GOVERNMENT OF
WESTERN AUSTRALIA

CLEARING PERMIT

Granted under section 51E of the Environmental Protection Act 1986

Purpose Permit number:	CPS 10217/1
Permit Holder:	Mineral Resources Limited
Duration of Permit:	From 29 October 2023 to 29 October 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 purpose of road upgrades.

2. Land on which clearing is to be done

Lot 557 on Deposited Plan 74894, Talandji
Lot 558 on Deposited Plan 71346, Talandji
Lot 561 on Deposited Plan 71346, Talandji
Lot 565 on Deposited Plan 71346, Talandji
Lot 575 on Deposited Plan 71345, Talandji
Lot 605 on Deposited Plan 402524, Talandji

3. Clearing authorised

The permit holder must not clear more than 13.9 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 29 October 2028.

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 towards adjacent *native vegetation* to allow fauna to move into adjacent *native vegetation* ahead of the clearing activity.

8. Vegetation management

(a) Where practicable the permit holder shall avoid clearing *riparian vegetation*.

(b) Where a *watercourse* or wetland is to be impacted by clearing, the permit holder shall maintain the existing surface flow by use of culverts or diversions.

9. Flora management

(a) The permit holder must ensure that:

(i) the boundaries of the area to be cleared are identified and demarcated using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 2020 (GDA20), expressing the geographical coordinates in Eastings and Northings or decimal degrees

(ii) *recorded priority flor*a are identified within the clearing boundary using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 2020 (GDA20), expressing the geographical coordinates in Eastings and Northings or decimal degrees

(b) When undertaking any clearing authorised under this permit, the permit holder must not cause or allow the clearing of more than the *recorded priority flora* within the clearing boundary.

PART III - RECORD KEEPING AND REPORTING

10. 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 GDA2020, expressing the geographical coordinates in Eastings and Northings; (c) the date that the area was cleared; (d) the size of the area cleared (in hectares); (e) actions taken to avoid, minimise, and reduce the impacts and extent of clearing in accordance with condition 5; (f) actions taken to minimise the risk of the introduction and spread of *weeds* in accordance with condition 6; (g) actions taken to conduct directional clearing in accordance with condition 7; and (h) actions taken to avoid clearing *riparian vegetation* and maintain existing surface flow in accordance with condition 8.
2.	In relation to flora management pursuant to condition 9	(a) the date recorded *priority flora* species were cleared; (b) the recorded *priority flora* taxa and number of individuals cleared; (c) the name and location of each *priority flora* species, recorded using a Global Positioning System (GPS) unit set to GDA2020, expressing the geographical coordinates in Eastings and Northings; (d) actions taken to avoid the clearing of *priority flora* species.

11. Reporting

The permit holder must provide to the *CEO* the records required under condition 10 of this permit when requested by the *CEO*.

DEFINITIONS

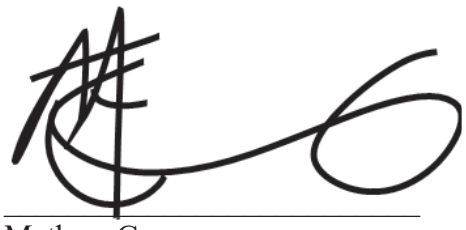
In this permit, the terms in Table have the meanings defined.

Table 2: Definitions

Term	Definition
CEO	Chief Executive Officer of the department responsible for the administration of the clearing provisions under the *Environmental Protection Act 1986*.

Term	Definition
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.
fill	means material used to increase the ground level, or to fill a depression.
dieback	means the effect of *Phytophthora* species on native vegetation.
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.
EP Act	*Environmental Protection Act 1986* (WA)
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.
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 from time to time).
recorded	means individuals of those priority flora species found within the area cross-hatched yellow in Figure 1 of Schedule 1 during the following surveys: (a) *Ashburton Infrastructure Project – Flora and vegetation Assessment* (360 Environmental, 2021); (b) *Detailed Flora and Vegetation Assessment – Onslow Rare Earths Plant* (RPS Group, 2021); (c) *Eremophila forrestii subsp. viridis targeted flora survey August 2022* (Anders Environmental Consulting, 2022a); (d) *Eremophila forrestii subsp. viridis targeted flora survey September 2022* (Anders Environmental Consulting, 2022b); (e) *Targeted Eremophila forrestii subsp. viridis (P3) Survey at Onslow* (EcoLogical Australia, 2021); and (f) *Warrirda Road Detailed and Targeted Flora and Basic Fauna Assessment* (Spectrum Ecology, 2021).
riparian vegetation	has the meaning given to it in Regulation 3 of the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004;*
watercourse	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.

END OF CONDITIONS



Mathew Gannaway
MANAGER
NATIVE VEGETATION REGULATION

Officer delegated under Section 20
of the Environmental Protection Act 1986

5 October 2023

Schedule 1

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

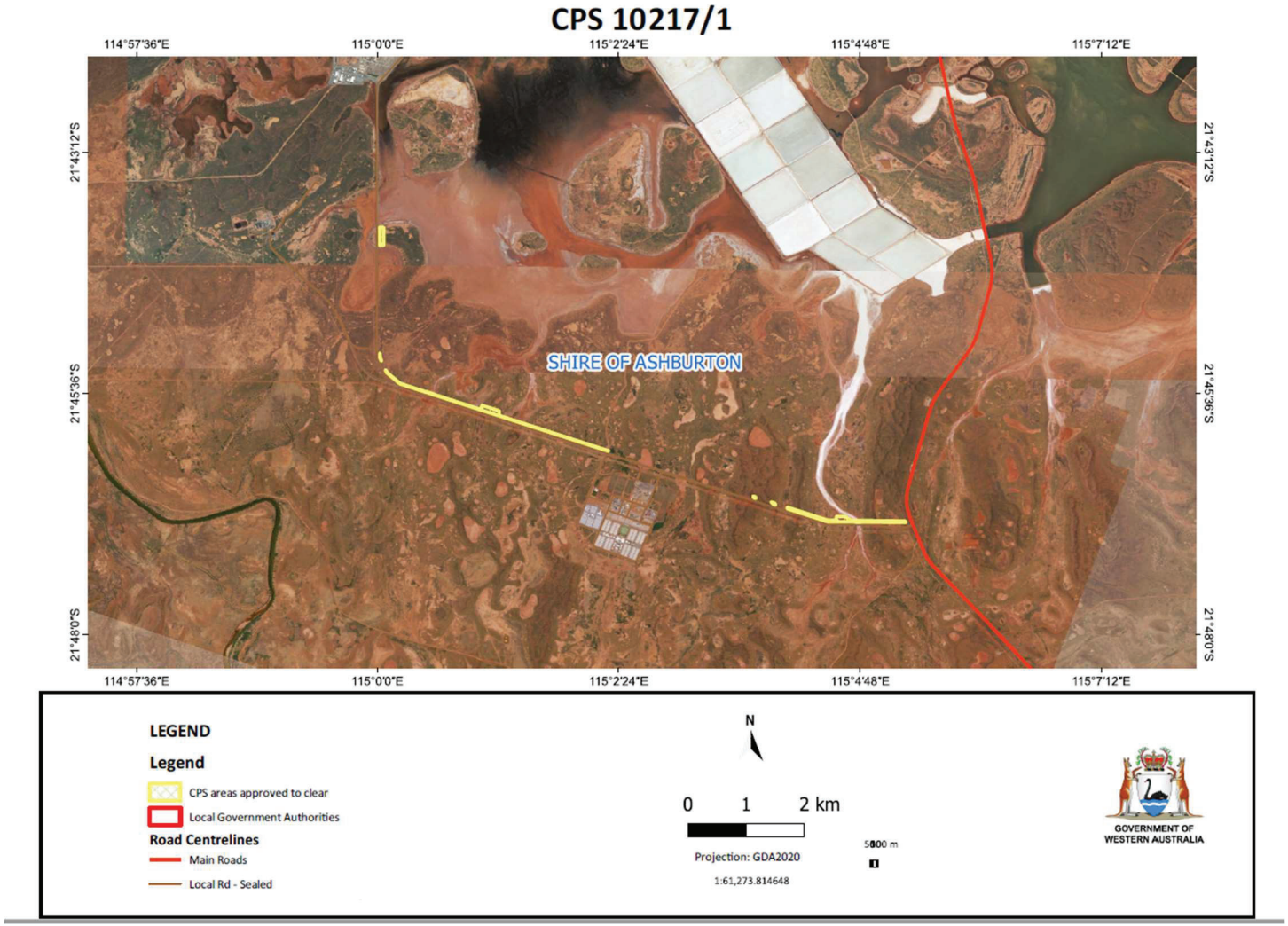


Figure 1: Map of the boundary of the area within which clearing may occur

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 10217/1
Permit type:	Purpose permit
Applicant name:	Mineral Resources Limited
Application received:	31 May 2023
Application area:	13.9 hectares of native vegetation
Purpose of clearing:	Road upgrades to Warrirda Road
Method of clearing:	Mechanical Clearing
Property:	Lot 558 on Deposited Plan 71346 Lot 561 on Deposited Plan 71346 Lot 565 on Deposited Plan 71346 Lot 575 on Deposited Plan 71345 Lot 605 on Deposited Plan 402524 Lot 557 on Deposited Plan 74894
Location (LGA area/s):	Shire of Ashburton
Localities (suburb/s):	Talandji

1.2. Description of clearing activities

The vegetation proposed to be cleared is contained within several discontinuous locations on the northern side of Warrirda Road in the Shire of Ashburton (see Figure 1, Section 1.5). The proposed clearing is to facilitate the support of a temporary bypass track, construction laydown and access areas, cut and fill requirements and additional slope battering (EcoLogical, 2023).

