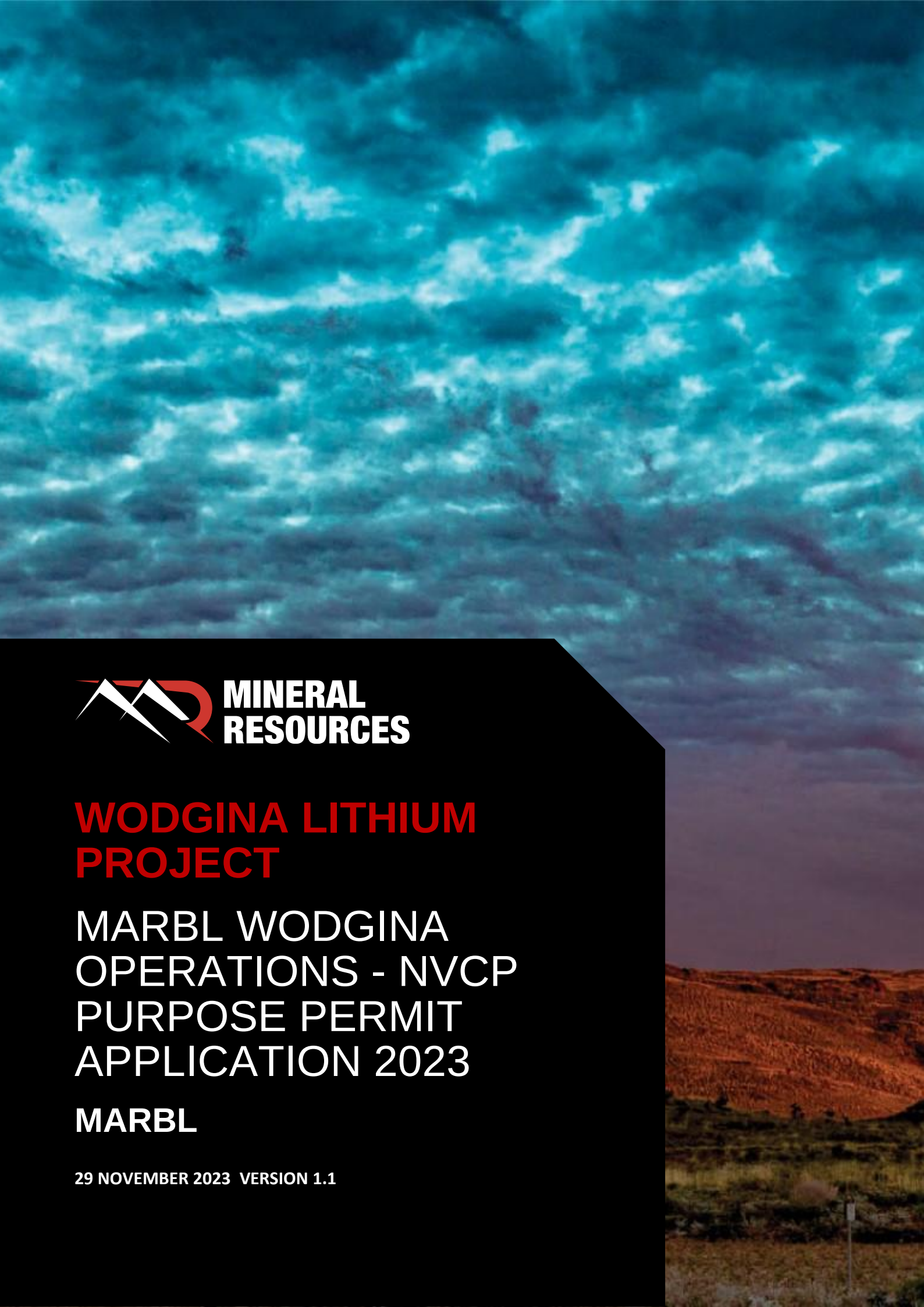

MINERAL RESOURCES

WODGINA LITHIUM PROJECT

MARBL WODGINA OPERATIONS - NVCP PURPOSE PERMIT APPLICATION 2023

MARBL

29 NOVEMBER 2023 VERSION 1.1

DOCUMENT INFORMATION

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Revision History

Rev	Ver	Issue Date	Prepared by	Reviewed By	Approved By	Document Purpose
0	1	31/08/2023	M. Spence	T. Wilson	J. Cookson	Submission to DMIRS
1	1	29/11/2023	T. Wilson			Update to spatial data to align with MP REGID 120114

Acknowledgement of Country

MinRes is committed to reconciliation and recognises and respects the significance of Aboriginal and Torres Strait Islander peoples' communities, cultures, and histories. MinRes acknowledge and respect Aboriginal and Torres Strait Islander peoples as the traditional custodians of the land.

