Karara Iron Ore Project Mine Life Extension

Review Significance of Residual Impacts

Final

February 2026

umwelt

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Prepared by
Umwelt (Australia) Pty Limited

On behalf of
Karara Mining Limited

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This report was prepared using Umwelt's ISO 9001 certified Quality Management System.

Acknowledgement of Country

Umwelt acknowledges the Traditional Owners of Country throughout Australia and their continuing values, culture and connection to the land, waters and sky.

We pay our respects to Elders past and present.

The below image is from the artwork *Yapung Maryiyang* (Pathway Forward) by Saretta Fielding.

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Document Status

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V1	Adam Parker	18/12/2025	Emma Molloy	18/12/2025
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Executive Summary

The predicted impacts from the Karara Iron Ore Project Mine Life Extension Proposal were assessed against the following guidelines to determine the potential significance of residual impacts:

- *Matters of National Environmental Significance – Significant impact guidelines 1.1* (Department of the Environment, 2013)
- *WA Environmental Offsets Guidelines* (Government of Western Australia, 2014)
- International Union for Conservation of Nature (IUCN) Red List Categories and Criteria, as outlined in:
    - *Guidelines for assessing the conservation status of native species according to the EPBC Act* (Threatened Species Scientific Committee (TSSC), 2024a)
    - *Guidelines for nominating and assessing the eligibility for listing of ecological communities as threatened under national environmental law* (Threatened Species Scientific Committee (TSSC), 2024b).

The Proposal has been mitigated by reducing the Development Envelope and Disturbance Footprint (referred to as the "mitigated Proposal"). This report reviews significance of residual impacts from the mitigated Proposal to conservation significant flora, ecological communities, banded iron formation landforms and terrestrial fauna.

This assessment has identified that the following ecological values will have significant residual impacts that might require offsets:

- Flora:
    - *Persoonia pentasticha* (P3)
    - *Caesia* sp. Koolanooka Hills (R. Meissner & Y. Caruso 78) (P1)
    - *Crassula* sp. nov. (undescribed species)
- Fauna:
    - Gilled Slender Blue-tongue (*Cyclodomorphus branchialis*) (Vulnerable – BC Act)
    - Western Spiny-tailed Skink (*Egernia stokesii badia*) (Endangered – EPBC Act, Vulnerable – BC Act)
    - Malleefowl (*Leipoa ocellata*) (Vulnerable – EPBC Act & BC Act) (breeding and foraging habitat)
    - Ornate Trapdoor Spider (*Idiosoma formosum*) (Endangered – BC Act)
    - Aganippe (*Idiosoma*) sp.) (potential new species)
    - Karara Millipede (short range endemic).

The KIOP MLE Offset Strategy will be updated to consider offsets for these ecological values.

The assessment concluded that the Proposal will not have significant residual impacts to the following values:

- Flora:
  - *Acacia karinae* (P3)
  - *Allocasuarina tessellata* (P3)
  - *Calandrinia kalanniensis* (P2)
  - *Calandrinia* sp. Warriedar (P2)
  - *Calotis* sp. Perrinvale Station (P3)
  - *Eucalyptus synandra* (Vulnerable – EPBC Act, Threatened – BC Act)
  - *Grevillea globosa* (P3)
  - *Grevillea scabrida* (P3)
  - *Gunniopsis divisa* (P3)
  - *Lepidosperma* sp. Blue Hills (A. Markey & S. Dillon 3468) (P1)
  - *Millotia dimorpha* (P1)
  - *Rhodanthe collina* (P3)
  - *Stylidium scintillans* (Threatened – BC Act)
  - *Swainsona picta* (P1)
- Ecological communities and landforms:
  - Blue Hills PEC (P1)
  - Banded Iron Formation Landforms
- Fauna:
  - Southern Whiteface (*Aphelocephala leucopsis*) (Vulnerable – EPBC Act & BC Act)
  - Central Long-eared Bat (*Nyctophilus major tor*) (P3)
  - Northern Shield-backed Trapdoor Spider (*Idiosoma clypeatum*) (P3) (important population of *Idiosoma nigrum*, Vulnerable – EPBC Act)
  - Millipede PM1 (locally significant)
  - Mt Gairdner Scorpion (locally significant)

These outcomes are described in the Environmental Review Document (ERD).

Abbreviations

Abbreviation	Meaning
ALA	Atlas of Living Australia
AOO	Area of occupancy
BC Act	*Biodiversity Conservation Act 2016* (WA)
BIF	Banded iron formation
Cth	Commonwealth
DBCA	Department of Biodiversity, Conservation and Attractions (WA)
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DE	Development Envelope
EOO	Extent of occurrence
EPA	Environmental Protection Authority (EPA)
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)
ERD	Environmental review document
IBRA	Interim Biogeographic Regionalisation for Australia
IUCN	International Union for Conservation of Nature
KIOP	Karara Iron Ore Project
KML	Karara Mining Limited
MLE	Mine Life Extension
MNES	Matters of National Environmental Significance
MS	Ministerial Statement
PEC	Priority ecological community
TEC	Threatened ecological community
TSSC	Threatened Species Scientific Committee
TSF	Tailings storage facility
VT	Vegetation type
VSA	Vegetation substrate association
WRD	Waste rock dump

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1.0 Purpose

Comments received from Department of Climate Change, Energy, the Environment and Water (DCCEEW), the Department of Biodiversity, Conservation and Attractions (DBCA) and the Environmental Protection Authority Services (EPA Services) on the Karara Iron Ore Project (KIOP) Mine Life Extension (MLE) Environmental Review Document (ERD) submitted in September 2025 raised queries about:

- Adequacy of survey and impact assessment for flora listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (Matters of National Environmental Significance, MNES flora).
- Evidence to support assessment of significance of residual impacts for State-listed Threatened flora, Priority flora and listed fauna
- Application of the mitigation hierarchy to minimise impacts to listed flora
- Adequacy of survey and assessment of significance of residual impacts for MNES fauna, including assessing impacts to specific habitat features such as malleefowl mounds, Western Spiny-tailed skink log piles and trapdoor spider burrows.

A detailed review of the significance of residual impacts for the proposed KIOP MLE was undertaken to address these regulator comments. The residual impacts are those impacts that remain after application of the mitigation hierarchy to reduce impacts as much as possible. The Proposal has been mitigated by reducing the Development Envelope and Disturbance Footprint (referred to as the "mitigated Proposal").

This report reviews significance of residual impacts from the mitigated Proposal. It draws on the quantified impacts for the mitigated Proposal that are presented in the *KIOP MLE Environmental Values Updated Impact Assessment* (Umwelt, 2026b). The mitigation approach, constraints and proposal areas are also presented in the *KIOP MLE Environmental Values Updated Impact Assessment* (Umwelt, 2026b).

The mitigation strategies, residual impacts and environmental outcomes presented in this report informed the updated ERD. The outcomes of the review confirmed the ecological values expected to require offsets, to inform update of the Offset Strategy.

2.0 Methods

The predicted impacts from the KIOP MLE Proposal were evaluated against the following guidelines to determine the potential significance of residual impacts:

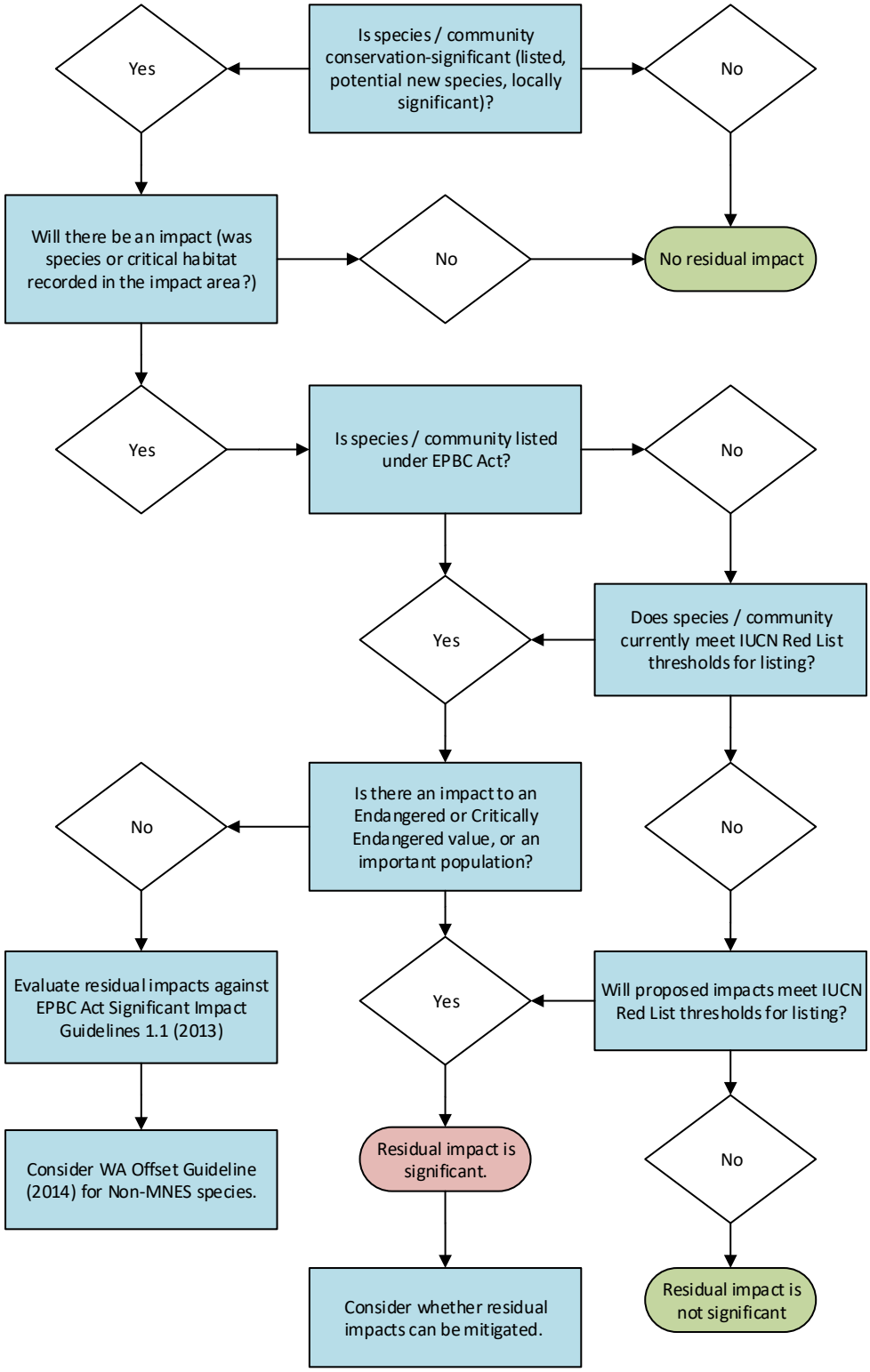
- International Union for Conservation of Nature (IUCN) Red List Categories and Criteria, as outlined in:
    - *Guidelines for assessing the conservation status of native species according to the EPBC Act* (Threatened Species Scientific Committee (TSSC), 2024a)
    - *Guidelines for nominating and assessing the eligibility for listing of ecological communities as threatened under national environmental law* (Threatened Species Scientific Committee (TSSC), 2024b)
- *Matters of National Environmental Significance – Significant impact guidelines 1.1* (Department of the Environment, 2013)
- *WA Environmental Offsets Guidelines* (Government of Western Australia, 2014).

Conservation advice and recovery plans for species and communities were also considered, where available.

The flowchart in **Figure 2.1** presents the overall process used in the evaluation of significance of residual impacts. Further details on the methods per type of ecological value are provided in the relevant sections.

An iterative approach was taken to assess residual impacts. The ecological values with highest impacts were prioritised when seeking to avoid or minimise significant impacts. After mitigation, the impacts were re-calculated and significance of impacts re-assessed with the revised disturbance footprint. This report presents the review of significance of residual impacts from the final version of the mitigated Proposal.

Process for Assessing Significance of Residual Impacts



3.0 Results

This section presents the results of the review of significance of residual impacts for flora species, ecological communities and landforms, and fauna species.

3.1 Flora Species

The review of significance of residual impacts for conservation significant flora species considered:

- Survey adequacy and likelihood of occurrence for species that were not recorded but were likely or possible to occur (**Section 3.1.1**)
- Significance of impacts to flora habitats for species that that were not recorded but habitat was present (**Section 3.1.2**)
- Significance of impacts for species that were recorded and relatively large impacts were predicted (**Section 3.1.3**)
- Proposed environmental outcomes for flora (**Section 3.1.4**).

3.1.1 Review Likelihood of Occurrence

Four MNES flora species were raised by DCCEEW as potentially occurring in and around the proposed Combined Development Envelope:

- Jingymia Mallee (*Eucalyptus synandra*) – Vulnerable
- Mingenew Everlasting (*Schoenia filifolia* subsp. *subulifolia*) – Endangered
- Scaly-leaved Featherflower (*Verticordia spicata* subsp. *squamosa*) – Endangered
- Long-flowered Nancy (*Wurmbea tubulasa*) – Endangered.

The Jingymia Mallee occurs near the mine area, and the other three species occur only in the Wheatbelt area.

Impacts to the MNES flora species that occur only near the Wheatbelt area will now be avoided, as the disturbance footprint has been amended to remove any proposed new disturbance in the Wheatbelt area.

Furthermore, DBCA and EPA Services raised queries about the survey adequacy or impacts to habitat for the following State-listed flora species for the mine area:

- Jingymia Mallee (*Eucalyptus synandra*) – Threatened
- Glistening Triggerplant *(Stylidium scintillans)* – Threatened
- *Calandrinia kalanniensis* – P2
- *Calandrinia sp. Warriedar* – P2
- *Millotia dimorpha* – P1
- *Persoonia kararae* – P2
- *Swainsona picta* – P1.

The flora survey outcomes have been reviewed to determine adequacy of survey and update likelihood of occurrence for these species relevant to the mine area. Species that might occur only in the Wheatbelt area will not be impacted by the mitigated Proposal, which has no new disturbance areas in the Wheatbelt area. The *2023 and 2024 Detailed and Targeted Flora and Vegetation Assessment* (Umwelt, 2025a) survey methods for the mine area are summarised in **Table 3.1**.

Table 3.1 Summary of Flora and Vegetation Survey Methods

Item	Mine Area
Desktop Study Area	Approximately 50 km search radius around Proposal Development Envelope, search undertaken in July 2024 (WA Herbarium, Threatened and Priority Flora Databases and DCCEEW Protected Matters Search Tool).
Survey Area	Survey area = Proposal Development Envelope
Targeted Survey Area	Targeted survey area = Proposal Disturbance Footprint
Flora survey methods	**Quadrat** – 20 m x 20 m, targeting at least three quadrats per vegetation pattern. Extensive records including soil colour and type, vegetation condition, time since fire, foliage cover and height for each taxon. **Releve** – records dominant taxa of each stratum level and taxa not recorded previously elsewhere **Vegetation mapping note** – notes on dominant and characteristic taxa and landform information, intended to support mapping of vegetation types **Targeted survey track logs** – grid pattern via transects 50 m apart or closer if required for cryptic significant flora, records of significant and introduced taxa including GPS locations (not a full population census due to grid spacing) Numerous **historic quadrat and releve observations**
Flora survey dates	October 2023, 6–12 & 21–28 August 2024 and 16–20 September 2024 Historic observations from 2020 and circa 2008–2010 by Woodman and Umwelt, all data held by Umwelt.

A review of survey adequacy and likelihood of occurrence was undertaken for significant flora that were rated in the *2023 and 2024 Detailed and Targeted Flora and Vegetation Assessment* (Umwelt, 2025a) as likely or possible to occur in the mine area (**Table 3.2**). The review was also informed by further research into species form and flowering period, habitat requirements and known distribution and records. **Figure 3.1** presents information that informed the review of survey adequacy for the mine area, including known records of species of interest, flora survey extent and mitigated disturbance footprint.

The review concluded that:

- *Persoonia kararae* is unlikely to be present in the region and no impacts are expected – the survey was adequate to detect occurrences and the only records in the Karara region are from 1974 (with generalised coordinates), despite numerous flora surveys in the bioregion since that time.
- Jingymia Mallee (*Eucalyptus synandra)*, Glistening Triggerplant *(Stylidium scintillans*) and *Swainsona picta* individuals are unlikely to be present in the proposed disturbance footprint as the survey was adequate. However, suitable habitat is present – impacts to habitat need to be assessed.

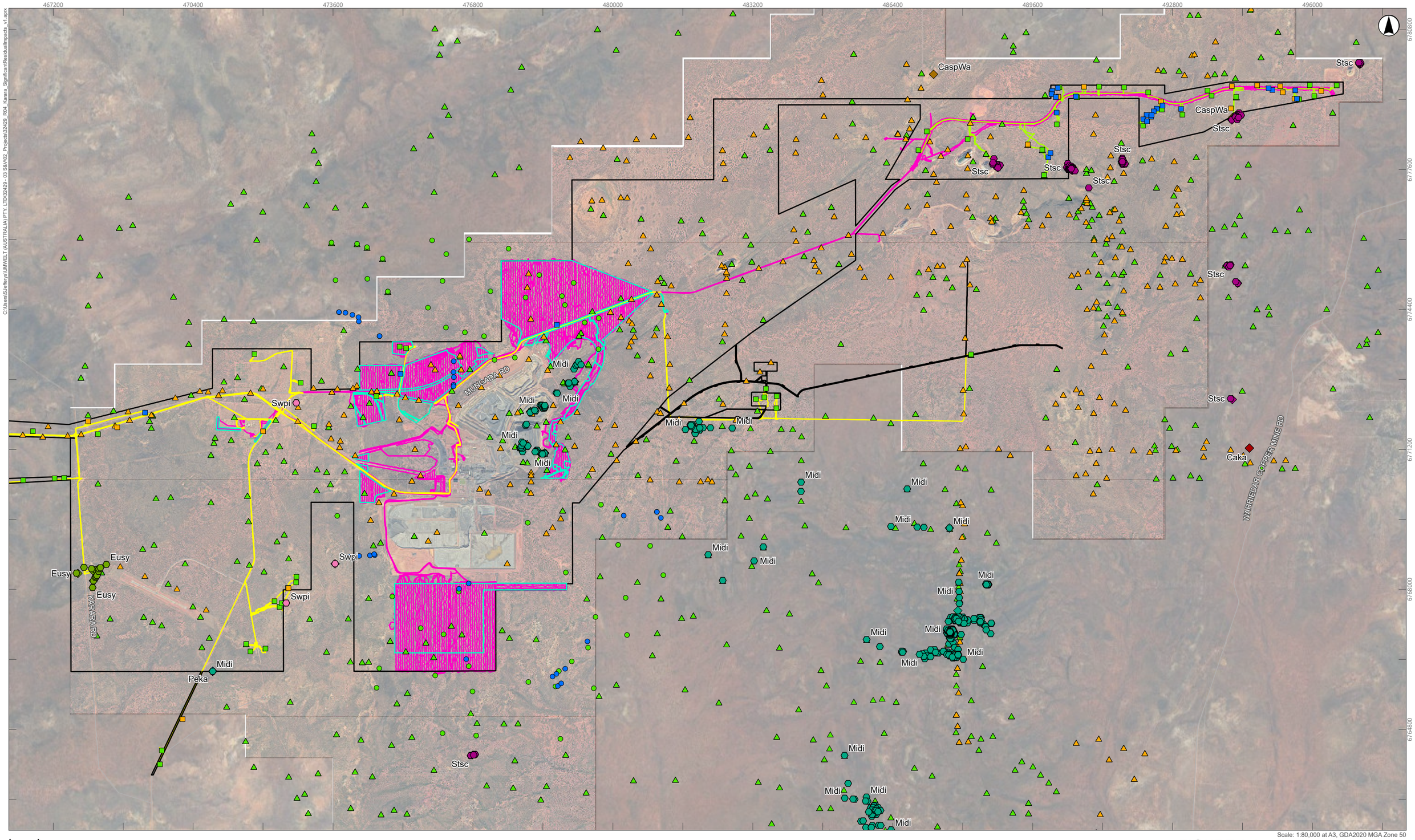
- *Calandrinia kalanniensis, Calandrinia* sp. Warriedar and *Millotia dimorpha* individuals could occur in the proposed disturbance footprint that have not been recorded, due to the small size of plants and specific flowering seasons. Habitat is also present - impacts to habitat need to be assessed.

Section 3.1.2 assesses the impacts to the above species (except *Persoonia kararae*) habitats and presents the assessment against the significant impact criteria for species as detailed in the *Matters of National Environmental Significance – Significant impact guidelines 1.1 EPBC Act* (Department of the Environment, 2013).