1.3. Decision on application

Decision:	Granted
Decision date:	5 October 2023
Decision area:	13.9 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 two submissions were received. Consideration of the maters raised in the submission are provided in Appendix A.

In making this decision, the Delegated Officer had regard for the site characteristics (see Appendix B), relevant datasets (see Appendix F.1), the findings of biological surveys (see Appendix E), the clearing principles set out in Schedule 5 of the EP Act (see Appendix C), relevant planning instruments and any other matters considered relevant to the assessment (see Section 3). The Delegated Officer noted that the proposed clearing is associated with upgrades to Warrirda Road to facilitate a number road safety upgrades.

The assessment identified that the proposed clearing will result in:

- the loss of one individual *Eremophila forrestii* subsp. *viridis* (Priority 3) plant,
- the loss of native vegetation that is suitable habitat for migratory waterbirds and the Lakeland Downs mouse *(Leggadina lakedownensis)* and potential direct impacts to these fauna if utilising the application area during the time of clearing,
- the loss of native vegetation growing in, or in association with, an environment associated with a watercourse or wetland, and
- the potential introduction and spread of weeds into adjacent vegetation, which could impact on the quality of the adjacent vegetation and its habitat values for conservation significant flora and fauna, and riparian communities.

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 clearing is unlikely to have long-term adverse impacts on the persistence of priority flora at the subpopulation, regional, and species level. The proposed clearing is also unlikely to result in significant adverse impacts to significant habitat for fauna, the quality of surface or underground water, or the ecological values of the riparian communities associated with the watercourses and wetlands within the application area. The Delegated Officer determined that the proposed clearing can be minimised and managed to unlikely lead to an unacceptable risk to these environmental values.

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

- avoid, minimise, and reduce the impacts and extent of clearing,
- 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,
- avoid the clearing of riparian vegetation in the first instance and, where unavoidable, ensure the existing surface flow is maintained by use of culverts or diversions, and
- ensure the clearing of *Eremophila forrestii* subsp. *viridis* is limited to the individual plant recorded within the clearing boundary during the local flora surveys.

1.5. Site map

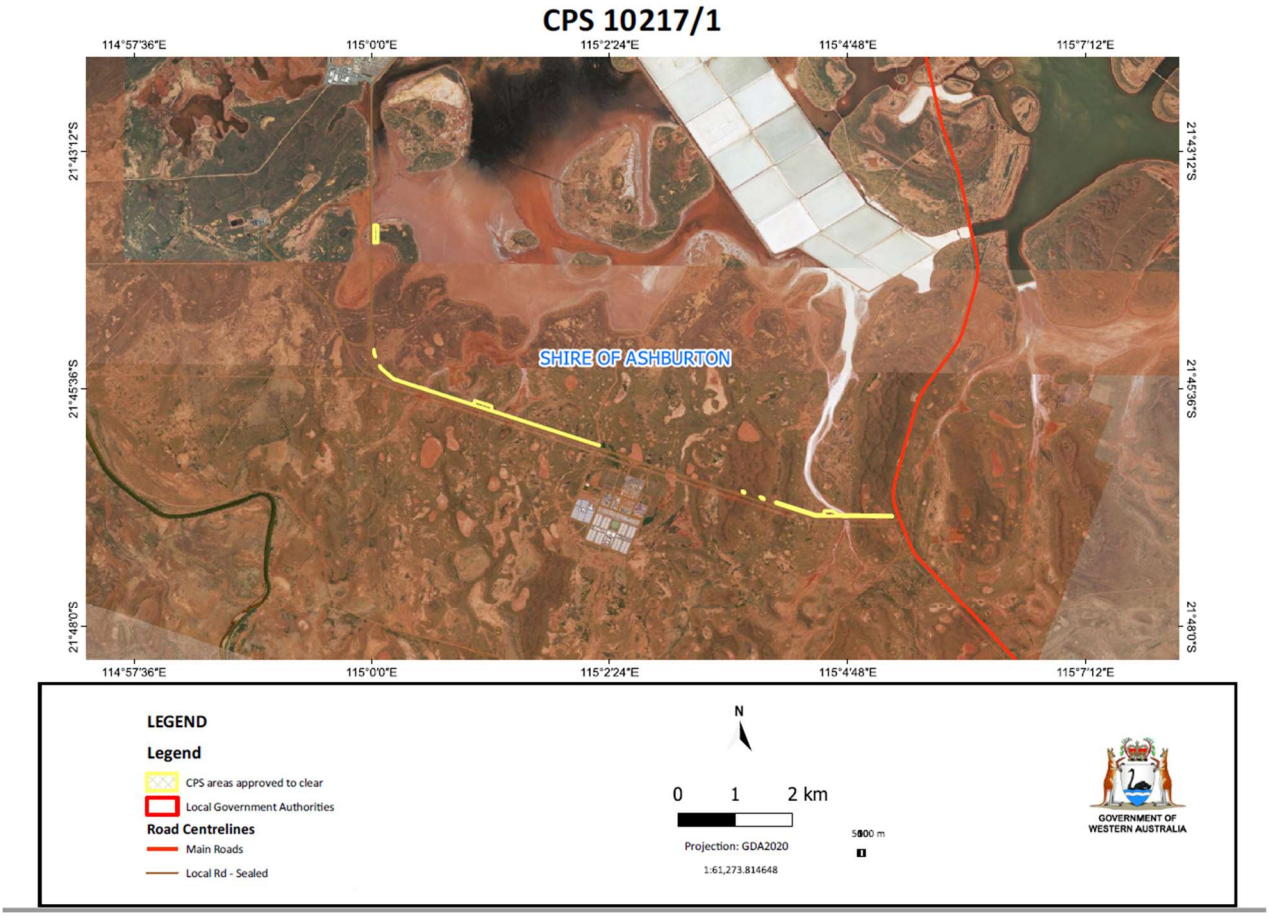


Figure 1 Map of the application area

The areas crosshatched yellow indicate the areas 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)
- *Contaminated Sites Act 2003 (WA)* (CS Act)
- *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act)
- *Rights in Water and Irrigation Act 1914* (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)
- 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

Supporting documentation was submitted by the applicant indicating that the proposed clearing identified a requirement for some additional land adjoining the Main Roads Western Australia (MRWA) road reserve to support a temporary bypass track, construction laydown and access areas, cut and fill requirements and additional slope battering (Mineral Resources, 2023).

During the Proposal design process and the MRWA Native Vegetation Clearing Permit (NVCP) assessment (reference CPS 9534/1), significant changes to the size of the road's disturbance envelope were made to avoid as many *Eremophila forrestii* subsp. *viridis* (P3) and *Triumfetta echinata* (P3) as practicable (Mineral Resources, 2023).

The applicant advised the following measures to mitigate the impacts of the proposed clearing will be undertaken (Mineral Resources, 2023):

- The installation of appropriate surface water drainage infrastructure, to minimise any impacts to local natural hydrological regimes.
- Clearing will be conducted progressively to allow any fauna species currently residing within the Proposal Area to relocate to adjacent vegetation.
- A Construction Environmental Management Plan (CEMP) has been prepared to manage the potential environmental impacts associated with clearing and construction within the adjoining MRWA road reserve. The CEMP was submitted in support of the MRWA NVCP application (CPS 9534/1). The clearing permit (CPS 9534/1) was granted on 9 November 2022. The CEMP has been revised to incorporate commitments made during the assessment process and permit conditions. The plan will be revised again to include the clearing and construction associated with this Proposal and to incorporate any additional clearing permit conditions. There are no new environmental risks associated with the Proposal, relative to those considered for the MRWA NVCP. The CEMP addresses the management of potential impacts on the environment from the Proposal including:
  - o Acid sulfate soils
  - o Dust
  - o Erosion and sedimentation
  - o Noise and Vibrations
  - o Storage and disposal of waste and hazardous materials
  - o Invasive species.

In considering the above, 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

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

The assessment against the clearing principles (see Appendix C) identified that the impacts of the proposed clearing present a risk to biological values (fauna and flora), 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 the site characteristics and habitat preferences of the conservation significant flora species recorded in the local area (See Appendix B) identified that the application area may provide suitable and potentially significant habitat for the following species:

- *Eremophila forrestii* subsp. *viridis* (listed as Priority 3 by DBCA), and
- *Triumfetta echinata* (listed as Priority 3 by DBCA).

A Warrirda Road Detailed and Targeted Flora survey, undertaken over three days in December 2022, overlaps the application area (Spectrum Ecology, 2023). The survey was undertaken outside the ideal timing for the Eremaean

Botanical Province (March-June). However, it was possible to identify the majority of significant flora taxa identified in the desktop assessment.

