



# Clearing Permit Decision Report

## 1. Application details and outcomes

### 1.1. Permit application details

Permit number:	9640/1
Permit type:	Purpose Permit
Applicant name:	Navigator Mining Pty Ltd
Application received:	1 March 2022
Application area:	355 hectares
Purpose of clearing:	Mineral Production and Associated Activities
Method of clearing:	Mechanical Removal
Tenure:	Mining Leases 37/81, 37/82, 37/231, 37/232, 37/233, 37/317, 37/1284, 37/1303, 37/1325 Miscellaneous Licences 37/241, 37/244
Location (LGA area):	Shire of Leonora
Colloquial name:	Mertondale Gold Project

### 1.2. Description of clearing activities

Navigator Mining Pty Ltd (Navigator Mining) (the applicant) proposes to clear up to 355 hectares of native vegetation within a boundary of approximately 4,414 hectares, for the purpose of mine site development (360 Environmental, 2022). The project is located approximately 31 kilometres east northeast of nearest Leonora, within the Shire of Leonora (GIS Database).

The application is to allow for the mining of the Mertondale open pits which includes extension to the Mertondale 3/4 pit and Merton's Reward pit which encompasses Mertondale 2 pit, additional waste rock landforms and related activities (360 Environmental, 2022). Clearing will allow for the mining and transport of ore for processing at a nearby existing plant (360 Environmental, 2022).

### 1.3. Decision on application and key considerations

Decision:	Granted
Decision date:	18 May 2023
Decision area:	355 hectares of native vegetation

### 1.4. Reasons for decision

This clearing permit application was made in accordance with section 51E of the *Environmental Protection Act 1986* (EP Act) and was received by the Department of Mines, Industry Regulation and Safety (DMIRS) on 01 March 2022. DMIRS advertised the application for a public comment for a period of 21 days, and no submissions were received.

In making this decision, the Delegated Officer had regard for the site characteristics (Appendix B), relevant datasets (Appendix E), supporting information provided by the applicant including the results of a flora and vegetation survey the clearing principles set out in Schedule 5 of the EP Act (Appendix C), proposed avoidance and minimisation measures (Section **Error! Reference source not found.**), relevant planning instruments and any other matters considered relevant to the assessment (Section **Error! Reference source not found.**).

The assessment identified that the proposed clearing may result in:

- the potential introduction and spread of weeds into adjacent vegetation, which could impact on the quality of the adjacent vegetation and its habitat values;
- impacts to conservation significant flora;
- impacts to conservation significant fauna; and
- potential land degradation in the form of wind erosion.

After consideration of the available information, as well as the applicant's minimisation and mitigation measures (see Section **Error! Reference source not found.**), the Delegated Officer determined the proposed clearing can be minimised and managed to be unlikely to lead to an unacceptable risk to environmental values.

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

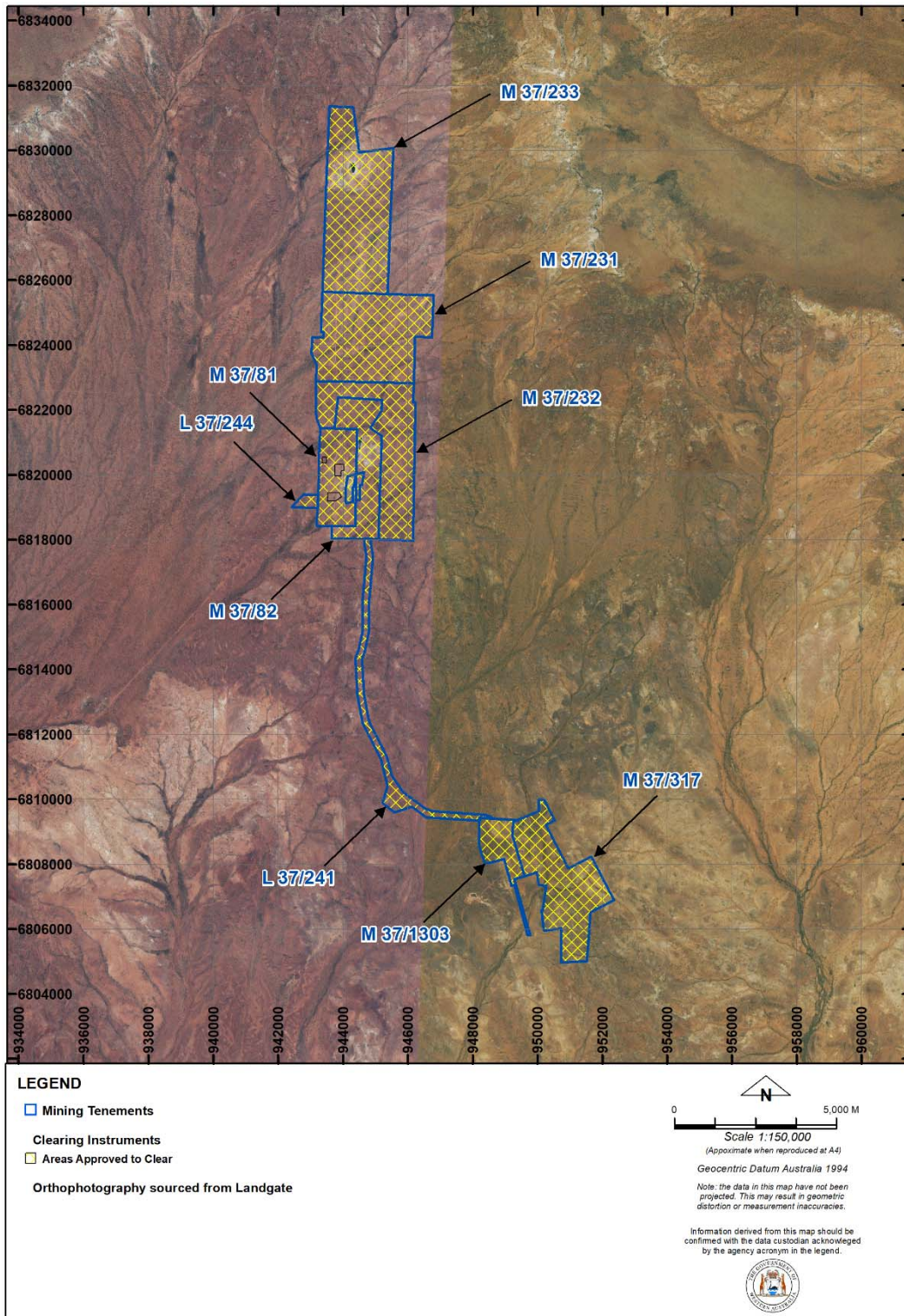
- avoid, minimise to reduce the impacts and extent of clearing;

- take hygiene steps to minimise the risk of the introduction and spread of weeds;
- avoid clearing riparian vegetation;
- maintain existing surface flow when impacting drainage line;
- flora management requiring all individuals of *Eremophila annoscaulis* and *Hibiscus* sp. Perrinvale Station to be avoided;
- slow directional clearing to allow fauna to move into adjacent vegetation ahead of the clearing activity which will minimise impact to individuals; and
- fauna management (*Sminthopsis longicaudata* (long-tailed dunnart): preclearance surveys within outcropping and breakaway habitats shall be conducted prior to clearing.