Table 3.2 Review of Flora Species Survey Adequacy and Likelihood of Occurrence

Species	Conservation Status	Distribution	Habitat	Plant Description	Survey and Historic Records Nearby Disturbance Footprint	Adequacy of Survey, Likelihood of Occurrence	Outcome
Eucalyptus synandra **Jingymia Mallee**	Vulnerable - EPBC, Threatened – BC Act	**Source:** ALA spatial database. Present around Karara mine area. Range 260 km from Pindar in northwest to near Mollerin Rock in southeast. WA Herbarium 68 records. (Umwelt, 2025a)	**Source:** Approved Conservation Advice for *Eucalyptus synandra* (Jingymia Mallee) dated 16 Dec 2008 Jingymia Mallee grows on sandy, lateritic soils in undulating or flat country with heath and scrub.	**Source:** Approved Conservation Advice for *Eucalyptus synandra* (Jingymia Mallee) dated 16 Dec 2008 Straggly multi-stemmed tree to 10 m high. Perennial. Flowers Dec–March.	46 records from previous flora surveys for Karara, locations in far west of mine area (near airstrip). No records from 2023–2024 flora survey (Umwelt, 2025a).	Intensive systematic survey of mine area proposed disturbance footprint was completed (Umwelt, 2025a). As this species is a substantial tree, it is reasonable that all plants within the disturbance footprint would have been recorded from the targeted flora survey undertaken. Unlikely to be further undetected records in the disturbance footprint.	Survey adequate. No impact on individuals. Assess impact on habitat to determine significance of residual impact. Use EPBC Act significant impact guidelines for Vulnerable species.
Stylidium scintillans **Glistening Triggerplant**	Threatened – BC Act	**Source:** ALA spatial database. Found only around Karara mine area. EOO 2439 km^2 AOO 44 km^2 (0.02 degree grid) Range 40 km from near Golden Grove in north to west of Mongers Lake in southeast. WA Herbarium 23 records. (Umwelt, 2025a)	Brown clay loam or brown gravelly loam on mid to upper slopes of granite outcropping. Sometimes growing in cracks between rocks.	**Source:** *2023 and 2024 Detailed and Targeted Flora and Vegetation Assessment* (Umwelt, 2025a) Flowering period Aug-Oct. Erect annual herb 3–8 cm high. White flowers with red-pink throat markings.	15 records from previous flora surveys for Karara, locations in far east of Mine Area. No records from 2023–2024 flora survey (Umwelt, 2025a).	Survey timing appropriate to detect during flowering period. Intensive targeted search in disturbance footprint would be expected to detect this species if present. Records from previous surveys are in the far east of the Development Envelope, outside of disturbance footprint. Unlikely to be further undetected records in the disturbance footprint.	Survey adequate. No impact on individuals. Assess impact on habitat to determine significance of residual impact. EOO and AOO would qualify species for Endangered listing under IUCN criteria – assess impacts using EPBC Act significant impact guidelines for Endangered species.
Calandrinia kalanniensis	P2 – BC Act	**Source:** ALA spatial database Northernmost record is near Karara mine area (dated 2005, generalised by 10 km). Remaining 19 records are more than 100 km south of the Karara mine area, extending south to Merredin, 300 km south of the Karara mine area.	Brown, red gritty sandy clay over granite. Shallow rock hollow on large granite rock. (Umwelt, 2025a)	**Source:** Florabase Tuberous perennial herb to 9 cm high. Flowering Nov-Dec or Jan. Not detectable outside of flowering period.	No records from 2023–2024 flora survey (Umwelt, 2025a). Recorded in previous survey for Karara mine area, survey periods Jun-Oct. Records near Mungada Ridge (Woodman Environmental, 2008) – these are all outside of the Development Envelope.	Although this species has previously been recorded in the region from surveys in spring, the typical flowering period is late spring to summer. Therefore, it is possible occurrences were not detected if the species was not flowering during the survey period. The closest known records are over 7 km from the proposed disturbance footprint. The species preferred habitat is present in the survey area.	There are possible occurrences of this species not recorded within the survey area. Assess impact on habitat to determine significance of residual impact.
***Calandrinia* sp. Warriedar**	P2 – BC Act	**Source:** Florabase Range approximately 100 km, from north of Morawa in the northwest of the range, to near Lake Moore in the southeast of the range.	Red-brown, fine clayey loam. Gently sloping granitic flats. (Umwelt, 2025a)	Flowers Aug–Sept (Umwelt, 2025a) Succulent annual herb growing to 3 cm high, restricted to exposed rocky sites on granite or duricrust outcropping, often as breakaways or flats (Woodman Environmental, 2017)	Not recorded in 2023–2024 flora survey or any historic surveys of the Karara mine area (Umwelt, 2025a). It has been recorded in other regional flora surveys of Warriedar Fold Belt and Rothsay Gold Project (Umwelt, 2025a). Recorded in the far east of the Karara Mine Area.	Flora survey timing was appropriate to detect this species during the flowering period, although it was not detected during the 2023-24 survey. Although targeted searches were undertaken, the transect intervals were 50 m. Due to the small size of this species, there could be occurrences that were not recorded. Previous records are more than 9 km from the proposed disturbance footprint.	There are possible occurrences of this species not recorded within the survey area. Assess impact on habitat to determine significance of residual impact.

Species	Conservation Status	Distribution	Habitat	Plant Description	Survey and Historic Records Nearby Disturbance Footprint	Adequacy of Survey, Likelihood of Occurrence	Outcome
Millotia dimorpha	P1 – BC Act	Range 115 km from Canna Nature Reserve in northwest to near Warriedar Mine in southeast, encompassing Karara mine area. WA Herbarium 23 records (Umwelt, 2025a).	Rocky red to brown clay loam across moderately inclined slopes of banded (often laterised with haematite) ironstone (Umwelt, 2025a)	**Source:** Florabase Erect or ascending annual herb, 10 cm high. Flowers in September.	Recorded in historic flora surveys, with 11 records from two areas (Umwelt, 2025a): • Southern edge of the Development Envelope south of the mine airstrip, 4 km from the proposed disturbance footprint. • Within the approved area of the open pit.	Flora survey timing was appropriate to detect this species during the flowering period, although it was not detected during the 2023–24 survey. Although targeted searches were undertaken, the transect intervals were 50 m. Due to the small size of this species, there could be occurrences that were not recorded. Previous records are less than 500 m from the proposed disturbance footprint, within a similar landform.	There are possible occurrences of this species not recorded within the proposed disturbance footprint. Assess impact on habitat to determine significance of residual impact.
Persoonia kararae	P2 – BC Act	**Source:** ALA spatial database One record from 1996 in Toolonga Nature Reserve, approximately 200 km north of Geraldton. Four records from 1974 near Karara mine area (on edge of Development Envelope but more than 4 km from proposed disturbance footprint), with records generalized by 10 km.	Gentle rises on sandplains. Red clay loam. (Umwelt, 2025a)	**Source:** Florabase Erect spreading shrub, 1–5 m high. Flowers Sept-Nov.	This species has not been recorded in the Karara area by any surveys since 1974, including numerous surveys of the Karara mine area. As the only other known location is in a different bioregion, the location of the historical records might be inaccurate.	Flora survey timing was appropriate to detect this species during the flowering period, and as it is a shrub it would also be detectable when it is not flowering. There are unlikely to be further undetected records in the disturbance footprint. There is a low risk of unexpected impact on individuals due to survey adequacy, distance from proposed disturbance, and uncertainty whether this species occurs in the region.	Survey adequate. No impact on individuals. Uncertain whether species occurs in the region. No impact assessment on habitat is required.
Swainsona picta	P1 – BC Act	Range 18 km, from near Weelhamby Lake in west to near John Forrest lookout in southeast. WA Herbarium 2 records (Umwelt, 2025a).	Red brown sandy loam. Granite outcrops and adjacent areas (Umwelt, 2025a)	Ascending erect annual herb to 15 cm high. Flowers in August (Umwelt, 2025a).	Recorded in 2023-24 flora survey from three locations (Umwelt, 2025a): • Between Weelhamby Lake and mine area, 500 m from Development Envelope, 15 km from proposed disturbance footprint. • Near the mine village within the Development Envelope, 700 m from proposed disturbance footprint. • Near the mine airstrip, just outside the Development Envelope, 2.5 km from the proposed disturbance footprint.	Flora survey timing was appropriate to detect this species during the flowering period, and three locations were recorded by Umwelt. The recorded locations are more than 700 m from the proposed disturbance footprint. There are unlikely to be further undetected records in the disturbance footprint. There is a low risk of unexpected impact on individuals due to survey adequacy and distance from proposed disturbance.	Survey adequate. No impact on individuals. Assess impact on habitat to determine significance of residual impact. Due to the small range and very few known records of this species (less than 250 known individuals, extent of occurrence less than 100 km^2), it could qualify for Critically Endangered listing under IUCN criteria – assess impacts using EPBC Act significant impact guidelines for Critically Endangered species.



Legend

- Combined Proposal Mitigated Development Envelope
- KIOP MLE Mitigated Disturbance Footprint
- Minor Road
- Detailed Survey Track Logs – 2023
- Detailed Survey Track Logs – 2024
- Targeted Survey Track Logs – 2024

Observations – 2023/2024

- Quadrat
- Relevé
- Vegetation Mapping Note

Observations – 2020

- Quadrat
- Vegetation Mapping Note

Observations – Historic

- Quadrat
- Relevé

Significant Flora (Umwelt)

- Eusy *Eucalyptus synandra* (Vulnerable EPBC Act)
- Midi *Millotia dimorpha* (P1)
- Stsc *Stylidium scintillans* (Threatened BC Act)
- Swpi *Swainsona picta* (P1)

Significant Flora (DBCA)

- Caka *Calandrinia kalanniensis* (P2)
- CaspWa *Calandrinia* sp. Warriedar (F. Obbens 04/09) (P2)
- Eusy *Eucalyptus synandra* (Vulnerable EPBC Act)
- Midi *Millotia dimorpha* (P1)
- Peka *Persoonia kararae* (P2)
- Stsc *Stylidium scintillans* (Threatened BC Act)
- Swpi *Swainsona picta* (P1)

Scale: 1:80,000 at A3, GDA2020 MGA Zone 50

FIGURE 3.1
Review of Significant Flora Likelihood of Occurrence in Mine Area

0 1.6 3.2 km

Image Source: KML (2024), ESRI Basemap (2025) | **Data Source:** Landgate (2022, 2025), DBCA (2023), Umwelt (2025), KML (2025)

umwelt

3.1.2 Significance of Impacts – Flora Habitats

The review of survey adequacy and likelihood of occurrence identified that three listed flora species are unlikely to occur, but suitable habitat is present (*Eucalyptus synandra*, *Stylidium scintillans* and *Swainsona picta*). These species are either listed as MNES or would meet IUCN criteria for Endangered or Critically Endangered. This section presents the predicted impact to habitat and assessment against the *Significant impact guidelines 1.1 EPBC Act* (Department of the Environment, 2013) for these species.

Furthermore, three listed flora species could have occurrences that have not been recorded (*Calandrinia kalanniensis, Calandrinia* sp. Warriedar and *Millotia dimorpha*). This section presents the impacts to habitat for these species.

Table 3.3 summarises the identified habitat for each species per vegetation type (VT) and the impact from the proposed KIOP MLE mitigated disturbance footprint as a proportion of the total habitat in the Combined Proposal mitigated development envelope (DE).

Table 3.3 Review of Impacts to Habitat – Listed Flora Species

Species	Habitat (VTs)	Area of mapped habitat (area of VTs in Combined Proposal mitigated DE) (ha)	Proposed impact - area of habitat in proposed KIOP MLE mitigated disturbance footprint (ha)	Proposed impact – proportion of development envelope (%)	Combined Proposal – area of habitat in Combined mitigated disturbance footprint (ha)	Combined impact – proportion of development envelope (%)
Calandrinia kalanniensis	A, B, F and O	1,317.0	169.9	12.9	388.3	29.5
Calandrinia sp. Warriedar	O	546.2	86.9	15.9	232.1	42.5
Eucalyptus synandra	R	4,917.31	104.4	13.3	235.5	30.0
Millotia dimorpha	O	546.2	86.9	15.9	232.1	42.5
Stylidium scintillans	O	546.2	86.9	15.9	232.1	42.5
Swainsona picta	B	112.3	3.8	3.4	5.5	4.9

Table 3.4 presents the assessment against the significant impact criteria for species as detailed in the *Matters of National Environmental Significance – Significant impact guidelines 1.1 EPBC Act* (Department of the Environment, 2013) for:

- *Eucalyptus synandra* – Vulnerable, EPBC Act & Threatened, BC Act & meets IUCN criteria for Endangered (Fensham, R.J., Laffineur, B., Collingwood, T.D., Beech, E., Bell, S., Hopper, S.D., Phillips, G., Rivers, M.C., Walsh, N., White, M., 2020)
- *Stylidium scintillans* – Threatened, BC Act & meets IUCN criteria for Endangered
- *Swainsona picta* – P1 BC Act & may meet IUCN criteria for Critically Endangered

The assessment concluded that there will not be a significant residual impact for any these species.

The significance of residual impacts for flora species that are not MNES and do not meet IUCN criteria for listing considered the residual impact significance model in the *WA Environmental Offsets Guidelines* (Government of Western Australia, 2014). The residual impacts to *Calandrinia kalanniensis, Calandrinia* sp. Warriedar and *Millotia dimorpha* are not considered significant as:

- The Proposed mitigated disturbance footprint would impact 12.9–15.9% of habitat within the Combined Proposal mitigated development envelope. This is not a substantial increase in impact.
- The cumulative impact to habitat from the Combined Proposal mitigated disturbance footprint is 29.5–42.5% of habitat within the development envelope. All three species have a range of 100 km or more. Therefore, the Combined Proposal impact within the development envelope is only a portion of the known range and suitable habitat for these species.
- Although the review of survey adequacy identified that there are possible occurrences of these species that were not recorded, these species have been detected in comparable regional surveys completed by Umwelt (or previously Woodman). This ameliorates the likelihood of undetected occurrences.

Based on the above assessment, the impacts from the Proposal would not trigger an increase in conservation status for these species or increase the cumulative impact to a critical level. Therefore, there will not be a significant residual impact for any these species.

Table 3.4 Significant Impact Guidelines 1.1 Assessment

MNES Significant Impact Guidelines 1.1 – Endangered or Critically Endangered Species [adjustments for Vulnerable in brackets]	***Eucalyptus synandra*** Vulnerable, EPBC Act & Threatened – BC Act Has been identified as meeting criteria for Endangered	***Stylidium scintillans*** Threatened – BC Act Consider as Endangered based on IUCN criteria	***Swainsona picta*** P1 – BC Act Consider as Critically Endangered based on IUCN criteria
Conservation advice	Approved Conservation Advice for *Eucalyptus synandra*, dated 16 December 2008. Most populations are undisturbed and healthy. No definitions of critical habitat or important populations. *A review of Australian eucalypts against IUCN Red List criteria* (Fensham, R.J., Laffineur, B., Collingwood, T.D., Beech, E., Bell, S., Hopper, S.D., Phillips, G., Rivers, M.C., Walsh, N., White, M., 2020) identified *Eucalyptus synandra* meets criteria for listing as Endangered due to having small total population and sub-populations with ongoing decline. On this basis, all populations are likely to be important.	No published conservation advice	No published conservation advice
Recovery plan	No published recovery plan.	No published recovery plan	No published recovery plan
Lead to a long-term decrease in the size of a population of a species [important population for Vulnerable species]	No - the size of the local population won't reduce as there are no individuals within proposed disturbance footprint and survey was adequate to detect individuals.	No - the size of the population won't reduce as there are no individuals within proposed disturbance footprint and survey was adequate to detect individuals.	No - the size of the population won't reduce as there are no individuals within proposed disturbance footprint and survey was adequate to detect individuals.
Reduce the area of occupancy of [an important population] the species	No - the proposal will not reduce the area of occupancy of the local population or species as there are no individuals within proposed disturbance footprint.	No - the proposal will not reduce the area of occupancy of the local population or species as there are no individuals within proposed disturbance footprint.	No - the proposal will not reduce the area of occupancy of the local population or species as there are no individuals within proposed disturbance footprint.

MNES Significant Impact Guidelines 1.1 – Endangered or Critically Endangered Species [adjustments for Vulnerable in brackets]	***Eucalyptus synandra*** Vulnerable, EPBC Act & Threatened – BC Act Has been identified as meeting criteria for Endangered	***Stylidium scintillans*** Threatened – BC Act Consider as Endangered based on IUCN criteria	***Swainsona picta*** P1 – BC Act Consider as Critically Endangered based on IUCN criteria
Fragment an existing population [important population] into two or more populations	No – the proposal will not fragment the local population; the proposed disturbance footprint is approximately 3.5 km from recorded individuals.	No - the proposal will not fragment the local population. The proposed disturbance footprint is approximately 14 km from recorded individuals.	No - the proposal will not fragment the local population. The proposed disturbance footprint is approximately 700 m from recorded individuals.
Adversely affect habitat critical to the survival of a species	No – the habitat to be cleared is not considered habitat critical to the survival of the species as no individuals were recorded in the area to be cleared. Therefore, this habitat is not considered critical to maintain genetic diversity or maintain species survival. Although the proposed disturbance footprint will impact habitat that is potentially suitable for the species, no individuals were recorded in the habitat to be removed, and unrecorded occurrences were rated as unlikely.	No – the habitat to be cleared is not considered habitat critical to the survival of the species as no individuals were recorded in the area to be cleared and unrecorded occurrences were rated as unlikely. Therefore, this habitat is not considered critical to maintain genetic diversity or maintain species survival.	No – the habitat to be cleared is not considered habitat critical to the survival of the species as no individuals were recorded in the area to be cleared and unrecorded occurrences were rated as unlikely. Therefore, this habitat is not considered critical to maintain genetic diversity or maintain species survival.
Disrupt the breeding cycling of a population [important population]	No – the proposal is not expected to disrupt the breeding cycle. There are no individuals in habitat proposed to be cleared.	No - no direct impact to individuals	No - no direct impact to individuals
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	No – the proposal is not expected to impact habitat to the extent that it would cause the species to decline. Although potential habitat will be impacted, no individuals were recorded in the proposed expansion area, and it is unlikely unrecorded individuals would be present. The proposed mitigated disturbance footprint will impact 104.3 ha (13.3%) of mapped habitat for this species in the Combined Proposal mitigated Development Envelope.	No – the proposal is not expected to impact habitat to the extent that it would cause the species to decline. Although potential habitat will be impacted, no individuals were recorded in the proposed expansion area, and it is unlikely unrecorded individuals would be present. The proposed mitigated disturbance footprint will impact 86.9 ha (15.9%) of mapped habitat for this species in the Combined Proposal mitigated Development Envelope.	No – the proposal is not expected to impact habitat to the extent that it would cause the species to decline. Although potential habitat will be impacted, no individuals were recorded in the proposed expansion area, and it is unlikely unrecorded individuals would be present. The proposed mitigated disturbance footprint will impact 3.8 ha (3.4%) of mapped habitat for this species in the Combined Proposal mitigated Development Envelope.

MNES Significant Impact Guidelines 1.1 – Endangered or Critically Endangered Species [adjustments for Vulnerable in brackets]	***Eucalyptus synandra*** Vulnerable, EPBC Act & Threatened – BC Act Has been identified as meeting criteria for Endangered	***Stylidium scintillans*** Threatened – BC Act Consider as Endangered based on IUCN criteria	***Swainsona picta*** P1 – BC Act Consider as Critically Endangered based on IUCN criteria
Result in invasive species that are harmful to the species becoming established in the species' habitat	No – the proposal is not expected to result in invasive species becoming established, as it is an expansion of existing operations - this does not introduce a new risk.	No – the proposal is not expected to result in invasive species becoming established, as it is an expansion of existing operations - this does not introduce a new risk.	No – the proposal is not expected to result in invasive species becoming established, as it is an expansion of existing operations - this does not introduce a new risk.
Introduce disease that may cause the species to decline	No – the proposal is not expected to result in introduction of disease, as it is an expansion of existing operations - this does not introduce a new risk.	No – the proposal is not expected to result in introduction of disease, as it is an expansion of existing operations - this does not introduce a new risk.	No – the proposal is not expected to result in introduction of disease, as it is an expansion of existing operations - this does not introduce a new risk.
Interfere with the recovery of the species	No – no approved recovery plan.	No – no approved recovery plan.	No – no approved recovery plan.
Outcome	**No significant impact as no impact to population, no change to area of occupancy, no impact to habitat critical to the survival of the species.**	**No significant impact as no impact to population, no change to area of occupancy, no impact to habitat critical to the survival of the species.**	**No significant impact as no impact to population, no change to area of occupancy, no impact to habitat critical to the survival of the species.**

3.1.3 Significance of Impacts – Recorded Flora Locations

The significance of impacts was reviewed for all conservation significant flora with a predicted impact to recorded locations from the KIOP MLE mitigated disturbance footprint. No MNES flora species were recorded in the proposed KIOP MLE mitigated disturbance footprint. Therefore, this assessment considers priority species listed under the BC Act and potential new species.

The significance of impacts was assessed with reference to the *Guidelines for assessing the conservation status of native species according to the EPBC Act* (Threatened Species Scientific Committee (TSSC), 2024a) ("IUCN Guidelines" or "IUCN criteria"). This assessment was applied to determine if the species would already meet IUCN criteria for listing, or if the proposed MLE impact would increase the impact to an extent that the species would meet IUCN criteria for listing. If the proposed MLE impact would cause the species to meet IUCN criteria for listing, the Proposal impact would be potentially significant (as per the residual impact significance model in the *WA Environmental Offsets Guidelines* (Government of Western Australia, 2014)).

The IUCN criteria and methods applied to assess the potential significance of residual impacts to flora species are summarised in **Table 3.5** with further details provided in Karara Iron Ore Project Mine Life Extension – Environmental Values Updated Impact Assessment (Umwelt, 2026a).

Table 3.5 IUCN Criteria Applied to Assess Significance of Residual Impacts to Flora Species

IUCN Criteria	How Estimated	Critically Endangered	Endangered	Vulnerable
Would the species meet IUCN criteria for listing based on previously approved impacts?				
Population size reduction – estimated in the past, where causes of reduction have not ceased and may not be reversible.	Approved impact in the region as a percentage of total known population.	>80%	>50%	>30%
Would the species meet IUCN criteria for listing based on proposed impacts?				
Population size and decline (both criteria must be met)	Total known population from additional data sourced from DBCA combined with project data	<250	<2,500	<10,000
	Proposed MLE mitigated disturbance footprint was calculated as a percent of the total known population to estimate projected population decline over the next 3-5 years	>25% in 3 years	>20% in 5 years	>10% in 10 years

This assessment is presented in **Table 3.6** and **Figure 3.2** for significant perennial flora taxa and **Table 3.7** and **Figure 3.3** for significant ephemeral and annual flora taxa. The assessment has identified that the KIOP MLE Proposal impacts to the following species are potentially significant due to increasing the impact to a level that would trigger IUCN criteria for listing:

- *Persoonia pentasticha*
- *Caesia* sp. Koolanooka Hills (R. Meissner & Y. Caruso 78)

- *Crassula* sp. nov

The potentially significant residual impacts to these species will be considered in the Offset Strategy.