Eremophila forrestii* subsp. *viridis

Eremophila forrestii subsp. *viridis* is a multi-branched shrub with pink-cream flowers occurring in August and occurs in red to brown sandy soils, usually in *Acacia* shrubland over hummock grassland of *Triodia spp*. (Western Australian Herbarium, 1998-). *Eremophila forrestii* subsp. *viridis* is known from six locations in Western Australia over a range of 1000 kilometres east-west by 700 kilometres north-south from Talandji to Gibson Desert North and is also known from one record in the Northern Territory and one record in South Australia (DBCA, 2022). Advice received from DBCA indicates that, although the species occurs over a large range, the locations of records are disjunct and three known locations are based on records obtained pre-1980, where plants may no longer persist (DBCA, 2022). In addition, the number of individuals has not been recorded at most known locations and the total number of plants in Western Australia is unknown (DBCA, 2022).

The Warrirda Road Detailed and Targeted Flora survey identified a total of 18 individuals of *Eremophila forrestii* subsp. *viridis* within the survey area, of which one individual occurs within the original clearing area of 13.9 hectares (Spectrum Ecology, 2023). It is noted that whilst this individual occurs within the proposal area, it also occurs within a previously approved Hastings NVCP (CPS 9818/1) area, currently being held by Yangibana Pty Ltd, which overlaps the proposal area (EcoLogical, 2023). It should also be noted that there is one other individual that is located on the boundary of the proposal area (see Figure 2).

From DWER's records, seven flora surveys targeting *Eremophila forrestii* subsp. *viridis* have been undertaken in the vicinity of the proposed clearing area between 2021 and 2023. The extent of individuals recorded in these surveys is summarised in Table 1 and the extent of these surveys is captured in Figure 3 below.

Table 1. Summary of known flora and vegetation surveys, conducted in the vicinity of the CPS 10217/1 application area.

Survey Reference	**Survey Title**	**IBSA Reference**	**No.of *Eremophila forrestii* subsp. *viridis* identified**
Spectrum Ecology (2022)	Warrirda Road Targeted Flora Assessment	IBSA-2023-0198	18
Spectrum Ecology (2021)	Warrirda Road Flora and Fauna Assessment	IBSA-2021-0480	1072
RPS (2021)	Detailed Flora and Vegetation Assessment – Onslow Rare Earths Plant	IBSA-2021-0097	1102
EcoLogical Australia (2021)	Targeted *Eremophila forrestii* subsp. *viridis* (P3) Survey at Onslow	IBSA-2021-0076	3559
Anders (2022a)	*Eremophila forrestii* subsp. *viridis* targeted flora survey August 2022	IBSA-2022-0303	281
Anders (2022b)	*Eremophila forrestii* subsp. *viridis* targeted flora survey September 2022	IBSA-2022-0337	1444
		TOTAL	8570*

*NOTE: Approximately 143 records of *Eremophila forrestii* subsp. *viridis* are considered to be duplicate records between surveys and have been removed from the total, based on the individual records overlapping by 2 metres or less.

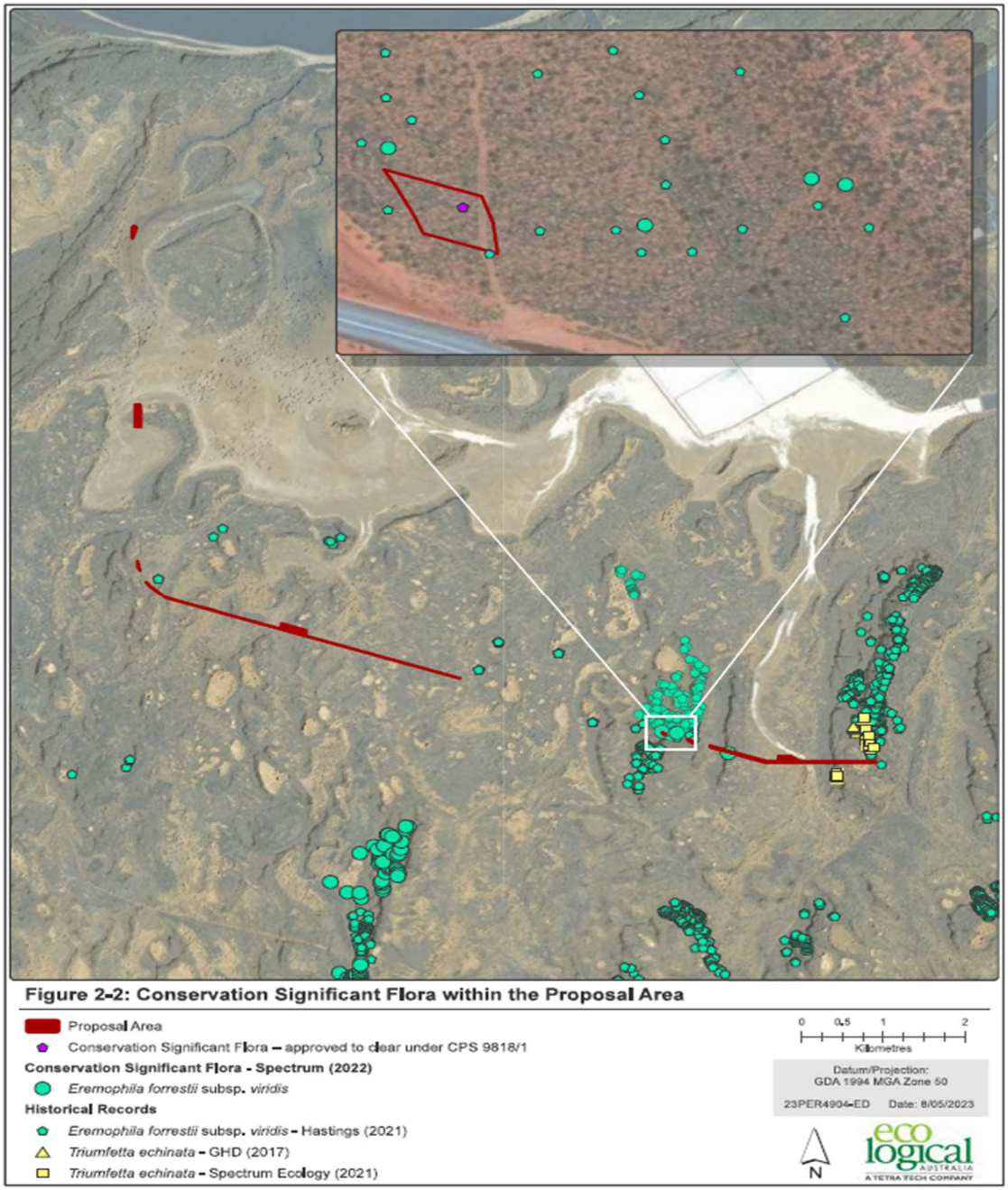


Figure 2. Records of *Eremophila forrestii* subsp. *viridis* from known flora and vegetation surveys conducted in the vicinity of the CPS 10217/1 application area.

In considering impacts to *Eremophila forrestii* subsp. *viridis* resulting from CPS 10217/1, the Delegated Officer also had regard to four additional clearing permit applications in the vicinity of the proposal that may impact the species (CPS 9534/1, CPS 9545/1, CPS 9550/1, and CPS 9818/1). The cumulative impacts of these five proposals will result in the loss of approximately (1741) individuals of *Eremophila forrestii* subsp. *viridis* with potential indirect impacts to an additional 269 individuals and represents impacts to between 20.1 and 23.3 per cent of the regional population.

Although *Eremophila forrestii* subsp. *viridis* has not been well-surveyed over a large range, it is acknowledged that the seven flora surveys outlined in Table 1 are unlikely to have captured the full extent of the subpopulations within the vicinity of the CPS 10217/1 application area, given the surveys were predominantly linear in nature and focused on suitable habitat within and immediately adjacent to proposed disturbance areas. Advice received from DBCA indicates that there are also large areas of unsurveyed suitable habitat and possible unconfirmed subpopulations in the region (DBCA, 2022). Therefore, the true impact to the regional population of *Eremophila forrestii* subsp. *viridis* may be less than the 20.1 to 23.3 per cent that has been assumed from the available survey data and is unlikely to represent a significant impact the species' long-term persistence in the region (DBCA, 2022). In addition, the clearing proposed under CPS 10217/1 relates to linear clearing along an existing road. It is unlikely to result in fragmentation

of the subpopulations of *Eremophila forrestii* subsp. *viridis* in the vicinity of this application area. Given the above, the loss of this individual is unlikely to be significant at subpopulation, regional or species level and does not constitute a significant residual impact to priority flora species. It is considered that the potential for additional impacts to *Eremophila forrestii* subsp. *viridis* resulting from CPS 10217/1 can be adequately mitigated through permit conditioning and the provisions of the CEMP, including the demarcation of the clearing boundaries, the application of exclusion zones for priority flora to be retained, and dust and weed management measures.

Triumfetta echinata
Triumfetta echinata is a prostrate shrub that flowers in August and occurs in red to brown sandy soils, typically in dune systems of *Triodia* hummock grassland (Western Australian Herbarium, 1998-). *Triumfetta echinata* is known from three locations in Western Australia over a range of 40 kilometres east-west by 40 kilometres north-south from Peedamulla to Talandji (DBCA, 2022). An additional southernmost record of *Triumfetta echinata* in Yannarie was recorded in 1905, however, it is not considered to accurately represent the location of collection of the specimen, and it is unlikely that plants persist at this location (DBCA, 2022). Advice received from DBCA indicates that plant numbers have not been recorded at most locations and that the total number of plants cannot be estimated (DBCA, 2022). Based on the uncertainty surrounding the distribution and extent of *Triumfetta echinata*, advice received from DBCA indicates that major disturbance to a known population may represent a significant impact to the conservation status of the species (DBCA, 2022).