### 1.5. Site map

A site map proposed provided in below.

of clearing is Figure 1



**Figure 1. Map of the application area. The yellow area indicates the area within which conditional authorised clearing can occur under the granted clearing permit.**

## 2. Legislative context

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

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

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

Other legislation of relevance for this assessment include:

- *Biodiversity Conservation Act 2016* (WA) (BC Act)
- *Conservation and Land Management Act 1984* (WA) (CALM Act)
- *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act)
- *Mining Act 1978* (WA)

The key guidance documents which inform this assessment are:

- *A guide to the assessment of applications to clear native vegetation* (DER, December 2013)
- *Procedure: Native vegetation clearing permits* (DWER, October 2021)
- Technical guidance – *Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA, 2016)
- Technical guidance – *Terrestrial Fauna Surveys for Environmental Impact Assessment* (EPA, 2016)

## 3. Detailed assessment of application

### 3.1. Avoidance and mitigation measures

Evidence was submitted by the applicant, demonstrating that efforts have been made to avoid clearing native vegetation through the engineering design of the mine and supporting infrastructure, and by mining and transporting ore for processing at a nearby existing plant (360 Environmental, 2022). Furthermore, Navigator have outlined the following environmental management measures which can be implemented:

- all clearing will be demarcated prior to the commencement of project activities and prior to the commencement of native vegetation clearing;
- all contractors and/or internal personnel undertaking the clearing will be inducted in accordance with Navigator's internal procedures;
- prior to clearing activities, areas of native vegetation to be retained will be demarcated by star pickets, coloured tape or bunting and all personnel will be made aware of the requirement to protect native vegetation in these areas,
- areas previously cleared or disturbed will be utilised;
- processing of ore will be undertaken off-site; and
- topsoil and timber waste will be retained and the land will be rehabilitated in line with the Mine Closure Plan (in preparation) (360 Environmental, 2022).

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, or land and water resource values.

The assessment against the clearing principles 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 Principles (a) and (c)

##### Assessment

The flora and vegetation surveys which covered the application area and adjacent areas outside of the proposed area, identified 51 vegetation associations (360 Environmental, 2022). The relatively large number of community types is partially due to the detail of mapping, the interplay between geological, topographic, hydrological and salinity factors and the elongated linear nature of the proposed area (360 Environmental, 2022). None of the vegetation communities within the proposed area have been identified as a Threatened or Priority Ecological Community (360 Environmental, 2022).

A total of 321 species from 132 genera and 44 families have been recorded from the survey area (360 Environmental, 2022). The floral diversity and composition recorded is consistent with the Murchison bioregion, the landforms, the season of field survey, and the level of sampling intensity (360 Environmental, 2022). No species of Threatened flora have been recorded in the application area (360 Environmental, 2022; GIS Database). Three species of Priority flora, *Acacia* sp. Marshall Pool (Priority 3), *Eremophila annosicaulis* (Priority 3) and *Cratystylis centralis* (Priority 3) were recorded in the survey area (360 Environmental, 2022).

*Eremophila annosicaulis*, Priority 3, is a low densely branching shrub that is regionally known from four populations (Western Botanical, 2019). This species is the only conservation significant species that was identified within the application area. *E. annosicaulis* was recorded at 9 sites in total, within the northern section of the application area in areas associated with stony hill tops and mid to lower slopes (Western Botanical, 2019). Population size and mapping of populations within the application area was not undertaken (Western Botanical, 2019). Given the low number of regional populations, any known or potential locations of this plant should be avoided until further investigations are completed to determine its proper extent. Potential impacts to this species may be minimised by a flora management condition requiring known records of this species to be avoided during clearing.

The following conservation significant species were recorded from the previous surveys within the local area:

*Acacia* sp. Marshall Pool, Priority 3, is a single trunked small tree recorded from low to high rounded hills of weathered gabbro and basalt with infiltrated paleo groundwater calcrete (Western Botanical, 2019). This habitat is generally associated with the Leonora land system as mapped regionally by Department of Agriculture (Western Botanical, 2019). Individuals of this species were not recorded within the application area, however suitable habitat is present (Western Botanical, 2019). Western Botanical estimated the total population of *Acacia* sp. Marshall Pool to be 37,266 plants across three population centres and the proposed area to be cleared is located just north of the largest population of plants (estimated at approximately 31,364 individuals) (Western Botanical, 2019). The proposed clearing will unlikely lead to a significant impact to the conservation status of this species as suitable habitat is available across multiple bioregions, large populations exist within the local area and no individuals were recorded within the application area.

*Cratystylis centralis*, Priority 3, is a much-branched, brittle, greyish shrub that is known to be found associated with calcareous soils with a shallow mantle of red silty sandy soil and ironstone pisolites (Western Botanical, 2019). *C. centralis* was recorded adjacent to the existing Cardinia access road south-west of the application area where a population of 268 plants were recorded (Western Botanical, 2019). This population represents the seventh population of *C. centralis* known in Western Australia (Western Botanical, 2019). Although no individuals of this species was recorded within the application area, suitable habitat is present, and therefore *C. centralis* may occur. The proposed clearing will unlikely lead to a significant impact to the conservation status of this species as suitable habitat is available across both the Coolgardie and Murchison bioregions, and large populations exist within the local area.

*Hibiscus* sp. Perrinvale Station (J. Warden & E. Ager WB10581), Priority 1, was recorded as a potential new species (Western Botanical, 2019). It has only previously been collected from a low banded ironstone range on Perrinvale Station approximately 160 kilometres west of the permit area (Western Botanical, 2019). This plant was recorded at five locations within the local area (south-east of the application area) with an additional four locations where only vegetative material was recorded (potential locations) (Western Botanical, 2019). All of the plants were found on stony ground or hills with either ironstone or basalt rocks at the surface (Western Botanical, 2019). This species was not positively recorded within the application area, however, there are potential locations situated within the permit boundary (Western Botanical, 2019). Given the low number of regional populations, any known or potential locations of this plant should be avoided until further investigations are completed to determine its proper extent. Potential impacts to this species may be minimised by a flora management condition requiring known locations to be avoided during clearing.

The following three Priority Flora have been recorded within 20 kilometres of the application area, suitable habitat is present for these species and they are considered likely to occur within the proposed area, however have not been positively identified during previous surveys:

*Triglochin protuberans*, Priority 3, is an annual herb, 0.03 – 0.13 metres high which can be found inhabiting red loam, grey mud over clay in winter-wet sites, claypans, near salt lakes, margins of pools (Western Australian Herbarium (1998- )). The species has been previously recorded within the Avon Wheatbelt, Geraldton Sandplains, Murchison and Yalgoo Interim Biogeographic Regionalisation for Australia (IBRA) regions (Western Australian Herbarium (1998- )). As suitable habitat (drainage lines) are present within the application area, it is considered that this species may be present. Impacts to this species may be managed through a vegetation management condition for riparian vegetation and therefore the clearing is unlikely to lead to significant impacts to this species.