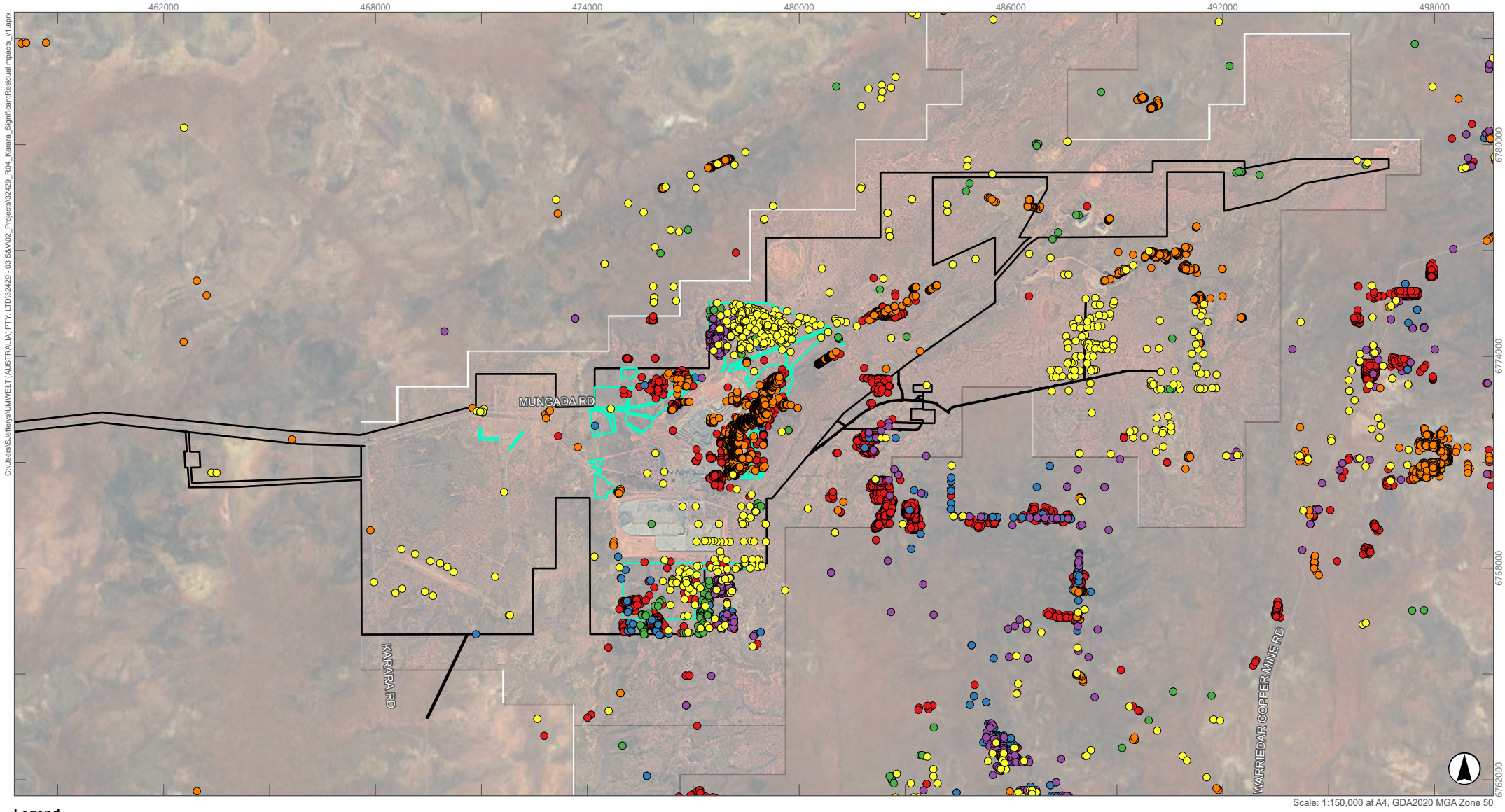
The assessment concluded that there will not be a significant residual impact to the remaining species as the proposed impact would not trigger IUCN criteria for listing.

Table 3.6 Significance of Impact to Total Known Population – Perennial Significant Flora Taxa Individuals

Taxon	Status	Total known population (#)	Approved regional impact (#)	Approved regional impact (% of total population) [Proxy for observed population size reduction]	Meets IUCN Criteria for Species Listing based on population size approved (observed) reduction	Proposed direct impact – KIOP MLE mitigated disturbance footprint (#)	Proposed direct impact – KIOP MLE mitigated disturbance footprint (% of total population) [Projected population size decline]	Meets IUCN Criteria for Species Listing based on total population and projected population size reduction
Acacia karinae	P3	46,724	6,936	14.8	No	1,347	2.9	No
Allocasuarina tessellata	P3	28,612	7	0.0	No	583	2.0	No
Grevillea globosa	P3	996	125	12.6	No	175	17.6	No Population <2,500 but <20% decline in 5 years.
Grevillea scabrida	P3	12,700	7	0.1	No	944	7.4	No
Lepidosperma sp. Blue Hills	P1	78,528	38,898	49.5	Meets criteria for Vulnerable listing (>30% of population reduction observed, cause has not ceased)	223	0.3	No
Persoonia pentasticha	P3	1,329	150	11.3	No	364	27.4	Meets criteria for Endangered Population <2,500 and >20% decline in 5 years.

Table 3.7 Significance of Impact to Total Known Population – Annual and Ephemeral Significant Flora Taxa Locations

Taxon	Status	Total known no. locations (estimated population)	Approved regional impact (#)	Approved regional impact (% of total population) [Proxy for observed population size reduction]	Meets IUCN Criteria for Species Listing based on population size approved (observed) reduction	Proposed direct impact – KIOP MLE mitigated disturbance footprint (#)	Proposed direct impact – KIOP MLE mitigated disturbance footprint (% of total population) [Projected population size decline]	Meets IUCN Criteria for Species Listing based on total population and projected population size reduction
Caesia sp. Koolanooka Hills	P1	269 (population ~800-1,000 individuals)	7	2.6	No	172	63.9	Meets criteria for Endangered Population <2,500 and >20% decline in 5 years.
Calotis sp. Perrinvale Station	P3	69 (population ~11,000-40,000 individuals)	3	4.3	No	28	40.6	No >10% decline but population >10,000
Crassula sp. nov	-	4 recorded to date	0	0	No	2	50%	Meets criteria for Critically Endangered Known population <250 and >25% decline in 3 years.
Gunniopsis divisa	P3	133 (population ~3,000-30,000 individuals)	3	2.3	No	21	15.8	No >10% decline but population expected to be >10,000
Rhodanthe collina	P3	841 (population ~7-24 million)	67	8.0	No	347	41.3	No >10% decline but population >>10,000



Scale: 1:150,000 at A4, GDA2020 MGA Zone 50

Legend

- Combined Proposal Mitigated Development Envelope
- KIOP MLE Mitigated Disturbance Footprint
- Minor Road

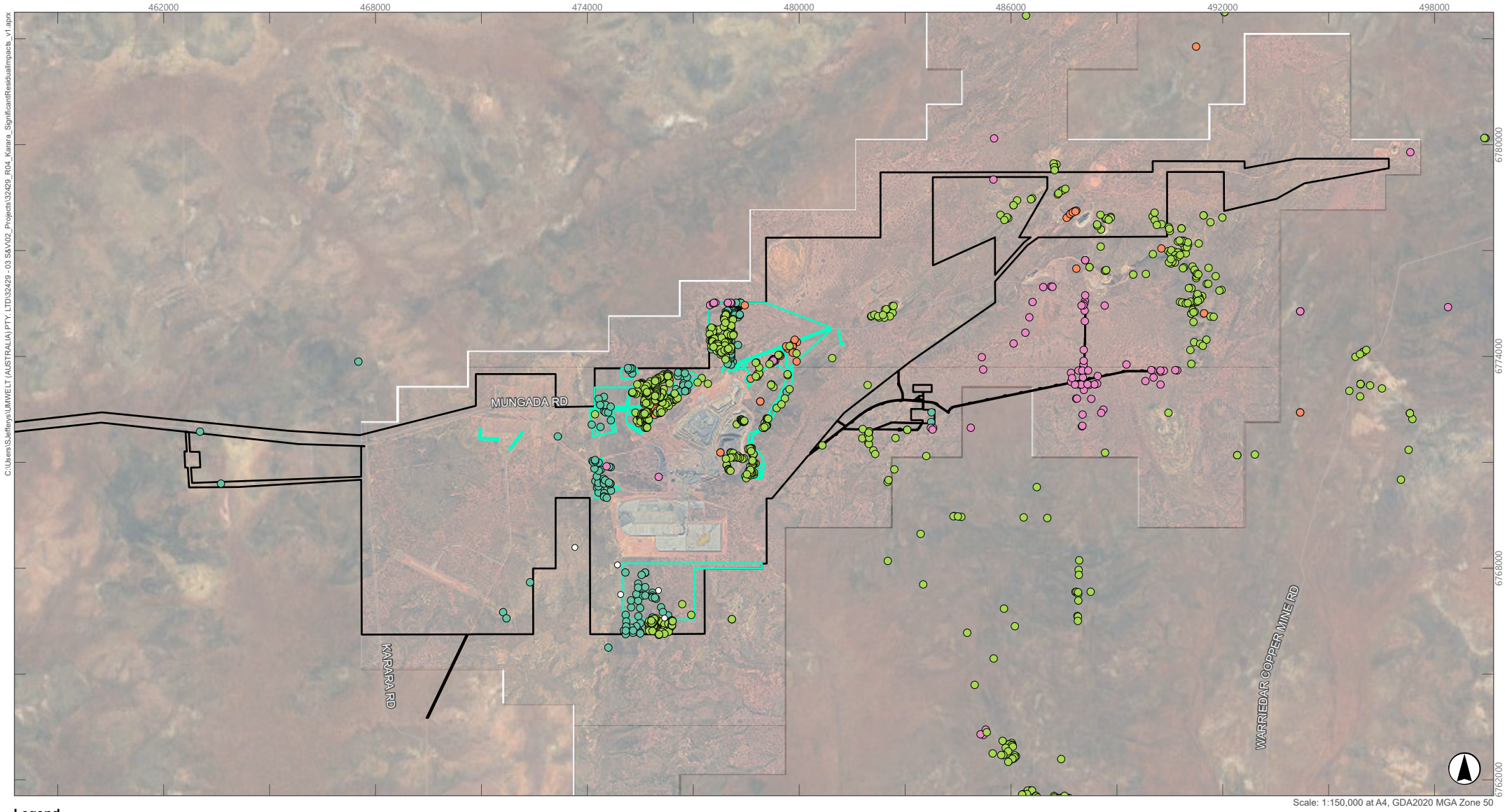
Ackar	*Acacia karinae* (P3)
Alte	*Allocasuarina tessellata* (P3)
Grgl	*Grevillea globosa* (P3)
Grsc	*Grevillea scabrida* (P3)
LespBH	*Lepidosperma* sp. Blue Hills (A. Markey & S. Dillon 3468) (P1)
Pepe	*Persoonia pentasticha* (P3)

FIGURE 3.2

Significance of Impacts to Recorded Locations – Perennial Flora

0 3 6 km

Image Source: KML (2024), ESRI Basemap (2025) | **Data Source:** Landgate (2025), KML (2025)



Scale: 1:150,000 at A4, GDA2020 MGA Zone 50

Legend

- Combined Proposal Mitigated Development Envelope
- KIOP MLE Mitigated Disturbance Footprint
- Minor Road

CaspKH	*Caesia* sp. Koolanooka Hills (R. Meissner & Y. Caruso 78) (P1)
CaspPS	*Calotis* sp. Perrinvale Station (R.J. Cranfield 7096) (P3)
Cras	*Crassula* sp. nov.
Gudi	*Gunniopsis divisa* (P3)
Rhco	*Rhodanthe collina* (P3)

FIGURE 3.3

Significance of Impacts to Recorded Locations – Ephemeral Flora

0 3 6 km

Image Source: KML (2024), ESRI Basemap (2025) | **Data Source:** Landgate (2025), KML (2025)

3.1.4 Environmental Outcomes

The following environmental outcomes are proposed for the KIOP MLE for flora and vegetation:

- No vegetation clearing from the Proposal in the Geraldton Sandplains or Avon Wheatbelt IBRA subregions.
- No impacts to individuals of the following species:
  - *Acacia woodmaniorum* – Endangered
  - Jingymia Mallee (*Eucalyptus synandra*) – Vulnerable
  - Mingenew Everlasting (*Schoenia filifolia* subsp. *subulifolia*) – Endangered
  - *Stylidium scintillans* – Vulnerable
  - Scaly-leaved Featherflower (*Verticordia spicata* subsp. *squamosa*) – Endangered
  - Long-flowered Nancy (*Wurmbea tubulasa*) – Endangered
  - *Persoonia kararae – P2*
  - *Swainsona picta – P1*.

3.2 Ecological Communities and Landforms

The Blue Hills banded iron formation (BIF) priority 1 ecological community (PEC) occurs within the proposed MLE disturbance footprint. The sections below review the significance of residual impacts and consider further mitigation strategies for the Blue Hills PEC and the BIF landform.

Impacts to the Eucalypt woodlands of the Western Australian Wheatbelt have been avoided through amendments to the Development Envelope and disturbance footprint.

3.2.1 Blue Hills PEC

The assessment of significant of impacts to Blue Hills PEC considered:

- *WA Environmental Offsets Guidelines* (Government of Western Australia, 2014) – the impact is potentially significant if it would result in a community requiring protection under statue or increase the cumulative impact to a critical level (i.e. if the proposed MLE or cumulative impacts would cause the Blue Hills PEC to meet IUCN ecological community criteria for listing)
- *Guidelines for nominating and assessing the eligibility for listing of ecological communities as threatened under national environmental law* (Threatened Species Scientific Committee (TSSC), 2024b) ("IUCN ecological community criteria") was used to determine the threat status for Blue Hills PEC with current impacts, and cumulative impacts including KIOP MLE.

The assessment of impacts was applied to both the Blue Hills PEC boundary as applied in the regional impact assessment for Mungada East Expansion Project (Maia Environmental Consultancy, 2017) and the Blue Hills PEC boundary as mapped by DBCA (excluding 500 m buffer). The results of the assessment against IUCN criteria for Blue Hills PEC are presented in **Table 3.8** and **Figure 3.4**.

The assessment demonstrates that Blue Hills PEC would not trigger any IUCN threat levels based on historic and proposed decline in geographic distribution, although the PEC would be classified as Vulnerable based on rate of continuing detrimental change and would be classified as Endangered based on limited geographic distribution.

This assessment also demonstrates that the Proposal will not change the threat level for Blue Hills PEC compared to the current threat level. Furthermore, the cumulative impact to Blue Hills PEC including the proposed disturbance would not result in the community requiring protection under statute or increase the cumulative impact to a critical level.

Therefore, the impact to Blue Hills PEC from the proposed KIOP MLE is not significant.

Table 3.8 IUCN Ecosystems Criteria Assessment for Blue Hills PEC (P1)

Criteria	Critically Endangered	Endangered	Vulnerable	Assessment for Estimated Current State	Assessment Including KIOP MLE
1 – Decline In Geographic Distribution					
Past decline relative to the longer-term (beyond 50 years ago)	≥ 90%	≥ 70%	≥ 50%	<50% - substantial impacts to Blue Hills PEC commenced more recently than 50 years ago.	Not relevant – no change
Past decline relative to the shorter-term (past 50 years)	≥ 80%	≥ 50%	≥ 30%	<30% based on: Blue Hills PEC applied in regional impact assessment for Mungada East Expansion Project (Maia Environmental Consultancy, 2017) Pre-European Extent: 7,098 ha Decline (approved impact including Karara Mining Limited to 2017): 939 ha + Mungada East Project: 13 ha = Cumulative past decline: 953 ha / 13%	<30% based on: Pre-European Extent: 7,098 ha Cumulative past decline: 953 ha + proposed KIOP MLE 89 ha = 1,041 ha / 15%
				<30% based on: Blue Hills PEC mapped in DBCA database, minus 500 m buffer Original extent in region: 8,732 ha Historical impact in region: 1,376 ha = 16%	<30% based on: Original extent in region: 8,732 ha Historical impact in region: 1,376 ha + proposed KIOP MLE 391 ha = 1,466 ha / 20%
Criterion 1 category				Does not meet criterion	Does not meet criterion
2 – Limited Geographic Distribution					
Its geographic distribution is:	Very Restricted	Restricted	Limited	Source: interrogation from DBCA's Threatened and Priority Ecological Communities Database boundary for Blue Hills PEC, including buffer (Umwelt, 2025c)	
Extent of occurrence (ha)	< 10,000	< 100,000	< 1,000,000	43,750; Restricted	43,750; Restricted
Area of occupancy (ha)	< 1,000	< 10,000	< 100,000	90,000; Limited	90,000; Limited
Median patch size (ha)	< 10	< 100	NA	~1,000; does not meet criteria	~1,000; does not meet criteria
Coupled with demonstrable threat that could cause loss in:	Immediate future (10 years)	Near future (20 years)	Medium-term future (50 years)	Immediate future (Mungada East Project)	Immediate future (KIOP MLE proposal)
Criterion 2 category				**Endangered**	**Endangered**
3 - Loss or Decline of Functionally Important Species					
For a population of a native species that is likely to play a major role in the community, there is a decline	Very severe	Severe	Substantial	Not applicable for assessment under this category. The PEC is predominately defined by the extent of the BIF landform which supports the overall flora diversity, rather than functionally important species.	
to the extent that restoration of the community is not likely to be possible in the future (if the above item is met)	Immediate future	Near future	Medium-term future		
4 – Reduction in Community Integrity					
The reduction in its integrity across most of its geographic distribution is:	Very severe	Severe	Substantial	Below criteria. The PEC is predominantly in Excellent condition and not currently impacted by weed invasion or exhibiting loss of native species diversity such that it is causing a reduction in integrity of the community across its distribution.	The KIOP MLE is not expected to substantially reduce the community integrity.
as indicated by degradation of the community or its habitat, or disruption of important community processes that is:	Very severe	Severe	Substantial		
5 – Rate of Continuing Detrimental Change					
Its rate of continuing detrimental change is: as indicated by: a) rate of continuing decline in its geographic distribution, or a population of a native species that is believed to play a major role in the community OR b) intensification, across most of its geographic distribution, in degradation, or disruption of important community processes	Very severe	Severe	Substantial	**Substantial; Vulnerable**: Continuing detrimental change could occur over time due to ongoing threats by mining. The community is restricted due to its association with the BIF landform. The main threatening process is vegetation clearing due to mining of the BIF, and associated edge effects.	No change. The rate of continuing detrimental change, decline in geographic distribution and intensification of degradation including the KIOP MLE would continue to be Substantial.

3.2.2 Banded Iron Formation Landform

The assessment of significance of impacts to Banded Iron Formation (BIF) landforms considered:

- *Landforms Environmental Factor Guideline* (EPA 2018) – criteria for determining if a landform is significant, and consideration for environmental impact assessment
- IUCN criteria to determine increase in threat categories of flora, fauna and ecological communities.

Based on the significance considerations of the *Landforms Environmental Factor Guideline* (EPA 2018), Mt Karara is not considered a significant example of a BIF landform due to variety, integrity, ecological importance, scientific importance, rarity or social importance. This is because 71% of the original landform has already been approved for permanent disturbance, and the physical characteristics of the remaining landform are no more remarkable than other landforms in the Blue Hills Range system (Umwelt, 2025c).

Nevertheless, Mt Karara does support significant ecological values that are associated with the BIF landform. The BIF landform is aligned with fauna habitat vegetation system association (VSA) 1 (breakaways and rocky ridges) which includes vegetation types O (tall sparse mixed shrubland on ironstone, BIF or granite slopes) and F (tall sparse *Acacia* shrubland on slopes and plains, sometimes with granite outcropping) (Umwelt, 2025a).

Table 3.9 lists significant ecological values with at least half of their preferred habitat types aligned with BIF landform and summarises assessment of the current IUCN Threat Category and whether the KIOP MLE Proposal will increase the IUCN Threat Category. This assessment informs consideration against the *Strategic Review of the Banded Iron Formation Ranges of the Midwest and Goldfields* (DEC 2007).

Table 3.9 Assessment of Changes in IUCN Threat Category for Significant Ecological Values Associated with BIF Landform

Significant Ecological Values associated with BIF Landform	Preferred Habitat	Assessment Against IUCN Criteria Threat Category
Blue Hills PEC	Banded Iron Formation	Meets IUCN criteria for Endangered. The Proposal will not change the threat level compared to the current threat level (**Section 3.2.1**).
Calandrinia kalanniensis	A, B, F and O	Does not meet IUCN criteria for listing. The Proposal will not change the threat level compared to the current threat level (**Section 3.1.2**).
Calandrinia *sp. Warriedar*	O	Does not meet IUCN criteria for listing. The Proposal will not change the threat level compared to the current threat level (**Section 3.1.2**).
Crassula sp. nov.	B and O	KIOP MLE Proposal impacts are potentially significant due to increasing the impact to a level that would trigger IUCN criteria for listing, based on impact to two locations (of four total locations recorded to date).
Grevillea subtiliflora	F	No predicted impacts to individuals, only 13.2 ha impact to habitat from KIOP MLE mitigated disturbance footprint. Would not trigger IUCN criteria.