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EXECUTIVE SUMMARY

MARBL Lithium Operations Pty Ltd (MARBL), a joint venture between Mineral Resources Limited (MinRes) and the Albemarle Corporation (Albemarle) operates the Wodgina Lithium Mine (Wodgina or the Project). The Project is located approximately 95 kilometres (km) south of Port Hedland in the Pilbara region of Western Australia (WA) (**Figure 1**). MinRes is applying for a Native Vegetation Clearing Permit (NVCP) Purpose Permit to facilitate the expansion of the Project and support the relevant environmental approvals.

This application is for a single clearing permit to enable expansion of the Project, while consolidating the already assessment and approved CPS 9911/1, which covers a portion of the Project area.

The overall proposed Disturbance Footprint area includes **448.36 hectares (ha)** of native vegetation within a permit boundary of **2,214.75 ha.** This encompasses clearing under the approved NVCP CPS 9911, but excludes clearing completed to date under this NVCP. The quantity of clearing already occurred under historic, current and proposed permits is outlined further in **Table 2**.

Of the 448.36 ha proposed to be cleared in this NVCP application, an additional 20.02 ha of Rocky Ridge fauna habitat and 8.04 ha of Drainage Line habitat is proposed to be disturbed. These habitat types may be critical for both State and Commonwealth listed fauna species (including Matters of National Environmental Significance). However, the extent of the proposed disturbance to these fauna habitats is not significantly greater than was previously referred under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) in 2018, which was determined as 'Not a Controlled Action'. Accordingly, no additional referral is proposed under the Commonwealth's EPBC Act.

Furthermore, in 2018 the Department of Mines and Industry Regulation (DMIRS) and Department of Water and Environmental Regulation (DWER) advised that the impact of clearing associated with expansions at Wodgina could be adequately managed under Part V of the *Environmental Protection Act 1986* (EP Act). Considering the level of impact, adequacy of Part V of the EP Act to manage the impacts, and advice received through consultation with regulatory Departments at the time, it was determined that the proposed works did not warrant formal referral under Part IV of the EP Act. This is still the view of MARBL in relation to this current NVCP application.

The Wodgina project area has been the subject of numerous biological surveys, providing a clear understanding of the environmental values of the area. Woodman Environmental Consulting Pty Ltd was commissioned in 2020 to undertake a Detailed Flora and Vegetation Assessment of project area. The assessment comprised a review of previous flora and vegetation assessments, a detailed flora and vegetation study of unsurveyed areas and targeted surveys of conservation significant species to produce a detailed flora and vegetation assessment that builds upon the results of the previous assessments.

No Threatened Ecological Communities (TECs) or Priority Ecological Communities (PECs) were recorded during the assessment (Woodman Environmental Consulting Pty Ltd, 2020). A total of 15 vegetation units were defined and mapped from the surveys, representing four broad groups based on soils and topography. None of the Vegetation Units were defined as locally or regionally significant. A total of 267 discrete vascular flora taxa (including eight introduced species) were recorded during the surveys, representing 51 families and 130 genera (Woodman Environmental Consulting Pty Ltd, 2020). No Threatened species were recorded in the surveys with a total of six conservation significant species (Priority 3) recorded (see Section 7.1).

Western Wildlife was commissioned to undertake a two-phase Level 2 vertebrate fauna survey across the Wodgina project area in 2019. The purpose of the survey was to collate existing data from previous surveys and gather additional baseline data where necessary to formalise an assessment adequate for environmental approvals. The survey identified six fauna habitats over the Study Area described as Ironstone Ridgetop, Rocky Ridge and Gorge, Rocky Foothills, Stony Rise, Spinifex Stony Plain and Drainage Line (Western Wildlife, 2020).

