation identified in these surveys during geotechnical investigations, mesquite management, and the construction of access tracks (BCI Minerals Limited, 2021b). To ensure this mitigation measure is adhered to, a flora management condition will be placed on the permit requiring a botanist to have conducted a targeted flora survey of the areas proposed to be cleared prior to undertaking any clearing authorised under the permit. Where threatened or priority flora species are identified within the permit area during the targeted flora survey, all individuals must be demarcated and no clearing of individuals or their relevant buffers (20 to 50 metres) will be permitted, unless otherwise approved by DWER. Given the implementation of the flora management condition, it is not considered likely that the proposed clearing will result in significant impacts to priority flora species or their habitat.

No species listed as threatened under either the state BC Act or Commonwealth EPBC Act were recorded in the local area. Given the nature of the proposed works, the condition of the vegetation within the application area, the extent of suitable habitat in the local area, and the distribution and extent of existing records, the application area is not considered likely to comprise significant habitat for any threatened flora species. Should any threatened flora be identified within the application area during pre-clearing flora survey, all individuals and their relevant buffers (50 metres) will be avoided under the flora management condition.

Conclusion

Based on the above assessment, the proposed clearing may result in impacts to significant habitat for priority flora species including *Goodenia nuda*, *Goodenia pallida*, and *Minuria tridens*. For the reasons set out above, it is considered that the impacts of the proposed clearing on priority flora can be managed to be environmentally acceptable through permit conditioning that requires pre-clearing flora surveys and the avoidance of any conservation significant flora or vegetation identified. Given the above, the Delegated Officer determined that the proposed clearing does not constitute a significant residual impact to conservation significant flora species.

Conditions

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

- Flora management, requiring pre-clearing flora surveys for the presence of threatened and priority flora species and the avoidance of any individuals identified and their relevant buffers.

3.2.2. Biological values (fauna) - Clearing Principles (a) and (b)

Assessment

A review of available databases indicates that a total of 55 conservation significant fauna species have been recorded within the local area (see Appendix A). These species were listed under the state BC Act and/or Commonwealth EPBC Act, as Priority species by DBCA, or are migratory species listed under International Agreements (MI). With consideration of the site characteristics, relevant datasets and the habitat preferences and distribution of the aforementioned species, 29 conservation significant fauna species recorded in the local area have the potential to occur within the permit area (see Appendix A.4).

Migratory Waterbirds

The following migratory waterbird species have the potential to occur within the application area based on habitat preferences:

- 15 species of migratory waterbird protected under International Agreements, which may inhabit the mudflat communities within the application area for foraging or roosting habitat, or as transient habitat during migration (Commonwealth of Australia, 2015).
- Curlew sandpiper (*Calidris ferruginea*) (Critically Endangered under EPBC Act and Vulnerable under BC Act) is found on intertidal mudflats of estuaries, lagoons, mangroves, as well as beaches, rocky shores and around lakes, dams and floodwaters (DoE, 2015a). The coastal mudflat habitat in the application area is unlikely to provide suitable breeding habitat, as the species does not breed in Australia, but may provide suitable roosting or foraging habitat for this species as well as transient habitat as it migrates between more suitable coastal habitats.
- Great knot (*Calidris tenuirostris*) (Critically Endangered under EPBC Act and BC Act) inhabits intertidal mudflats and sandflats in sheltered coasts, including bays and estuaries (TSSC, 2016a). They forage on the moist mud, and often roost on beaches or in nearby low vegetation, such as mangroves or dune vegetation (TSSC, 2016a). The coastal mudflat habitat in the application area is unlikely to provide suitable breeding habitat, as the species does not breed in Australia, but may provide suitable foraging habitat for this species as well as transient habitat as it migrates between more suitable coastal habitats for roosting.
- Greater sand plover (*Charadrius leschenaultii*) (Vulnerable under EPBC Act and BC Act) is known to occur in littoral and estuarine habitats, typically on sheltered sandy, shelly or muddy beaches with large intertidal mudflats or sandbanks (TSSC, 2016b). The coastal mudflat habitat in the application area is unlikely to

provide suitable breeding habitat, as the species does not breed in Australia, but may provide suitable roosting or foraging habitat for this species as well as transient habitat as it migrates between more suitable coastal habitats.

- Lesser sand plover (*Charadrius mongolus*) (Endangered under EPBC Act and BC Act) usually occurs in coastal littoral and mudflats in estuaries or beaches but has also been recorded at inland sites in muddy areas around lakes, soaks and bores (TSSC, 2016c). The coastal mudflat habitat in the application area is unlikely to provide suitable breeding habitat, as the species does not breed in Australia, but may provide suitable roosting or foraging habitat for this species as well as transient habitat as it migrates between more suitable coastal habitats.
- Eastern curlew (*Numenius madagascariensis*) (Critically Endangered under EPBC Act and BC Act) is found on intertidal mudflats and sandflats, often with beds of seagrass, on sheltered coasts, especially estuaries, mangrove swamps, bays, harbours and lagoons (DoE, 2015b). The coastal mudflat habitat in the application area is unlikely to provide suitable breeding habitat, as the species does not breed in Australia, but may provide suitable roosting or foraging habitat for this species as well as transient habitat as it migrates between more suitable coastal habitats.
- Grey-tailed tattler (*Tringa brevipes*) (Priority 4) is known to occur in sheltered coasts with reefs or rock platforms or with intertidal mudflats, including embayments, estuaries, and coastal lagoons, especially those fringed with mangroves (Higgins and Davies, 1996). The coastal mudflat habitat in the application area is unlikely to provide suitable breeding habitat, as the species does not breed in Australia, but may provide suitable roosting or foraging habitat for this species as well as transient habitat as it migrates between more suitable coastal habitats.

While the aforementioned waterbird species have the potential to occur within the application area, it is acknowledged that the coastal mudflat habitat within the application area is well-represented within the local area and the greater Pilbara region. It is also acknowledged that disturbance activities within coastal mudflats is likely to be limited to geotechnical investigations that will require minor clearing of native vegetation that provides roosting and foraging habitat for migratory bird species. As none of the aforementioned waterbird species breed within Australia, the proposed clearing is not considered likely to impact significant breeding habitat for these species. Noting the extent of the proposed clearing and that abundant suitable habitat is available in the local area, the application area is not considered likely to represent significant breeding, foraging or roosting habitat for any conservation significant waterbird species.

Avian Fauna

The grey falcon (*Falco hypoleucos*) (Vulnerable under the BC Act and EPBC Act) occurs in arid and semi-arid inland Australia and is associated with timbered lowland plains such as tussock grassland, open woodland, and particularly *Acacia* shrublands that are crossed by tree-lined watercourses (TSSC, 2020). The grey falcon roosts and nests in the tallest trees along watercourses, particularly river red gum (*Eucalyptus camaldulensis*) and coolibah (*Eucalyptus coolabah*) (TSSC, 2020). The *Acacia* shrubland and hummock grassland within the application area may provide transient foraging habitat for the grey falcon as it migrates through the landscape. However, given riparian vegetation along watercourses will be excluded from clearing (see Section 3.2.3), it is not considered likely that the proposed clearing will result in the loss of suitable foraging or breeding habitat for the species. Given the extent of the proposed clearing, the extent of similar habitat in the local area, and that the grey falcon is a mobile species with a large range that does not rely on specialist niche habitats, it is not considered likely that the application area contains significant habitat for the species or that the proposed clearing will significantly reduce foraging habitat for the grey falcon in the local area.