Significant Ecological Values associated with BIF Landform	Preferred Habitat	Assessment Against IUCN Criteria Threat Category
Lepidosperma sp. Blue Hills (A. Markey & S. Dillon 3468)	O and P	Meets IUCN criteria for Vulnerable. The Proposal will not change the threat level compared to the current threat level (**Section 3.1.3**).
Micromyrtus acuta	O	No predicted impacts to individuals, only 86.9 ha impact to habitat from KIOP MLE mitigated disturbance footprint. Would not trigger IUCN criteria.
Micromyrtus trudgenii	O	Predicted impact to 28 individuals of more than 12,000 individuals in the Survey Area +20 km buffer, only 86.9 ha impact to habitat from KIOP MLE mitigated disturbance footprint. Would not trigger IUCN criteria.
Millotia dimorpha	O	Does not meet IUCN criteria for listing. The Proposal will not change the threat level compared to the current threat level (**Section 3.1.2**).
Petrophile pauciflora	O	No predicted impacts to individuals, only 86.9 ha impact to habitat from KIOP MLE mitigated disturbance footprint. Would not trigger IUCN criteria.
Stylidium scintillans	O	Meets IUCN criteria for Endangered. The Proposal will not change the threat level for compared to the current threat level (**Section 3.1.2**).
Gilled Slender Blue-tongue	VSA 1 and 2	Listed as Vulnerable under the BC Act, although could meet IUCN criteria for Endangered. Assessment of impacts against IUCN criteria not completed as habitat requirements are unclear and no records have been made of the species in the impact zone despite intensive targeted searches. The Proposal will not increase the threat level compared to the current threat level (**Section 3.3.1**).
Woolley's Pseudantechinus	VSA 1 and 2	Does not meet IUCN criteria for listing. The Proposal will not change the threat level compared to the current threat level (**Section 3.3.1**).
Mt Karara Millipede	VSA 1 and 3	Assessment of impacts against IUCN criteria not completed as habitat requirements are unclear and no records have been made of the species in the impact zone. The Proposal will not increase the threat level compared to the current threat level (**Section 3.3.1**).
Millipede PM1	VSA 1 and 3	Assessment of impacts against IUCN criteria not completed as habitat requirements are unclear and no records have been made of the species in the impact zone. The Proposal will not increase the threat level compared to the current threat level (**Section 3.3.1**).
Mt Gairdner Scorpion	VSA 1 and 3	Assessment of impacts against IUCN criteria not completed as habitat requirements are unclear and no records have been made of the species in the impact zone. The Proposal will not increase the threat level compared to the current threat level (**Section 3.3.1**).

The assessment of IUCN criteria identified that the proposed KIOP MLE will not result in a change in IUCN threat category for significant ecological values associated with the BIF landform. Only one ecological value could experience a change in IUCN Threat Category - *Crassula* sp. nov. However, this is due to the very few records of this potential new species, rather than its association with the BIF landform.

The *Strategic Review of the Banded Iron Formation Ranges of the Midwest and Goldfields* (DEC 2007) states three conservation principles and three guiding items that should be considered for environmental assessment for impacts to landforms. **Table 3.10** presents the assessment against the principles and guiding items.

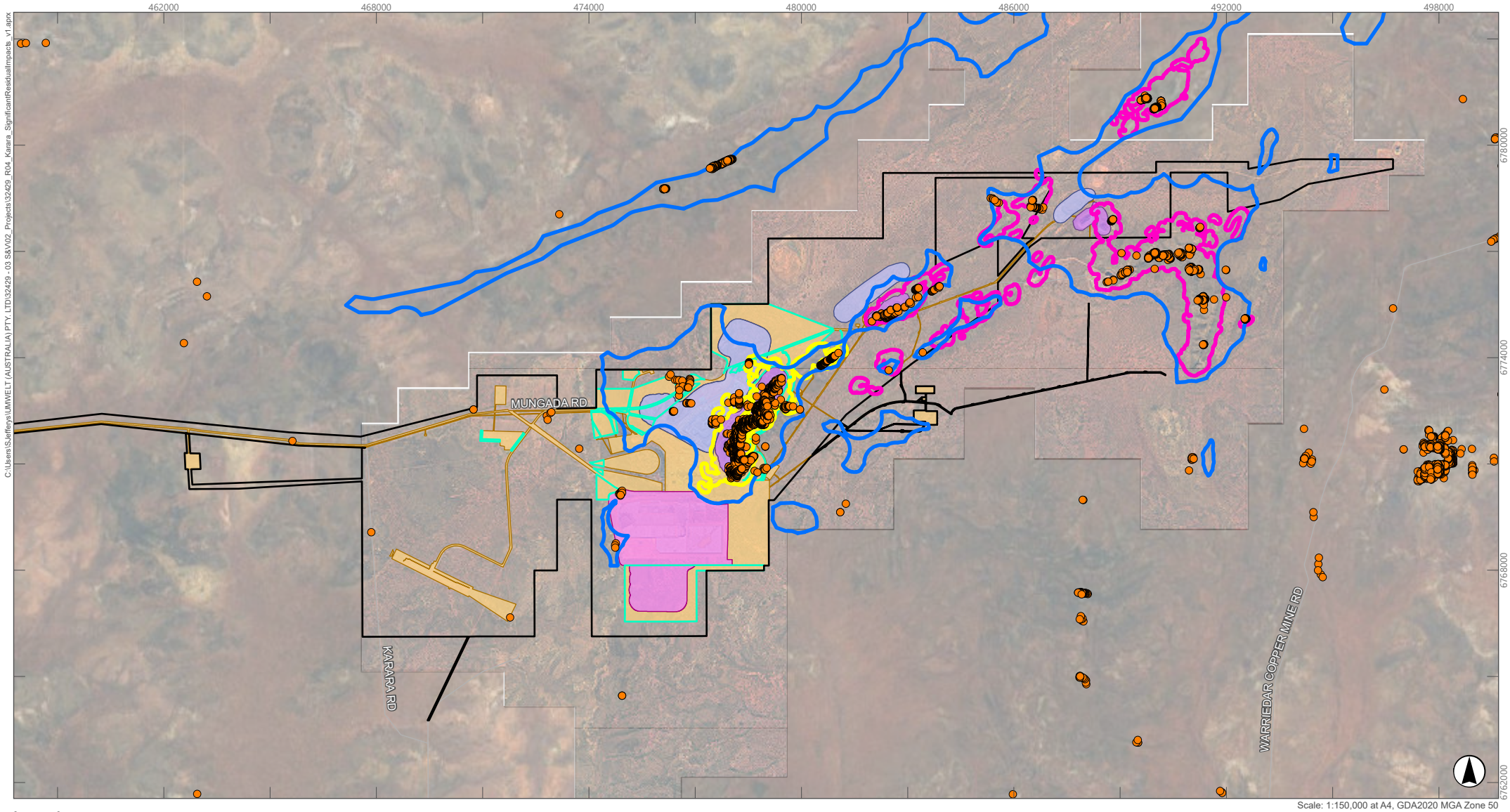
Table 3.10 Assessment of KIOP MLE Proposal against the Principles and Guiding Items of the Strategic Review of the BIF Ranges

Strategic Review of the BIF Ranges – Principles and Guidance	Assessment for KIOP MLE Proposal
No development activity should proceed if it would result in the increase of an IUCN Threat Category of any plant or animal taxon.	The Proposed KIOP MLE impacts to BIF landform will not result in the increase of IUCN Threat Category of any plant or animal (**Table 3.9**). Only one ecological value could experience a change in IUCN Threat Category - *Crassula* sp. nov. However, this is due to the very few records of this potential new species, rather than its association with the BIF landform.
No development activity should proceed if it would result in the increase of an IUCN Threat Category of any ecological community.	The Blue Hills PEC already qualifies for the Endangered IUCN category due to having limited geographic distribution with ongoing threat, and an existing substantial rate of continuing detrimental change. The predicted cumulative impact of the proposed KIOP MLE do not increase the Blue Hills PEC IUCN threat category.
15–30% of the total number of ranges should be reserved in their entirety so complete examples of landform and ecosystem are protected.	Approximately 23% of the total regional BIF landform area is reserved, but only one range in the region (Red Hill BIF landform) is reserved in its entirety (3% of the total number of ranges in the region). This is less than the 15 – 30% target. The KIOP and MIOP mining areas, including the proposed KIOP MLE, are within Karara Conservation Park, which is managed by DBCA for conservation. Although further ranges would need to be reserved to achieve the target protection, Mt Karara is already substantially impacted and thus is not a complete landform. Therefore, the proposed additional disturbance to Mt Karara would not influence achievement of this target.
Conservation reserves should include at least 60% of largely contiguous ecosystem/habitat for each of the key BIF species and communities restricted to the BIF ranges.	Contiguous habitat could only be defined for the Blue Hills PEC and *Lepidosperma* sp. Blue Hills (A. Markey & S. Dillon 3468). Neither met the 60% target of conservation of contiguous habitat, with the Blue Hills PEC having 42% of the PEC present in conservation reserves, and *Lepidosperma* having 32% of suitable soil landscape systems present in conservation reserve within the taxon's EOO. The KIOP MLE will not reduce the proportion of conservation reserve extent for any assessed value.

Strategic Review of the BIF Ranges – Principles and Guidance	Assessment for KIOP MLE Proposal
An objective of detailed mine site planning should be to maximise protection of any flora species or ecological community identified as being restricted to the BIF or dependent on the BIF for its conservation.	The proposed WRD has been designed to expand towards the north, which minimises impact to the Blue Hills PEC. Most of the undisturbed Blue Hills PEC is located to the east of the WRD expansion. The location of infrastructure required to support the WRD (e.g. topsoil stockpiles) has been amended to minimise impacts to *Lepidosperma* sp. Blue Hills, which has substantially reduced the impacts to this species associated with the BIF landform. The TSF expansion to the south will not result in any impact to the Blue Hills PEC(Umwelt 2025b).
Landscape, geodiversity, Aboriginal heritage values and the potential for nature-based tourism should be considered in developing a reserve system.	Mt Karara has not been identified as having significant landscape, geodiversity or Aboriginal heritage values.

3.2.3 Environmental Outcomes

- No disturbance from the Proposal to Eucalyptus woodlands of the Western Australian Wheatbelt TEC
- Temporary impacts to Banded Iron Formation landforms, such as infrastructure, will be reshaped during mine closure to blend to the natural surface, restoring Banded Iron Formation landform values as much as possible.
- Re-establishment of vegetation in rehabilitation will achieve at least 70% species composition comparable with the pre-mining vegetation within five years of cessation of productive mining.



Scale: 1:150,000 at A4, GDA2020 MGA Zone 50

Legend

- Combined Proposal Mitigated Development Envelope
- KIOP MLE Mitigated Disturbance Footprint
- Mt Karara (included as part of the LAU)
- Blue Hills Local Assessment Unit (LAU)
- Blue Hills Banded Iron Formation PEC (P1) (DBCA mapped minus 500m buffer)
- Minor Road
- LespBH *Lepidosperma* sp. Blue Hills (A. Markey & S. Dillon 3468) (P1)

Mine Activity

- Infrastructure
- Pit
- TSF
- WRD

FIGURE 3.4

Proposed Impacts to Blue Hills PEC and BIF Landform

0 3 6 km

Image Source: KML (2024), ESRI Basemap (2025) | **Data Source:** Landgate (2025), KML (2025)

umwelt

3.3 Fauna Species

This section reviews the significance of residual impacts for all conservation-significant fauna species that were rated as 'resident' or 'regular visitor' within the Proposal area. The significance of impacts is formally assessed for vertebrate MNES fauna and invertebrate fauna.

3.3.1 Review of Significance of Impacts

A review of the significance of residual impacts was conducted for all of the conservation-significant species that were considered in the *Terrestrial Fauna Impact Assessment* (Umwelt, 2025d). The conservation-significant fauna species as identified by the fauna ecologist (Bamford Consulting Ecologists, 2025) included numerous species classified as locally significant including invertebrates with limited current records. The review of significance of residual impacts for fauna species was informed by:

- Further research into recorded locations of species with limited ranges (particularly invertebrates)
- Current species distribution including automated calculation of extent of occurrence (EOO) and area of occurrence (AOO) sourced from the Atlas of Living Australia spatial portal (https://spatial.ala.org.au/)
- Conservation Advice and/or Recovery Plans for MNES
- Mitigated development envelope and disturbance footprint that excluded disturbance in the Wheatbelt area (Geraldton Sandplains and Avon Wheatbelt IBRA subregions).

Key criteria applied in the assessment of significance of residual impacts were:

- *Guidelines for assessing the conservation status of native species according to the EPBC Act* (Threatened Species Scientific Committee (TSSC), 2024a) (also referred to as 'IUCN criteria'):
    - Species extent of occurrence (EEO) < 20,000 km^2 would meet criteria for listing as vulnerable.
    - Species area of occupancy (AOO) < 2,000 km^2 combined with severely fragmented distribution and continuing decline would meet criteria for listing as vulnerable (AOO < 500 km^2 meeting criteria for listing as endangered).
    - The IUCN criteria were used to determine if criteria for listing or changes to listing were met.
- *WA Environmental Offsets Guidelines* (Government of Western Australia, 2014)
    - Impacts that are likely to result in a species or ecosystem requiring protection under statute (i.e. meeting criteria for listing) or increasing the cumulative impact to a critical level (i.e. cumulative impacts meeting criteria for listing) are potentially significant impacts.
    - Impacts to species or ecosystems protected by statute (i.e. listed as Vulnerable, Endangered or Critically Endangered) or where the cumulative impact is already at a critical level (i.e. current or proposed cumulative impacts would meet criteria for listing) are significant impacts.

Table 3.11 presents the review of significance of the residual impact for conservation-significant fauna species that would potentially be impacted by the Proposal.

Table 3.11 Review of Significance of Residual Impacts – Fauna Species

Species	Conservation Status	Outcomes of Further Research into Species Records in the Proposal Area	Atlas of Living Australia (ALA) Information on Species Distribution	Evaluation of Significance of Residual Impact	Further Mitigation	Outcome
Frogs						
Neobatrachus centralis Desert Trilling Frog	Locally significant	No records from 2020 or 2024 survey (Bamford Consulting Ecologists, 2025). Single specimen recorded in 2004, at site near Blue Hills mine (Bamford & Wilcox, 2004) – this is more than 2 km from the closest proposed MLE disturbance.	Recognised as same species as *Neobatrachus sudellae*. This species is widely distributed throughout Australia - large populations in southeast Australia, fewer recorded in WA. Although Karara remains on the south-western edge of the known range, the species has a wide distribution.	Not significant impact - species is widely distributed throughout Australia, species extent of occurrence would not trigger listing under IUCN criteria.	Not applicable	No significant impact
Reptiles						
Caimanops (Diporiphora) amphiboluroides Mulga Dragon	Locally significant	No records from 2020 or 2024 survey (Bamford Consulting Ecologists, 2025). Numerous records from 2006 survey – all these records were from Blue Hills mine area (subsequently impacted from existing mine development) or Mungada Ridge (now part of conservation reserve) (Bancroft and Bamford, 2007). The trapping program in 2006 did not find any records at Karara Ridge (Bancroft and Bamford, 2007).	Distribution from Kalgoorlie to Exmouth. Although Karara remains on the south-western edge of the known range, the species has a wide distribution. EOO 714,194 km^2.	Not significant impact - species is widely distributed throughout Australia, species extent of occurrence would not trigger listing under IUCN criteria.	Not applicable	No significant impact
Hesperoedura reticulata Reticulated Velvet Gecko	Locally significant	No records from 2020 or 2024 survey (Bamford Consulting Ecologists, 2025). One specimen found in 2006 during spotlighting in eucalypt woodland near Mungada ridge (Bancroft and Bamford, 2007).	Distribution from Kalgoorlie to Perth and beyond. Karara is not at the edge of the known range. EOO 240,765 km^2.	Not significant impact - species is widely distributed throughout Australia, species extent of occurrence would not trigger listing under IUCN criteria.	Not applicable	No significant impact
Cyclodomorphus branchialis Gilled Slender Blue-tongue	Vulnerable – BC Act	No records from intensive targeted searches for the species in 2010-2012, 2020 and 2024 (Bamford Consulting Ecologists, 2025). Two records from 2004, one record was from ~7 km south of Mungada Ridge, well outside all current and proposed impacts, one record was within Blue Hills mine area and has subsequently been impacted (Bamford & Wilcox, 2004). One record from Karara Ridge in 2006 that has subsequently been impacted (Bamford Consulting Ecologists, 2025) – no details could be found for the location of this record. Preferred habitat is unclear as it has been recorded (by various parties) on loamy soils, heavy red soil and rocky hills (Bamford Consulting Ecologists, 2025). Mapped habitat is VSAs 1, 2, 3, 7 and 11 (Bamford Consulting Ecologists, 2025). Records and mapped habitat are shown in **Figure 3.5**.	Patchy but broad distribution. Extends from Perth to Pilbara, NT, SA, Brisbane, NSW coast. EOO 5,752,639 km^2. AOO 252 km^2 (25,200 ha)	AAO < 500 km2 and severely fragmented distribution - would likely qualify for listing as Endangered. Listed as Vulnerable under the BC Act. As per EPA Offset Guideline (2014), any impact to species protected by statute (e.g. listed vulnerable or endangered) is a significant impact. Although habitat requirements are unclear, the species has been recorded in the area. The Proposal is likely to have an adverse impact on potential habitat for the species. Therefore, this is potentially a significant residual impact.	Difficult to mitigate impacts as no records have been made from recent targeted searches and habitat requirements are unclear.	Potentially significant residual impact – offset required
Egernia stokesii badia Western Spiny-tailed Skink	Vulnerable – BC Act Endangered – EPBC Act	Individuals and scats recorded in survey area in 2020 and 2024. Locations of key habitat values (suitable log piles for colony sites) were recorded along survey tracks and transects during the 2020 and 2024 survey (Bamford Consulting Ecologists, 2025). The survey tracks covered approximately half of the proposed MLE expansion footprint by area, with an estimate that approximately twice as many suitable log piles might be available compared to what was recorded (Bamford Consulting Ecologists, 2025). KML has a register of known colony sites which are monitored annually to determine if the site is occupied. The number of occupied colony sites recorded per year has declined from 63 in 2018 to 49 in 2023, which is attributed to little crows and feral cats (possibly attracted by the site landfill) and colony sites	Distribution largely wheatbelt to mid-west (Kellerberrin to Mullewa) with scattered records to Kalgoorlie, Shark Bay, Carnarvon. EOO 225,302 km^2. AOO 192 km^2 (19,200 ha) Tallering IBRA subregion: 5 records, EOO 3,631 km^2, AOO 12 km^2 (0.02 degree grid) (1,200 ha)	Listed as Endangered under EPBC Act. Assessment against MNES Significant Impact Guidelines 1.1 (see next table) determined that the proposal is likely to have a significant residual impact on habitat critical to the survival of the species (i.e. suitable log piles and mapped potential habitat types) and contribute to long-term decline in the number of active colonies in the local area (monitoring has demonstrated	Pre-clearance survey and translocation – as per translocation management plan. Manage mine site landfill to minimise exposure of putrescible materials, limiting attraction of crows.	Significant residual impact – offset required

Species	Conservation Status	Outcomes of Further Research into Species Records in the Proposal Area	Atlas of Living Australia (ALA) Information on Species Distribution	Evaluation of Significance of Residual Impact	Further Mitigation	Outcome
		providing little cover or food (possibly due to livestock grazing) (Bamford Consulting Ecologists, 2025). Mapped habitat is VSA 7 York Gum open woodland (Bamford Consulting Ecologists, 2025). Records and mapped habitat are shown in **Figure 3.6**.		the species is already experiencing decline in the local Mine Area).		
Birds						
Burhinus grallarius Bush Stone-curlew	Locally significant	Bush stone-curlew tracks were recorded in the Mine Area in June 2024. This was the first record of the stone-curlew within the KML area, with previous records from Badja Station to the north.	Wide distribution throughout much of Australia.	Not significant impact - species is widely distributed throughout Australia, species extent of occurrence would not trigger listing under IUCN criteria.	Not applicable	No significant impact
Cacatua leadbeateri Major Mitchell's Cockatoo	Locally significant	All these locally significant birds expected to be resident in the Mine Area have been observed by Bamford during previous site inspections; six of these were observed during the site inspections of the Mine Area in 2024 (July/August and November). All bird species listed as locally significant have declined in the Wheatbelt due to extensive clearing, and this makes populations persisting in the Wheatbelt and in nearby uncleared, pastoral areas significant.	Wide distribution throughout much of Australia.	Not significant impact - species are widely distributed throughout Australia, species extent of occurrence would not trigger listing under IUCN criteria.	Not applicable	No significant impact
Climacteris affinis White-browed Treecreeper	Locally significant					
Climacteris rufus Rufous Treecreeper	Locally significant					
Oreoica gutturalis Crested Bellbird	Locally significant					
Pyrrholaemus brunneus Redthroat	Locally significant					
Eopsaltria griseogularis Western Yellow Robin	Locally significant					
Pomatostomus superciliosus White-browed Babbler	Locally significant					
Polytelis anthopeplus Regent Parrot	Locally significant					
Falco peregrinus Peregrine Falcon	Other specially protected – BC Act	There are several records in the DBCA threatened fauna database within 20–40km of the Mine Area, and there is a nest on the eastern side of Mungada Ridge. Only one observation of the nesting peregrine was made over four field trips in 2004–2006, suggesting the pair might forage mostly to the east (outside of the survey area) (Bancroft and Bamford, 2007). The proposed disturbance areas within the Mine Area are within the foraging range of what is probably a resident pair. The proposed disturbance areas lack elevated landscapes/cliffs and tall trees, so are unlikely to support nesting.	Wide distribution throughout much of Australia.	Not significant impact - species is widely distributed throughout Australia, species extent of occurrence would not trigger listing under IUCN criteria.	Not applicable	No significant impact
Leipoa ocellata Malleefowl	Vulnerable – BC Act and EPBC Act	Malleefowl mounds and bird tracks were recorded in 2020 and 2024 surveys. The fauna survey estimated six breeding Malleefowl pairs used the southern portion of the survey area, which was the only part of the proposed disturbance where recently active mounds have been recorded (Bamford Consulting Ecologists, 2025). Annual malleefowl mound monitoring program has been undertaken since 2008 and has recorded over 800 malleefowl mounds in the area. A higher number and proportion of surveyed mounds were active in recent monitoring periods (Bamford Consulting Ecologists, 2025).	**Source:** National Recovery Plan for the Malleefowl (*Leipoa ocellata*) (DCCEEW, 2024) Known or may occur in a broad area across southern Western Australia and western and south of South Australia, with smaller known distributions in western Victoria and central New South Wales. Density is highest in the semi-arid zone.	Listed as Vulnerable under EPBC Act and BC Act. Assessment against MNES Significant Impact Guidelines 1.1 (see next table) determined that there is likely to be a significant residual impact due to clearing of habitat critical to the survival of the species (habitat mapped as suitable for nesting, and active and historic mounds), leading to reduced area of occupancy for the local population. All populations of	Avoid disturbance to any Malleefowl mound, regardless of activity status, in breeding season	Significant residual impact – offset required