In accordance with the *Native Vegetation Clearing Regulations 2004* (WA), an assessment of the proposed clearing has been completed against the Ten Clearing Principles and is included as part of this report. This assessment concluded that the proposed clearing is not at variance with Principles (A) to (J).

1. INTRODUCTION

MARBL Lithium Operations Pty Ltd (MARBL), a joint venture between Mineral Resources Limited (MinRes) and the Albemarle Corporation (Albemarle), is applying for a Native Vegetation Clearing Permit (NVCP) Purpose Permit to facilitate the expansion of the Wodgina Lithium Project (Wodgina or the Project) and support relevant environmental approvals.

The Project is located approximately 95 kilometres (km) south of Port Hedland in the Pilbara Region of Western Australia within the Town of Port Hedland local government area. **Figure 1** illustrates the regional location of the Project, with further details on the Project's land tenure and background provided in Section 2 of this document.

1.1 PURPOSE & METHODOLOGY

The purpose of this document is to provide information to support the NVCP application, consisting of the Department of Water and Environmental Regulation (DWER) NVCP proforma; relevant supporting documentation; and spatial data.

The objective of this NVCP Application is to facilitate the expansion of the Project and support relevant environmental approvals. This expansion will ultimately ensure continual ore supply and operation at the Project to meet increased market demands for Lithium.

Consistent with previous applications, the NVCP application being applied for is a Purpose Permit. This provides flexibility for the location of the mine activities and final Disturbance Footprint within the proposed development envelope (NVCP Permit Area). This may be required where technical modelling and assessments indicate the need to implement small changes to the Mine Plan to achieve the highest safety and environmental outcomes.

Environmental values, including a summary of supporting biological surveys completed to support this application are provided in Section 7, with the relevant impact assessment included as Section 9. A comparison of the impacts of this NVCP application with respect to the previous 2018 NVCP CPS 8230/1 submission and the revised 2022 NVCP Application (CPS 9911) is provided in Section 1.5 and Section 9.

An assessment of the proposed clearing against the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* Clearing Principles is provided in Section 10, and considers the key surrounding environmental characteristics and analysis of the relevant supporting biological surveys. An overview of the proposed NVCP Application is displayed in **Figure 2.**

Once this application is assessed and approved, formal notification requesting the withdrawal of CPS 9911/1 will be submitted to DMIRS.