The Warrirda Road Detailed and Targeted Flora survey did not record any *Triumfetta echinata* individuals within the greater survey area (Spectrum Ecology, 2023). No *Triumfetta echinata* are proposed to be impacted by the clearing under CPS 10217/1. One individual was proposed to be removed by CPS 10217/1, with the species not known to occur within the application areas of CPS 9545/1, CPS 9550/1, or CPS 9818/1. Therefore, cumulative impacts to *Triumfetta echinata* are not expected to occur as a result of these clearing permit applications and have not been included in this assessment.

Conclusion
Based on the above assessment, the proposed clearing will result in the loss of one individual of *Eremophila forrestii* subsp. *viridis* recorded within the clearing boundary of the seven local flora surveys. No *Triumfetta echinata* are proposed to be impacted. For the reasons set out above, it is considered unlikely to be significant at subpopulation, regional or species level and does not constitute a significant residual impact to priority flora species.

Based on the avoidance and minimisation measures proposed by the applicant, it is considered that the impacts of the proposed clearing on priority flora species can be managed through permit conditioning and by implementing appropriate construction and design methods to maintain surface drainage patterns, as well as dust and weed control measures.

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

- Flora management- Priority flora, which ensures that the clearing of *Eremophila forrestii* subsp. *viridis* is limited to the individual plant recorded within the clearing boundary during the seven local flora surveys, and
- Weed control, which ensures protocols are put in place to limit the introduction and transportation of weed-affected materials.

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

Assessment

The Warrirda Road Basic Fauna Assessment recorded five fauna habitat types within the greater survey area:

- Sand Plains, covering approximately 9.9 hectares and described as areas of scattered shrubs of *Acacia tetragonophylla*., *Acacia synchronicia*, and **Vachellia farnesiana* over moderate to open grass cover of *Triodia epactia* and **Cenchrus ciliaris* in red sand and sandy clay, intersected by a series of drainage lines and clay pans,
- Sand Dunes, covering approximately 2.0 hectares and described as areas of red sand dunes characterised by sparse to moderate shrubs of *Acacia stellaticeps*, *Scaevola sericophylla* and *Grevillea stenobotrya* with a ground layer of *Triodia epactia* and areas of **Cenchrus ciliaris*,
- Tidal Mudflats and Claypans, covering approximately 1.3 hectares and described as seasonally or tidally inundated areas with little vegetation present other than a fringing layer of *Tecticornia auriculata* or *Tecticornia indica* subsp. *leiostachya* with **Cenchrus ciliaris* present in some areas,

- *Tecticornia* Shrubland, covering approximately 1.0 hectare and described as areas of scattered *Tecticornia auriculata* or *Tecticornia indica* subsp. *leiostachya* shrubs with sparse *Eragrostis pergracilis* or **Cenchrus ciliaris* which was present in some areas ranging from a sparse to dense layer in orange clay, and
- Tall Mesquite Shrubland, covering approximately 0.1 hectares and described as a dense thicket of **Prosopis pallida* (Mesquite) over **Cenchrus ciliaris* grass on sandy clay (Spectrum Ecology, 2021).

Noting the findings of the Warrirda Road Basic Fauna Assessment and the habitat preferences of the conservation significant fauna species recorded in the local area (See Appendix B), the application area was considered to contain suitable habitat for the following:

- Migratory waterbirds (37 species)
- *Falco peregrinus* (peregrine falcon) (listed as other specially protected fauna by DBCA), and
- *Leggadina lakedownensis* (Lakeland Downs mouse or northern short-tailed mouse) (listed as Priority 4 by DBCA)

Migratory waterbirds

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

- Twenty-eight species of migratory waterbird protected under International Agreements, which may inhabit the Tidal Mudflats and Claypans habitat within the application area for foraging or roosting habitat, or as transient habitat during migration (Commonwealth of Australia, 2015). Two of these migratory waterbirds, *Gelochelidon nilotica* (gull-billed tern) and *Sternula albifrons* (little tern), were recorded flying over the application area during the fauna assessment (Spectrum Ecology, 2021).
- *Calidris canutus* (Red knot) (Endangered under EPBC Act and Vulnerable under BC Act) typically inhabit intertidal mudflats, sand flats and sandy beaches of sheltered coasts, estuaries, or terrestrial saline wetlands near the coast (TSSC, 2016a). The Tidal Mudflats and Claypans habitat within the application area may provide suitable roosting and foraging habitat for this species, as well as transient habitat during migration. The red knot is not known to breed in Australia, and the application area is not considered likely to provide suitable breeding habitat for this species (TSSC, 2016a).
- *Calidris ferruginea* (Curlew sandpiper) (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 Tidal Mudflats and Claypans habitat within 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.
- *Calidris tenuirostris* (Great knot) (Critically Endangered under EPBC Act and BC Act) inhabits intertidal mudflats and sandflats in sheltered coasts, including bays and estuaries (TSSC, 2016b). They forage on the moist mud, and often roost on beaches or in nearby low vegetation, such as mangroves or dune vegetation (TSSC, 2016b). The Tidal Mudflats and Claypans habitat within 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.
- *Charadrius leschenaultii* (Greater sand plover) (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, 2016c). The Tidal Mudflats and Claypans habitat within the application area may provide suitable roosting and foraging habitat for this species, as well as transient habitat during migration. The greater sand plover is not known to breed in Australia, and the application area is not considered likely to provide suitable breeding habitat for this species (TSSC, 2016c).
- *Charadrius mongolus* (Lesser sand plover) (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, 2016d). The Tidal Mudflats and Claypans habitat within the application area may provide suitable roosting and foraging habitat for this species, as well as transient habitat during migration. The lesser sand plover is not known to breed in Australia, and the application area is not considered likely to provide suitable breeding habitat for this species (TSSC, 2016d).
- *Limosa lapponica menzbieri* (Bar-tailed godwit, northern Siberian) (Critically Endangered under EPBC Act and BC Act) typically inhabit coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays (TSSC, 2016e). The Tidal Mudflats and Claypans habitat within the application area is unlikely to provide suitable breeding habitat, as the species does not breed in Australia, but may provide suitable roosting and foraging habitat for this species, as well as transient habitat during migration.
- *Numenius madagascariensis* (Eastern curlew) (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 Tidal Mudflats and Claypans habitat within 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.

- *Sternula nereis nereis* (Fairy tern) (Vulnerable under EPBC Act and BC Act) utilises a variety of habitats including offshore, estuarine, or lacustrine (lake) islands, wetlands, beaches and spits (DSEWPC, 2011). The Tidal Mudflats and Claypans habitat within the application area may provide suitable roosting and foraging habitat for this species, as well as transient habitat during migration. Whilst it is acknowledged that the application area occurs within the breeding range of the fairy tern, it is noted that the species typically nests on sandy, shelly beaches, above the high-water mark and often in clear view of the water (DSEWPC, 2011). As the application area occurs approximately three kilometres inland from the coast and the Tidal Mudflats and Claypans habitat is more representative of a saline coastal flat or claypan than a sandy beach, it is not considered likely that the application area would be utilised as nesting habitat for the fairy tern.
- *Tringa brevipes* (Grey-tailed tattler) (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 Tidal Mudflats and Claypans habitat within the application area may provide suitable roosting and foraging habitat for this species, as well as transient habitat during migration. The grey-tailed tattler is not known to breed in Australia, and the application area is not considered likely to provide suitable breeding habitat for this species (Higgins and Davies, 1996).

While the aforementioned waterbird species have the potential to occur within the application area, it is acknowledged that the Tidal Mudflats and Claypans habitat within the application area is well-represented within the local area and the greater Carnarvon bioregion. As none of the waterbird species are expected to breed within the application area, the proposed clearing is also not considered likely to impact nest sites or 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. It is considered that the potential for direct impacts to individual waterbirds utilising the Tidal Mudflats and Claypans habitat within the application area for foraging or roosting at the time of the proposed clearing can be suitably mitigated through the application of slow, directional clearing.

Peregrine falcon

The peregrine falcon typically nests on rocky ledges in tall, vertical cliff faces and gorges, or in tall trees associated with drainage lines and can hunt in a range of habitat types including timbered watercourses, riverine environments, wetlands, plains, open woodlands, and pylons and spires of buildings (Australian Museum, 2021). The Warrirda Road Basic Fauna Assessment identified that, given the widespread nature of the species and the proximity of existing records, the application area may provide suitable foraging habitat for the peregrine falcon, particularly along drainage lines (Spectrum Ecology, 2021). However, the application area does not contain suitable nesting habitat for the peregrine falcon and the species is likely to occur infrequently and at low densities within the application area (Spectrum Ecology, 2021). Given the extent of similar, suitable habitat in the local area and that the peregrine falcon is a highly 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 peregrine falcon in the local area.