*Hemigenia exilis*, Priority 4, is an erect, multi-stemmed shrub, 0.5 – 2 metres high which can be found inhabiting laterite on breakaways or slopes (Western Australian Herbarium (1998- )). The species has been recorded only within the Murchison IBRA region (Western Australian Herbarium (1998- )). This species occurs commonly within the local area and are known from the Murrin Murrin, Leinster, Yakabindie and Mt Keith nickeliferous minesites and has an obligate association with volcanoclastic sediments associated with nickel bearing basalts and volcanics (Western Botanical, 2019). The proposed clearing will unlikely lead to a significant impact to the conservation status of this species as suitable habitat is available within the surrounding, several records of this species exists within the region and no individuals were recorded within the application area.

*Hybanthus floribundus* subsp. *chloroxanthus* (currently known as *Pigea* sp. *Chloroxantha*), Priority 3, is a multi-stemmed shrub growing to 0.7 metres tall and can be found inhabiting rocky areas, creek banks, and along drainage lines in dark red-brown soils (Western Australian Herbarium (1998- )). The species is known from 27 specimens at the WA Herbarium from the south-eastern portion of the Murchison IBRA region (Western Australian Herbarium (1998- )). As suitable habitat (drainage lines) are present within the application area, it is considered that this species may be present. Impacts to this species may be managed through a vegetation management condition for riparian vegetation and therefore the clearing is unlikely to lead to significant impacts to this species.

There were 20 species of weeds recorded in the larger flora survey area (Western Botanical, 2019). Weeds have the potential to out-compete native flora and reduce the biodiversity of an area. Potential impacts to biodiversity as a result of the introduction of weeds may be minimised by the implementation of a weed management condition.

There were eight broad fauna habitats mapped during fauna surveys of the greater Leonora Gold project (Phoenix Environmental Sciences, 2019). All of the habitats present in the permit area were considered to be well represented in the Eastern Murchison subregion (Phoenix Environmental Sciences, 2019). There was generally a low diversity of fauna habitats



and a lack of significant habitat features (e.g. caves, perennial watercourses, major rock outcrops) (Phoenix Environmental Sciences, 2019). Based on the habitats present, the permit area is not likely to support a high level of faunal diversity and the faunal assemblage is likely to be similar to surrounding areas in the local area.

### Conclusion

Based on the above assessment, the proposed clearing may result in impacts to priority flora species such as *Eremophila annosicaulis*. 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 the avoidance of *Eremophila annosicaulis* and *Hibiscus* sp. Perrinvale Station individuals. 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:

- implementation of weed management strategies, and
- flora management requiring all individuals of *Eremophila annosicaulis* and *Hibiscus* sp. Perrinvale Station to be avoided.

### 3.2.2. *Biological values (fauna) - Clearing Principles (b)*

#### Assessment

A reconnaissance fauna survey was conducted of the greater Leonora Gold project (which includes the application area) in April 2019. The survey identified the following eight fauna habitats within the application area (Phoenix Environmental Sciences, 2019):

- Mulga woodland on plain: Open to sparse woodland or shrubland of Mulga (*Acacia aneura* group) or Bastard Mulga (*A. papyrocarpa*) over varying mid- and understorey of lower shrubs and/or grasses;
- Shrubland on plain: Open to sparse shrubland dominated by shrub Mulga, other *Acacia species*, *Hakea*, chenopods or hummock grasses on a range of substrates.
- Acacia shrubland on stony hills: Rolling hills with gravel or cobble substrate, with shrubland vegetation dominated by *Acacia* other than Mulga;
- Acacia woodland in drainage lines and groves: Drainage lines with associated riparian vegetation, usually Mulga or other *Acacia* over variable understory cover, often dominated by dense grass cover nearer to drainage line;
- Mulga woodland on stony hills: Mulga (*Acacia aneura* group) woodland on hill slopes and tops; also includes patches of *Casuarina pauper* woodland on calcrete outcrop;
- Cleared: Existing cleared and/or disturbed areas (i.e. existing tracks, roads and clearing for previous exploration or mining operations);
- Outcropping and breakaway: Outcrop of calcrete, basalt or other rock types with boulder piles, small caves or crevices on hilltops, slopes and breakaways; woodland or shrubland vegetation; and
- Vegetated gilgai/claypan: Drainage foci with clay soils and perennial grasses, and with or without shrub vegetation (Phoenix Environmental Sciences, 2019).

The 'mulga woodland on plain' (occupying approximately 44%) and 'shrubland on plain' (occupying approximately 24%) were the most dominant habitats covering the greater survey area (Phoenix Environmental Sciences, 2019). The 'outcropping and breakaway' (occupying 0.29%) habitat is likely to have important ecological function for local fauna (Phoenix Environmental Sciences, 2019). The habitat is described as outcrops of calcrete, basalt or other rock types with boulder piles, small caves or crevices on hilltops, slopes and breakaways; woodland or shrubland vegetation (Phoenix Environmental Sciences, 2019). The habitat provides refuges such as crevices for smaller animals and dens or hunting perches for larger predators such as dingos and wedge-tailed eagles (Phoenix Environmental Sciences, 2019). Only a small amount of the habitat identified during the survey is present within the application area (Phoenix Environmental Sciences, 2019).

A desktop review identified 30 species of conservation significant fauna which have the potential to be present within the proposed area (Appendix E) (Phoenix Environmental Sciences, 2019). The reconnaissance survey undertaken by Phoenix Environmental Sciences identified secondary evidence of three conservation significant fauna (Phoenix Environmental Sciences, 2019):

- Long-tailed Dunnart (*Sminthopsis longicaudata*) – Priority 4;
- Burrowing Bettong (*Bettongia lesueur graii*) – BC Act and EPBC Act - Extinct; and
- Greater Stick-nest Rat (*Leporillus conditor*) – BC Act - Conservation Dependent and EPBC Act - Vulnerable).

Long-tailed dunnart (*Sminthopsis longicaudata*) (Priority 4) is a small carnivorous marsupial typically found in rocky habitat with hilly areas, breakaways, occasionally open areas with a stony, rocky mantle (Stanetc, 2018b). The species has been recorded in the region with the closest record from approximately 25 kilometres south east of the proposed area (Stantec, 2018b). The species was recorded provisionally based on small dasyurid scats associated with crevices on rocky hills and breakaways at three sites (Phoenix Environmental Sciences, 2019). Only a small amount of this habitat was recorded in the permit area and suitable habitat used for foraging and dispersal are well represented in the region (Phoenix Environmental Sciences, 2019). Impacts to this species may be managed via maintaining slow directional clearing.

Historic warrens and nests of the Burrowing Bettong and Greater Stick-nest Rat were identified in the survey area, however these species are both extinct from the local area and the Burrowing Bettong is extinct from Western Australia (Phoenix Environmental Sciences, 2019). Despite the presence of historical secondary evidence, these two species are considered Extinct in the region and are unlikely to be occurring within the application area (Phoenix Environmental Sciences, 2019).