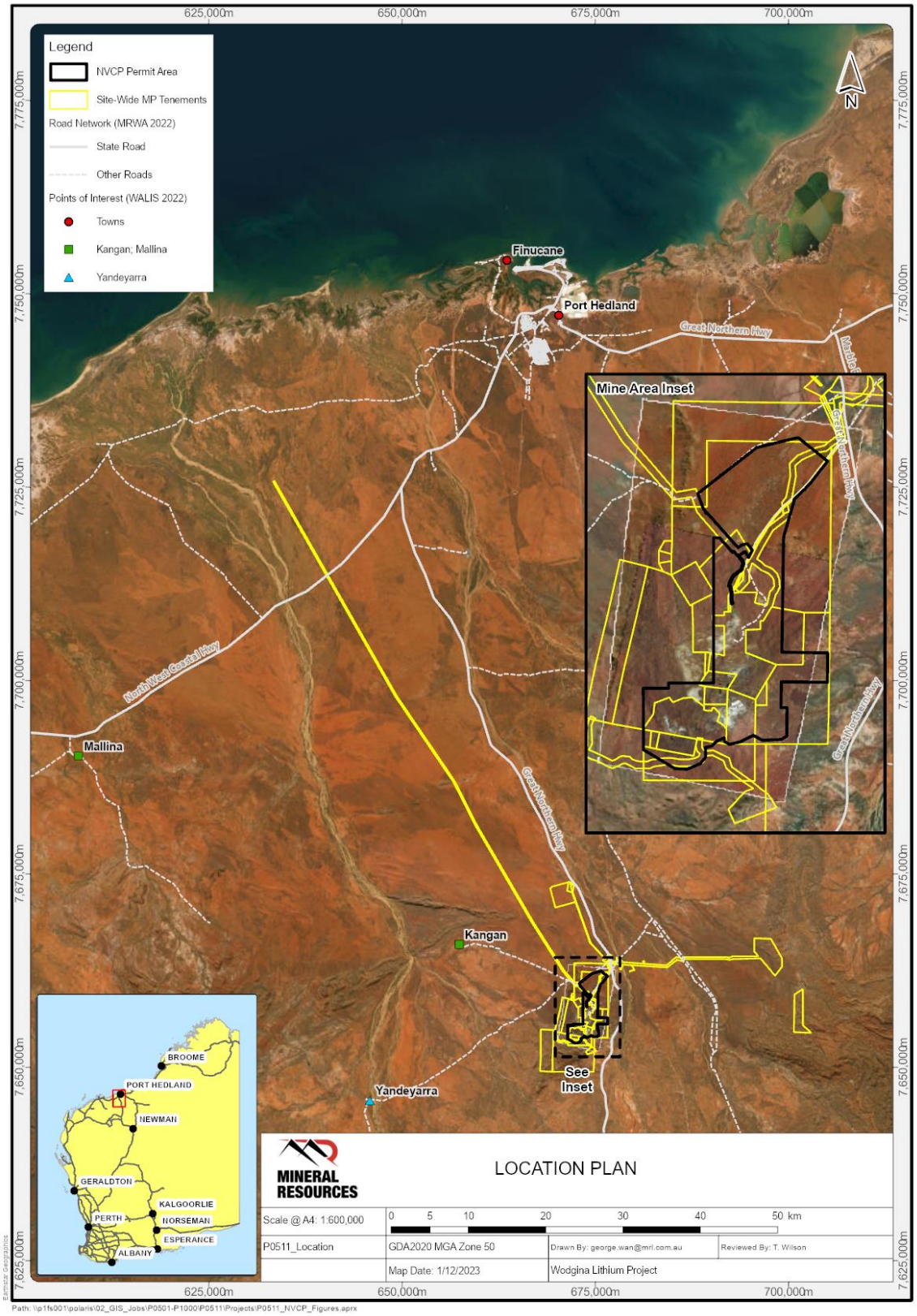


FIGURE 1: REGIONAL LOCATION OF NVCP

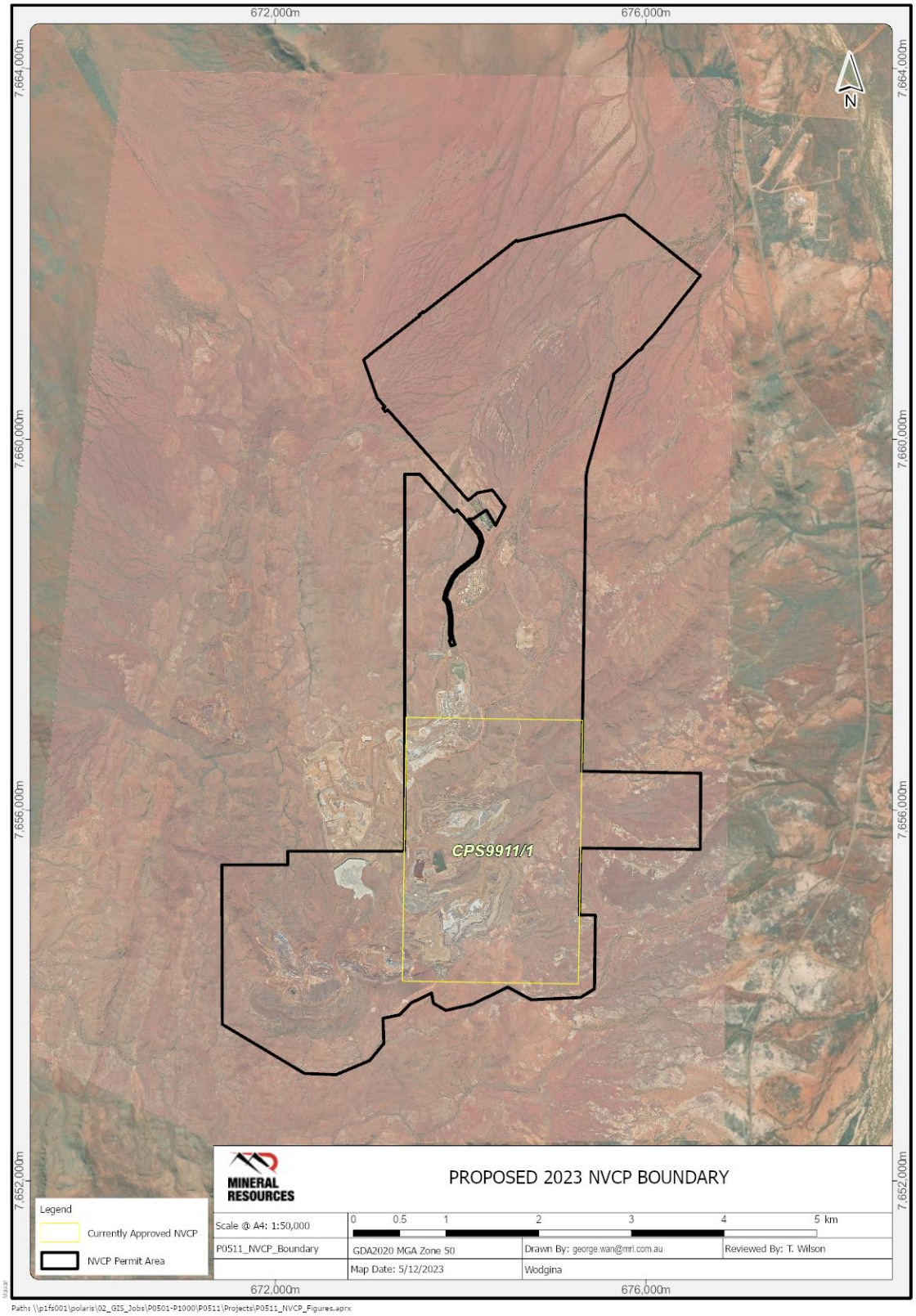


FIGURE 2: CURRENT AND PROPOSED NVCP BOUNDARY

1.2 CLEARING TECHNIQUES

Clearing will be undertaken using mechanical equipment (e.g., dozer / wheel loader) with topsoil and vegetation material stockpiled for reuse in rehabilitation activities.

A deviation from the standard clearing methodology is necessary for clearing a small area of ridgeline (approximately 1.8 ha) located to the west of the existing processing plant to enable expansion to processing infrastructure (Figure 3). The topography of the ridge poses a safety risk for machinery and equipment access, therefore blasting is proposed to be used to remove the ridge.

Considering the proximity of the existing processing plant, any blasting activities will be meticulously managed to account for the sensitivity of nearby infrastructure. To address this, specialists in sensitive blasting techniques will be engaged to employ low-impact blasting methods, proven to minimise vibration, noise, and fly rock, and therefore minimising potential impacts to the nearby potential environmental receptors and heritage sites. It's important to emphasise that this area is situated at a considerable distance from any caves that hold significant importance as roosting sites for bats, as detailed in Section 7.2.