Lakeland Downs mouse

The Lakeland Downs mouse occupies spinifex and tussock grasslands in *Acacia* shrublands 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). The Warrirda Road Basic Fauna Assessment identified that the Sand Plains habitat within the application area may provide suitable substrate and vegetation for the Lakeland Downs mouse (Spectrum Ecology, 2021). However, no individuals, burrows or other evidence of the Lakeland Downs mouse were recorded within the greater survey area during the fauna assessment (Spectrum Ecology, 2021). Whilst it is acknowledged that the proposed clearing will result in the loss of up to 13.9 hectares of suitable habitat for the Lakeland Downs mouse, it is noted that this impact is distributed across a linear footprint along a length of approximately 22 kilometres, that runs directly adjacent to the existing Warrirda road. It is also acknowledged that the Sand Plains habitat within the application area was noted to be well-represented in the immediate vicinity of the survey area during the fauna assessment (Spectrum Ecology, 2021) and that similar habitat is also likely to be well-represented in the extensively vegetated local area. Given the extent of suitable habitat in the local area, that no evidence of individuals was observed during the fauna assessment, and that the species has a scattered distribution on the mainland across northern Australia and on offshore islands including Thevenard and Serrurier Islands, it is not expected that the application area comprises significant habitat for the Lakeland Downs mouse or is critical for the continuation of the species. Noting the linear nature of the proposed clearing and that abundant suitable habitat for the Lakeland Downs mouse is located adjacent to the application area, it is expected that any individuals present at the time of clearing

will be able to disperse into adjacent suitable habitat given the application of slow, directional clearing and are unlikely to be significantly impacted.

Conclusion
Based on the above assessment, the application area is not considered likely to represent significant habitat for any conservation significant fauna species or to be critical for the continuation of the species. However, it is acknowledged that the proposed clearing has the potential to result in direct impacts to migratory waterbirds and the Lakeland Downs mouse, if individuals are present at the time of clearing. For the reasons set out above, it is considered that direct impacts to threatened and priority fauna species can be managed through the application of slow, directional clearing and that the proposed clearing 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:

- 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 impacts to individuals.

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

Assessment
As the application area intersects saline coastal flats and transects several minor, non-perennial tributaries, waterbodies, and drainage lines, 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 or wetland. It is also acknowledged that the application area contains *Tecticornia* shrublands in tidal mudflats and claypans that are indicative of wetland and riparian areas. Further, as the application area is mapped within the Pilbara Surface Water Area, any clearing within the vicinity of these watercourses has the potential to impact surface water quality within a proclaimed water resource under the RIWI Act. Based on vegetation mapping from the Warrirda Road Detailed and Targeted Flora and Basic Fauna Assessment (Spectrum Ecology, 2021), the proposal will result in the clearing of up to 1.8 hectares of vegetation growing in association with a watercourse or wetland within six patches across a linear footprint of 22 kilometres in length. Only a small portion of the proposed clearing will impact a watercourse or wetland. It is acknowledged that the vegetation proposed to be cleared runs directly adjacent to the existing Warrirda Road which have historically disturbed the saline coastal flats and non-perennial tributaries, waterbodies, and drainage lines within the application area.

Given the extent of the proposed clearing across a linear footprint, the non-perennial nature of the waterbodies, the extensively vegetated local area, and the applicant's commitments to minimising erosion and maintaining natural surface water flows, 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 watercourses and coastal flats within the application area.

Given parts of the application area contain invasive weeds, it is acknowledged that the proposed clearing may cause degradation of adjacent remnant native vegetation and riparian vegetation by facilitating the spread of weeds, in particular the Declared Pests **Neltuma pallida* (Mesquite) and **Tamarix aphylla* (Athel tree). However, noting the extent of the proposed clearing across a linear footprint and that the applicant has committed to implementing hygiene protocols to avoid the spread of invasive weeds in the CEMP, it is considered that a weed management condition will adequately minimise this risk.

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 or wetland and may facilitate the spread of invasive weeds into adjacent 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 watercourses and wetlands within the application area.

It is considered that the impacts of the proposed clearing can be managed through permit conditioning to avoid clearing riparian vegetation where practicable and maintain surface hydrology through use of appropriate infrastructure, and by taking steps to minimise the risk of the introduction and spread of weeds. In considering the above, the Delegated Officer determined that the impacts of the proposed 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:

- Vegetation management - watercourse and wetland surface flow, which ensures that riparian vegetation is avoided from clearing in the first instance and that, where clearing of a watercourse or wetland is unavoidable, the existing surface flow is maintained by use of culverts or diversions, and
- weed control, which ensures protocols are put in place to limit the introduction and transportation of weed affected materials.

3.3. Relevant planning instruments and other matters

The clearing permit was advertised on DWER's website on 4 August 2023, inviting submissions from the public within a 21-day period. Two submissions were received in relation to this application. Consideration of the matters raised is discussed in Appendix A.

The Shire of Ashburton advised DWER that, pursuant to the Shire of Ashburton Local Planning Scheme No. 7 and the Deemed Provisions of the Planning and Development (Local Planning Schemes) Regulations 2015, local government approvals are not required, and that the proposed clearing is consistent with the Shire's Local Planning Scheme (Shire of Ashburton, 2022). The Shire did not raise any concerns in relation to the proposed clearing (Shire of Ashburton, 2022).

The application area intersects several reported contaminated sites. However, none of these areas have been confirmed contaminated or classified under the *Contaminated Sites Act 2003.*

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

End

Appendix A. Details of public submissions

Two submissions were received raising nine grounds in total, with supporting information provided as comments under each ground of submission. Where the comments within the grounds of submission raised similar concerns, they have been combined in the summary table below to provide a streamlined approach.

Summary of comments	Consideration of comment
The area proposed to be cleared is inconsistent and therefore ambiguous with a lack of reasoning.	Spatial data indicates that there is a 0.5-hectare area that is devoid of native vegetation within the local area. The area proposed to be cleared was reduced from 14.4 hectares to 13.9 hectares during the validation stage of the application to account for this area. Mineral Resource Limited's (MinRes) supporting documentation states the reason for the proposed clearing is for road construction upgrades to facilitate the safe transport of ore to port along Warrirda Road.
Surveys conducted are inadequate to properly assess impacts on flora or fauna and potential variance with Clearing Principles (a), (b) and (c). Submissions raised the following concern with regards to the surveys: • The Applicant has not conducted a fauna survey of the application area, • The flora survey of the application area is inadequate, • Reliance on an unverified assumption with respect to *Eremophila forrestii* subsp*. viridis*	DWER's assessment of clearing permit applications is undertaken in accordance with *A guide to the assessment of applications to clear native vegetation* (DER, 2013) and *Procedure: Native vegetation clearing permits* (DWER, 2019). DWER's assessment is a risk-based and evidence-based judgment in accordance with the requirements of the EP Act on whether a clearing permit application is likely to have a significant effect on the environment. In considering whether to grant a clearing permit, the Delegated Officer must take into account not only the clearing principles, but also any planning instruments or other matters considered to be relevant. In accordance with section 51H of the EP Act, a clearing permit may be granted subject to conditions as necessary for the purposes of preventing, controlling, abating, or mitigating environmental harm or directly or indirectly offsetting the loss of the cleared vegetation, and proportionate to the assessed potential impact on the environment. During the assessment of CPS 10217/1, EPA and DBCA guidance was reviewed, in addition to advice received for previous clearing permit applications. The Department considers surveys provided to past and current applications to be adequate for the assessment for CPS 10217/1 (See Section 3.2.1). Approximately 137 *Triumfetta echinata* individuals were recorded within 600 metres of the eastern end of the Proposal Area between 2017 and 2021 due to the presence of suitable habitat (Sand Dunes) (Spectrum 2021). No individuals will be impacted during the proposed clearing of CPS 10217/1. Only one individual of *Eremophila forrestii* subsp*. viridis* is proposed to be impacted (See section 3.2.1)
Information about potential water-related impacts and proposed mitigation measures is inadequate to properly assess variance with Clearing Principles (f), (g), (i) and (j)	The Departments assessment did not identify any long-term adverse effects to water- related impacts. Specific conditions will be implemented on the permit (See section 3.2.3).

Summary of comments	Consideration of comment
The application fails to provide adequate information about the proposed measures to prevent the spread of Mesquite and Athel tree weeds	Applicant's supporting documentation states there will be a general weed management plan (Mineral Resources, 2023). The Department will include a weed hygiene management condition on the permit to prevent the further spread of weeds (See section 3.2).
The application fails to properly assess potential cumulative impacts of the proposed clearing and needs to be reviewed cumulatively to CPS 9534/1	The Department has assessed cumulative impacts of preceding permits in the area (See 3.2.1 Table 2).
The application does not comply with the requirement to consider any relevant planning instruments	In considering a clearing permit application, the Delegated Officer shall have regard for any developmental approval, planning instrument or other matter that they consider relevant, in accordance with section 51O of the EP Act (See section 3.3).
The application fails to consider potential impacts on Aboriginal cultural heritage	The entirety of the NVCP application area has been subject to heritage investigations with representatives of the Thalanyji Native Title Holders, coordinated and nominated through their Prescribed Body Corporate, the Buurabalayji Thalanyji Aboriginal Corporation (BTAC). These heritage surveys culminated in the lodgement of a Notice seeking Ministerial consent under Section 18 of the *Aboriginal Heritage Act 1972* (then in force) in April 2023 for identified heritage places that could not be avoided. Ministerial consent was issued in July 2023. Prior to the lodgement of this Notice, the applicant agreed a Cultural Heritage Management Plan (CHMP) with BTAC that dealt with management of both direct and potential indirect impacts on heritage places outside the haul road construction envelope. Both the Notice and CHMP were presented to a Thalanyji Common Law Holders Meeting (convened by BTAC) in early April 2023, which resulted in endorsement of the CHMP by the Thalanyji People and a letter of non-objection to the lodgement of the Section 18 Notice being issued by BTAC. One of the key elements of the CHMP was that the cultural material in the construction envelope should be salvaged by a team of Thalanyji People supported by professional archaeologists of their choosing. The applicant facilitated this work, which was completed in August 2023. A further key CHMP management strategy is the engagement of Thalanyji People as heritage monitors for the duration of initial construction activities, which is already in place for all Mineral Resources activities across the Thalanyji Determination area.
Majority of vegetation condition is rated Good-Very Good and should be conserved, more analysis should be undertaken to confirm that the >30% retention is realised in a highly fragmented landscape.	The Departments assessment of vegetation extent is beyond the recommended greater than 30% retention. See section B.2 for vegetation extent in the local and surrounding area.
Removing vegetation and habitat on the presumption Threatened species will not return is a mistake, habitat should be preserved	DWER's assessment notes that fauna species will intermittently utilise the application area. However, it is unlikely to represent significant habitat for the continuation of threatened species. A slow directional clearing condition will be conditioned on the permit

Summary of comments	Consideration of comment
	(See section 3.2.2.) to minimise impacts to individuals that may be present at the time of clearing.