There is a historical record of a night parrot (*Pezoporus occidentalis*) (Critically Endangered under the BC Act and Endangered under the EPBC Act) within the local area, dated from 1967 (DBCA, 2007-). Night parrots are associated with spinifex (*Triodia* spp.) grasslands, mulga (*Acacia aneura*) woodland, or chenopod shrublands in the arid and semi-arid zones (TSSC, 2016d). Although it is acknowledged that records of the night parrot in Western Australia are predominantly historical, with few substantiated records since 1935, the Conservation Advice for the species states that it is possible that the night parrot continues to occur throughout much of its historical range, including remote arid and semi-arid inland regions of Western Australia (TSSC, 2016d). Given the above and the lack of current survey information for the application area, it is considered possible that the *Acacia* shrubland and hummock grassland within the application area provide suitable habitat for the night parrot and that the species occurs within the application area. Noting the conservation status of the species, an occurrence of the night parrot and its critical habitat within the application area would be significant and the clearing of this habitat could represent a significant impact to the species. In order to mitigate this risk, a fauna management condition will be placed on the permit, requiring a fauna specialist to undertake a fauna survey of the areas proposed to be cleared prior to undertaking any clearing authorised under the permit. Any critical habitat for threatened or priority fauna identified during the survey must be avoided unless otherwise approved by DWER. Given the implementation of the fauna management condition and the abundance of suitable habitat in the local area, it is not considered likely that the

proposed clearing will result in significant impacts to the night parrot, should it persist within the vicinity of the application area.

Ground-dwelling and Arboreal Fauna

The northern quoll (*Dasyurus hallucatus*) (Endangered under the BC Act and EPBC Act) occurs in a variety of habitat types across its range, favouring rocky areas and eucalypt woodlands with suitable den resources that provide shelter and protection from predators including rocky outcrops, tree hollows, hollow logs, and termite mounds (Hill and Ward, 2010). Fauna surveys undertaken in 2019 for the adjacent Mardie Project have identified individuals and suitable foraging and den resources for northern quolls in vegetation adjacent to the application area (Phoenix Environmental Sciences Pty Ltd, 2019b). Given the application area occurs within the range of the species and may include suitable den resource and noting the vicinity of existing records and the lack of current survey information for the application area, it is considered possible that northern quolls are utilising the proposed clearing area. If the proposed clearing will involve the removal of den resources for northern quolls, this could represent a significant impact to the species by exposing individuals in the local area to a higher risk of predation. However, given the implementation of a fauna management condition requiring the avoidance of all critical habitat identified during a pre-clearing fauna survey and the abundance of suitable habitat for the species in the local area, it is not considered likely that the proposed clearing will result in the loss of significant habitat for the northern quoll.

The Lakeland Downs mouse (*Leggadina lakedownensis*) (Priority 4) occupies *Acacia* shrublands and low shrubs on deep sandy soils (CALM, 2002). The species is nocturnal, residing in burrows during the day and foraging on invertebrates and plant material at night (CALM, 2002). Given the lack of current survey information for the application area, it is considered possible that the *Acacia* shrubland and hummock grassland within the application area provide suitable habitat for the Lakeland Downs mouse. Although there is abundant suitable habitat for the Lakeland Downs mouse adjacent to the application area and within the local area, it is acknowledged that the proposed clearing may result in direct impacts to individuals, should it result in the disturbance of burrows. Given the implementation of the fauna management condition requiring the avoidance of all critical habitat identified during a pre-clearing fauna survey, it is not considered likely that the proposed clearing will result in the disturbance of burrows or in significant impacts to the Lakeland Downs mouse.

The lined soil-crevice skink (*Notoscincus butleri*) is a poorly recorded reptile whose ecology and habitat preferences are not known in detail. Records of the species are known from arid, rocky areas in the near-coastal Pilbara region including spinifex dominated areas near creeks and river margins (Wilson and Swan, 2010). One occurrence of a lined soil-crevice skink was identified during fauna surveys undertaken in 2019 for the adjacent Mardie Project (Phoenix Environmental Sciences Pty Ltd, 2019b). Given the composition of vegetation within the application area, the vicinity of existing records, and the lack of current survey information for the application area, the proposed clearing area may provide suitable habitat for the lined soil-crevice skink. However, it is acknowledged that the proposed clearing will result in the loss of up to 10 hectares of native vegetation within a 5189-hectare footprint and within an extensively vegetated local area, much of which is likely to provide suitable habitat for the lined soil-crevice skink. Further, riparian vegetation along watercourses will be excluded from clearing (see Section 3.2.3), which is likely to mitigate impacts to much of the suitable habitat for the lined soil-crevice skink within the application area. Given the above, it is not considered likely that the proposed clearing will result in the loss of significant habitat for the lined soil-crevice skink.

The western pebble-mound mouse (*Pseudomys chapmani*) (Priority 4) is known from across the Pilbara region and is associated with *Triodia* hummock grasslands over eroding sands with exposed small stones (pebbles), often including an overstorey of *Cassia* spp., *Acacia* spp., and *Ptilotus* spp. (Kitchener, 1983). The western pebble mound mouse utilises complex underground burrow systems characterised by a distinctive mound of pebbles at burrow entrances above-ground, with mounds hypothesised to insulate the burrows beneath from extreme desert temperatures (Kitchener, 1983). Fauna surveys undertaken for the adjacent Mardie Project identified the western pebble-mound mouse in vegetation adjacent to the application area in 2019 (Phoenix Environmental Sciences Pty Ltd, 2019b). Given the application area contains *Acacia* shrublands and *Triodia* hummock grasslands, the vicinity of existing records, and the lack of current survey information for the application area, it is considered possible that the western pebble-mound mouse is utilising the proposed clearing area. Although there is abundant suitable habitat for the western pebble-mound mouse in the local area, the proposed clearing may represent a significant impact to individuals, should it result in the disturbance of burrows. Given the implementation of the fauna management condition requiring the avoidance of all critical habitat identified during a pre-clearing fauna survey, it is not considered likely that the proposed clearing will result in the disturbance of burrows or in significant impacts to the western pebble-mound mouse.

The Pilbara leaf-nosed bat (*Rhinonicteris aurantia* (Pilbara)) (Vulnerable under the BC Act and EPBC Act) is known from a variety of habitats in the Pilbara region that provide suitable diurnal roost sites, nocturnal refuge, and foraging habitat for the species, including underground mines and cave systems, gorges with pools, gullies, rocky

outcrops, riparian vegetation along major watercourses, and open *Triodia* grassland under woodland (TSSC, 2016e). Given the lack of current survey information for the application area, the *Acacia* shrubland and *Triodia* grassland within the application area is considered to provide suitable foraging and roosting habitat for the Pilbara leaf-nosed bat. Occurrences of the Pilbara leaf-nosed bat were also recorded during fauna surveys undertaken in 2019 for the adjacent Mardie Project (Phoenix Environmental Sciences Pty Ltd, 2019b). The species' recovery plan describes critical habitat for the Pilbara leaf-nosed bat as any underground diurnal roost sites within the vicinity of potential foraging habitat or nocturnal refuges and indicates that any activity that will adversely affect individuals or critical habitat for the species will have a significant impact on the Pilbara leaf-nosed bat (TSSC, 2016e). Therefore, the proposed clearing has the potential to result in significant impacts to the Pilbara leaf-nosed bat, if it will result in the disturbance of individuals or diurnal roost sites. Given the implementation of the fauna management condition requiring the avoidance of all critical habitat identified during a pre-clearing fauna survey, it is not considered likely that the proposed clearing will result in the disturbance of diurnal refuge sites or in significant impacts to the Pilbara leaf-nosed bat.