Species	Conservation Status	Outcomes of Further Research into Species Records in the Proposal Area	Atlas of Living Australia (ALA) Information on Species Distribution	Evaluation of Significance of Residual Impact	Further Mitigation	Outcome
		Habitat suitable for Malleefowl nesting and foraging was mapped as VSAs 3, 4 and 6. (Bamford Consulting Ecologists, 2025). Locally in the Karara region, this species prefers the areas close to ridges where the soil is a gravely loam rather than the heavier soils of the plain, which are more likely to waterlog when used in mound construction (Bamford Consulting Ecologists, 2025). Habitat suitable for Malleefowl foraging only (i.e. not suitable for nesting) was mapped as VSAs 7 and 11 (Bamford Consulting Ecologists, 2025). Records and mapped habitat are shown in **Figure 3.7**.	**Source:** Threatened Species Strategy Year 3 Scorecard – Malleefowl (National Environmental Science Program Threatened Species Research Hub, 2019) Estimate in 2018: EOO: 2,000,000 km^2, AOO: 730,000 km^2 Tallering IBRA subregion: 62 records, EOO 17,689 km^2, AOO 128 km^2 (0.02 degree grid) (12,800 ha)	Malleefowl are considered equally important.		
Aphelocephala leucopsis Southern Whiteface	Vulnerable – BC Act and EPBC Act	Southern Whiteface has been observed in survey records from 2012 to 2024, and further records are available from ALA in the region. During surveys for the proposal, the species was typically observed at the intersection of shrubland and bare ground, which is a complex habitat type to map (Bamford Consulting Ecologists, 2025). The mapped habitat is broadly described as Acacia shrubland and chenopod shrubland and salt lakes and comprises VSAs 3, 4, 5, 6 and 9 (Bamford Consulting Ecologists, 2025). Records and mapped habitat are shown in **Figure 3.8**.	**Source:** Conservation Advice for *Aphelocephala leucopsis* (southern whiteface) (DCCEEW, 2023a) Distributed across most of mainland Australia south of the tropics (southern half of Australia). There are two subspecies, with the south-east subspecies present in the eastern and central portion of the range, and the south-west southern whiteface found in central and southern WA. EOO 4,910,000 km^2 AOO 70,000 km^2	Listed as Vulnerable under EPBC Act and BC Act. Assessment against MNES Significant Impact Guidelines 1.1 (see next table) determined that there is not a significant residual impact as the local population is not an important population of the species, and the impact to habitat is negligible at a bioregional level.	Not applicable	No significant impact
Mammals						
Antechinomys (Sminthopsis) longicaudata Long-tailed Dunnart	P4 – BC Act	There are no database records of Long-tailed Dunnart within 40 km of the development envelope. The closest detection was in rocky hills in Koolanooka (approximately 60 km east of the Mine Area and 35 km west of the Wheatbelt Area) in early 2024 by another proponent (Bamford Consulting Ecologists, 2025). Long-tailed Dunnart has not been recorded in the Mine Area over numerous surveys since 2004 (20 years). There is no evidence that it is present despite targeted searches over this period.	Recorded distribution in ALA is largely central Western Australia (Pilbara, Gascoyne and Mid-West regions) and Northern Territory. The southern-most occurrences are north of Morawa, approximately 45 km northwest of the Karara mine area. EOO 735,700 km^2 **Source:** Western Australian Museum Collections, Long-Tailed Dunnart (accessed December 2025). Habitat is exposed rock and stony soils with hummock grasses (e.g. spinifex) and shrubs (e.g. mulga).	Not significant impact - species extent of occurrence would not trigger listing. Has not been detected closer than 60 km to Karara Mine Area despite many fauna surveys in the region since 2004. This species is more prevalent in central and northern regions and spinifex – the Proposal area is not considered suitable habitat based on known distribution.	Not applicable	No significant impact
Pseudantechinus woolleyae Woolley's Pseudantechinus	Locally significant	No records from 2020 or 2024 survey (Bamford Consulting Ecologists, 2025). Focussed survey effort undertaken in 2008, including intensive trapping program and searching for scats (Bamford Consulting Ecologists, 2008). Scats were found in all areas of rocky habitat inspected including Terapod, Mungada, Blue Hills North and Karara. Intensive trapping was undertaken on a group of low hills 4 km NE of Blue Hills North, only two specimens were caught (0.53% capture rate) – indicating that a massive trapping effort would be required to capture a suitable sample size, or to characterise the population size (Bamford Consulting Ecologists, 2008). The high prevalence of scats in rocky areas suggested the species was abundant in these areas (Bamford Consulting Ecologists, 2008).	Distribution from Kalgoorlie to Pilbara north coast. Karara is at southern end of range. EOO 700,000 km^2	Not significant impact - species extent of occurrence would not trigger listing. Species appears to be common in the region although difficult to detect from trapping.	Not applicable	No significant impact

Species	Conservation Status	Outcomes of Further Research into Species Records in the Proposal Area	Atlas of Living Australia (ALA) Information on Species Distribution	Evaluation of Significance of Residual Impact	Further Mitigation	Outcome
Antechinomys laniger Kultarr	Locally significant	No records from 2020 or 2024 survey or any other KIOP fauna surveys (Bamford Consulting Ecologists, 2025). It has been reported from Badja Station to the north of Karara in the mid-2000s, so it may be present and resident in the Mine Area (Bamford Consulting Ecologists, 2025).	Wide distribution across all of Australia including much of WA. Karara is not on edge of range.	Not significant impact - species is widely distributed throughout Australia, species extent of occurrence would not trigger listing under IUCN criteria.	Not applicable	No significant impact
Nyctophilus major tor Central Long-eared Bat	P3 – BC Act	No records from 2020 or 2024 survey or any other KIOP fauna surveys (Bamford Consulting Ecologists, 2025). Recent records from Mt Gibson Nature Reserve by another proponent (approximately 80 km east of the Mine Area) suggest that this species may be present in both project areas (Bamford Consulting Ecologists, 2025).	Distributed throughout southern WA and SA. Closest record to the Proposal was near Wubin, over 70 km to the south. EOO 1,040,000 km^2	Not significant impact - species is widely distributed throughout Australia, species extent of occurrence would not trigger listing under IUCN criteria.	Not applicable	No significant impact
Invertebrates						
Idiosoma clypeatum Northern Shield-backed Trapdoor Spider	P3 – BC Act Vulnerable – EPBC Act (*I. nigrum*)	The Northern Shield-backed Trapdoor Spider was initially identified as *Idiosoma nigrum*, listed as Vulnerable under the EPBC Act and Schedule 2 of the BC Act. However, a taxonomic review (Michael G. Rix, Joel A. Huey, Steven J. B. Cooper, Andrew D. Austin, Mark S. Harvey, 2018) confirmed that the "nigrum group" is multiple separate species. The trapdoor spider records from surveys at Karara Mine Area are now recognised as *Idiosoma clypeatum* and *Idiosoma formosum*, with one unidentified specimen. None of the trapdoor spider specimens collected from the Karara Mine Area are currently recognised as *Idiosoma nigrum*. The distribution of the revised *Idiosoma nigrum* species extends from Cunderdin as far north as Moora, which lies more than 150 km south of the Karara Proposal. Nevertheless, DCCEEW has confirmed that *Idiosoma clypeatum* should be considered an important population of the listed *Idiosoma nigrum* species until the EPBC Act listing is updated. Therefore, for the purpose of DCCEEW assessment, *Idiosoma clypeatum* is considered as an important population of a Vulnerable species. For the purposes of assessment under the BC Act, the species recorded at Karara have separate listings and will be considered separately. Both the Northern Shield-backed Trapdoor Spider (*Idiosoma clypeatum*) and the Ornate Trapdoor Spider (*Idiosoma formosum*) were found in the Mine Area in 2020 and 2024, along with an unidentified and possibly significant third species (*Idiosoma (Aganippe*) sp.). *Idiosoma clypeatum* has been formally assessed and listed as Priority 3 with an extent of occurrence of over 120,000 km^2 (Rix et al, 2018). Mapped habitat is VSAs 1, 3, 5 and 6 (breakaway and rocky ridges and Acacia and mixed shrubland) (Bamford Consulting Ecologists, 2025). Records and mapped habitat are shown in **Figure 3.9**. *Idiosoma formosum* has been formally assessed and listed as Endangered under the BC Act with a known extent of occurrence of approximately 4,000 km^2 and area of occupancy of <500 km^2 (Rix et al, 2018). Mapped habitat is VSAs 4, 5, 6 and 7 (typically sandy loam and moderately heavy soils on plains, away from rocky ridges – includes Acacia and mixed shrubland and York Gum Woodland) (Bamford Consulting Ecologists, 2025). Records and mapped habitat are shown in **Figure 3.10**. Mapped habitat for *Idiosoma (Aganippe*) sp.) is VSA 2 (granite outcrop) based on the single record which was collected in the	*Idiosoma nigrum* is mapped to occur in inner Wheatbelt from near Moora in the northwest and near Cunderdin in the southeast. *I. clypeatum* is mapped to occur in Midwest - Leinster to Geraldton, including Karara region. *I. formosum* is mapped to occur only near Mt Gibson, south of Karara.	*Idiosoma clypeatum* Listed as Vulnerable (important population) under the EPBC Act and P3 under BC Act. Assessment against MNES Significant Impact Guidelines 1.1 (see next table) determined that there is not a significant residual impact as *Idiosoma clypeatum* does not meet IUCN criteria for listing as Vulnerable, and the impact would not increase the threat level to the species such that it would trigger listing or increase the cumulative impact to a critical level.	Not aware of any feasible further mitigations.	No significant impact
Idiosoma formosum Ornate Trapdoor Spider	Endangered – BC Act			*Idiosoma formosum* Listed as Endangered under the BC Act. Assessment against MNES Significant Impact Guidelines 1.1 (see next table) determined that there is a significant residual impact due to impact on habitat critical to the survival of a species (burrows and mapped suitable habitat), which could lead to decline in species numbers.		Significant residual impact – offset required
Aganippe (Idiosoma) sp. Unidentified trapdoor spider	Locally significant			*Aganippe (Idiosoma) sp.* The location where this taxon was recorded is not expected to be impacted. As only one individual has been detected, the potential distribution of this taxon is not known. Significance of residual impacts cannot be assessed, and it is not feasible to propose offsets for a taxon with very little information known.		Potentially significant residual impact – offset required

Species	Conservation Status	Outcomes of Further Research into Species Records in the Proposal Area	Atlas of Living Australia (ALA) Information on Species Distribution	Evaluation of Significance of Residual Impact	Further Mitigation	Outcome
		northwest corner of the southern survey area (Bamford Consulting Ecologists, 2025). The coordinates of this record are not available, but VSA 2 in the southern survey area is almost entirely outside of the proposed disturbance footprint. Therefore, this location is not expected to be impacted.				
Antichiropus sp. nov. 'Karara' Karara Millipede	Locally significant	No records from 2020 or 2024 survey (Bamford Consulting Ecologists, 2025). Karara Millipede was identified by the Western Australian museum in 2008 from specimens collected from Karara in 2006. The specimens were collected from the following locations: edge of Karara pit (assumed now destroyed), near Blue Hills Mine open pit (outside of direct impact zone on the edge of Mungada Road, unsure if population still survives) and east of Mungada Ridge (outside of all impacts) (Volker W. Framenau & Mark S. Harvey, 2008). Of these populations, two are presumed destroyed and one is outside of all known and proposed impacts. No further records on Karara Millipede were available. Potential habitat was mapped as VSA 1 (breakaways and rocky ridges) and VSA 3 (*Acacia* tall shrubland) in the Mine Area (Bamford Consulting Ecologists, 2025).	No information on ALA. Known range is 17 km, and preferred habitat appears to be ironstone hills (Volker W. Framenau & Mark S. Harvey, 2008).	Potentially significant impact – species is known only from Karara-Blue Hills-Mungada region. Although known populations will not be impacted, the Proposed MLE will impact on potential habitat that might contain a population that hasn't been detected. Based on the small range and number of populations, an impact on suitable habitat is considered a potentially significant impact.	It is not feasible to avoid impacts to ironstone habitat	Potentially significant residual impact – offset required
Antichiropus sp. nov. 'PM1' Millipede PM1	Locally significant	No records from 2020 or 2024 survey (Bamford Consulting Ecologists, 2025). One specimen collected in 2006 from a site alongside the area that is now Blue Hills mine (Bancroft and Bamford, 2007) (this is outside of the combined mitigated development envelope).	No information on ALA. This taxon is known to occur across the northern Wheatbelt and southern Murchison regions in WA, with a linear distribution of 310 km (Bancroft and Bamford, 2007).	Not significant impact – no direct impacts to population or critical habitat from the proposal. One record near Blue Hills mine, which is outside of the combined mitigated development envelope. The PM1 millipede has a known range of at least 310 km.	Not applicable	No significant impact
Urodacus sp. nov. 'Mt Gairdner' Mt Gairdner Scorpion	Locally significant	No records from 2020 or 2024 survey (Bamford Consulting Ecologists, 2025). Two specimens collected in 2006 (Bancroft and Bamford, 2007) – one from Mungada Ridge (this is outside of impacts), and one from a site alongside the area that is now Blue Hills mine (this is outside of the combined mitigated development envelope). Neither of these locations have been impacted by historic disturbance and are not proposed to be impacted by the MLE.	No information on ALA. One historic record known by WA Museum from Gairdner Range, 200 km south east of Karara area (Bancroft and Bamford, 2007).	Not significant impact – no direct impacts to population or critical habitat. Recorded occurrences in the Karara mine area have not been impacted and are not within the combined mitigated development envelope. The Mt Gairdner scorpion has a known range of at least 200 km.	Not applicable	No significant impact

3.3.2 Significance of Impacts – Vertebrate Fauna

Assessment against the *MNES – Significant impact guidelines 1.1 EPBC Act* (Department of the Environment, 2013) is provided in **Table 3.12** for vertebrate MNES fauna species.

The assessment concluded that there would be a significant residual impact for Gilled Slender Blue-tongue, Western Spiny-tailed Skink and Malleefowl.

Table 3.12 Significant Impact Assessment – MNES Vertebrate Fauna Species

MNES Significant Impact Guidelines 1.1– Endangered Species [adjustments for Vulnerable in brackets]	*Egernia stokesii badia* **Western Spiny-tailed Skink** Endangered– EPBC Act, Vulnerable – BC Act	*Leipoa ocellata* **Malleefowl** Vulnerable – EPBC Act & BC Act	*Aphelocephala leucopsis* **Southern Whiteface** Vulnerable – EPBC Act & BC Act
Published conservation advice and recovery plans	No approved conservation advice Western Spiny-tailed Skink (*Egernia stokesii*) National Recovery Plan (DEC, 2012) All populations are considered **important populations**. **Threats** include habitat clearing and degradation, modification of natural processes that generate hollow logs, and predation. **Criteria for recovery** plan success include maintaining the number of populations and habitat and at least 50% of known remnant woodland populations being managed for conservation. **Critical habitat** is not defined in the Recovery Plan. **Recovery actions** include determining essential habitat requirements, clarifying distribution and threatening processes, managing known populations in remnant woodland, protecting habitat remnants, preventing illegal collection, engaging landholders to support conservation efforts, minimising the impact of stock on habitat, developing conservation agreements with landholders and mining companies to retain and link remnant woodland patches, and developing a strategy for translocation of at-risk populations. Research into the species has identified preferred habitat as hollow log piles with long logs, an average of three logs and overhanging mid-storey vegetation with low canopy cover (Bradley et al, 2022).	No approved conservation advice National Recovery Plan for the Malleefowl (*Leipoa ocellata*) (DCCEEW, 2024). All populations and areas occupied by malleefowl are considered of **equal importance** for the protection and recovery of the malleefowl, despite any variability of population density, size, conservation challenges or other factors. The recovery plan identifies that while there is an incomplete understanding of **critical habitat** for Malleefowl, a sandy substrate and abundance of leaf litter are clear requirements for construction of their nests and density of birds is generally greatest in areas of higher rainfall and with greater shrub diversity. **Performance criteria** in the National Recovery Plan include: mound activity (as an indicator of population trend) is stable or increasing, and the area of occupancy is maintained or increased at all locations at which Malleefowl occur. Malleefowl is identified as a priority species in the Australian Government *Threatened Species Action Plan 2022-2032* (DCCEEW, 2022). The Action Plan target is for all priority species to be on track for improved trajectory by 2027 and implementation of priority actions for priority species is tracked and published. The threatened species action plan for Malleefowl (DCCEEW, 2023b) includes the following information on key threats and priority actions: The identified **key threats** for malleefowl are loss and fragmentation of habitat, inappropriate fire regimes, predation, herbivores competing for food and droughts. The **priority actions** for malleefowl are to reduce the size and frequency of hot large-scale fires, continue restorage of habitat linkages and protect remaining mallee habitat, targeted predator control and continued management of grazing pressure.	Conservation Advice for *Aphelocephala leucopsis* (Southern Whiteface) dated 31 March 2023. **Important populations** are not described. **Habitat critical to the survival** of the species is areas of: • relatively undisturbed open woodlands and shrublands that support an understorey of grasses and/or shrubs • areas with low tree density and an herbaceous, litter-rich understorey that provides essential foraging opportunities • the presence of both living and dead trees containing hollows or crevices suitable for roosting and nesting. **Key threats** are clearing of habitat for agriculture, degradation of habitat by livestock grazing and climate-related pressures such as drought. Primary conservation objectives are to stabilise population trends of both subspecies and understand the causes of population declines. **Conservation priorities** are to cease clearing of habitat critical to the survival of the species, secure occupied habitat patches in areas where the birds have a patchy distribution, undertake revegetation, promote ecological management and connectivity of woodland remnants and promote agriculture and biodiversity stewardship programs to retain habitat. No approved recovery plan.
Lead to a long-term decrease in the size of a population of a species [important population for Vulnerable species]	Yes – the Proposal could lead to a long-term decrease in the size of a population of the species. The species has already experienced loss of habitat from the KIOP and monitoring in the Karara mine area has recorded decline in the number of active colonies (Bamford Consulting Ecologists, 2025). This is attributed to increase predation due to greater abundance of feral animals and crows in the local area, particularly associated with the KIOP landfill attracting crows (Bamford Consulting Ecologists, 2025). These impacts are likely to continue with implementation of the KIOP MLE Proposal. The KIOP MLE will also directly impact seven active Western Spiny-tailed Skink colonies. Although individuals will be translocated in accordance with KML procedures, the potential success of translocation is uncertain and is likely to result in some loss of individuals, contributing to a potential long-term decrease in the local numbers.	No – the Proposal is not expected to lead to a long-term decrease in the size of the regional Malleefowl population, indicated by the number of active Malleefowl mounds in the Mine Area. The MNES Significant Impact Guidelines 1.1 defines a population as an occurrence of a species in a particular area, such as a geographically distinct regional population or a bioregion. For this assessment, the Tallering IBRA subregion is used to define the population extent. As per the Conservation Advice, all populations are considered of equal importance. Therefore, the Tallering IBRA bioregional population is an important population. Monitoring of Malleefowl mounds in the Karara Mine Area has recorded a higher number and proportion of active mounds in recent monitoring periods (Bamford Consulting Ecologists, 2025). In the National Recovery Plan for the Malleefowl, mound activity is adopted as an indicator of Malleefowl population trend. Therefore, the increasing number of active Malleefowl mounds indicates an increasing population trend. This shows that the current Karara mining operations has not resulted in a decrease in the local numbers of Malleefowl. The current Karara mining operations (MS 805 & 806) approved impact to Malleefowl is 512.3 ha (9.6%) of habitat mapped as suitable for nesting and 364 ha (19.1%) of mapped foraging-only habitat in the Survey Area, as well as removal of one active and 128 historic Malleefowl mounds. The proposed KIOP MLE mitigated disturbance footprint would impact 692.6 (13%) of mapped nesting habitat and 239.1 ha (12.5%) of mapped foraging-only habitat in the Survey Area, as well as removal of 2 active and 27 historic Malleefowl mounds.	No – the proposal is unlikely to lead to a long-term decrease in the size of an important population of the species. The Conservation Advice does not define any important populations of the species. The MNES Significant Impact Guidelines 1.1 defines an important population as one that is necessary for a species' long-term survival and recovery, including key source populations, populations necessary for maintaining genetic diversity, or those near the limit of the species range. The species is broadly distributed across Australia. The distribution in Western Australia encompasses the width of the state in a broad band that extends to the south and north of the Karara Mine Area. Given the broad distribution of the species, the population at the KIOP Mine Area is not considered to be an important population for genetic diversity, as a source population, or near the limit of the species range.