Appendix B. Site characteristics

B.1. Site characteristics

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

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 spans sections of the length of the existing Warrirda Road. The proposed clearing area is adjacent to expansive tracts of remnant native vegetation, as well as land developed as part of Wheatstone Project. Spatial data indicates the local area (50-kilometre radius from the centre of the area proposed to be cleared) retains approximately 98.73 per cent of the original native vegetation cover.
Ecological linkage	The application area does not intersect any formally mapped ecological linkages. Although, the vegetation may be providing some connectivity along the existing road infrastructure, it is not considered likely to be contributing significantly to vegetation connectivity or linkage values in the local area, noting the extensively vegetated region and adjacent expansive tracts of connected vegetation.
Conservation areas	The closest conservation area is Locker Island Nature Reserve located approximately 2.5 kilometre west of the application area, off the coast of the Port of Ashburton. The closest mainland conservation area is Cane River Conservation Area, located approximately 50 kilometres south-east of the application area.
Vegetation description	A flora and vegetation survey undertaken by Spectrum Ecology & Spatial in May 2021 identified eight vegetation units within the greater survey area, of which eight vegetation units occur within the proposed clearing area, outlined in Table 2. Table 2. Vegetation units within the clearing footprint for CPS 10217/1 (EcoLogical, 2023)

Vegetation unit	Vegetation Type Description	Extent to be cleared (ha)	% of area to be cleared
Claypans (C1)	*Tecticornia auriculata* or *Tecticornia indica* subsp. *leiostachya* low open shrubland over *Eragrostis pergracilis* and/or *Cenchrus ciliaris* low sparse grassland.	1.0	6.9
Claypans (C2)	+/- *Tecticornia auriculata* low isolated shrubs*	1.3	9.0
Dunes (D1)	+/- *Grevillea stenobotrya* tall sparse shrubland over *Scaevola sericophylla*, +/- *Acacia stellaticeps* mid sparse shrubland over *Triodia epactia* open hummock grassland.	2.0	13.9
Drainage Line (DL1)	+/-*Eucalyptus camaldulensis* subsp. refulgens low isolated trees over *Acacia tetragonophylla* and **Vachellia farnesiana* tall open shrubland over	NA	0

Characteristic	Details

	**Cenchrus ciliaris* sparse tussock grassland.		
Plains (P1a)	*+/- Acacia tetragonophylla* tall, isolated shrubs over *Triodia epactia* open hummock grassland	3.3	22.9
Plains (P1b)	*Cenchrus ciliaris* low open tussock grassland, with *+/- Triodia epactia* sparse hummock grassland	5.9	41.0
Plains 2 (P2)	*Acacia synchronicia*, *Acacia tetragonophylla* and **Vachellia farnesiana* tall sparse shrubland over *Scaevola spinescens* and *Sesbania cannabina* mid sparse shrubland over *Diplachne fusca* subsp. *fusca*, *Eulalia aurea* and **Cenchrus ciliaris* sparse tussock grassland.	0.7	4.9
Plains 3 (P3)	**Neltuma pallida* tall closed shrubland over **Cenchrus ciliaris* open tussock grassland.	0.1	0.7
Cleared	Cleared with no vegetation	<0.1	0.7
Total		14.4	100

The full survey descriptions and mapping is available in Appendix E.

This is consistent with the mapped Beard vegetation types:

- Beard 670, which is described as hummock grasslands, shrub steppe; scattered shrubs over *Triodia basedowii* (Shepherd et al, 2001)
- Beard 589, which is described as a mosaic of short bunch grassland, savanna, and grass plain, and hummock grasslands, grass steppe and soft spinifex,
- Beard 127, which is described as bare areas and mud flats.

Vegetation condition

A flora and vegetation survey undertaken by Spectrum Ecology & Spatial in May 2021 identified that the vegetation within the proposed clearing is in Very Good to Completely Degraded (Trudgen, 1991) condition, as outlined in Table 3.

Table 3. Vegetation condition within the clearing footprint for CPS 10217/1 (EcoLogical, 2023)

Condition rating (Trudgen, 1991)	Extent within area to be cleared (ha)	% of area to be cleared
Very Good	3.5	24.3
Good	4.4	30.6
Poor	6.3	43.8
Degraded	0.1	0.7
Completely Degraded	<0.1	0.6
Total	14.4	100

The full Trudgen (1991) condition rating scale is provided in Appendix D. The full survey descriptions and mapping are available in Appendix E.

Climate and landform

The application area is located on flat topography within Cape Range sub-region, characterised by limestone ranges and extensive areas of red dune fields, coastal beach dunes and mud flats. The climate is arid, semi desert to sub-tropical climate, with variable summer and winter rainfall; cyclonic activity can be significant (Kendrick and Mau, 2022)

Characteristic	Details
Soil description	The soil within the application area is mapped as the following systems: • Onslow System (201On), described as undulating sandplains, dunes and level clay plains supporting soft spinifex grasslands and minor tussock grasslands, • Dune System (201Du), described as dune fields supporting soft spinifex and minor hard spinifex grasslands, and • 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 (DPIRD, 2022).
Land degradation risk	While the mapped soils generally are not prone to land degradation, sandy units of the Onslow System and Dune System are susceptible to wind erosion when bared by overgrazing or fire, but revegetate rapidly after rain (Van Vreeswyk et al., 2004). Clay plains with tussock grasses within the Onslow System are also sensitive to overgrazing and are susceptible to erosion (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).
Waterbodies and Hydrogeography	The desktop assessment and aerial imagery indicated that the application area intersects several saline coastal flats. The application area also transects several non-perennial lakes and non-perennial tributaries. The application area is mapped within the Pilbara Surface Water Area and the Pilbara Groundwater Area proclaimed under the 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 7000 to 14000 milligrams per litre total dissolved solids.
Flora	The desktop assessment identified that a total of nine conservation significant flora species have been recorded in the local area, comprising of one priority 1 (P1) flora, seven priority 3 (P3) flora and one priority 4 (P4) flora (Western Australian Herbarium, 1998-). None of these existing records occur within the application area, however there is one record of *Eremophila forrestii* subsp. v*iridis* (P3) that occurs on the border of the proposed area. This is not considered significant for the survival of the local population (Figure 2) No flora species listed as threatened under the BC or EPBC Act have been recorded in the local area. With consideration for the site characteristics set out above, relevant datasets (See Appendix F.1), the habitat preferences and conservation statuses of the aforementioned species, the distribution and extent of existing records, and biological survey information (Spectrum Ecology, 2021), the application area provides suitable habitat for two priority flora species and impacts to these species required further consideration (See Appendix B.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) (Themeda grasslands) TEC, located approximately 241 kilometres east of the application area. The closest state-listed priority ecological community (PEC) is an occurrence of the Tanpool Land System PEC, located approximately 53 kilometres east of the application area.

Characteristic	Details
	No TECs or PECs were recorded within the application area (Spectrum Ecology. 2021).
Fauna	The desktop assessment identified that a total of 70 threatened or priority fauna species have been recorded in the local area, including 20 threatened fauna species, 11 priority fauna species, 34 fauna species protected under international agreement and five other fauna specially protected fauna species (DBCA, 2007). With consideration for the site characteristics set out above, relevant databases (See Appendix F.1), the habitat preferences and conservation statuses of the aforementioned species, the distribution and the extent of existing records, and biological survey information (EcoLogical, 2023), the application area may provide suitable habitat for 39 conservation significant fauna species and impacts to these species required further conservation (See Appendix B.4).

B.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*					
Carnarvon	8382890.35	8360801.46	99.74	1020434.08	12.17
Vegetation complex*					
Beard vegetation association 670	147810.16	147793.61	99.99	17242.88	11.67
Beard vegetation association 589	806985.08	802646.84	99.46	15304.39	1.9
Beard vegetation association 127	716160.82	691516.26	96.56	83831.67	11.71
Vegetation Complex within IBRA Bioregion*					
Beard vegetation association 670 (Carnarvon)	147808.61	147792.06	99.99	17242.88	11.67
Beard vegetation association 589 (Carnarvon)	78100.80	77834.93	99.66	0	0
Beard vegetation association 127 (Carnarvon)	102780.91	101489.55	98.74	1996.31	1.94
Local area					
50km radius	537495.90	530713.25	98.73	-	-

*Government of Western Australia (2019)

B.3. Flora analysis table

With consideration for the site characteristics set out above, relevant datasets (see Appendix F.1), the distribution and extent of existing records, and biological survey information (EcoLogical, 2023), impacts to the following conservation significant flora required further consideration.