Conclusion

Based on the above assessment, the proposed clearing may result in impacts to significant habitat for conservation significant fauna species including the night parrot, northern quoll, Lakeland Downs mouse, western pebble-mound mouse, and Pilbara leaf-nosed bat. For the reasons set out above, it is considered that the impacts of the proposed clearing on these species can be managed to be environmentally acceptable through permit conditioning that requires pre-clearing fauna surveys and the avoidance of any conservation significant flora or vegetation identified, as well as ensuring slow, progressive, directional clearing is undertaken to allow fauna to move into adjacent vegetation. Given the above, the Delegated Officer determined that the proposed clearing does not constitute a significant residual impact to conservation significant fauna species.

Conditions

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

- Directional clearing, which ensures slow, progressive, directional clearing is undertaken to allow fauna to move into adjacent vegetation ahead of the clearing activity to minimise impact to individuals, and
- Fauna management, requiring pre-clearing fauna surveys for the presence of threatened and priority fauna and the avoidance of any individuals identified and their critical habitat.

3.2.3. Land and water resources - Clearing Principles (f), (g) and (i)

Assessment

As the application area intersects five minor, non-perennial tributaries of the Fortescue River System, some of the vegetation within the application area may be considered to be growing in, or in association with, an environment associated with a watercourse. Further, as the application area is mapped within the Pilbara Surface Water Area, any clearing within the vicinity of these watercourses has to potential to impact surface water quality within a proclaimed water resource under the RIWI Act. However, noting that the purpose of the proposed clearing is geotechnical investigations, mesquite management and rehabilitation trials, and construction or re-establishment of access tracks, it is considered unlikely that the proposed clearing will require the removal of riparian vegetation that is associated with these non-perennial tributaries. This has been confirmed by the applicant, who has advised that the proposed clearing and geotechnical investigations will not interfere with or obstruct any non-perennial tributaries of the Fortescue River System (BCI Minerals Limited, 2021a). Given the proposal will not require clearing within the vicinity of these watercourses, a vegetation management condition will be applied to the permit, requiring the applicant to avoid clearing within 30 metres of riparian vegetation associated with non-perennial tributaries of the Fortescue River System. Given the implementation of the vegetation management condition, the condition of the vegetation, and the extent of the proposed clearing within a 5,189-hectare footprint, it is not considered likely that the proposed clearing will result in any significant or long-term impacts to surface or underground water quality or to the ecological values of the vegetation communities associated with the non-perennial tributaries of Fortescue River.

Noting that the mapped soil types within the application area are susceptible to land degradation resulting from erosion and flooding when vegetation cover is lost, the proposed clearing has the potential facilitate land degradation. However, it is acknowledged that much of the vegetation proposed to be cleared is degraded and infested by mesquite and that the proposed clearing will result in the loss of 10 hectares of native vegetation within an extensively vegetated 5,189-hectare footprint, that is likely to act as a buffer to the effects of land degradation. Further, the applicant has committed to revegetating and rehabilitating all areas cleared for temporary works and it is not considered likely that cleared areas will be left exposed to weathering for extended periods of time. Given the implementation of a revegetation condition, the extent of the proposed clearing, and the extent of remnant vegetation in the local area, the proposed clearing is not considered likely to cause appreciable land degradation.

Given parts of the application area are weed-infested, it is acknowledged that the proposed clearing may cause degradation of adjacent and nearby remnant native vegetation by facilitating the spread of weeds, in particular the Declared Pest mesquite. However, it is noted that one of the purposes of the proposed clearing is mesquite management, aimed to prevent the spread of mesquite into nearby vegetation, and it is considered that a weed management condition will adequately minimise this risk. Therefore, it is not considered likely that the proposed clearing will have a significant impact on adjacent remnant vegetation

Conclusion
Based on the above assessment, the proposed clearing may result in the loss of vegetation growing in, or in association with, an environment associated with a watercourse and may facilitate the spread of invasive weeds into adjacent retained vegetation in the local area. For the reasons set out above, the proposed clearing is unlikely to result in any significant or long-term impacts to the quality of surface or underground water or the ecological values of the riparian communities associated with the watercourse, or to result in appreciable land degradation.

It is considered that the impacts of the proposed clearing can be managed to be environmentally acceptable by avoiding the clearing of vegetation associated with the watercourses that intersect the application area, taking steps to minimise the risk of the introduction and spread of weeds, and revegetating all areas cleared for temporary works. In considering the above, the Delegated Officer determined that the impacts of the propose clearing on land and water resources does not constitute a significant residual impact.

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

- Weed control, which ensures protocols are put in place to limit the introduction and transportation of weed-affected materials,
- Vegetation management, which ensures riparian vegetation within 30 metres of the non-perennial tributaries of the Fortescue River System is excluded from clearing, and
- Revegetation and rehabilitation (temporary works), which ensures areas cleared for temporary works are revegetated and rehabilitated within six months of the area no longer being required for the purpose for which it was cleared.

3.3. Relevant planning instruments and other matters

The clearing permit application was advertised on DWER's website on 1 July 2021, inviting submissions from the public within a 21-day period. No submissions were received in relation to this application.

The City of Karratha (the City) advised DWER that much of the application area is contained within mining tenements and that additional local government approvals are unlikely to be required for the purpose of the proposed clearing (City of Karratha, 2021). The City noted that there has been considerable work undertaken in the locality relating to the control of mesquite and that this work should be considered in any program to clear land so as not to increase the potential for spread of the weed (City of Karratha, 2021). The City did not register any objections to the proposed clearing (City of Karratha, 2021).

License 00203/2019_A11291964 under section 91 of the *Land Administration Act 1997* (section 91 License) was granted to the applicant on 13 July 2021 by the Department of Planning, Lands and Heritage (DPLH) and facilitates access to Lot 1501 on Deposited Plan 74341 (Pastoral Lease N050076), Lot 319 on Deposited Plan 63521 (Crown Reserve 9701), Lot 4999 on Deposited Plan 403120 (Pastoral Lease N050076), Unallocated Crown Land (PINs 1380154 and 11926376), and Unnamed Dedicated Road (PIN 11733284) (BCI Minerals Limited, 2021a). Under this section 91 License, the applicant is permitted to undertake of low impact ground disturbance activities and investigative works including geotechnical, geological and hydrogeological investigations required for the Mardie Project, within the aforementioned properties (BCI Minerals Limited, 2021a). The clearing proposed under this application is considered consistent with the provisions of the applicant's section 91 License.