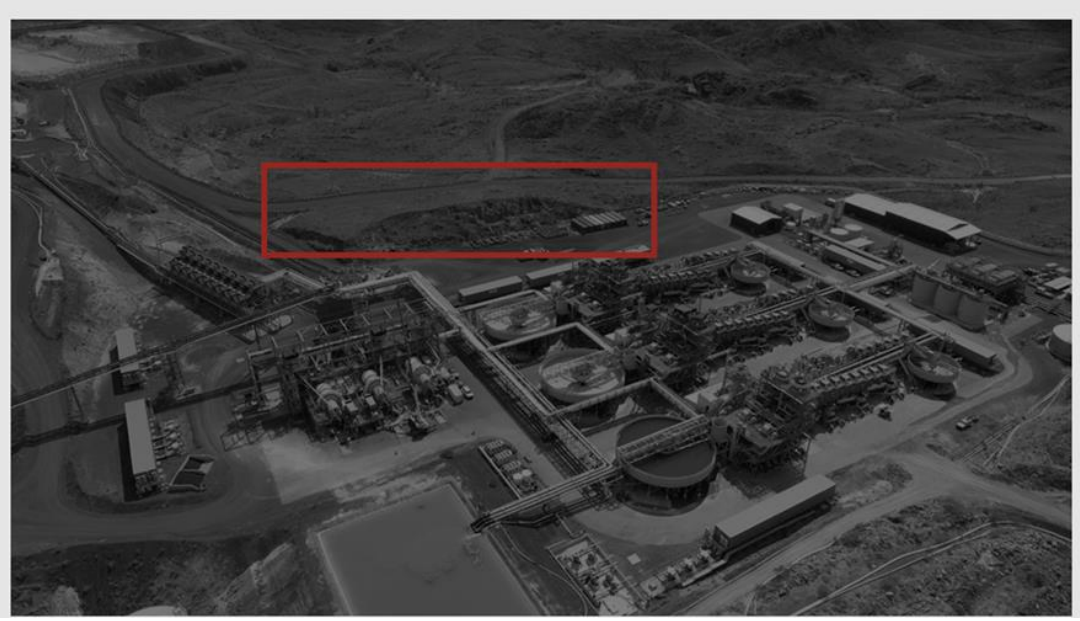


FIGURE 3: LOCATION OF RIDGELINE ADJACENT TO PROPOSED PLANT EXPANSION

1.3 PROPOSED MINE EXPANSION

The NVCP Application area is proposed to allow for mine expansion activities at the Project to sustain the operation. Key aspects of the Project that will require native vegetation clearing within this NVCP include:

- Expansion to the Cassiterite Pit involving an increase to pit stage depths.
- Expansion of Eastern Waste Landform (EWL).
- Expansion of the existing Plant footprint.
- Construction of an Evaporation Pond to manage Reverse Osmosis (RO) Plant brine.
- Construction of a Low-Grade Ore Stockpile area.
- Vertical expansion of the Atlas In-pit Tailings Storage Facility (TSF) with an embankment raise.

- Construction of the following infrastructure:
  - Haul road connecting the Pit and EWL, and associated soil stockpile.
  - Atlas NAF Stockpile.
  - Duplication of production bore pipelines.
  - Topsoil stockpiling.
  - Landfill; and
  - Construction Camp.

1.4 NVCP HISTORY

Wodgina is a historical mining project, that was been disturbed and mined in differing forms for nearly 120 years. The complete history related to this NVCP Application is summarised **Table 1**.

TABLE 1: NVCP APPLICATION HISTORY

Date	History
29 Oct 2018	Wodgina Lithium Pty Ltd (WLPL), a wholly owned subsidiary of MinRes and sole owner/operator (at the time), submitted an NVCP Application to DMIRS for a proposed large scale Project expansion (NVCP CPS 8230/1). This application included a Significant Species Management Plan (SSMP) due to the size and potential impacts of the proposed NVCP Application.
14 Dec 2018	WLPL submitted a secondary NVCP Application to clear vegetation for the construction of a lithium hydroxide processing facility (NVCP CPS 8295/1).
14 Dec 2018	WLPL submitted a revised NVCP Application (Revision 1) with included management measures for entrapment of fauna in trenches and excavations.
24 Jan 2019	A Requests for Information (RFI) was received from DMIRS and the Department of Biodiversity, Conservation and Attractions (DBCA) requiring extensive work to be completed including an Impact Assessment and additional survey effort for conservation significant species.
05 Nov 2019	NVCP CPS 8295/1 was formally withdrawn therefore the NVCP assessment would only require NVCP CPS 8230/1 to be considered.
29 Nov 2019	WLPL submitted a revised NVCP Application (Revision 2) addressing the RFI. Revision 2 included a smaller Permit Area and development of exclusion zones. In agreeance with DMIRS this included a revised Fauna Management Plan, to replace the SSMP, due to the reduction in potential impacts.
Nov 2019	Activities were commenced to place the Project in Care and Maintenance due to a deterioration in the global Lithium market at the end of 2019.
7 Oct 2022	MARBLE submitted an NVCP Application (Revision 2)
16 Mar 2023	NVCP CPS 9911/1 was granted allowing for the clearing of 113.8 ha to facilitate the expansion of mining activities associated with the existing Wodgina Lithium Operations.