Species name	Conservation status	Suitable habitat features ? [Y/N]	Suitable vegetation type? [Y/N]	Suitable soil type? [Y/N]	Distance of closest record to application area (km)	Number of known records (total)	Are surveys adequate to identify? [Y, N, N/A]
Eremophila forrestii subsp. viridis	P3	Y	Y	Y	0.8	3	Y
Triumfetta echinata	P3	Y	Y	Y	0.4	3	Y

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

B.4. Fauna analysis table

Species name	Conservation status	Suitable habitat features? [Y/N]	Suitable vegetation type? [Y/N]	Distance of closest record to application area (km)	Number of known records (total)	Are surveys adequate to identify? [Y, N, N/A]
Calidris canutus (red knot)	EN	Y	Y	7.5	3	Y
Charadrius mongolus (lesser sand plover)	EN	Y	Y	1.4	33	Y
Charadrius leschenaultia (greater sand plover)	VU	Y	Y	1.4	106	Y
Calidris ferruginea (curlew sandpiper)	CR	Y	Y	9.7	5	Y
Calidris tenuirostris (great knot)	CR	Y	Y	1.6	11	Y
Falco peregrinus (peregrine falcon)	OS	Y	Y	1.7	5	Y
Leggadina lakedownensis (lakeland downs mouse)	P4	Y	Y	1.7	348	Y
Limosa lapponica menzbieri (bar-tailed godwit)	CR	Y	Y	3.2	4	Y
Migratory waterbirds (28 species)	MI	Y	Y	<10	-	Y
Numenius madagascariensis (eastern curlew)	CR	Y	Y	7.5	29	Y
Sternula nereis nereis (fairy Tern)	VU	Y	Y	12.7	51	Y
Tringa brevipes (grey-tailed tattler)	P4	Y	Y	1.4	96	Y

T: threatened, CR: critically endangered, EN: endangered, VU: vulnerable, P: priority, MI: migratory species protected under International Agreement, OS: other specially protected fauna

Appendix C. 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 contains 13.9 hectares of tidal mudflats and claypans, sand plains and dunes, *Tecticornia* spp. shrubland, and Mesquite shrubland over hummock and tussock grasslands that are well-represented in the local area and region but contains suitable habitat for priority flora and conservation significant fauna species.	At variance	Yes *Refer to Section 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 contains suitable habitat for conservation significant fauna.	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."* Assessment: No threatened flora species are known to occur within a 50-kilometre radius of the application area. Therefore, the area proposed to be cleared is unlikely to contain suitable or significant habitat necessary for the continued existence of threatened for a species.	Not likely to be at variance	No
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 is unlikely to be representative of any TEC listed under the BC Act or EPBC Act. Given the separation from the nearest TEC through road infrastructure, the proposed clearing is not likely to impact or be necessary for the maintenance of any 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. The vegetation proposed to be cleared is not considered to be part of a significant ecological linkage in the 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 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 the application area transects a saline coastal flat and several non-perennial watercourses, the vegetation is considered to be growing in, or in association with, an environment associated with a	At variance	Yes *Refer to Section 3.2.3, above.*

Assessment against the clearing principles	Variance level	Is further consideration required?
watercourse or wetland and the proposed clearing has the potential to impact on- or off-site hydrology and water quality.		
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 susceptible to wind erosion where surface cover is lost. However, it is acknowledged that cleared areas will be developed into permanent road infrastructure and that bare ground will not be left exposed to weathering for extended periods. Noting this, the long, linear nature of the application area, and the extent of the proposed clearing in the context of the extensively vegetated local area, the proposed clearing is not considered likely to have an appreciable impact on land degradation	Not likely to be at variance	No
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 a saline coastal flat and several non-perennial water courses are recorded within the application area, the proposed clearing has the potential to impact surface or ground water quality.	Not likely to be at variance	Yes *Refer to Section 3.2.3, above.*
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: Given the application area intersects a saline coastal flat and includes tidal mudflat and claypan vegetation, portions of the application area may be seasonally inundated. However, the mapped soils and topographic contours in the surrounding area do not indicate the proposed clearing is likely to contribute to increased incidence or intensity of flooding or waterlogging. Further, noting the long, linear nature of the application area, and the extent of the proposed clearing in the context of the extensively vegetated area, the proposed clearing is not considered likely to cause, or exacerbate, the incidence of flooding.	Not likely to be at variance	No

Appendix D. Vegetation condition rating scale

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

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.

Condition	Description
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 E. Biological survey information excerpts

Warrirda Road Detailed and Targeted Flora and Basic Fauna Assessment (Spectrum Ecology, 2021) The applicant commissioned the 'Warrirda Road Detailed and Targeted Flora and Basic Fauna Assessment' to delineate key flora, fauna, soil, and surface water (wetland) values within the application area (Spectrum Ecology, 2021). The 'Warrirda Road Detailed and Targeted Flora and Basic Fauna Assessment' comprised a desktop assessment, flora and vegetation assessment, and terrestrial fauna assessment (Spectrum Ecology, 2021). Survey descriptions and mapping excised from the flora and fauna assessments is available in Figures 5 to 9 and Table 5 below.

Desktop Assessment

The desktop assessment for the 'Warrirda Road Detailed and Targeted Flora and Basic Fauna Assessment' was undertaken by experienced ecologists and involved the following:

- A review of all relevant and available flora, vegetation, and fauna data sources in the vicinity of the survey area,
- A review of previous flora and fauna assessments conducted in the vicinity of the survey area, and
- A likelihood of occurrence assessment for conservation significant flora and fauna identified in the vicinity of the survey area, including consideration of the distance of existing records to the survey area and the potential for appropriate habitats to occur within the survey area based on geology, vegetation mapping and aerial imagery (Spectrum Ecology, 2021).

Flora and Vegetation Assessment

The methods of the flora and vegetation assessment were in accordance with the EPA Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment (EPA, 2016). The flora and vegetation assessment was undertaken by an experienced botanist and involved the following:

- Field surveys over three days between 4 and 7 May 2021, including comprehensive sampling of 12 quadrats, 13 relevès, and 65 kilometres of targeted flora traverses,
- Vegetation type mapping for the survey area, using data collected from quadrats, relevès, traverses and opportunistic sampling,
- Vegetation condition mapping for the survey area, using data collected from quadrats, relevès, and opportunistic sampling, and
- Targeted searches for significant flora, involving flora traverses at spacing of 20-40 metres through all potential habitat for conservation significant flora identified in the likelihood of occurrence assessment (Spectrum Ecology, 2021).

Terrestrial Fauna Assessment

The methods of the terrestrial fauna assessment were in accordance with the EPA Technical Guidance – Vertebrate Fauna Surveys for Environmental Impact Assessment (EPA, 2020). The terrestrial fauna assessment was undertaken by an experienced zoologist and involved the following:

- Field surveys over three days between 4 and 7 May 2021, involving traversing the survey area to record direct sightings or indirect evidence of fauna and potential fauna habitat, as well as targeted searches for reptiles and amphibians in areas of suitable habitat, and

- Fauna habitat mapping for the survey area, based on:
  - Vegetation type mapping and structure, from desktop assessment and flora and vegetation assessment,
  - Landforms,
  - Geological units,
  - Soil substrate,
  - Aerial imagery,
  - Fauna assemblage, and
  - Field observations (Spectrum Ecology, 2021).

Survey Descriptions and Mapping

Table 5. Vegetation types recorded within the clearing footprint for CPS 10217/1 (Spectrum Ecology, 2022)

Code	Vegetation Description (NVIS)	Landform & Condition	Area ha & %		Representative Photo
			Disturbance Footprint	Total	
Claypans					
C1	*Tecticornia auriculata* or *Tecticornia indica* subsp. *leiostachya* low open shrubland over *Eragrostis pergracilis* and/or **Cenchrus ciliaris* low sparse tussock grassland.	Drainage plain, salt pans on clay soils.	3.4 ha 7.3%	18.8 ha 4.5%	
C2	+/-*Tecticornia auriculata* low isolated shrubs.	Bare clay pans, tidal mud flats.	7.4 ha 15.8%	33.9 ha 8.1%	
Dunes					
D1	+/-*Grevillea stenobotrya* tall sparse shrubland over *Scaevola sericophylla*, +/-*Acacia stellaticeps* mid sparse shrubland over *Triodia epactia* open hummock grassland.	Sand dunes, swales, low rises.	19.2 ha 41.1%	96.3 ha 16.6%	
Drainage Line					
DL1	+/-*Eucalyptus camaldulensis* subsp. *refulgens* low isolated trees over *Acacia tetragonophylla* and **Vachellia farnesiana* tall open shrubland over **Cenchrus ciliaris* sparse tussock grassland.	Drainage line. Degraded condition. Mostly no native species present.	-	2.1 ha 0.5%	