DWER's North West Region advised that the proposed activities occur within the Pilbara surface and groundwater areas that are subject to licensing requirements under the RIWI Act (DWER, 2021). The North West Region advised that the proposed disturbance envelope encompasses tributary watercourses of the Fortescue River System and that a bed and banks permit will be required if the proposed disturbance will interfere with or obstruct the bed or banks of these tributary watercourses (DWER, 2021). Given a condition will be placed on the permit requiring riparian vegetation within 30 metres of the non-perennial tributaries of the Fortescue River System to be avoided from clearing, it is not considered likely that the proposed clearing or associated activities will require a bed and banks permit. However, the applicant has been advised that any future activities within the disturbance envelope may be subject to licensing requirements under the RIWI Act. The North West Region also advised the

best practice management should be used during clearing activities to minimise impacts to surface and groundwater quality including, but not limited to:

- Adhering to the Department's Guidelines and Water Quality Protection Notes (WQPNs), including:
  - WQPN 6: *Vegetation buffers to sensitive water resources*,
  - WQPN 10: *Contaminant spills – emergency response*,
  - WQPN 65: *Toxic and hazardous substances – storage and use*, and
  - WQPN 83: *Infrastructure corridors near sensitive water resources*.
- Avoiding disturbance to riparian vegetation to maintain foreshore stability and protect important riparian habitats (where possible),
- Constructing any unavoidable creek crossings on relatively straight sections of the watercourse not on meander bends, and
- Rehabilitating disturbed areas as soon as practical after the campaign (DWER, 2021).

The North West Region advised that the proposal is unlikely to impact on the water quality of water resources, provided clearing activities are undertaken with the applicant's environmental management commitments, the above advice and DWER's Water Quality Protection Notes and Guidelines (DWER, 2021).

The application area is located within the boundaries of the registered area of interest of the Wirrawandi Aboriginal Corporation RNTBC, acting on behalf of the Mardudhunera People native title claimants. The Mardudhunera People and the Wirrawandi Aboriginal Corporation RNTBC were invited to provided comment on the clearing permit application under section 24KA of the *Native Title Act 1993*. No comments have been received to date.

Two Aboriginal sites of significance (Mardie Salt 01 and Mardie Salt 02) have been mapped within the application area. It is the permit holder's responsibility to comply with the *Aboriginal Heritage Act 1972* (WA) and ensure that no Aboriginal Sites of Significance are damaged through the clearing process.

End

Appendix A. Site characteristics

A.1. Site characteristics

Characteristic	Details
Local context	The area proposed to be cleared is part of an expansive tract of native vegetation in the extensive land use zone of Western Australia. It is adjacent to the existing Mardie Project to the west and south, including infrastructure associated with solar salt and sulphate of potash (SOP) production and an export facility, and is surrounded by pastoral land and remnant vegetation to the north and east. Spatial data indicates the local area (50-kilometre radius from the centre of the area proposed to be cleared) retains approximately 97.5 per cent of the original native vegetation cover (see Appendix A.2).
Ecological linkage	According to available databases, there are no formal ecological linkages mapped over the application area. As the vegetation within the application area is a part of contiguous remnant vegetation within an extensively vegetated local area, the application area is not considered likely to be functioning as a significant ecological linkage in the local area.
Conservation areas	The nearest conservation area is Great Sandy Island Nature Reserve which occurs offshore, approximately 10 kilometres west of the application area. According to available databases, there are no mainland conservation areas within the local area, the closest being Cane River Conservation Park approximately 90 kilometres south of the application area.
Vegetation description	Supporting documentation supplied by the applicant (BCI Minerals Limited, 2021b) indicates that the vegetation within the proposed clearing area consists of three broad vegetation units based on surveys undertaken for the adjacent Mardie Project and the vegetation units defined for the Roebourne Subregion, including: • Mangrove and chenopod (*Tecticornia* spp.) shrublands on tidal mudflats and low shrubland over *Sporobolus virginicus* grassland, representative of samphire, *Sporobolus*, and mangal communities on marine alluvial flats and river deltas, • *Triodia* spp. and *Eragrostis* spp. grasslands, representative of grass savannah of mixed bunch and hummock grasses on colluvial coastal and sub-coastal plains, and • Riparian vegetation on most creeks, representative of the *Eucalyptus victrix* woodlands of ephemeral drainage lines (Kendrick and Stanley, 2001). Representative mapping is available in Appendix D. This is broadly consistent with the mapped Beard vegetation associations: • Beard 127, which is described as bare areas of tidal mud flats, • Beard 600, which is described as sedgeland comprising various sedges with an open low tree savanna of *Eucalyptus* sp. *aff aspera*, and • Beard 601, which is described as a mosaic of sedgeland and hummock grasslands, comprising various sedges with very sparse snakewood (*Acacia xiphlophylla*) or grasslands and shrub-steppe of kanji (*Acacia inaequilatera*) over soft spinifex (Shepherd et al, 2001).
Vegetation condition	Supporting documentation supplied by the applicant (BCI Minerals Limited, 2021b) indicates that the vegetation within the proposed clearing area is likely to range from Degraded/Very poor to Excellent (Trudgen, 1991) condition based on surveys undertaken for the adjacent Mardie Project, described as: • Excellent: Pristine or nearly so, no obvious signs of damage caused by human activities since European settlement, and • Degraded/Very poor: Severely impacted by grazing, very frequent fires, clearing or a combination of these activities. Scope for some regeneration but not to a state approaching good condition without intensive management. Usually with a

Characteristic	Details
	number of weed species present including very aggressive species (Trudgen, 1991). The full Trudgen (1991) condition rating scale is provided in Appendix C. Representative mapping is available in Appendix D.
Climate and landform	The application area occurs on relatively flat topography with a slight elevation in the south-east. The application area occurs within the Pilbara bioregion and the Roebourne subregion. The climate of the Roebourne subregion is defined as arid (semi-desert) tropical with highly variable rainfall and cyclonic activity, primarily over summer (Kendrick and Stanley, 2001). The mean annual maximum temperature is 34°C and mean annual minimum temperature is 18.9°C, while the mean annual rainfall is approximately 400 millimetres, and the annual evapotranspiration rate is approximately 400 millimetres.
Soil description and land degradation risk	The soil is mapped within the following soil systems: • Yamerina System (202Ya), described as flood plains and deltaic deposits supporting tussock grasslands, woodlands with buffel grass and minor halophytic low shrublands and comprising approximately 75 per cent of the application area, • Littoral System (201Li), described as bare coastal mudflats (unvegetated), samphire flats, sandy islands, coastal dunes and beaches, supporting samphire low shrublands, sparse acacia shrublands and mangrove forests and comprising approximately 20 per cent of the application area, and • Horseflat System (202Hf), described as gilgaied clay plains supporting Roebourne Plains grass grasslands and minor grassy snakewood shrublands and comprising approximately five per cent of the application area (DPIRD, 2021). While the mapped soils generally are not prone to land degradation, saline flats within the Yamerina System may be susceptible to erosion if vegetation cover is lost and the system is generally prone to flooding (Van Vreeswyk et al., 2004). Similarly, coastal dunes within the Littoral System are highly prone to wind erosion if vegetation cover is lost as a result of fire or other disturbance (Van Vreeswyk et al., 2004). Non-gilgaied plains, alluvial plains and dissected slopes within the Horseflat System are also moderately to highly susceptible to erosion if vegetation cover is depleted (Van Vreeswyk et al., 2004).
Waterbodies and hydrogeography	The desktop assessment and aerial imagery indicated that five minor, non-perennial tributaries of the Fortescue River System transect the area proposed to be cleared. The application area also intersects saline coastal flats associated with the Robe River Soaks. However, the application area also does not transect any mapped wetlands, with the closest mapped wetland being the Millstream Pools, approximately 115 kilometres south-east of the application area. The application area is mapped within the Pilbara Surface Water Area and the Pilbara Groundwater Area proclaimed under the *Rights in Water and Irrigation Act 1914* (RIWI Act) but does not transect any water resources proclaimed under either the *Metropolitan Water Supply Sewerage and Drainage Act 1909* or *Country Areas Water Supply Act 1947* (CAWS Act). Groundwater salinity within the application area is mapped at 500 to 7000 milligrams per litre total dissolved solids.