The following seven conservation significant fauna species may potentially occur within the application area (Phoenix Environmental Sciences, 2019; GIS Database):

*Actitis hypoleucos* (common sandpiper), Migratory, is a small sandpiper which can be found across all coastlines of Australia and in many areas inland (DCCEEW, 2023). Generally the species forages in shallow water and on bare soft mud at the edges of wetlands (DCCEEW, 2023). The species has been recorded within 10 kilometres of the application area, and therefore the species may visit the application area, however suitable wetland habitat is not present within the application area (GIS Database). As the application area does not contain suitable habitat for this species, the proposed clearing will unlikely lead to a significant impact to the species.

*Calidris canutus* (red knot), Endangered, is most common in all the main suitable habitats around the coast of Australia and occasionally has been recorded inland (DCCEEW, 2023). The species mainly inhabits intertidal mudflats, sandflats and sandy beaches of sheltered coasts, in estuaries, bays, inlets, lagoons and harbours; sometimes on sandy ocean beaches or shallow pools on exposed wave-cut rock platforms or coral reefs (DCCEEW, 2023). The species has been recorded within 10 kilometres of the application area, and therefore the species may visit the application area, however suitable wetland habitat is not present within the application area (GIS Database). As the application area does not contain suitable habitat for this species, the proposed clearing will unlikely lead to a significant impact to the species.

*Falco peregrinus* (peregrine falcon), Other Specially Protected Species, is one of the most widespread birds in the world and occurs across most of Australia (DCCEEW, 2023). The species inhabits cliffs, coastal habitats, rivers, wooded water courses, lakes and urban environments (DCCEEW, 2023). No individuals were recorded during the survey, however, this species has been recorded within 10 kilometres from the application area, suggesting that they may use the application area as part of a larger home range, however there is no suitable breeding habitat within the application area (Phoenix Environmental Sciences, 2019; GIS Database).

*Thinornis rubricollis* (hooded plover), Priority 4, is a stocky medium-sized wading bird that is endemic to the southern states of Australia, it occurs on the south-west Western Australian coast from Cape Naturaliste to Eyre, and on inland lakes as far north as lakes Cowan, Moore and Yalgorup (DCCEEW, 2023). This species inhabits ocean beaches and the edges of near-coastal and inland salt-lakes that may be hundreds of kilometres from the coast (DCCEEW, 2023). No individuals were recorded during the survey, however, this species has been recorded within 10 kilometres from the application area, suggesting that they may use the application area as part of a larger home range, however there is no suitable breeding habitat within the application area (Phoenix Environmental Sciences, 2019; GIS Database).

*Tringa glareola* (wood sandpiper), IA, is a small thin wader that has its largest numbers recorded in north-west Australia, with all areas of national importance located in Western Australia (DCCEEW, 2023). The species can be found inhabiting well-vegetated, shallow, freshwater wetlands, such as swamps, billabongs, lakes, pools and waterholes (DCCEEW, 2023). No individuals were recorded during the survey, however, this species has been recorded within 10 kilometres from the application area, suggesting that they may use the application area as part of a larger home range, however there is no suitable breeding habitat within the application area (Phoenix Environmental Sciences, 2019; GIS Database).

*Tringa nebularia* (common greenshank), Migratory, is a heavy built, elegant wader that does not breed in Australia, however the species occurs in all types of wetlands and has the widest distribution of any shorebird in Australia (DCCEEW, 2023). Given the highly mobile nature of this species and the availability of suitable habitat outside the application area, the proposed clearing is not likely to impact this species.

*Leipoa ocellata* (malleefowl), Vulnerable, is found in semi-arid to arid shrubland and lowlands, especially those dominated by mallee and/or acacias (DCCEEW, 2023). This species requires sandy substrates and an abundance of leaf litter to breed (DCCEEW, 2023). The application area does not provide suitable nesting habitat for mound construction and indicates that this species may be an infrequent visitor and not a resident (Phoenix Environmental Sciences, 2019). As the habitat is not considered significant for the species, the proposed clearing will unlikely lead to a significant impact to the species.

### Conclusion

Based on the above assessment, the proposed clearing will result in loss of potential habitat for a number of conservation significant fauna species. For the reasons set out above, it is considered that the impacts of the proposed clearing on fauna habitats can be managed by implementing fauna management conditions.

### Conditions

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

- slow directional clearing to allow fauna to move into adjacent vegetation ahead of the clearing activity which will minimise impact to individuals; and
- avoid, minimise and reduce the impacts and extent of clearing.

### **3.2.3. Land and water resources – Clearing Principle (f), (g) and (i)**

#### Assessment

The site is not located within a Proclaimed Surface Water Area (PWSA) and there are no permanent watercourses or wetlands within the proposed area to clear (GIS Database). The drainage lines within the proposed area are not considered regionally prominent and are not listed within the *Directory of Important Wetlands in Australia* or listed as an Environmentally Significant Area (ESA) (360 Environmental, 2022). Drainage line habitat did not contain vegetation communities or species that are confined to watercourses or wetlands, or are groundwater dependent (Stantec, 2018b). Several ephemeral creek lines intersect the proposed area, with Bummer Creek and Cardinia Creek to the south of the proposed being the most significant. Creek lines in the region are typically dry for most of the year, only flowing briefly immediately following significant rainfall.

Two major and several minor ephemeral *Acacia burkittii* or Mulga (*Acacia aneura* and its allies) dominated creeklines drain from north-east to south-west within the proposed area (360 Environmental, 2022). Some of the deposit areas lie at or near the heads of these ephemeral creek systems and the proposed borefield lies within a section of Bummer Creek in the south-eastern part of the Study Area (360 Environmental, 2022).

Water reserve 7452 is located 600 metres from the waste rock landform (WRL) at Merton's Reward and water reserve 7453 is located approximately 75 metres from the application area (360 Environmental, 2022). The water reserves are historical water reserves to capture water from the minor drainage line that runs through them and are vested with the Department of Water (DoW). The minor drainage line located within the proposed area is part of the headwaters of an unnamed creek which drains into Lake Raeside near Malcolm and is referred to as Malcolm creek (360 Environmental, 2022). No activities will be undertaken in the water reserve (360 Environmental, 2022). The surface area of the proposed WRL expansion will only increase slightly and the WRL will limit sedimentation (360 Environmental, 2022).

The terrain of the proposed area is relatively level aside from some low hills, with no permanent surface water features (360 Environmental, 2022). The proposed area lies within the Bevon, Gundockerta, Jundee, Leonora, Monk, Violet and Wyarri land systems (GIS Database). These land systems, as described in Appendix B, have been mapped and described in technical bulletins produced by former Department of Agriculture (now the Department of Primary Industries and Regional Development) with some areas susceptible to erosion due to the presence of natural drainage lines, relatively low gravel contents, clay/silt materials and sloping landforms. The soil substrate is firm, with areas of continuous gravel maintaining structure (360 Environmental, 2022). Any clearing of native vegetation is unlikely to increase soil erosion or nutrient export within the landscape due to the already low density of vegetation and firm soil structure (360 Environmental, 2022). The Study Area is not within a salinity risk area and the site would not be expected to be vulnerable to salinity even following proposed clearing (360 Environmental, 2022).