Code	Vegetation Description (NVIS)	Landform & Condition	Area ha & %		Representative Photo
			Disturbance Footprint	Total	
Plains					
P1a	*+/-Acacia tetragonophylla* tall isolated shrubs over *Triodia epactia* open hummock grassland.	Flat plains on sand/sandy clay/ clay soils.	4.9 ha 10.5%	113.2 ha 26.9%	
P1b	**Cenchrus ciliaris* low open tussock grassland, with *+/-Triodia epactia* sparse hummock grassland.	Flat plains / Floodplains on sandy clay soils. Structurally separated from P1a due to dominance of **Cenchrus ciliaris*.	9.9 ha 21.2%	67.9 ha 16.0%	
P2	*Acacia synchronicia*, *Acacia tetragonophylla* and **Vachellia farnesiana* tall sparse shrubland over *Scaevola spinescens* and *Sesbania cannabina* mid sparse shrubland over *Diplachne fusca* subsp. *fusca*, *Eulalia aurea*, and **Cenchrus ciliaris* sparse tussock grassland.	Minor depressions on clay to sandy clay soils.	0.4 ha 0.9%	13.6 ha 3.2%	
P3	**Prosopis pallida* tall closed shrubland over **Cenchrus ciliaris* open tussock grassland.	Unnatural depression on sandy clay soils. Degraded condition. Mostly no native species present.	1.3 ha 2.8%	3.2 ha 1.3%	
Other					
-	Cleared (no vegetation)	N/A	0.2 ha 0.4%	69.8 ha 16.6%	-

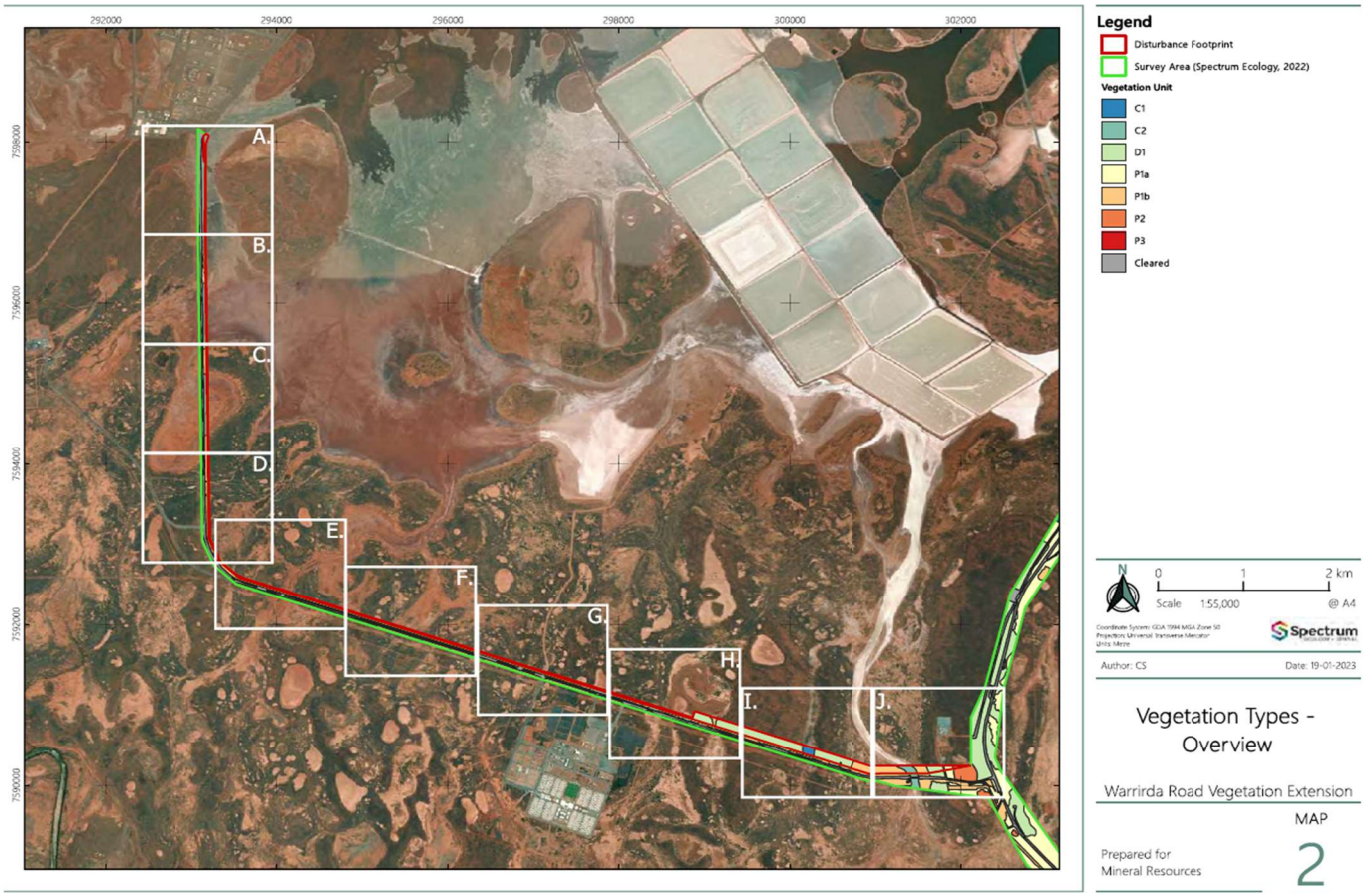


Figure 3. Vegetation type mapping overview for the clearing footprint for CPS 10217/1 (Spectrum Ecology, 2022)

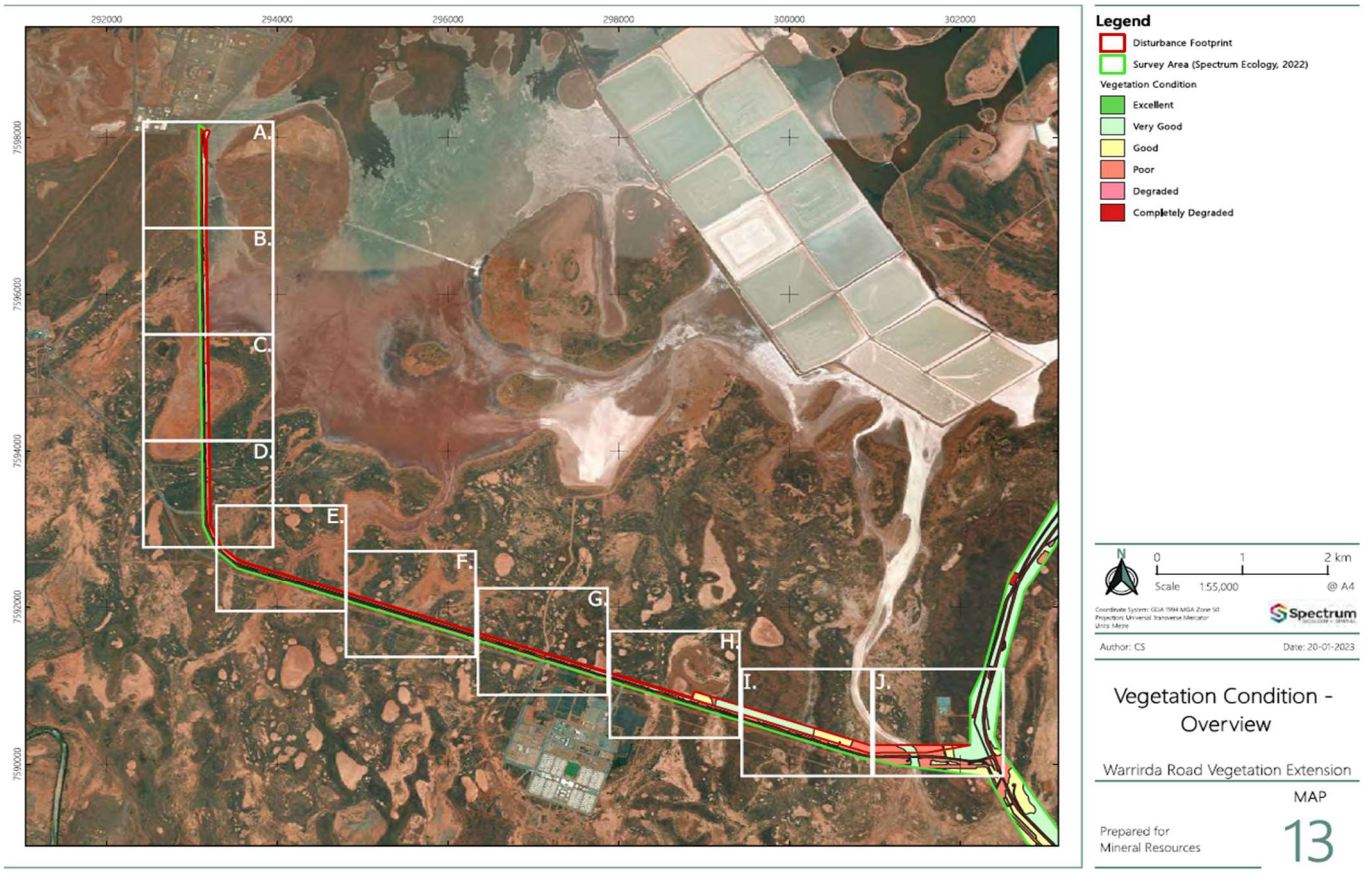


Figure 4. Vegetation condition mapping overview for the clearing footprint for CPS 10217/1 (Spectrum Ecology, 2022)

Figure 5. Priority flora recorded within the clearing footprint for CPS 10217/1 (Spectrum Ecology, 2022)

Appendix F. Sources of information

F.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)
- 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)

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