Flora	The desktop assessment identified that a total of 10 rare flora species have been recorded within the local area, comprising two Priority 1 (P1) flora, one Priority 2 (P2) flora, five Priority 3 (P3) flora, and two Priority 4 (P4) flora (Western Australian Herbarium, 1998-). One of these existing records, an occurrence of *Goodenia nuda* (P4) occurs within the application area itself, with the next closest record being an occurrence of *Minuria tridens* (P1) approximately 1.3 kilometres from the application area. According to available databases, there are no records of threatened flora in the local area. The closest record of a threatened flora species is an occurrence of *Seringia exastia* (Critically Endangered under both the BC Act and EPBC Act), approximately 93 kilometres south of the application area. With consideration for the site characteristics set out above, relevant datasets (see Appendix E.1), the habitat preferences of the aforementioned species, and the distribution of existing records, the application area may provide suitable habitat for four conservation significant flora species. Impacts to three of these species required further consideration based on their conservation status, the extent of suitable habitat in the local area, and the distribution and extent of existing records (see Appendix A.3).
Ecological communities	The desktop assessment identified that the closest state-listed threatened ecological community (TEC) is an occurrence of the Themeda grasslands on cracking clays (Hamersley Station, Pilbara) TEC, located approximately 186 kilometres south-east of the application area. The closest state-listed priority ecological communities (PECs) include an occurrence of the Horseflat Land System of the Roebourne Plains PEC, located approximately 28 kilometres east of the application area.
Fauna	The desktop assessment identified that a total of 55 threatened or priority fauna species have been recorded within the local area, including 17 threatened fauna species, 11 priority fauna species, 25 migratory fauna species protected under international agreement, and two other specially protected fauna species (DBCA, 2007-). None of these existing records occur within the application area, with the closest record being an occurrence of a lance-beaked cave shrimp (*Stygiocaris lancifera*), approximately 1.5 kilometres north-east of the application area. With consideration for the site characteristics set out above, relevant datasets (see Appendix E.1), and the habitat preferences of the aforementioned species, the application area may provide suitable habitat for 28 conservation significant fauna species and impacts to these species required further consideration (see Appendix A.4).

A.2. Vegetation extent

	Pre-European extent (ha)	Current extent (ha)	Extent remaining (%)	Current extent in all DBCA managed land (ha)	Current proportion (%) of pre-European extent in all DBCA managed land
IBRA bioregion*					
Pilbara	17,808,657.04	17,731,764.88	99.57	1,801,714.98	10.12
Beard vegetation association*					
127	716,160.82	691,516.26	96.56	83,831.67	11.71
600	67,036.26	66,954.63	99.88	-	-
601	238,784.52	238,716.03	99.97	-	-
Beard vegetation association within IBRA bioregion*					
127 (Pilbara)	177,749.75	159,595.04	89.79	3,703.79	2.08
600 (Pilbara)	67,036.26	66,954.63	99.88	-	-
601 (Pilbara)	109,686.98	109,618.49	99.94	-	-
Local area					
50-kilometre radius	515,480.83	502,858.74	97.55	-	-

*Government of Western Australia (2019)

A.3. Flora analysis table

With consideration for the site characteristics set out above, relevant datasets (see Appendix E.1), the extent of suitable habitat in the local area, and the distribution and extent of existing records, impacts to the following conservation significant flora required further consideration.

Species name	Conservation status	Suitable habitat features ? [Y/N]	Suitable vegetation type? [Y/N]	Suitable soil type? [Y/N]	Distance of closest record to application area (km)	Number of known records in local area (total)	Are surveys adequate to identify? [Y, N, N/A]
Goodenia nuda	P4	Y	Y	Y	0.0	4	N/A
Goodenia pallida	P1	Y	Y	N	29.3	1	N/A
Minuria tridens	P1	Y	Y	Y	1.3	5	N/A

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

A.4. Fauna analysis table

With consideration for the site characteristics set out above and relevant datasets (see Appendix E.1), impacts to the following conservation significant fauna required further consideration.

Species name	Conservation status	Suitable habitat features? [Y/N]	Suitable vegetation type? [Y/N]	Distance of closest record to application area (km)	Number of known records in local area (total)	Are surveys adequate to identify? [Y, N, N/A]
Calidris ferruginea (Curlew sandpiper)	CR	Y	N	44.8	1	N/A
Calidris tenuirostris (Great knot)	CR	Y	N	26.8	4	N/A
Charadrius leschenaultia (Greater sand plover)	VU	Y	N	13.4	26	N/A
Charadrius mongolus (Lesser sand plover)	EN	Y	N	8.8	16	N/A
Dasyurus hallucatus (Northern quoll)	EN	Y	Y	0.9	25	N/A
Falco hypoleucos (Grey falcon)	VU	Y	Y	47.3	1	N/A
Leggadina lakedownensis (Lakeland Downs mouse)	P4	Y	Y	15.2	14	N/A
Migratory waterbirds (15 species)	MI	Y	N	-	-	N/A
Notoscincus butleri (Lined soil-crevice skink)	P4	Y	Y	26.9	1	N/A
Numenius madagascariensis (Eastern curlew)	CR	Y	N	28.5	3	N/A
Pezoporus occidentalis (Night parrot)	CR	Y	Y	44.1	1	N/A
Pseudomys chapmani (Western pebble-mound mouse)	P4	Y	Y	15.1	5	N/A
Rhinonicteris aurantia (Pilbara) (Pilbara leaf-nosed bat)	VU	Y	Y	10.3	4	N/A
Tringa brevipes (Grey-tailed tattler)	P4	Y	N	10.0	50	N/A

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

Appendix B. Assessment against the clearing principles

Assessment against the clearing principles	Variance level	Is further consideration required?
Environmental value: biological values		
Principle (a): *"Native vegetation should not be cleared if it comprises a high level of biodiversity."* Assessment: The area proposed to be cleared comprises 10 hectares of tidal mudflats, sedgeland and hummock grasslands that are well-represented in the local area and region but may contain suitable or significant habitat for priority flora and conservation significant fauna species.	May be at variance	Yes *Refer to Sections 3.2.1 and 3.2.2, above.*
Principle (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."* Assessment: The area proposed to be cleared may contain suitable habitat for a number of conservation significant fauna species (see Appendix A.4).	May be at variance	Yes *Refer to Section 3.2.2, above.*
Principle (c): *"Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora."*	Not likely to be at variance	No