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		The impact from the proposed KIOP MLE is a comparable level of impact to potential Malleefowl habitat as the approved Karara mining operations, although substantially lower impact to historic Malleefowl mound locations. Monitoring at the existing Karara mining operations demonstrates an increasing population trend despite the impacts to date. As the proposed impacts are a similar or lower level of disturbance to Malleefowl habitat values compared to the existing operations, the proposed increase in impacts is not expected to lead to a long-term decrease in the local Malleefowl activity or the broader Tallering bioregional population.	
Reduce the area of occupancy of [an important population] the species	Yes – the Proposal is expected to decrease the area of occupancy of the species. The proposed KIOP MLE will directly impact mapped habitat values including active colonies, log piles and vegetation systems mapped as suitable potential habitat. The proposed disturbance area had a high occurrence of log piles recorded as suitable habitat for colonies. Therefore, it is reasonable to assume that the direct impact to 239.1 ha of mapped suitable habitat would have a comparable reduction on the area of occupancy. The area of occupancy calculated by Atlas of Living Australia spatial portal (February 2026) for the Western Spiny-tailed Skink species is 19,200 ha. The proposed impact to 239.1 ha is 1.2% of the area of occupancy of the species.	Yes – the Proposal is expected to decrease the area of occupancy of the Tallering IBRA bioregional population. The MNES Significant Impact Guidelines 1.1 defines a population as an occurrence of a species in a particular area, such as a geographically distinct regional population or a bioregion. For this assessment, the Tallering IBRA subregion is used to define the population extent. As per the Conservation Advice, all populations are considered of equal importance. Therefore, the Tallering IBRA bioregional population is an important population. The area of occupancy calculated by Atlas of Living Australia spatial portal (February 2026) for Malleefowl in the Tallering IBRA subregion is 12,800 ha. The proposed KIOP MLE mitigated disturbance footprint would impact 692.6 of mapped nesting habitat and 239.1 ha of mapped foraging-only habitat. The proposed disturbance footprint also included records of active Malleefowl mounds and tracks. The proposed impact to a combined 931.7 ha of mapped suitable habitat is 7.3% of the area of occupancy of the regional population.	No – the Proposal will not decrease the area of occupancy of an important population of the species. The population at the KIOP Mine Area is not considered to be an important population. The proposed KIOP MLE disturbance footprint will impact only 0.0001% of the National area of occupancy of the species. This is an insignificant area and is not considered to support an important population.
Fragment an existing population [important population] into two or more populations	No – the Proposal is not expected to fragment the existing population. The KIOP MLE disturbance footprint is adjacent to already disturbed areas. While the disturbance footprint will clear residual habitat, the proposed clearing will expand existing cleared areas and will not fragment patches of habitat. The impact areas are localised and do not serve as corridors between other suitable habitat for the species.	No – the Proposal is not expected to fragment the existing population. While habitat fragmentation is a major threat across the species entire distribution, the MLE Proposal involves additional clearing adjacent to already impacted areas. Therefore, there will be no additional fragmentation.	No – the Proposal will not fragment an important population. The population at the Mine Area is not considered an important population for the species. Southern Whiteface records are scattered around the KIOP Mine Area and potentially suitable habitat has been mapped as occurring broadly in the Mine Area and the region.
Adversely affect habitat critical to the survival of a species	Yes – the Proposal will result in clearing of habitat that can be considered habitat critical to the survival of the species. The MNES Significant Impact Guidelines 1.1 defines habitat critical to the survival of a species as areas that are necessary for foraging, breeding, roosting or dispersal, for long-term maintenance of the species or to maintain genetic diversity. For this assessment, log piles and York Gum woodland are considered critical habitat as the log piles are necessary for colonies to forage, breed and roost. The proposed KIOP MLE will result in clearing of 239.1 ha of York Gum woodland and 326 log piles mapped as potential colony sites.	Yes – the Proposal will adversely affect habitat critical to the survival of the species by clearing habitat suitable for nesting and active and historic mounds. The MNES Significant Impact Guidelines 1.1 defines habitat critical to the survival of a species as areas that are necessary for foraging, breeding, roosting or dispersal, for long-term maintenance of the species or to maintain genetic diversity. For this assessment, habitat critical to the survival of the species is considered to include habitat mapped as suitable for nesting, and existing mounds. The proposed KIOP MLE mitigated disturbance footprint would impact 692.6 (13%) of mapped nesting habitat in the Survey Area, as well as removal of 2 active and 27 historic Malleefowl mounds.	Yes - the conservation advice states that any known or likely habitat should be considered as habitat critical to the survival of the species. There is known habitat for the species that will be adversely affected (cleared). The species depends on open woodlands with dead timber and herbaceous litter (DCCEEW, 2023). The proposed KIOP MLE will impact 842 ha (10.8%) of mapped habitat in the Survey Area which is 0.03% of potential habitat in the Tallering IBRA subregion. This impact will be localised and is negligible compared to the existing habitat in the wider area and across the species' range.
Disrupt the breeding cycling of a population [important population]	No - the Proposal will not disrupt breeding of the population at a regional scale. The MNES Significant Impact Guidelines 1.1 defines a population as an occurrence of a species in a particular area, such as a geographically distinct regional population or a bioregion.	No - the Proposal will not disrupt breeding of the population at a regional scale. Monitoring at the existing Karara mining operations demonstrates increased numbers of active Malleefowl mounds despite the impacts to date. As the proposed KIOP MLE will impact substantially fewer Malleefowl mounds compared to the existing operations, the proposed impact is not expected to disrupt	No – the Proposal will not disrupt the breeding cycle of an important population. The local population is not considered to be an important population. This species builds a dome-shaped nest with a side entrance mostly in a hollow branch, a tree trunk, crevice between branches, a stump, a fence post or in a recumbent log entrance through a knot-hole or crack. Nests are made with

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	For this assessment, the Tallering IBRA subregion is used to define the population extent. Although the Proposal will disrupt individual Western Spiny-tailed Skink colonies, the breeding cycling across the Tallering IBRA bioregion will not be disrupted.	the breeding cycle of the local Malleefowl or the broader Tallering bioregional population.	grass, bark, rootlets, feathers and wool and lined with feathers, wool, fur and soft plant down (Johnstone et al., 2004). This type of habitat and materials are widely available in the local and regional area. Based on the geographic records, Southern Whiteface breeds in many locations in the semi-arid areas of WA.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Yes – the Proposal will decrease the availability of habitat which might contribute to ongoing decline of the species. The Proposal will directly impact habitat for Western Spiny-tailed Skink including 239.1 ha of mapped preferred habitat, 326 potentially suitable log piles (43% of log pile records in the Survey Area) and 7 active colonies (5.7% of active colonies known from monitoring). Monitoring of the species at KIOP since 2018 has recorded a decline in the number of occupied colony sites, likely due to predation by little crows and feral cats, with landfills associated with mining exacerbating this (modification of habitat by attraction of predators due to presence of landfill). The Proposal will directly remove known and potential habitat values (colonies and log piles) and will contribute to ongoing modification of habitat by attraction of predators through the ongoing operation of the mine site landfill.	No – the Proposal will not remove or decrease the quality of habitat to the extent that the species is likely to decline. There will be impact to habitat used for nesting and foraging, however this represents a minor and localised reduction and is not expected to have a significant impact on the species at the regional or national scale. Monitoring at the existing Karara mining operations demonstrates an increasing population trend despite the impacts to date. As the proposed impacts are a similar or lower level of disturbance to Malleefowl habitat values compared to the existing operations, the proposed increase in impacts is not expected to lead to a long-term decrease in the local Malleefowl activity or the broader Tallering bioregional population.	No – the Proposal will not decrease the availability or quality of habitat to the extent that the species is likely to decline. The proposed KIOP MLE will impact only 10.8% of mapped habitat in the Survey Area and 0.03% of potential habitat in the Tallering IBRA subregion. Whilst there will be an impact to potential habitat from the proposal, there is extensive habitat in the bioregion across the species' range. The habitat will not be impacted to an extent that the species is likely to decline.
Result in invasive species that are harmful to the species becoming established in the species' habitat	No – the Proposal will not result in establishment of invasive species in the species' habitat. Predation by invasive species such as foxes, cats and over-abundant native species including the little crow is a known threat (Bamford Consulting Ecologists, 2025). However, these species are already present in the habitat (due to the ongoing operations). No new invasive or harmful species are expected to be introduced or become established due to the Proposal. The Proposal is for continuation of existing operations – the population of these invasive species is not expected to increase due to the Proposal.	No – the Proposal will not result in establishment of invasive species in the species' habitat. Invasive predators and some invasive weeds such as buffel grass are listed as a known threat to Malleefowl. Foxes and cats are major predators and are already present in the KIOP MLE Proposal area. No new invasive species are expected to be introduced due to continuation of the existing operations.	No – the Proposal will not result in establishment of invasive species in the species' habitat. There are no invasive species currently documented as affecting this species. No new invasive or harmful species are expected to be introduced or become established due to the Proposal.
Introduce disease that may cause the species to decline	No – the Proposal will not introduce diseases that may cause the species to decline. There is no disease threat currently documented as affecting this species. Diseases are unlikely to be introduced by the KIOP MLE Proposal.	No – the Proposal will not introduce diseases that may cause the species to decline. There is no disease threat currently documented as affecting this species. Diseases are unlikely to be introduced by the KIOP MLE Proposal.	No – the Proposal will not introduce diseases that may cause the species to decline. There is no disease threat currently documented as affecting this species. Diseases are unlikely to be introduced by the KIOP MLE Proposal.
Interfere with the recovery of the species	No – the Proposal is not expected to interfere with recovery of the species. Criteria for recovery plan success include maintaining the number of populations and habitat and at least 50% of known remnant woodland populations being managed for conservation. The Proposal will not reduce the number of populations.	Yes – the Proposed MLE will interfere with recovery of the species by reducing the area of occupancy at a location where Malleefowl are known to occur. A key performance criterion of the National Recovery Plan for the Malleefowl is to maintain or increase the area of occupancy at all locations at which Malleefowl occur.	No – the Proposal will not interfere with recovery of the species. No active recovery actions are currently being carried out within the Proposal area or its vicinity.
Outcome	**Significant residual impact due to clearing of habitat critical to the survival of the species (known and potential colony sites), contributing to long-term trend of declining number of active colonies in the local area.**	**Significant residual impact due to clearing of habitat critical to the survival of the species (habitat mapped as suitable for nesting, and active and historic mounds), leading to reduced area of occupancy for the bioregional population. All populations of Malleefowl are considered equally important.**	**Not a significant residual impact as the local population is not an important population of the species, and the impact to habitat is not significant at a bioregional level.**

3.3.3 Significance of Impacts – Trapdoor Spiders

Two listed species of trapdoor spiders are expected to be impacted by the Proposal:

- *Idiosoma clypeatum*, Northern Shield-backed Trapdoor Spider (P3 – BC Act)
- *Idiosoma formosum*, Ornate Trapdoor Spider (Endangered – BC Act).

DCCEEW has highlighted that the impacts to trapdoor spiders must be assessed as follows:

- Assessment of impacts to Shield-backed Trapdoor spider must be consistent with the 2013 *Idiosoma nigrum* EPBC listing status as Vulnerable. Although the department is aware that Rix et al (2016) taxonomically separated species covered by this listing (including *Idiosoma clypeatum*)), until such time as a new EPBC listing decision is made the 2013 listing status applies.
- As one of the derived species from what was listed as '*Idiosoma nigrum'* in 2013, and as a species with a limited geographic distribution, the department considers the *Idiosoma clypeatum* qualifies as an 'important population' of *Idiosoma nigrum*.

Further background regarding the status of *Idiosoma nigrum* and *Idiosoma clypeatum* includes:

- The trapdoor spiders recorded from the Karara mine area were previously known as *Idiosoma nigrum* (Bamford Consulting Ecologists, 2025).
- *Idiosoma nigrum* was listed in 2013 under the EPBC Act as Vulnerable, and this listing status has not changed. The Conservation Advice for *Idiosoma nigrum* published in 2013 stated the species' extent of occurrence was 21,500 km^2 and area of occupancy was 1,700 km^2.
- A taxonomic and conservation review of the 'nigrum' group of trapdoor spiders was published in 2018, which significantly refined the known distribution of *Idiosoma nigrum* to include only the populations from the central and central-western Wheatbelt bioregion (Rix et al, 2018).
- The refined distribution of *Idiosoma nigrum* does not include records from the Karara Mine Area, which were re-classified as *Idiosoma clypeatum* and *Idiosoma formosum* (Bamford Consulting Ecologists, 2025). The extent of occurrence for each species relative to the Proposal area is shown in **Figure 3.11**.
- *Idiosoma clypeatum* has a substantially larger extent of occurrence and area of occupancy than *Idiosoma nigrum* at the time of listing in 2013 and does not meet criteria for listing as Vulnberable.

An assessment was conducted against IUCN listing criteria for *Idiosoma clypeatum* and *Idiosoma formosum* (**Table 3.13**). The assessment concluded that *Idiosoma clypeatum* does not meet IUCN criteria for listing, but *Idiosoma formosum* meets criteria for listing as Endangered (which corresponds with the State-level listing for both species).

Although *Idiosoma clypeatum* does not meet IUCN criteria for listing, assessment has been completed against the MNES significant impact guidelines based on *Idiosoma clypeatum* as an important population of *Idiosoma nigrum*, as instructed by DCCEEW. *Idiosoma formosum* was also assessed against the MNES significant impact guidelines based on the species meeting criteria for Endangered listing (and being listed as Endangered at a State-level).

Assessment against the *MNES – Significant impact guidelines 1.1 EPBC Act* (Department of the Environment, 2013) is provided in **Table 3.14** for the two trapdoor spider species.

The residual impact to *Idiosoma clypeatum* is not significant. The assessment against the MNES significant impact guidelines for Vulnerable species determined that there would be an impact on habitat critical to the survival of a species (burrows and mapped suitable habitat) and reduction in area of occupancy for *Idiosoma clypeatum*. However, this species does not meet the criteria for listing as Vulnerable. Furthermore, the predicted impact to *Idiosoma clypeatum* would not increase the threat level to the species such that it would trigger listing under IUCN criteria or increase the cumulative impact to a critical level. Therefore, the impact to the species is not significant according to the criteria for assessing significance of residual impact in the *WA Environmental Offsets Guidelines* (Government of Western Australia, 2014).

The residual impact to *Idiosoma formosum* is significant. This species meets the criteria for listing as Endangered, and the assessment determined there would be an impact on habitat critical to the survival of a species (burrows and mapped suitable habitat), which could lead to decline in species numbers.

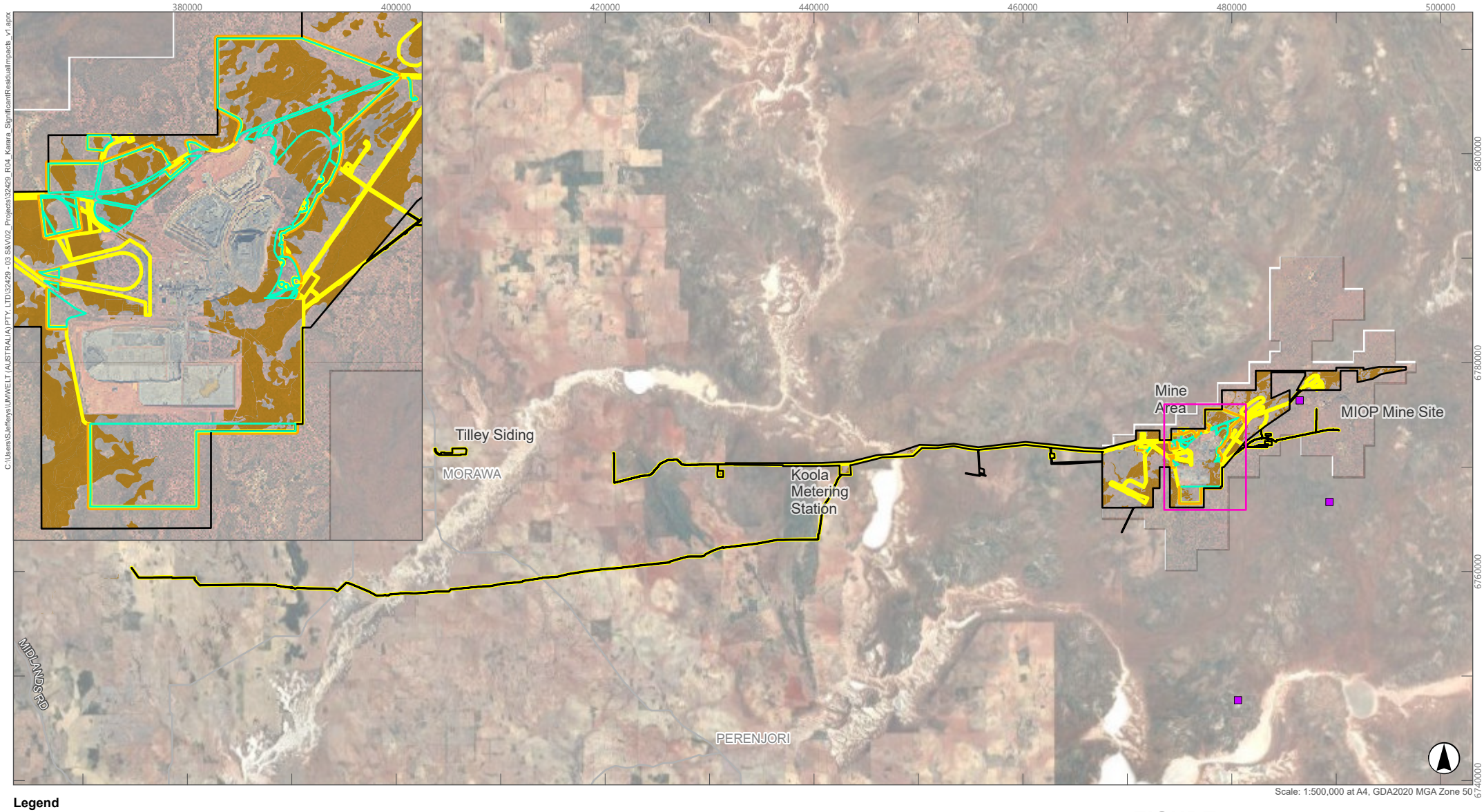
Table 3.13 IUCN Criteria Assessment for *Idiosoma* species

Criteria	Critically Endangered	Endangered	Vulnerable	Assessment for *Idiosoma clypeatum*	Assessment for *Idiosoma formosum*
Key Data to Inform Assessment					
Extent of occurrence				120,000 km^2 *Idiosoma clypeatum* has a wide distribution in the Yalgoo and Murchison bioregions (extent of occurrence of over 120,000 km^2) (Rix et al, 2018). The extent of occurrence mapped by Atlas of Living Australia concurs with this estimate (121,951 km^2). This includes records in the Karara Mine Area.	2,382-3,780 km^2 *Idiosoma formosum* has a restricted distribution in the Lake Moore catchment (junction of Wheatbelt, Yalgoo and Coolgardie bioregions) with extent of occurrence of 3,780 km^2 (Rix et al, 2018). The Atlas of Living Australia (February 2026) maps the extent of occurrence as 2,311 km^2, but doesn't include records from the Karara mine area. The mapped habitat in the Karara Survey Area is 7,115.9 ha (71 km^2). If the Karara Mine Area records are added to the Atlas of Living Australia, the extent of occurrence would be approximately 2,382 km^2.
Area of occupancy				12,800 ha The area of occupancy as mapped by Atlas of Living Australia is 128 km^2.	2,000 ha Atlas of Living Australia (February 2026) maps the area of occupancy as 20 km^2 (2,000 ha), although this doesn't include records from the Karara Mine Area.
Number of locations				The Atlas of Living Australia has 78 locations recorded in Australia.	Not required for assessment.
Estimated population size				1,792,000 individuals This species is very abundant in suitable areas, with density estimated as 140-623 spiders/ha in the Karara area (Bamford Consulting Ecologists, 2025). An indicative estimate of total population is calculated from area of occupancy x density: • The area of occupancy as is 12,800 ha. • Density – apply lowest end of recorded density range in the Karara area (140 spiders/ha). • Total population estimate 1,792,000 spiders across area of occupancy.	1,572,614 individuals This species is abundant in suitable areas, with density estimated as 221-364 spiders/ha in the Karara area (Bamford Consulting Ecologists, 2025). An indicative estimate of population in the Karara Mine Area was calculated from mapped habitat area x density: • The mapped habitat in the Karara Mine Area is 7,115.9 ha. • Density – apply lowest end of recorded density range in the Karara area (221 spiders/ha). • Total population estimate 1,572,614 spiders in the Karara Mine Area.
1 – Population Size Reduction					
Population reduction observed or estimated in the past where causes of the reduction have not ceased or may not be reversible	≥ 80%	≥ 50%	≥ 30%	Past population reduction estimated from cumulative impact to mapped habitat from approved projects within 15 km buffer of Karara Mine Area: • 9,754.0 ha • 3.4% of suitable regional habitat types (Umwelt, 2026b)	Past population reduction estimated from cumulative impact to mapped habitat from approved projects within 15 km buffer of Karara Mine Area: • 10,011.1 ha • 3.3% of suitable regional habitat types (Umwelt, 2026b)
Population reduction, projected or suspected in the future	≥ 80%	≥ 50%	≥ 30%	Projected future population reduction estimated from KIOP MLE proposed impact to mapped habitat in the Fauna Survey Area: • 599.5 ha • 9.8% of mapped habitat within Survey Area (Umwelt, 2026b)	Projected future population reduction estimated from KIOP MLE proposed impact to mapped habitat in the Fauna Survey Area: • 811.3 ha • 11.4% of mapped habitat within Survey Area (Umwelt, 2026b)
Criterion 1 category				Does not meet criterion for listing.	Does not meet criterion for listing.
2 – Limited Geographic Distribution					
Extent of occurrence OR	< 100 km^2	< 5,000 km^2	< 20,000 km^2	120,000 km^2 – does not meet criterion	3,780 km^2 – meets criterion for Endangered
Area of occupancy AND	< 10 km^2	< 500 km^2	< 2,000 km^2	128 km^2 – restricted	Not required as above criterion is met.
Number of locations AND	= 1	≤ 5	≤ 10	~78 – does not meet criterion	
Continuing decline or extreme fluctuations in extent of occurrence, area of occupancy, number of locations, or number of mature individuals.				Not relevant as large number of locations does not meet criterion.	
Criterion 2 category				Does not meet criterion.	**Meets criterion for Endangered**
3 – Population Size and Decline					
Estimated number of mature individuals AND	< 250	< 2,500	< 10,000	Indicative 1,792,000 individuals	Indicative 1,572,614 individuals
Observed or projected decline of at least	25% in 3 years	20% in 5 years	10% in 10 years	Not relevant as first component is not met.	Not relevant as first component is not met.
Criterion 3 category				Does not meet criterion for listing.	Does not meet criterion for listing.
4 – Number of Mature Individuals					
Number of mature individuals	< 50	< 250	< 1,000	Indicative 1,792,000 individuals	Indicative 1,572,614 individuals
Criterion 4 category				Does not meet criterion for listing.	Does not meet criterion for listing.