#### Conclusion

Based on the above assessment, the Delegated Officer has determined that the proposed clearing required further management conditions to compliment the avoidance and management measures outlined by 360 Environmental in relation to this environmental value.

#### Conditions

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

- where practicable, avoid clearing riparian vegetation, and
- where a watercourse or drainage line is to be impacted by clearing, existing surface water flow is to be maintained.

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

The clearing permit application was advertised on 29 March 2022 by the Department of Mines, Industry Regulation and Safety inviting submissions from the public. No submissions were received in relation to this application.

There is one native title claim (WC2018/005) over the area under application (DPLH, 2023). This claim has been registered determined by the Federal Court on behalf of the claimant group. However, the mining tenure has been granted in accordance with the future act regime of the *Native Title Act 1993* and the nature of the act (i.e. the proposed clearing activity) has been provided for in that process, therefore, the granting of a clearing permit is not a future act under the *Native Title Act 1993*.

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

Advice was received from the Department of Primary Industries and Regional development in regards to land degradation impacts associated with the proposed clearing and indicates that the soils in the area are susceptible to erosion if the perennial shrub cover is substantially reduced and/or the soil surface is disturbed (DPIRD, 2022).

Other relevant authorisations required for the proposed land use include:

- A Mining Proposal / Mine Closure Plan approved under the *Mining Act 1978*.

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

**End**

## Appendix A. Information provided by applicant

Summary of comments	Consideration of comment
Further information regarding estimated impacts to priority flora was requested. A more detailed explanation of which flora species were to be impacted was provided to the Department.	The information supplied has been taken into consideration in assessing this application.

## Appendix B. Site Characteristics

### B.1. Site characteristics

Characteristic	Details
Local context	<p>The application area is approximately 31 kilometres east northeast of Leonora, within the Shire of Leonora (GIS Database). The area proposed to be cleared is part of an expansive tract of native vegetation in the Murchison bioregion and Eastern Murchison subregion. It is surrounded by mostly undisturbed areas except for mining landforms, existing roads and access tracks. The proposed clearing area contains previously cleared areas including existing mining infrastructure and remnant native vegetation in varying conditions.</p> <p>Spatial data indicates the local area (20 kilometre radius from the centre of the area proposed to be cleared) retains approximately 90 per cent of the original native vegetation cover.</p>
Ecological linkage	According to available databases, the application area does not contain any known or mapped ecological linkages (GIS Database).
Conservation areas	The application area is not located within a conservation area (GIS Database). The nearest conservation area is a nature reserve (R 46847), located approximately 67 kilometres south of the application area (GIS Database).
Vegetation description	<p>The vegetation of the application area is broadly mapped as the following Beard vegetation associations:</p> <ul style="list-style-type: none"> <li>• 18: Low Woodlands, low open woodland or sparse woodland representing the areas dominated by Mulga and other <i>Acacia</i> species, and</li> <li>• 39: Scrub, open scrub or sparse scrub represent the low halophytic chenopod shrublands (<i>Tecticornia</i>, <i>Maireana</i> shrublands) (GIS Database).</li> </ul> <p>Flora and vegetation surveys were conducted over the application area by Stantec during 2016, 2017 and 2018 and by Western Botanical during October 2018 and February 2019 (Stantec, 2018a; 2018b; 2018c; 2021; Western Botanical, 2019). Fifty one vegetation associations, which were grouped into 11 vegetation complexes, were recorded within the proposed area (Western Botanical, 2019). These vegetation complexes are:</p> <ol style="list-style-type: none"> <li>1. Mulga Woodlands over Perennial Non-Halophytic Shrubs on hills and plains;</li> <li>2. Mulga Shrublands / Woodlands over Perennial Grasses on Plains;</li> <li>3. <i>Acacia</i> Woodlands over Shrubs and Grasses in Major Drainage Lines and Groves;</li> <li>4. <i>Acacia</i> (other than Mulga) Shrublands on Stony Hills;</li> <li>5. <i>Acacia papyrocarpa</i> Woodlands;</li> <li>6. <i>Acacia victoriae</i> Shrubland over Chenopods on Calcrete Plains;</li> <li>7. Perennial Grasslands;</li> <li>8. <i>Hakea preissii</i> and/or Halophytic Chenopod Shrublands;</li> <li>9. <i>Casuarina pauper</i> Woodland on Calcrete Outcrops;</li> <li>10. Claypans; and</li> <li>11. Breakaway Complex (Western Botanical, 2019).</li> </ol>
Vegetation condition	<p>Supporting documentation supplied by the applicant (360 Environmental 2022) indicate the majority of the vegetation within the proposed clearing area is in either Excellent or Very Good (87%) condition, where only minor evidence of disturbances were recorded such as access tracks or weeds (Western Botanical, 2019). The remaining 13% was assessed as Completely Degraded (13%), where areas had been completely cleared and no longer supported native vegetation (Western Botanical, 2019).</p> <p>The full Keighery (1994) condition rating scale is provided in Appendix D.</p>
Climate and landform	<p>The proposed area is located within the Goldfields region of Western Australia, which is classed as being arid to semi-arid where zero rainfall can be recorded within any month (360 Environmental 2022). According to the Bureau of Meteorology, the long-term annual rainfall is 249.3 millimetres (BoM, 2022).</p> <p>The following major landforms were noted within the proposed area during the Flora Survey conducted by Western Botanical in 2019:</p> <ul style="list-style-type: none"> <li>• low rounded gabbro or basalt hills and minor drainage lines associated with the Hootanui, Laverton and Leonora Land Systems;</li> </ul>