Assessment against the clearing principles	Variance level	Is further consideration required?
Assessment: Given the extent of similar suitable habitat in the local area and the distribution and extent of existing records, the area proposed to be cleared is unlikely to contain significant habitat for flora species listed under the BC Act.		
Principle (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."* Assessment: The area proposed to be cleared consists of 10 hectares of tidal mudflats, sedgeland and hummock grasslands and is unlikely to include species that are representative of any threatened ecological community listed under the BC Act. Given the distance and separation from the nearest TEC, the proposed clearing is not likely to impact on or be necessary for the maintenance of any state-listed TEC.	Not likely to be at variance	No
Environmental value: significant remnant vegetation and conservation areas		
Principle (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."* Assessment: The extent of the mapped vegetation types and native vegetation in the local area is consistent with the national objectives and targets for biodiversity conservation in Australia (Commonwealth of Australia, 2001). The vegetation proposed to be cleared is also not considered to be part of a significant ecological linkage in the extensively vegetated local area.	Not likely to be at variance	No
Principle (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."* Assessment: Given the distance to and separation from the nearest conservation area, the proposed clearing is not likely to have an impact on the environmental values of any nearby conservation areas.	Not likely to be at variance	No
Environmental value: land and water resources		
Principle (f): *"Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland."* Assessment: Given several non-perennial water courses are recorded within the application area, the vegetation may be considered to be growing in association with an environment associated with a watercourse and the proposed clearing has the potential to impact on- or off-site hydrology and water quality.	May be at variance	Yes *Refer to Section 3.2.3, above.*
Principle (g): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation."* Assessment: The mapped soils are moderately susceptible to land degradation resulting from erosion and flooding, where vegetation cover is lost.	Not likely to be at variance	Yes *Refer to Section 3.2.3, above.*
Principle (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."* Assessment: Given several non-perennial water courses are recorded within the application area, the proposed clearing may impact surface or ground water quality.	Not likely to be at variance	Yes *Refer to Section 3.2.3, above.*

Assessment against the clearing principles	Variance level	Is further consideration required?
Principle (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."* Assessment: Some of the mapped soils within the application area are considered prone to flooding where surface vegetation is removed. However, noting the nature of the proposed works, the extent of the proposed clearing, and the topographic contours in the surrounding area, it is not considered likely that the proposed clearing will contribute to increased incidence or intensity of flooding. It is also acknowledged that temporarily cleared areas will be revegetated following clearing, which is likely to further minimise the risk of flooding and waterlogging.	Not likely to be at variance	No

Appendix C. Vegetation condition rating scale

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

Considering its location, the scale below was used to measure the condition of the vegetation proposed to be cleared. This scale has been extracted from Trudgen, M.E. (1991) *Vegetation condition scale* in National Trust (WA) 1993 Urban Bushland Policy. National Trust of Australia (WA), Wildflower Society of WA (Inc.), and the Tree Society (Inc.), Perth.

Measuring vegetation condition for the Eremaean and Northern Botanical Provinces (Trudgen, 1991)

Condition	Description
Excellent	Pristine or nearly so, no obvious signs of damage caused by human activities since European settlement.
Very good	Some relatively slight signs of damage caused by human activities since European settlement. For example, some signs of damage to tree trunks caused by repeated fire, the presence of some relatively non-aggressive weeds, or occasional vehicle tracks.
Good	More obvious signs of damage caused by human activity since European settlement, including some obvious impact on the vegetation structure such as that caused by low levels of grazing or slightly aggressive weeds.
Poor	Still retains basic vegetation structure or ability to regenerate it after very obvious impacts of human activities since European settlement, such as grazing, partial clearing, frequent fires or aggressive weeds.
Very poor	Severely impacted by grazing, very frequent fires, clearing or a combination of these activities. Scope for some regeneration but not to a state approaching good condition without intensive management. Usually with a number of weed species present including very aggressive species.
Completely degraded	Areas that are completely or almost completely without native species in the structure of their vegetation; i.e. areas that are cleared or 'parkland cleared' with their flora comprising weed or crop species with isolated native trees or shrubs.

Appendix D. Supporting information excerpts

Figure 2. Indicative location of the Mardie Project including current and proposed infrastructure (BCI Minerals Limited, 2021b).

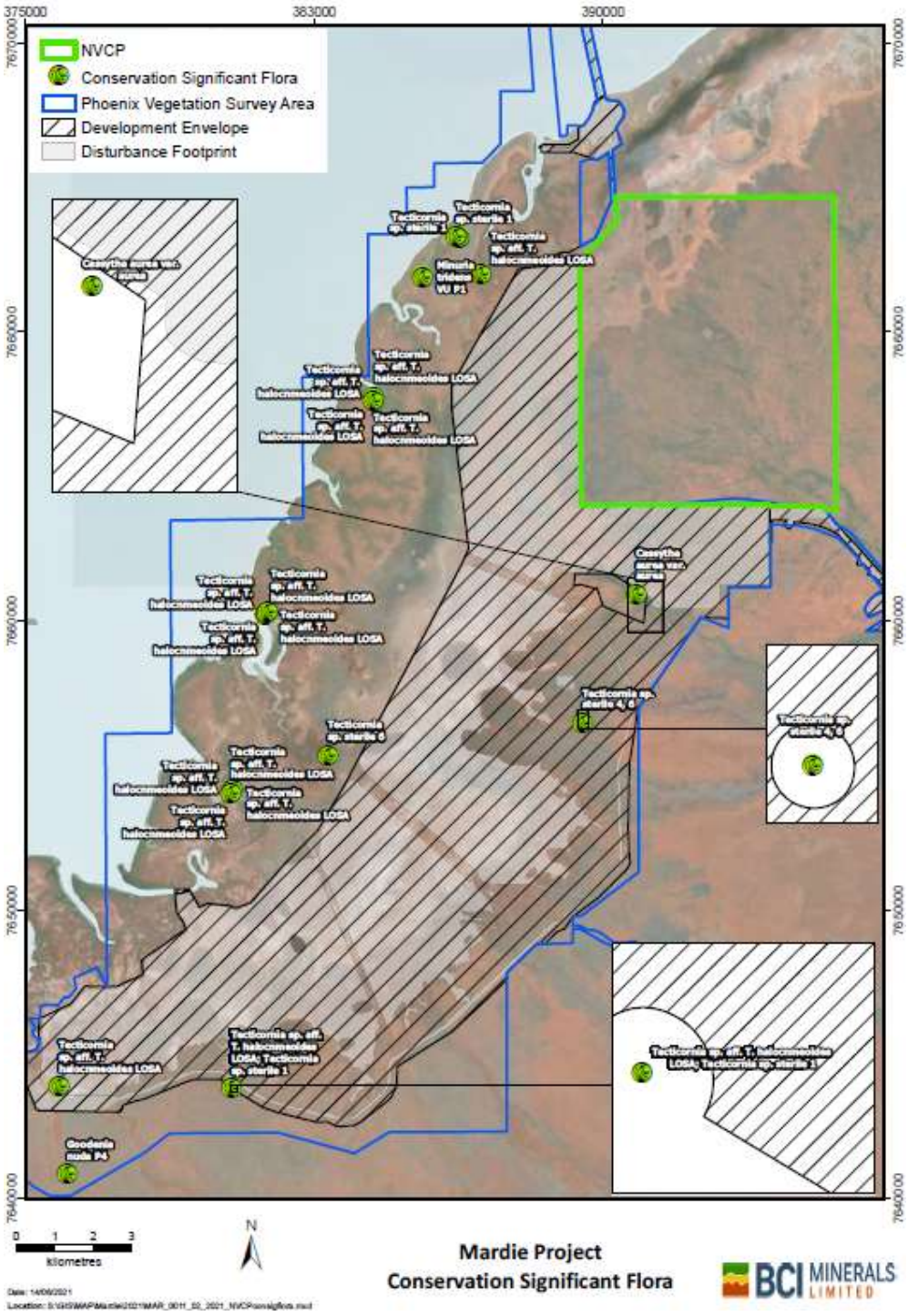

Figure 3. Location of conservation significant flora identified during Phoenix Environmental Sciences (2019a) surveys for the Mardie Project (BCI Minerals Limited, 2021b).