Table 3.14 Significant Impact Assessment – Trapdoor Spider Species

MNES Significant Impact Guidelines 1.1– Endangered Species [adjustments for Vulnerable in brackets]	***Idiosoma nigrum* important population (*Idiosoma clypeatum*, Northern Shield-backed Trapdoor Spider)** Vulnerable – EPBC Act, P3 – BC Act	***Idiosoma formosum*** **Ornate Trapdoor Spider** Endangered – BC Act
Published conservation advice and recovery plans	Approved Conservation Advice for *Idiosoma nigrum* (shield-backed spider) dated 26 April 2013. Females spend their entire life in the burrow or within its proximity, and male dispersal is estimated to be less than 500 m. Although **critical habitat** is not defined, for the purpose of this assessment the burrows are considered critical habitat. Main **threats** are land clearing, habitat fragmentation and grazing. **Priority actions** include managing threats and minimising adverse impacts from land use changes, especially mining. DCCEEW considers *Idiosoma clypeatum* qualifies as an 'important population' of *Idiosoma nigrum*. No approved recovery plan.	There is no published conservation advice or recovery plan. Listing advice under the BC Act is not published or publicly available.
Lead to a long-term decrease in the size of a population of a species [important population for Vulnerable species]	No – the Proposal is not expected to lead to a long-term decrease in the size of an important population of the species. *Idiosoma clypeatum* as a species is assessed as an 'important population' of *Idiosoma nigrum*. *Idiosoma clypeatum* has a large extent of occurrence and estimated total population of almost 2 million individuals and does not meet the IUCN criteria for listing as Vulnerable. An impact on a small proportion of the known area of occurrence will not lead to a long-term decrease in the size of the total population of *Idiosoma clypeatum*. The significance of residual impact was assessed in accordance with the *WA Environmental Offsets Guidelines* (Government of Western Australia, 2014): Impacts are potentially significant if they are likely to result in a species or ecosystem requiring protection under statute (i.e. meeting criteria for listing) or increasing the cumulative impact to a critical level (i.e. cumulative impacts meeting criteria for listing). The proposed KIOP MLE mitigated disturbance footprint will impact 599.5 ha of mapped habitat for *Idiosoma clypeatum* (9.8% of habitat mapped in the Survey Area, 4.7% of area of occupancy). The Combined Proposal disturbance footprint would impact 1,187 ha of mapped habitat for *Idiosoma clypeatum*. Using the same methods, the Combined Proposal could impact 9.3% of the indicative population. The predicted impact to *Idiosoma clypeatum* (proportional impact to the total area of occupancy) would not increase the threat level to the species such that it would increase the cumulative impact to a critical level or lead to long-term decrease of the population.	Yes – the Proposal could lead to a long-term decrease in the size of a population of the species. *Idiosoma formosum* meets IUCN criteria for listing as Endangered based on geographic distribution (small extent of occurrence). The predicted impact to 11.4% of the Karara Mine Area population could be considered a substantial impact on the population. The proposed KIOP MLE mitigated disturbance footprint will impact 811.3 ha of mapped habitat for *Idiosoma formosum* (11.4% of habitat mapped in the Survey Area). The Combined Proposal disturbance footprint would impact 1,572.1 ha of mapped habitat for *Idiosoma formosum* (21.7% of habitat mapped in the Survey Area). The predicted impact to 11.4% of the local population could lead to a long-term decrease in the size of a population of the species.
Reduce the area of occupancy of [an important population] the species	Yes – the Proposal is expected to decrease the area of occupancy of the species. However, this impact is not significant as *Idiosoma clypeatum* has been recorded in numerous locations and does not demonstrate a continuing decline or extreme fluctuations in the extent of its occurrence. The area of occupancy as mapped by Atlas of Living Australia is 128 km^2 (12,800 ha), which includes records from Karara Mine Area. The proposed KIOP MLE mitigated disturbance footprint will impact 29 recorded burrows of *Idiosoma clypeatum* (16.4% of locations recorded in the Survey Area). The impact to 16.4% of recorded locations in the Survey Area would reduce the area of occupancy of the species in the Karara Mine Area.	No – the studies completed for the KIOP MLE have extended the known area of occupancy of *Idiosoma formosum*. Although some of the newly recorded locations will be impacted by the Proposal, the net outcome is an increase in the area of occupancy of the species. The area of occupancy recorded by Atlas of Living Australia is 2,000 ha, which doesn't include records from Karara Mine Area. The proposed KIOP MLE mitigated disturbance footprint will impact 167 recorded burrows of *Idiosoma formosum* (49.4% of locations recorded in the Survey Area). The net impact is an increase in the area of occupancy compared to published records on Atlas of Living Australia.
Fragment an existing population [important population] into two or more populations	No – the Proposal will not fragment an important population. The KIOP MLE Proposal involves additional clearing adjacent to already impacted areas. Therefore, there will be no additional fragmentation.	No – the Proposal will not fragment an important population. The KIOP MLE Proposal involves additional clearing adjacent to already impacted areas. Therefore, there will be no additional fragmentation.
Adversely affect habitat critical to the survival of a species	Yes – the Proposal will result in clearing of habitat that can be considered habitat critical to the survival of the species. The MNES Significant Impact Guidelines 1.1 defines habitat critical to the survival of a species as areas that are necessary for foraging, breeding, roosting or dispersal, for long-term maintenance of the species or to maintain genetic diversity. For this assessment, the trapdoor spider burrows and mapped preferred habitat are considered critical habitat as the burrows are necessary for the individuals to forage, breed and roost, and the preferred habitat is necessary for hosting burrows (and will contain more burrows that feasible to record during a survey). The proposed KIOP MLE will result in clearing of 599.5 ha of mapped habitat and 29 recorded *Idiosoma clypeatum* burrows.	Yes – the Proposal will result in clearing of habitat that can be considered habitat critical to the survival of the species. The MNES Significant Impact Guidelines 1.1 defines habitat critical to the survival of a species as areas that are necessary for foraging, breeding, roosting or dispersal, for long-term maintenance of the species or to maintain genetic diversity. For this assessment, the trapdoor spider burrows and mapped preferred habitat are considered critical habitat as the burrows are necessary for the individuals to forage, breed and roost, and the preferred habitat is necessary for hosting burrows (and will contain more burrows than feasible to record during a survey). The proposed KIOP MLE will result in clearing of 811.3 ha of mapped habitat and 167 recorded *Idiosoma formosum* burrows.

MNES Significant Impact Guidelines 1.1– Endangered Species [adjustments for Vulnerable in brackets]	***Idiosoma nigrum* important population (*Idiosoma clypeatum*, Northern Shield-backed Trapdoor Spider)** Vulnerable – EPBC Act, P3 – BC Act	***Idiosoma formosum*** **Ornate Trapdoor Spider** Endangered – BC Act
Disrupt the breeding cycling of a population [important population]	No – the Proposal will not disrupt the breeding cycle of an important population of *Idiosoma nigrum*. *Idiosoma clypeatum* as a species is assessed as an 'important population' of *Idiosoma nigrum*. The proposed MLE will directly impact on recorded burrows where females spend their entire lives. Destruction of burrows will result in loss of females and disruption of breeding potential. Based on spider density and proportional impacts to area of occupancy, approximately 4.7% of the indicative total population of *Idiosoma clypeatum* would be impacted. This extent of impact is not expected to disrupt the breeding cycle of the entire *Idiosoma clypeatum* species (assessed as an important population of *Idiosoma nigrum*).	Yes – the Proposal could disrupt the breeding cycle of a population of *Idiosoma formosum*. The MNES Significant Impact Guidelines 1.1 defines a population as an occurrence of a species in a particular area, such as a geographically distinct regional population or a bioregion. As *Idiosoma formosum* has a restricted distribution in the Lake Moore catchment, the entire distribution of the species is considered one population for the purpose of this assessment. The proposed MLE will directly impact on recorded burrows where females spend their entire lives. Destruction of burrows will result in loss of females and disruption of breeding potential. Based on spider density and proportional impacts to the mapped habitat in Karara Mine Area, approximately 11.4% of the indicative numbers at the Karara Mine Area would be impacted by the proposal. This extent of impact could disrupt the breeding cycle of *Idiosoma formosum* in the local area.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	No – the Proposal will not decrease the availability or quality of habitat to the extent that the species is likely to decline. *Idiosoma clypeatum* has a large extent of occurrence and estimated total population of almost 2 million individuals. An impact on a small proportion of the known area of occurrence would not be considered a substantial impact on the total species. The proposed KIOP MLE mitigated disturbance footprint will impact 599.5 ha of mapped habitat for *Idiosoma clypeatum* (4.7% of area of occupancy). Whilst there will be an impact to potential habitat from the proposal, the species has a wide distribution and does not meet criteria for listing as Vulnerable. The habitat will not be impacted to an extent that the species is likely to decline.	Yes – the Proposal could decrease the availability or quality of habitat to the extent that the species is likely to decline. *Idiosoma formosum* meets IUCN criteria for listing as Endangered based on geographic distribution (small extent of occurrence). The predicted impact to 11.4% of the Karara Mine Area population could be considered a substantial impact on the population, which is a large component of the total known species.
Result in invasive species that are harmful to the species becoming established in the species' habitat	No – the Proposal will not result in establishment of invasive species in the species' habitat. There are no invasive species currently documented as affecting this species. No new invasive or harmful species are expected to be introduced or become established due to the proposal.	No – the Proposal will not result in establishment of invasive species in the species' habitat. There are no invasive species currently documented as affecting this species. No new invasive or harmful species are expected to be introduced or become established due to the proposal.
Introduce disease that may cause the species to decline	No – the Proposal will not introduce diseases that may cause the species to decline. There is no disease threat currently documented as affecting this species. Diseases are unlikely to be introduced by the KIOP MLE Proposal.	No – the Proposal will not introduce diseases that may cause the species to decline. There is no disease threat currently documented as affecting this species. Diseases are unlikely to be introduced by the KIOP MLE Proposal.
Interfere with the recovery of the species	No – there is no approved recovery plan. *Idiosoma clypeatum* does not meet IUCN criteria for listing. *Idiosoma clypeatum* has been formally assessed and listed as Priority 3 (Rix et al, 2018). Priority 3 listing by DBCA means the species has several poorly known populations and needs monitoring. No recovery of the species is required.	No – there is no approved recovery plan and species recovery actions are not known.
Outcome	**Significant residual impact assessed against MNES significant impact guidelines for Vulnerable species, due to impact on habitat critical to the survival of a species (burrows and mapped suitable habitat) and reduction in area of occupancy.** **However, *Idiosoma clypeatum* does not meet IUCN criteria for listing due to large extent of occurrence, large total known population and high number of locations. The predicted impact to *Idiosoma clypeatum* would not increase the threat level to the species such that it would trigger IUCN criteria or increase the cumulative impact to a critical level. Therefore, the impact to the species is not significant according to the criteria for assessing significance of residual impact in the *WA Environmental Offsets Guidelines* (Government of Western Australia, 2014).** **Residual impacts not significant.**	**Significant residual impact due to impact on habitat critical to the survival of a species (burrows and mapped suitable habitat), which could lead to decline in species numbers.** ***Idiosoma formosum* meets IUCN criteria for Endangered based on small extent of occurrence.**



Scale: 1:500,000 at A4, GDA2020 MGA Zone 50

Legend

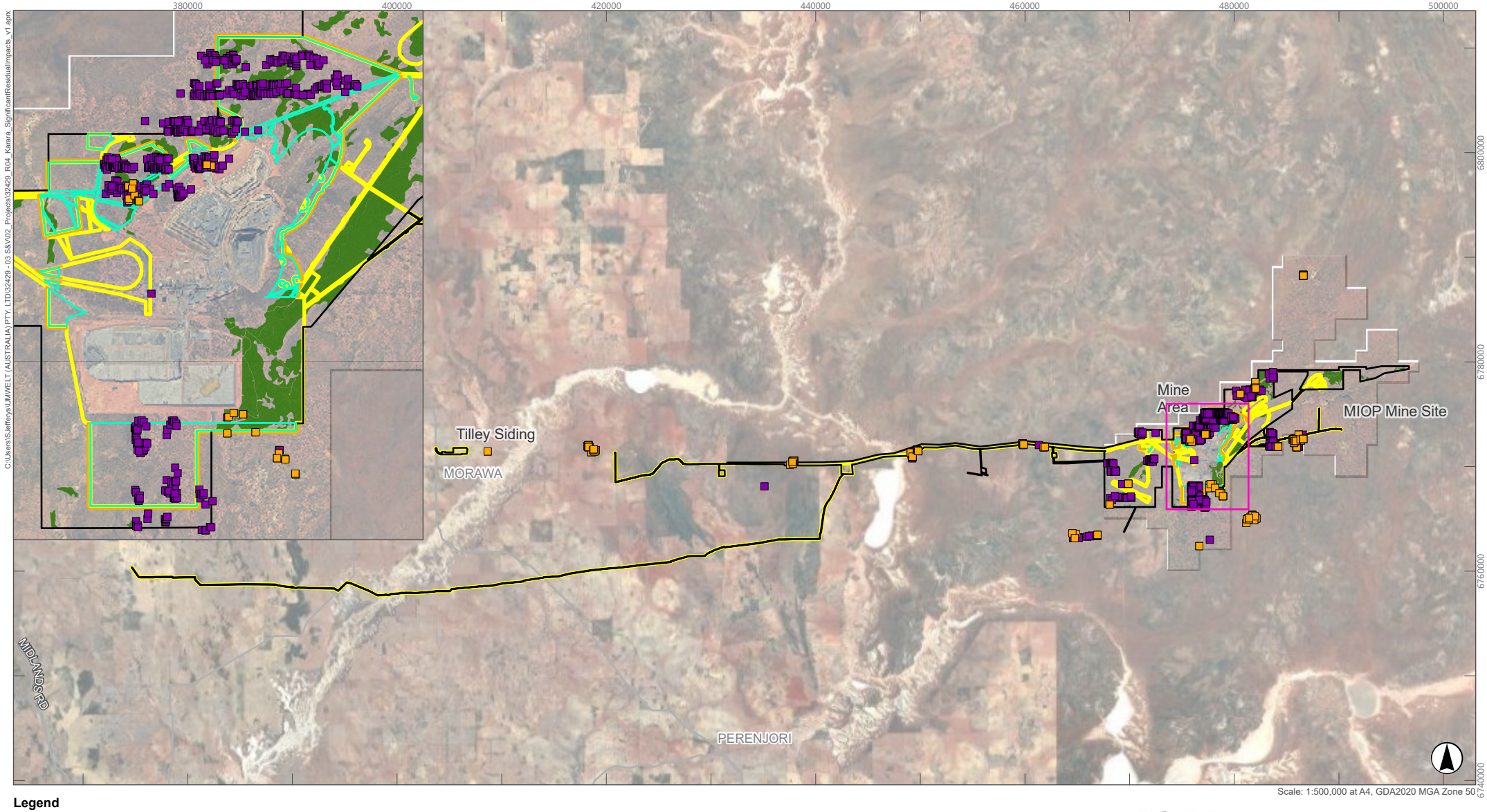
- Combined Proposal Mitigated Development Envelope
- KIOP MLE Mitigated Disturbance Footprint
- Mitigated Indirect Impact Zone
- Combined Proposal Mitigated Disturbance Footprint
- Main Road
- Gilled Slender Blue-tongue
- Mapped Habitat for Gilled Slender Blue-tongue

FIGURE 3.5

Predicted Impacts to Gilled Slender Blue-Tongue from the KIOP MLE Proposal

0 10 20 km

Image Source: KML (2024), ESRI Basemap (2025) | **Data Source:** Landgate (2025), KML (2025)



Scale: 1:500,000 at A4, GDA2020 MGA Zone 50

Legend

- Combined Proposal Mitigated Development Envelope
- KIOP MLE Mitigated Disturbance Footprint
- Mitigated Indirect Impact Zone
- Combined Proposal Mitigated Disturbance Footprint
- Main Road

Western Spiny-tailed Skink

- Active Colony
- Potential Colony
- Mapped Habitat for Western Spiny-tailed Skink

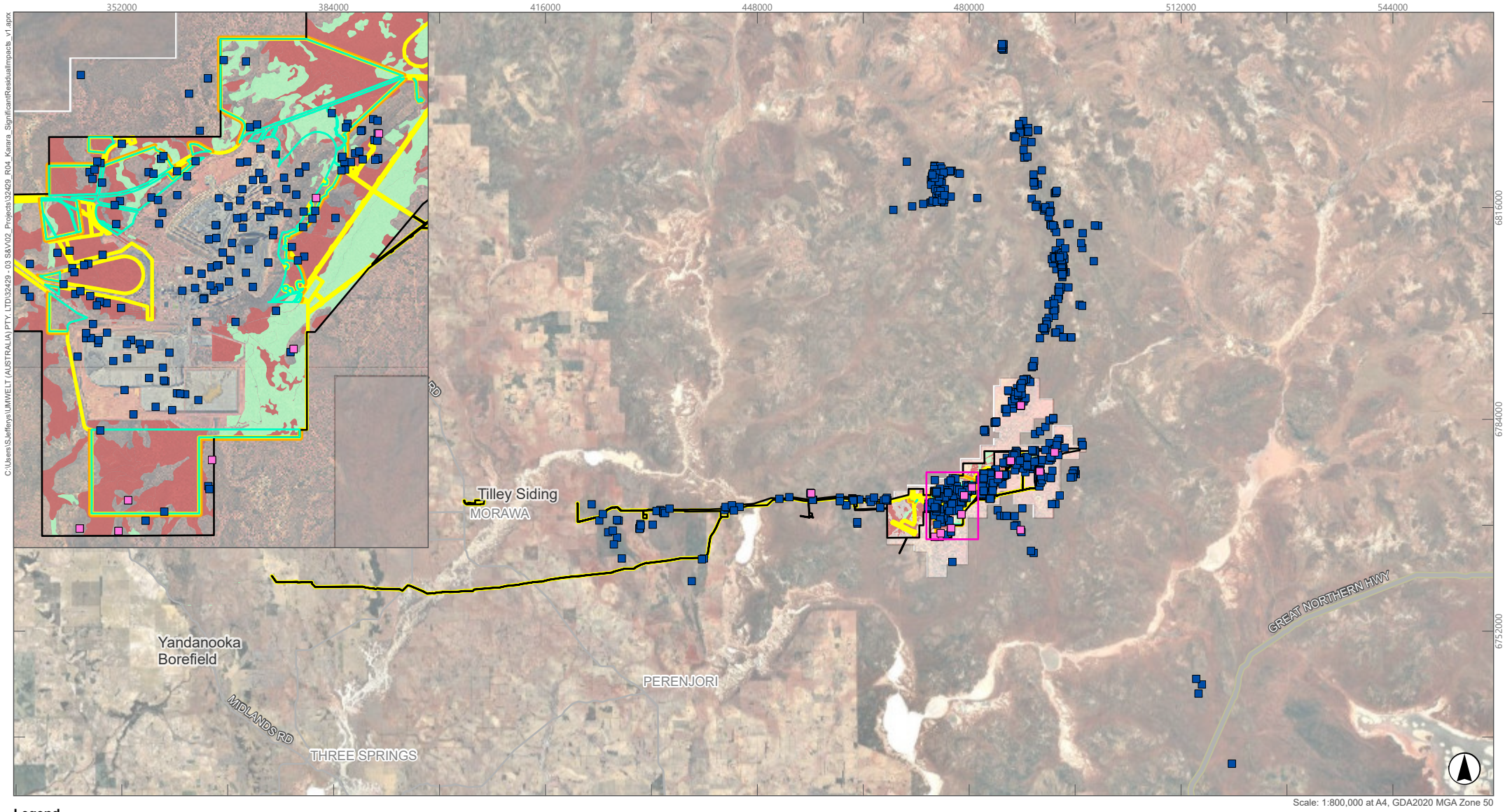
FIGURE 3.6

Predicted Impacts to Western Spiny-tailed Skink from KIOP MLE Proposal

0 10 20 km

Image Source: KML (2024), ESRI Basemap (2025) | **Data Source:** Landgate (2025), KML (2025)

umwelt



Scale: 1:800,000 at A4, GDA2020 MGA Zone 50

Legend

- Combined Proposal Mitigated Development Envelope
- KIOP MLE Mitigated Disturbance Footprint
- Mitigated Indirect Impact Zone
- Combined Proposal Mitigated Disturbance Footprint
- Highway
- Main Road

Malleefowl Mound

- Active
- Historic
- Mapped Habitat for Malleefowl (nesting & foraging)
- Mapped Habitat for Malleefowl (foraging only)