Characteristic	Details
	<ul style="list-style-type: none"> <li>• low ironstone or chert hills and minor drainage lines associated with the Bevon, Violet and Laverton Land Systems;</li> <li>• low breakaways of weathered granite and associated saline kaolinised slopes of the Sherwood Land System;</li> <li>• extensive non-saline hardpan wash plains associated with the Monitor and Jundee Land Systems;</li> <li>• extensive saline plains and low rises associated with the Nubev Land Systems; and</li> <li>• small, discrete areas of paleo groundwater calcrete (Western Botanical, 2019).</li> </ul>
Soil description	<p>The soils of the application area are broadly mapped as the following soil types:</p> <ul style="list-style-type: none"> <li>• Bevon System: irregular low ironstone hills with stony lower slopes supporting mulga shrublands;</li> <li>• Gundockerta: extensive, gently undulating calcareous stony plains supporting bluebush shrublands;</li> <li>• Jundee System: hardpan plains with variable gravelly mantles and minor sandy banks supporting weakly groved mulga bushes;</li> <li>• Leonora: extensive, gently undulating calcareous stony plains supporting bluebush shrublands;</li> <li>• Monk System: Hardpan plains with occasional sandy banks supporting Mulga tall shrublands and wanderrie grasses;</li> <li>• Nubev System: Gently undulating stony plains, minor limonitic low rises and drainage floors supporting mulga and halophytic shrublands;</li> <li>• Violet system: Gently undulating gravelly plains on greenstone, laterite, and hardpan, with low stony rises and minor saline plains; supporting groved Mulga and bowgada shrublands and occasionally chenopod shrublands; and</li> <li>• Wyarri System: Granite domes, hills, and tor fields with gritty-surfaced fringing plains supporting Mulga and granite wattle shrublands (DPIRD, 2023).</li> </ul>
Land degradation risk	<p>The proposed area comprises of relatively level terrain with some low hills (Western Botanical, 2019; GIS Database). No permanent water surface features are present and soil substrate is firm, with areas of continuous gravel maintaining structure and the proposed area is not within a salinity risk area (GIS Database). The soils in the application area are susceptible to erosion if the perennial shrub cover is substantially reduced and/or the soil surface is disturbed (DPIRD, 2022)</p>
Waterbodies	<p>The desktop assessment and aerial imagery indicated that the proposed area is not located within any permanent surface watercourse (GIS Database). There are a number of minor ephemeral drainage lines within the proposed area that may be related to hydrological regimes and three small reserves which have been excluded from development (360 Environmental, 2022). The nearest important wetland is Lake Ballard, 65 kilometres south of the proposed area (GIS Database).</p>
Hydrogeography	<p>The proposed area is not within a groundwater protection area, however approximately 5 kilometres to the west of the proposed area lies the Leonora Water Source Reserve Boundary (Public Drinking Water Source Area) (GIS Database). The mapped groundwater salinity in the proposed area is mapped between 1,000-3,000 Total Dissolved Solids (mg/L) (GIS Database).</p>
Flora	<p>Field surveys were undertaken over two events, 10 to 19 October 2018 and 5 to 17 February 2019 (Western Botanical, 2019). 236 flora species from 132 genera and 44 families have been recorded within the area during the 2018-19 studies (Western Botanical, 2019).</p> <p>No Threatened Flora were recorded during these surveys, however three Priority species were recorded within the local area: <i>Acacia</i> sp. Marshall Pool (G. Cockerton 3024) (Priority 3), <i>Cratystylis centralis</i> (Priority 3), and <i>Eremophila annoscaulis</i> (Priority 3). Only <i>Eremophila annoscaulis</i> (Priority 3) was recorded within the application area.</p> <p>A new species, <i>Hibiscus</i> sp. Perrinvale (J. Warden &amp; E. Ager WB10581) was confirmed at five sites within the proposed area (Western Botanical, 2019). The species has been previously collected once by Western Botanical 170 kilometres from the proposed area, at that time it was regarded as <i>Hibiscus</i> sp. Gardneri. A small herb, <i>Centrolepis</i> sp. Leonora, collected just within the north-eastern boundary of the application area, does not match any known <i>Centrolepis</i> species (Western Botanical, 2019). These species may have conservation significance, however require a review of their taxonomy (Western Botanical, 2019).</p>
Ecological communities	<p>The application area is not mapped within a Threatened or Priority Ecological Community (Western Botanical, 2019; GIS Database).</p>
Fauna	<p>Phoenix Environmental Sciences undertook a fauna survey between 1 and 4 of April 2019. A total of 65 terrestrial vertebrate fauna species were recorded during the fauna surveys (Phoenix Environmental Sciences, 2019).</p>

Characteristic	Details
	<p>No conservation significant species were positively identified as currently occurring during the terrestrial fauna survey conducted by Phoenix Environmental in 2019, however, three were recorded based on secondary evidence (Long-tailed Dunnart (P4), Burrowing Bettong (EX) and Greater Stick-nest Rat (VU)).</p> <p>The following eight broad fauna habitats were mapped within the application area:</p> <ul style="list-style-type: none"> <li>• Mulga woodland on plain: Open to sparse woodland or shrubland of Mulga (<i>Acacia aneura</i> group) or Bastard Mulga (<i>A. papyrocarpa</i>) over varying mid- and understorey of lower shrubs and/or grasses;</li> <li>• Shrubland on plain: Open to sparse shrubland dominated by shrub Mulga, other <i>Acacia species</i>, <i>Hakea</i>, chenopods or hummock grasses on a range of substrates.</li> <li>• Acacia shrubland on stony hills: Rolling hills with gravel or cobble substrate, with shrubland vegetation dominated by <i>Acacia</i> other than Mulga;</li> <li>• Acacia woodland in drainage lines and groves: Drainage lines with associated riparian vegetation, usually Mulga or other <i>Acacia</i> over variable understorey cover, often dominated by dense grass cover nearer to drainage line;</li> <li>• Mulga woodland on stony hills: Mulga (<i>Acacia aneura</i> group) woodland on hill slopes and tops; also includes patches of <i>Casuarina pauper</i> woodland on calcrete outcrop;</li> <li>• Cleared: Existing cleared and/or disturbed areas (i.e. existing tracks, roads and clearing for previous exploration or mining operations);</li> <li>• Outcropping and breakaway: Outcrop of calcrete, basalt or other rock types with boulder piles, small caves or crevices on hilltops, slopes and breakaways; woodland or shrubland vegetation; and</li> <li>• Vegetated gilgai/claypan: Drainage foci with clay soils and perennial grasses, and with or without shrub vegetation (Phoenix Environmental Sciences, 2019).</li> </ul>

## B.2. Vegetation extent

The below table shows the extent of vegetation remaining for the Bioregion and mapped vegetation association.

	Pre-European area (ha)	Current extent (ha)	Extent Remaining %	Current extent in all DBCA managed land (ha)	Current proportion (%) of pre-European extent in all DBCA Managed Lands
IBRA Bioregion					
Murchison	28,120,586.77	28,044,823.42	99.73	2,185,987.96	7.78
Beard vegetation associations - State					
18	19,892,306.46	19,843,148.07	99.75	886.49	56.99
39	6,613,567.48	6,602,578.44	99.83	2,469.48	99.95
Beard vegetation associations - Bioregion					
18	12,403,172.30	12,363,252.47	99.68	4.96	4.97
39	1,148,400.30	1,138,064.63	99.10	3.56	3.59

Government of Western Australia (2019)

## B.3. Flora analysis table

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

Species name	Conservation status	Suitable habitat features? [Y/N]	Distance of closest record to application area (km)	Number of known records (total)
<i>Eremophila annoscaulis</i>	P3	Y	Recorded within application area	5
<i>Hibiscus</i> sp. Perrinvale Station	P1	Y	<5	15
<i>Acacia</i> sp. Marshall Pool (G.Cockerton 3024)	P3	Y	<5	10
<i>Cratystylis centralis</i>	P3	Y	<5	12
<i>Triglochin protuberans</i>	P3	Y	<15	10
<i>Hemigenia exilis</i>	P4	Y	<20	43
<i>Hybanthus floribundus</i> subsp. <i>chloroxanthus</i> (currently known as <i>Pigea</i> sp. <i>Chloroxantha</i> )	P3	N	<20	27

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

#### B.4. Fauna analysis table

Species name	Common Name	Conservation status	Distance of closest record to application area (km)	Suitable habitat features? [Y/N]
<i>Actitis hypoleucos</i>	common sandpiper	MI	<10	Y
<i>Calidris canutus</i>	red knot	EN	<10	Y
<i>Falco peregrinus</i>	peregrine falcon	OS	<10	Y
<i>Sminthopsis longicaudata</i>	long-tailed dunnart	P4	<20	Y
<i>Thinornis rubricollis</i>	hooded plover	P4	<20	Y
<i>Tringa glareola</i>	wood sandpiper	IA	<10	Y
<i>Tringa nebularia</i>	common greenshank	MI	<10	Y
<i>Leipoa ocellata</i>	malleefowl	VU	<25	Y