The quantity of clearing already occurred under historic, current and proposed permits is compared in **Table 2.**

TABLE 2: HISTORICAL, PROPOSED AND CURRENT CLEARING PERMIT SUMMARY

Reference	CPS #	Date Issued	Expiry	Approved Permit Area (ha)	Approved Disturbance Footprint	Cleared to Date	Previous DMIRS Assessment Outcomes and Conditions
Historic: Pre-2009 Atlas DSO till 2018	Numerous	Prior to 2018	All Expired	N/A	774.5	774.5	N/A
MARBL	CPS 9911/1	21 Feb 2023	21 Feb 2028	540.6	113.8	51.14	**Permit Application** • CPS 9911/1 allowed for the expansion of mining activities associated with the existing Wodgina Lithium Operations, including a pit expansion, waste landform expansion, infrastructure corridors (haul roads, light vehicle roads, pipelines and drainage controls), soil stockpiles, and groundwater bores. **Assessment Decision** The assessment identified that the proposed clearing may result in: • The potential introduction and spread of weeds into adjacent vegetation, which could impact on the quality of the adjacent vegetation and its habitat values. • Impacts to conservation significant flora. • The loss of native vegetation that is suitable habitat for *Dasyurus hallucatus* (northern quoll), *Macroderma gigas* (ghost bat), and *Rhinonicteris aurantia* (Pilbara leaf-nosed bat). and • Impacts to riparian vegetation and watercourses. The Delegated Officer determined that impacts from the proposed clearing can be managed through permit conditions to be unlikely to lead to an unacceptable risk to environmental values.
New 2023 NVCP Permit	**Date Issued**	**Date Issued**	**Proposed Expiry**	**Proposed Permit Area (ha)**	**Proposed Disturbance Footprint**	**Cleared to Date**	**Rationale for 2023 NVCP Permit Application/Approach**
MARBL	2023 NVCP (this application)	TBD	5 years	2,214.75	448.36	NA	Allow for one permit over the Project area, which incorporates the current mine footprint approved under CPS 9911/1.

1.5 COMPARISON AGAINST NVCP CPS 9911/1 AND 2018 CPS 8230/1

An assessment comparing the impacts of the 2018 NVCP CPS 8230/1 submission and the 2022 NVCP 9911/1 Application with this new NVCP application is provided in **Table 3**. The impact assessment provided in Section 9, also considers these previous submissions.

1.5.1 Permit Area and Proposed Clearing Comparison

In 2018, an original project expansion scope was referred to the Commonwealth under the EPBC Act (EPBC 2018/8194) and was deemed not a controlled action. This proposal included a total proposed Disturbance Footprint of 560 ha (320 ha within the mine site and 240 ha along the pipeline). The proposed clearing included 36.8 ha of Rocky Ridge and Gorge habitat and 26.4 ha of Drainage Line habitat. An application for an NVCP was also submitted in 2018 (NVCP CPS 8230/1), which proposed a Disturbance Footprint of 462.5 ha, within a Permit Area of 814.9 ha. This Disturbance Footprint included 56.9 ha of Rocky Ridge and Gorge fauna habitat disturbance, and 29.5 ha of Drainage Line fauna habitat disturbance.

The 2022 NVCP Application Permit Area for CPS 9911/1 was significantly reduced from the 2018 NVCP CPS 8230/1 submission, with a Disturbance Footprint of 113.8 ha within a boundary of 540.6 ha (348.7 ha less than the original 2018 submission) (**Table 3**). The reduction in footprint for CPS 9911/1 from the previous 2018 NVCP CPS 8230/1 submission was triggered from a revision of the mine plan and the implementation of a staged process to mine development. The reduced footprint included disturbance of 18 ha of Rocky Ridge and Gorge habitat, and 5.6 ha Drainage Line habitat, as approved under Condition 4 of CPS 9911/1.

This current NVCP application includes a proposed Disturbance Footprint of **448.36 ha** of native vegetation within a permit boundary of **2,214.75 ha**. Of the 448.36 ha proposed to be cleared in this NVCP application, 20.02 ha is Rocky Ridge fauna habitat, and 8.04 ha is Drainage Line fauna habitat.