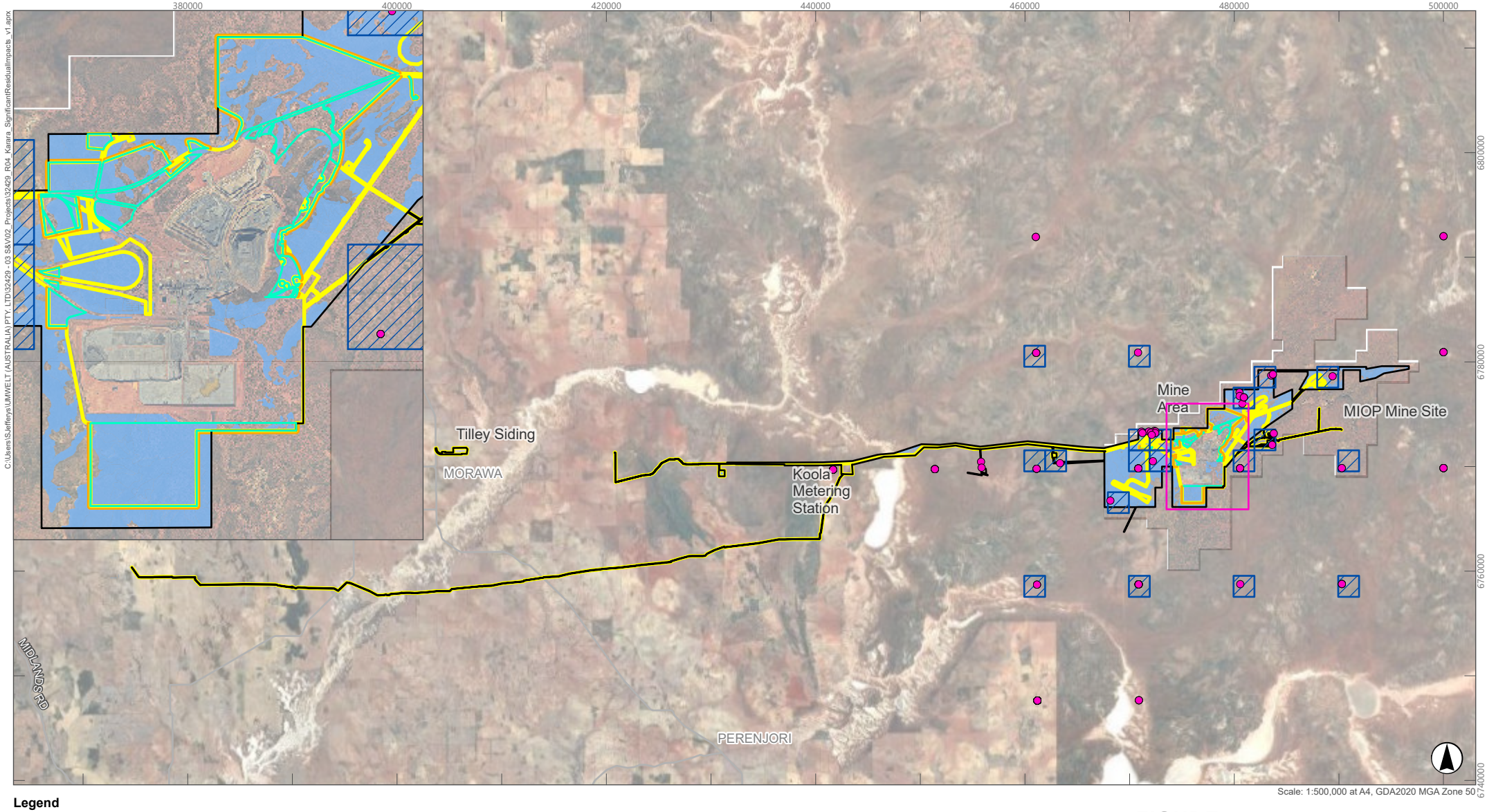
FIGURE 3.7

Predicted Impacts to Malleefowl from KIOP MLE Proposal

0 16 32 km

Image Source: KML (2024), ESRI Basemap (2025) | **Data Source:** Landgate (2025), KML (2025)

umwelt



Scale: 1:500,000 at A4, GDA2020 MGA Zone 50

Legend

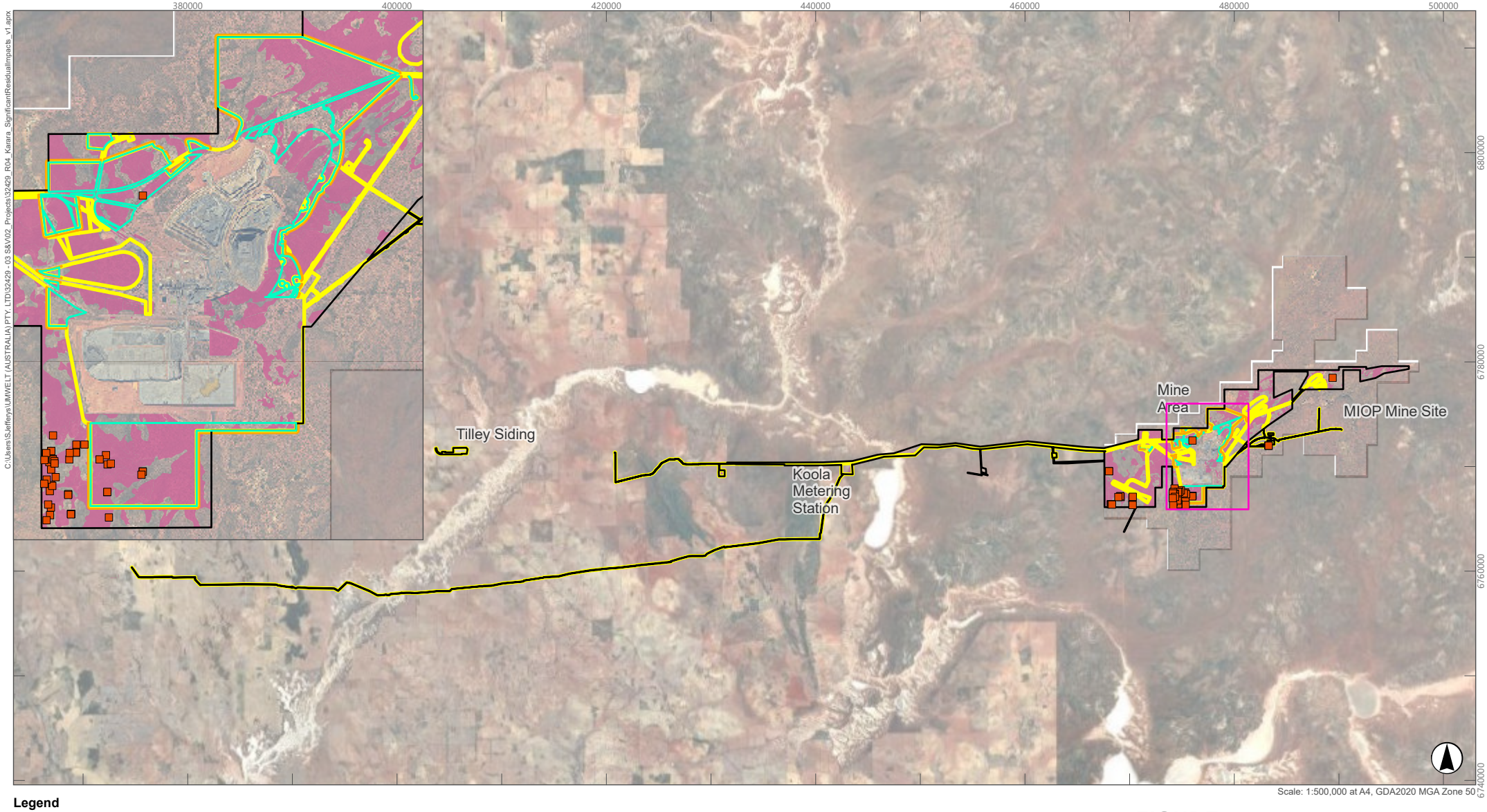
- Combined Proposal Mitigated Development Envelope
- KIOP MLE Mitigated Disturbance Footprint
- Mitigated Indirect Impact Zone
- Combined Proposal Mitigated Disturbance Footprint
- Main Road
- Southern Whiteface Record (Bamford Consulting Ecologists and Atlas of Living Australia)
- Southern Whiteface Area of Occupancy in Mine Area
- Mapped Habitat for Southern Whiteface

FIGURE 3.8

Predicted Impacts to Southern Whiteface from KIOP MLE Proposal

0 10 20 km

Image Source: KML (2024), ESRI Basemap (2025) | **Data Source:** Landgate (2025), KML (2025)



Scale: 1:500,000 at A4, GDA2020 MGA Zone 50

Legend

- Combined Proposal Mitigated Development Envelope
- KIOP MLE Mitigated Disturbance Footprint
- Mitigated Indirect Impact Zone
- Combined Proposal Mitigated Disturbance Footprint

Trapdoor Spider Burrow

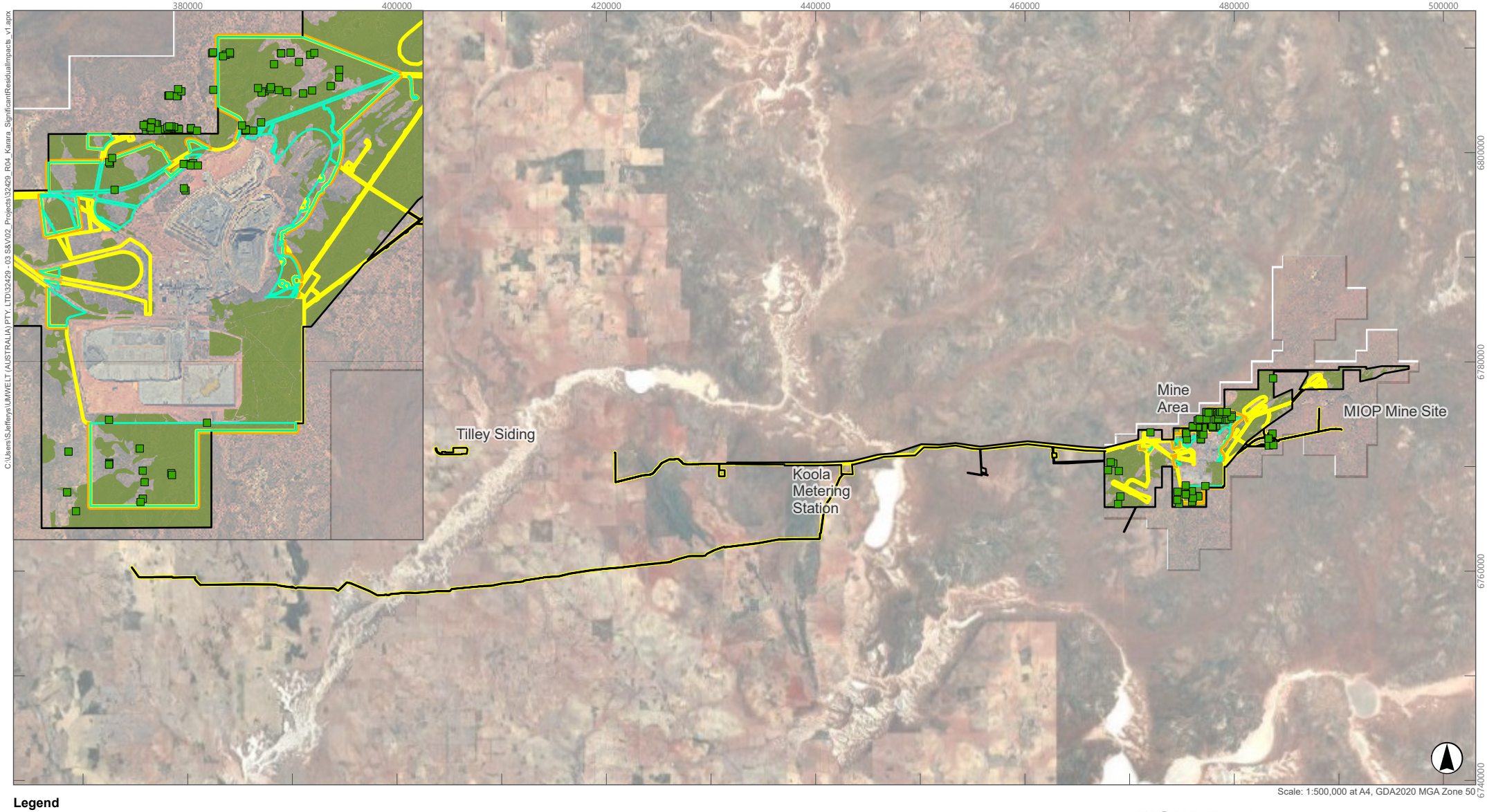
- *Idiosoma clypeatum*
- Mapped Habitat for *Idiosoma clypeatum*

FIGURE 3.9

Predicted Impacts to *Idiosoma clypeatum* from KIOP MLE Proposal

0 10 20 km

Image Source: KML (2024), ESRI Basemap (2025) | **Data Source:** Landgate (2025), KML (2025)



Scale: 1:500,000 at A4, GDA2020 MGA Zone 50

Legend

- Combined Proposal Mitigated Development Envelope
- KIOP MLE Mitigated Disturbance Footprint
- Mitigated Indirect Impact Zone
- Combined Proposal Mitigated Disturbance Footprint

Trapdoor Spider Burrow

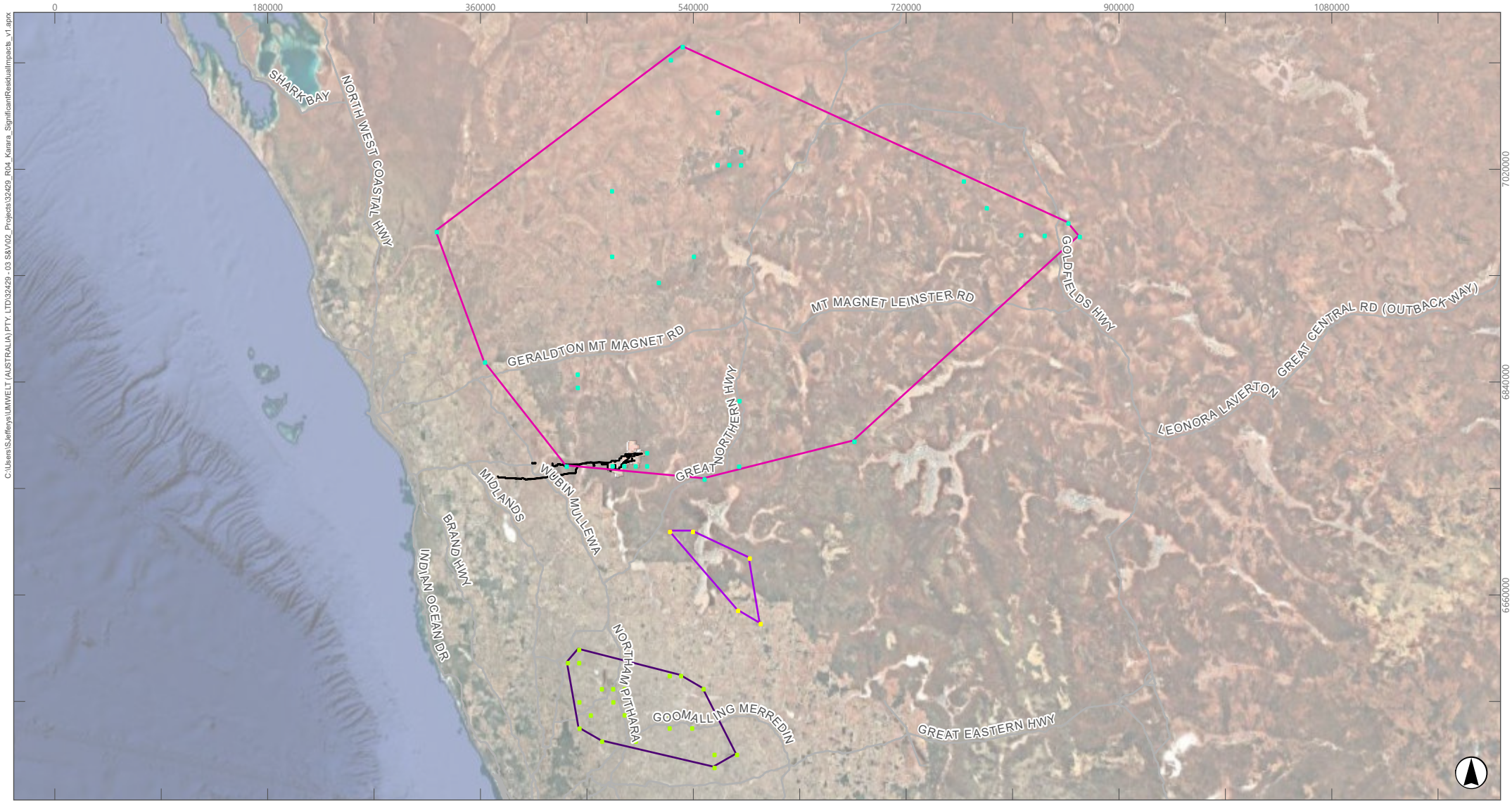
- *Idiosoma formosum*
- Mapped Habitat for *Idiosoma formosum*

FIGURE 3.10

Predicted Impacts to *Idiosoma formosum* from KIOP MLE Proposal

0 10 20 km

Image Source: KML (2024), ESRI Basemap (2025) | **Data Source:** Landgate (2025), KML (2025)



Scale: 1:4,500,000 at A4, GDA2020 MGA Zone 50

Legend

- Combined Proposal Mitigated Development Envelope
- State Road Network

Areas Mapped by Atlas of Living Australia (Feb 2026)

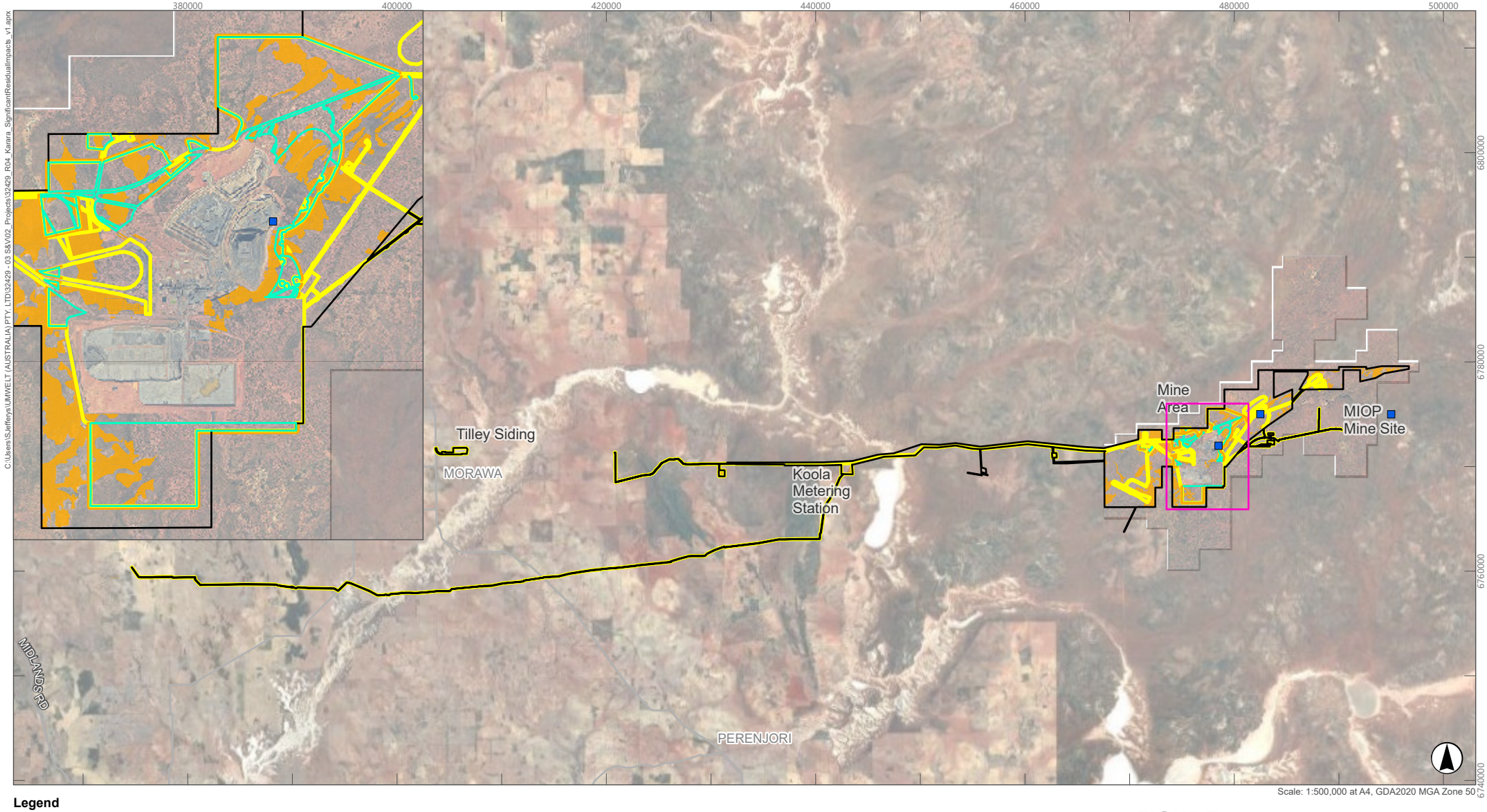
- Area of Occupancy – *Idiosoma clypeatum*
- Area of Occupancy – *Idiosoma formosum*
- Area of Occupancy – *Idiosoma nigrum*
- Extent of Occurrence – *Idiosoma clypeatum*
- Extent of Occurrence – *Idiosoma formosum*
- Extent of Occurrence – *Idiosoma nigrum*

FIGURE 3.11

Extent of Occurrence for Trapdoor Spiders

0 90 180 km

Image Source: KML (2024), ESRI Basemap (2025) | **Data Source:** Landgate (2025), ALA (2026), MRWA (2024), KML (2025)



Scale: 1:500,000 at A4, GDA2020 MGA Zone 50

Legend

- Combined Proposal Mitigated Development Envelope
- KIOP MLE Mitigated Disturbance Footprint
- Mitigated Indirect Impact Zone
- Combined Proposal Mitigated Disturbance Footprint
- Main Road
- *Antichiropus* sp. nov. "karara"
- Mapped Habitat for Karara Millipede

FIGURE 3.12

Predicted Impacts to Karara Millipede from KIOP MLE Proposal

0 10 20 km

Image Source: KML (2024), ESRI Basemap (2025) | **Data Source:** Landgate (2025), KML (2025)

4.0 Conclusion

This assessment has identified that the following ecological values will have significant residual impacts that require offsets:

- Flora:
  - *Persoonia pentasticha*
  - *Caesia* sp. Koolanooka Hills (R. Meissner & Y. Caruso 78)
  - *Crassula* sp. nov
- Fauna:
  - Gilled Slender Blue-tongue
  - Western Spiny-tailed Skink
  - Malleefowl (breeding and foraging habitat)
  - *Idiosoma formosum*
  - Aganippe (*Idiosoma*) sp.) (potential new species)
  - Karara Millipede (short range endemic).

The KIOP MLE Offset Strategy will be updated to consider offsets for these ecological values.

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