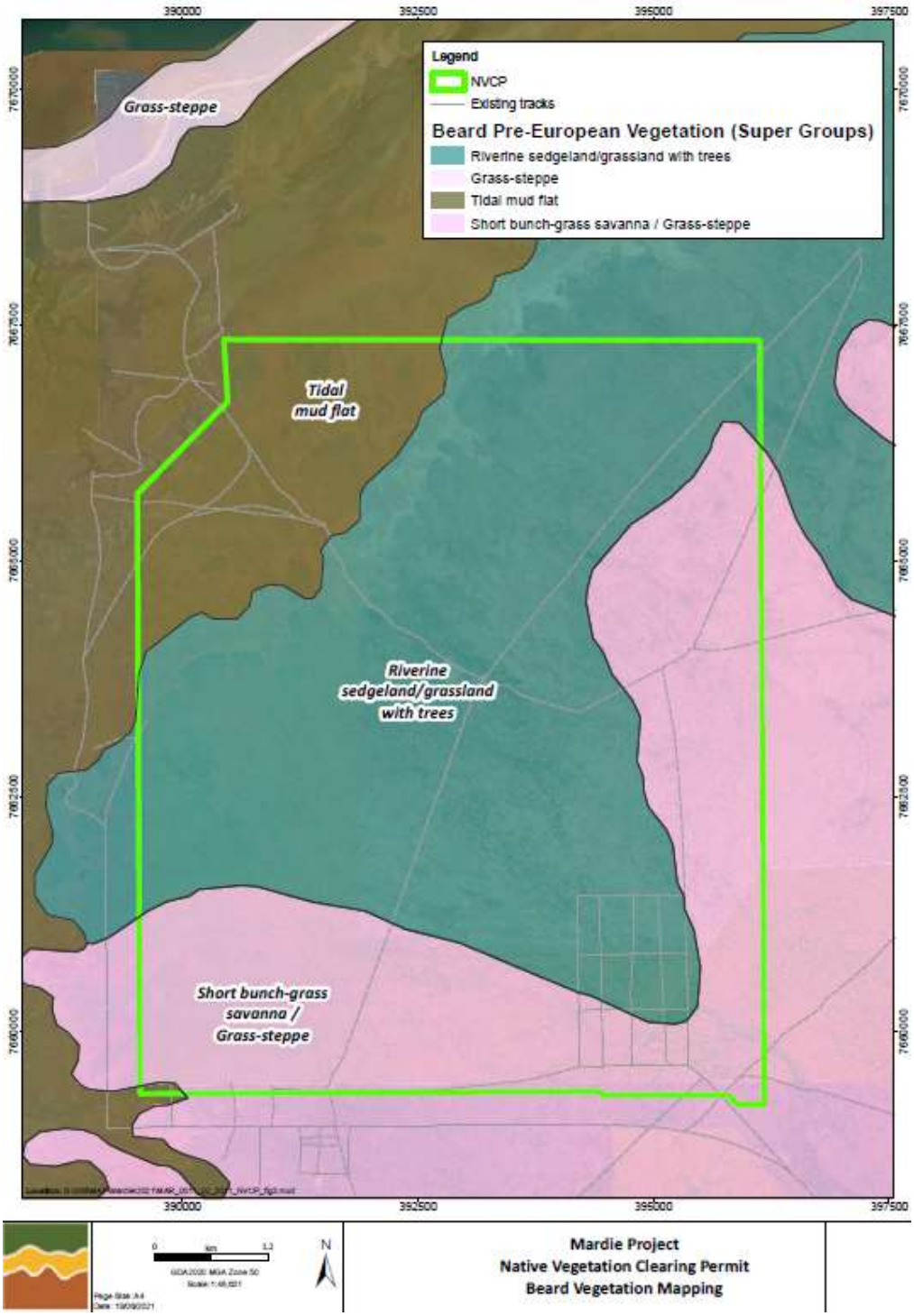

Figure 4. Beard Vegetation Mapping for the proposed clearing area (BCI Minerals Limited, 2021b).

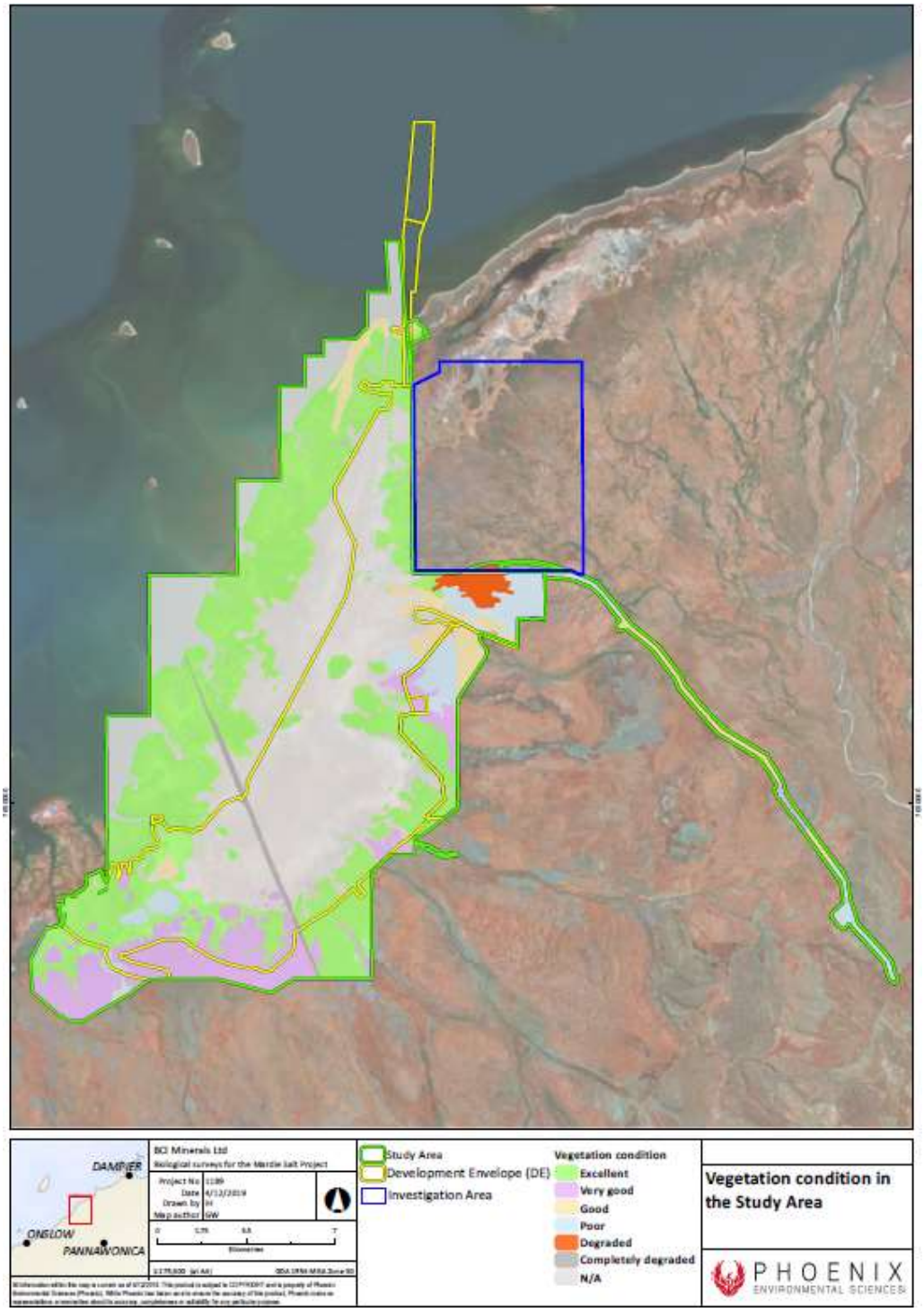

Figure 5. Vegetation condition mapping identified during Phoenix Environmental Sciences (2019a) surveys for the Mardie Project (BCI Minerals Limited, 2021b).