T: threatened, CR: critically endangered, EN: endangered, VU: vulnerable, P: priority, OS: other specially protected; IA: migratory birds protected under an international agreement

#### Appendix C. Assessment against the clearing principles

Assessment against the clearing principles	Variance level	Is further consideration required?
<b>Environmental value: biological values</b>		
<p><b>Principle (a):</b> "Native vegetation should not be cleared if it comprises a high level of biodiversity."</p> <p><b>Assessment:</b></p> <p>Flora and fauna surveys identified 321 species of flora from 132 genera and 44 families, inclusive of 18 weed species (Western Botanical, 2019). No threatened flora or fauna species were recorded, however three Priority Flora species were recorded within the survey area (Western Botanical, 2019). The application area consists of 51 vegetation associations, two vegetation units and seven Land Systems (Western Botanical, 2019).</p>	Not likely to be at variance	Yes <i>Refer to Section 3.2.1 above.</i>
<p><b>Principle (b):</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."</p> <p><b>Assessment:</b></p>	Not likely to be at variance	Yes <i>Refer to Section 3.2.2, above.</i>

Assessment against the clearing principles	Variance level	Is further consideration required?
The area proposed to be cleared may contain foraging habitat for several conservation significant fauna species.		
<p><u>Principle (c):</u> <i>“Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora.”</i></p> <p><u>Assessment:</u></p> <p>There are no known records of Threatened flora within the permit area (GIS Database). Flora surveys of the permit area did not record any species of Threatened flora (Western Botanical, 2019).</p>	Not likely to be at variance	Yes <i>Refer to Section 3.2.1 above.</i>
<p><u>Principle (d):</u> <i>“Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a threatened ecological community.”</i></p> <p><u>Assessment:</u></p> <p>There are no known Threatened Ecological Communities (TECs) located within the application area and the flora and vegetation survey did not identify any TECs (Western Botanical, 2019; GIS Database).</p>	Not likely to be at variance	No
<b>Environmental value: significant remnant vegetation and conservation areas</b>		
<p><u>Principle (e):</u> <i>“Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.”</i></p> <p><u>Assessment:</u></p> <p>The application area falls within the Murchison Bioregion of the Interim Biogeographic Regionalisation for Australia (IBRA) (GIS Database). Approximately 99% of the pre-European vegetation still exists in the IBRA Coolgardie Bioregion (Government of Western Australia, 2019). The application area is broadly mapped as Beard vegetation associations 18 and 39(GIS Database). Approximately 99% of the pre-European extent of this vegetation association remains uncleared at both the state and bioregional level (Government of Western Australia, 2019). Therefore, the application area does not represent a significant remnant of native vegetation in an area that has been extensively cleared and is not at variance to this principle.</p>	Not at variance	No
<p><u>Principle (h):</u> <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.”</i></p> <p><u>Assessment:</u></p> <p>Given the distance to the nearest conservation area, the proposed clearing is not likely to have an impact on the environmental values of nearby conservation areas (GIS Database).</p>	Not likely to be at variance	No
<b>Environmental value: land and water resources</b>		
<p><u>Principle (f):</u> <i>“Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.”</i></p> <p><u>Assessment:</u></p> <p>There are no permanent watercourses or wetlands within the proposed area (GIS Database), however regional hydrographic mapping identifies a number of minor ephemeral drainage lines, which was confirmed in the vegetation mapping (Western Botanical, 2019).</p>	At variance	Yes <i>Refer to Section 3.2.3, above.</i>
<p><u>Principle (g):</u> <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.”</i></p> <p><u>Assessment:</u></p> <p>The proposed area lies within the Bevon, Gundockerta, Jundee, Leonora, Monk, Violet and Wyarri land systems (GIS Database). Given the majority of the land systems within the permit area have susceptibility to erosion, the</p>	May be at variance	Yes <i>Refer to Section 3.2.3, above.</i>

Assessment against the clearing principles	Variance level	Is further consideration required?
proposed clearing has the potential to cause land degradation. Land degradation may be managed by implementing a staged clearing condition where potential impacts from erosion may be minimised by the implementation of a staged clearing condition requiring areas that are cleared are utilised within six months.		
<p><u>Principle (i):</u> “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.”</p> <p><u>Assessment:</u></p> <p>There are no permanent watercourses or wetlands within the proposed area (GIS Database), however there are numerous ephemeral drainage lines which intersect the permit area, the proposed clearing may impact surface or ground water quality.</p>	Not likely to be at variance	Yes <i>Refer to Section 3.2.3, above.</i>
<p><u>Principle (j):</u> “Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.”</p> <p><u>Assessment:</u></p> <p>The climate of the region is semi-arid, with a long-term annual rainfall of 249.3 millimetres. (BoM, 2022). Drainage lines in the area are dry for most of the year, only flowing briefly immediately following significant rainfall.</p> <p>There are no permanent water courses or waterbodies within the application area (GIS Database). The proposed area is not mapped as being within a flood risk area, however, seasonal drainage lines are common in the region and temporary localised flooding may occur briefly following heavy rainfall events. Standard surface water management strategies will be implemented during construction to mitigate any likelihood of flooding. The proposed clearing is unlikely to increase the incidence or intensity of natural flooding events.</p>	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 Keighery, B.J. (1994) *Bushland Plant Survey: A Guide to Plant Community Survey for the Community*. Wildflower Society of WA (Inc). Nedlands, Western Australia.

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

Condition	Description
Pristine	Pristine or nearly so, no obvious signs of disturbance.
Excellent	Vegetation structure intact, with disturbance affecting individual species; weeds are non-aggressive species.
Very good	Vegetation structure altered, with obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and/or grazing.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and/or grazing.
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and/or grazing.

Condition	Description
Completely degraded	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees or shrubs.

### Appendix E. Biological survey information excerpts / photographs of the vegetation / DMIRS site inspection report

**Table 1: Conservation significant vertebrate fauna species identified in the desktop review by Phoenix Environmental Sciences Pty Ltd (Phoenix Environmental Sciences, 2019).**

Species	Common name	Conservation status <sup>1</sup>		
		EPBC Act	BC Act	DBCAs list
<b>Birds (23)</b>				
<i>Leipoa ocellata</i>	Malleefowl	VU	VU	
<i>Apus pacificus</i>	Fork-tailed Swift	Mig	Mig	
<i>Plegadis falcinellus</i>	Glossy Ibis	Mig	Mig	
<i>Falco hypoleucos</i>	Grey Falcon		VU	
<i>Falco peregrinus</i>	Peregrine Falcon		OS	
<i>Charadrius veredus</i>	Oriental Plover	Mig	Mig	
<i>Thinornis rubricollis</i>	Hooded Plover			P4
<i>Pluvialis fulva</i>	Pacific Golden Plover	Mig	Mig	
<i>Limosa lapponica</i>	Bar-tailed Godwit	VU/Mig	VU/Mig	
<i>Actitis hypoleucos</i>	Common Sandpiper	Mig	Mig	
<i>Tringa nebularia</i>	Common Greenshank	Mig	Mig	
<i>Tringa glareola</i>	Wood Sandpiper	Mig	Mig	
<i>Tringa stagnatilis</i>	Marsh Sandpiper	Mig	Mig	
<i>Calidris canutus</i>	Red Knot	EN/Mig	Mig	
<i>Calidris melanotos</i>	Pectoral Sandpiper	Mig	Mig	
<i>Calidris ruficollis</i>	Red-necked Stint	Mig	Mig	
<i>Calidris subminuta</i>	Long-toed Stint	Mig	Mig	
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	Mig	Mig	
<i>Gelochelidon nilotica</i>	Gull-billed Tern	Mig	Mig	
<i>Polytelis alexandrae</i>	Princess Parrot	VU		P4
<i>Pezoporus occidentalis</i>	Night Parrot	EN	CR	
<i>Motacilla cinerea</i>	Grey Wagtail	Mig	Mig	
<i>Motacilla flava</i>	Yellow Wagtail	Mig	Mig	
<b>Mammals (7)</b>				
<i>Dasyurus geoffroii</i>	Chuditch	VU	VU	
<i>Sminthopsis longicaudata</i>	Long-tailed Dunnart			P4
<i>Myrmecobius fasciatus</i>	Numbat	VU	VU	
<i>Macrotis lagotis</i>	Greater Bilby	VU	VU	
<i>Bettongia lesueur</i>	Boodie	VU/EX	VU/EX	
<i>Lagostrophus fasciatus</i>	Banded Hare-wallaby	VU	VU	
<i>Leporillus conditor</i>	Greater Stick-nest Rat	VU	VU	

<sup>1</sup> CR – Critically Endangered; EN – Endangered; VU – Vulnerable; OS – Specially Protected; Mig – Migratory; P4 – Priority 4.



## Appendix F. Sources of information

### F.1. GIS databases

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

- Aboriginal Heritage Places (DPLH-001)
- Bush Forever (Regional Scheme) (DPLH-022)
- Clearing Regulations – Schedule One Areas (DWER-057)
- 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)
- Hydrographic Catchments – Catchments (DWER-028)
- Hydrography – Inland Waters – Waterlines
- Hydrography, Linear (DWER-031)
- Hydrological Zones of Western Australia (DPIRD-069)
- IBRA Vegetation Statistics
- Local Planning Scheme – Zones and Reserves (DPLH-071)
- Native Title (ILUA) (LGATE-067)
- Pre-European Vegetation Statistics
- Regional Parks (DBCA-026)
- Remnant Vegetation, All Areas
- RIWI Act, Groundwater Areas (DWER-034)
- RIWI Act, Surface Water Areas and Irrigation Districts (DWER-037)
- Soil Landscape Land Quality – Flood Risk (DPIRD-007)
- Soil Landscape Land Quality – Phosphorus Export Risk (DPIRD-010)
- Soil Landscape Land Quality – Subsurface Acidification Risk (DPIRD-011)
- Soil Landscape Land Quality – Water Erosion Risk (DPIRD-013)
- Soil Landscape Land Quality – Water Repellence Risk (DPIRD-014)
- Soil Landscape Land Quality – Waterlogging Risk (DPIRD-015)
- Soil Landscape Land Quality – Wind Erosion Risk (DPIRD-016)
- Soil Landscape Mapping – Best Available (DPIRD-027)
- Soil Landscape Mapping – Rangelands (DPIRD-064)
- WA Now Aerial Imagery
- Wheatbelt Wetlands Stage 1 (DBCA-021)

Restricted GIS Databases used:

- Threatened Flora (TPFL)
- Threatened Flora (WAHerb)
- Threatened Fauna
- Threatened Ecological Communities and Priority Ecological Communities
- Threatened Ecological Communities and Priority Ecological Communities (Buffers)

### F.2. References

- 360 Environmental (2021) Mining Proposal – Cardinia Gold Project. Report prepared for Navigator Mining Pty Ltd by 360 Environmental, 2 November 2021.
- 360 Environmental (2022) Mertondale Project Mertondale ¼ and Mertons Reward, Native Vegetation Clearing Permit (Purpose): Supporting Documentation. Report prepared for Navigator Mining Pty Ltd by 360 Environmental, March 2022.
- Bureau of Meteorology (BoM) (2023) Bureau of Meteorology Website – Climate Data Online, Leonora. Bureau of Meteorology. <http://www.bom.gov.au/climate/data/> (Accessed 08 July 2022).
- Department of Climate Change, Energy, the Environment and Water (DCCEEW) (2023) Species Profile and Threats Database (SPRAT). Available from <http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl> (Accessed 9 May 2023).
- Department of Environment Regulation (DER) (2014) *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](https://www.der.wa.gov.au/images/documents/your-environment/native-vegetation/Guidelines/Guide2_assessment_native_veg.pdf)
- Department of Planning, Lands and Heritage (DPLH) (2023) Aboriginal Heritage Inquiry System. Department of Planning, Lands and Heritage. <https://espatial.dplh.wa.gov.au/AHIS/index.html?viewer=AHIS> (Accessed 9 May 2023).
- Department of Primary Industries and Regional Development (DPIRD) (2022) Advice received in relation to Clearing Permit Application CPS 9640/1. Office of the Commissioner of Soil and Land Conservation, Department of Primary Industries and Regional Development, Western Australia, April 2022.
- Department of Primary Industries and Regional Development (DPIRD) (2023) NRInfo Digital Mapping. Department of Primary Industries and Regional Development. Government of Western Australia. URL: <https://dpiird.maps.arcgis.com/apps/webappviewer/index.html?id=662e8cbf2def492381fc915aaf3c6a0f> (Accessed 9 May 2023).
- Department of Water and Environmental Regulation (DWER) (2021) Procedure: Native vegetation clearing permits. Joondalup. Available from: [https://dwer.wa.gov.au/sites/default/files/Procedure\\_Native\\_vegetation\\_clearing\\_permits\\_v1.pdf](https://dwer.wa.gov.au/sites/default/files/Procedure_Native_vegetation_clearing_permits_v1.pdf)

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## Appendix G. Glossary

### Acronyms:

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

### Definitions:

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

#### **T** Threatened species:

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

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

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

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

**CR Critically endangered species**

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

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

**EN Endangered species**

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

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

**VU Vulnerable species**

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

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

**Extinct Species:**

**EX Extinct species**

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

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

**EW Extinct in the wild species**

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

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

**Specially protected species:**

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

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

**MI Migratory species**

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

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

Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species.

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

**CD Species of special conservation interest (conservation dependent fauna)**

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

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

**OS Other specially protected species**

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

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

**P Priority species:**

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

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

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

**P1 Priority One - Poorly-known species**

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

**P2 Priority Two - Poorly-known species**

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

**P3 Priority Three - Poorly-known species**

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

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

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

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

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

**Principles for clearing native vegetation:**

- (a) Native vegetation should not be cleared if it comprises a high level of biological diversity.

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