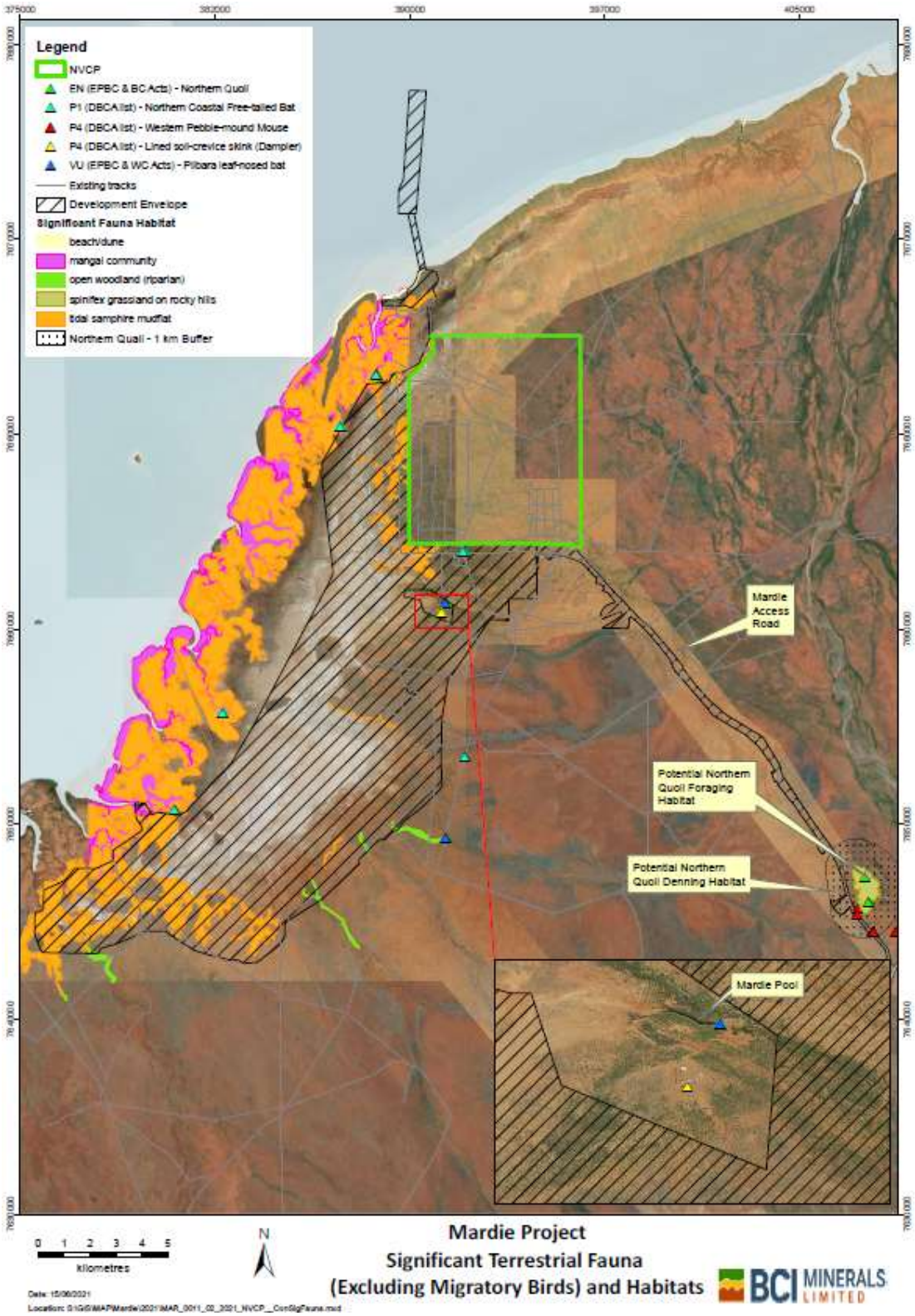

Figure 7. Location of significant terrestrial fauna species and habitats identified during Phoenix Environmental Sciences (2019b) surveys for the Mardie Project (BCI Minerals Limited, 2021b).

Appendix E. Sources of information

E.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)
- Cadastre (LGATE-218)
- Cadastre Address (LGATE-002)
- Contours (DPIRD-073)
- DBCA – Lands of Interest (DBCA-012)
- DBCA Legislated Lands and Waters (DBCA-011)
- Directory of Important Wetlands in Australia – Western Australia (DBCA-045)
- Environmentally Sensitive Areas (DWER-046)
- Flood Risk (DPIRD-007)
- Groundwater Salinity Statewide (DWER-026)
- Hydrography – Inland Waters – Waterlines
- Hydrological Zones of Western Australia (DPIRD-069)
- IBRA Vegetation Statistics
- Imagery
- Local Planning Scheme – Zones and Reserves (DPLH-071)
- Native Title (ILUA) (LGATE-067)
- Offsets Register – Offsets (DWER-078)
- Pre-European Vegetation Statistics
- Public Drinking Water Source Areas (DWER-033)
- Ramsar Sites (DBCA-010)
- Regional Parks (DBCA-026)
- Remnant Vegetation, All Areas
- RIWI Act, Groundwater Areas (DWER-034)
- RIWI Act, Surface Water Areas and Irrigation Districts (DWER-037)
- Soil Landscape Mapping – Best Available
- Soil Landscape Mapping – Systems

Restricted GIS Databases used:

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

E.2. References

BCI Minerals Limited (2021a) *Supporting information for clearing permit application CPS 9328/1,* received 13 July 2021 and 18 August 2021 (DWER Ref: A2027045 and A2037747).

BCI Minerals Limited (2021b) *Supporting information for clearing permit application CPS 9328/1, prepared for Mardie Minerals Pty Ltd by Preston Consulting Pty Ltd,* received 16 June 2021 (DWER Ref: DWERTDT465703).

City of Karratha (2021) *Advice for clearing permit application CPS 9328/1*, received 18 August 2021 (DWER Ref: DWERDT491825).

Commonwealth of Australia (2001) *National Objectives and Targets for Biodiversity Conservation 2001-2005*, Canberra.

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Department of the Environment (DoE) (2015a). *Conservation Advice Calidris ferruginea curlew sandpiper*. Department of the Environment, Canberra, ACT. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/856-conservation-advice.pdf (accessed August 2021).

Department of the Environment (DoE) (2015b). *Conservation Advice Numenius madagascariensis eastern curlew*. Department of the Environment, Canberra, ACT. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/847-conservation-advice.pdf (accessed August 2021).

Department of Environment Regulation (DER) (2013) *A guide to the assessment of applications to clear native vegetation*. Perth. Available from: https://www.der.wa.gov.au/images/documents/your-environment/native-vegetation/Guidelines/Guide2_assessment_native_veg.pdf.

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Mardie Minerals (2021) *Clearing permit application CPS 9328/1*, received 16 June 2021 (DWER Ref: DWERDT465703).

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