TABLE 3: PROPOSED 2023 NVCP APPLICATION, 2022 NVCP CPS 9911/1 AND 2018 NVCP CPS 8230/1 AREA COMPARISON

	2018 Submission Rev 2 NVCP CPS 8230/1	2022 NVCP CPS 9911/1 Submission	2018 v 2022 NVCP Difference	This 2023 NVCP Submission	2018 v 2023 NVCP Difference	2022 v 2023 NVCP Difference
Proposed NVCP Permit Area	814.9 ha	540.6 ha	-274.3 ha	**2,214.75 ha**	**(+) 1,399.85 ha**	**(+) 1,674.15 ha**
Proposed Disturbance Footprint (new clearing)	422.4 ha	113.8 ha	-308.6 ha	**448.36 ha**	**(+) 25.96 ha**	**(+) 334.56 ha**
Maximum clearing allocation applied for (NV-F01)	462.5 ha	113.8 ha	-348.7 ha	**448.36 ha**	**(-) 14.14 ha**	**(+) 348.70 ha**

Although there is a 25.96 ha increase proposed from the 2018 submission and a 334.56 ha increase in footprint from the CPS 9911/1 application, it should be noted that this does not include a significant portion of vegetation with high environmental values, including:

- 20.02 ha of additional Rocky Ridge habitat, 4.47 % of overall Rocky Ridge habitat in the fauna Study Area.
- 8.04 ha of additional Drainage Line habitat, 1.63 % of overall drainage habitat in the fauna Study Area.

TABLE 4: COMPARISON FAUNA HABITAT CLEARING: 2018 – 2023 NVCP

	2018 EPBC Referral 'Not a Controlled Action'	2018 Submission Rev 2 NVCP CPS 8230/1	2022 NVCP CPS 9911/1 Approval	Cleared under 9911/1 to date	This 2023 NVCP Submission	Combined Clearing (clearing under 9911/1 to date plus new submission)
Rocky Ridge Fauna Habitat	36.8 ha	56.9 ha	18 ha	9.97 ha	20.02 ha	**29.99 ha** (6.81 ha less than addressed in 2018 EPBC referral)
Drainage Line Fauna Habitat	26.4 ha	29.5 ha	5.6 ha	2.5 ha	8.04 ha	**10.54 ha** (15.86 ha less than referred in 2018 EPBC referral)

Further detail and comparison of this NVCP application against the previous NVCP CPS 8230/1 for priority flora and conservation significant fauna is outlined in Section 9.

1.5.2 NVCP 9911/1 Clearing Exclusion Areas

In March 2023, NVCP CPS 9911/1 was granted. Condition 4 of this permit requires avoidance of habitat delineated as an exclusion area, including a 100 m buffer around a Ghost Bat diurnal roost (Cave S-C10) and Rocky Ridge and Gorge habitat within the proposed CPS 9911/1 disturbance envelope totalling 28.67 ha.

This current 2023 NVCP proposed disturbance footprint intersects 4.66 ha of previously conditioned exclusion areas delineated in CPS 9911/1, specifically:

- 4.43 ha of Rocky Ridge and Gorge habitat located within the proposed EWL expansion area; and
- 0.24 ha of Rocky Ridge and Gorge habitat located adjacent to the Cassiterite Pit as a result of expanding the Zone of Impact to meet mine safety requirements.

  Note: the exclusion zones surrounding the Ghost Bat Roost Sites will not be changed.

As detailed in the CPS 9911/1 DMIRS Decision Report, the Rocky Ridge and Gorge habitat extends outside the CPS 9911/1 Permit Area, with the current extent mapped as 447.99 ha (**Figure 4**). The clearing of the previously excluded 4.66 ha (1.02 %) is considered unlikely to increase the cumulative impact to an unacceptable level for the local population of the Conservation Significant Fauna Species (see Section 9 for full impact assessment).

1.6 TERMINOLOGY

This NVCP Application utilises the terminology listed in **Table 5**.

TABLE 5: NVCP APPLICATION TERMINOLOGY

Terminology	Definition
Proposed NVCP Permit Area	Extent of the NVCP Purpose Permit Boundary (2,214.75 ha) applied for in this Application. Shown on **Figure 4, Figure 5,** and **Figure 6.**
Proposed Disturbance Footprint	Proposed disturbance or clearing required to meet the revised Mine Plan expansion and total amount of clearing applied for in this Application (448.36 ha). Shown on **Figure 4, Figure 5**, and **Figure 6**.
Flora or Vegetation Study Area	Extent of Flora and/or Vegetation surveys over the wider Wodgina Project area covering approximately 6,745 ha. Surveys for significant flora extend outside this Study Area in areas where suitable habitat or populations are identified. Shown on **Figure 5.**
Fauna Study Area	Extent of Fauna surveys over the wider Wodgina Project area covering approximately 6,880 ha. Shown on **Figure 6.**

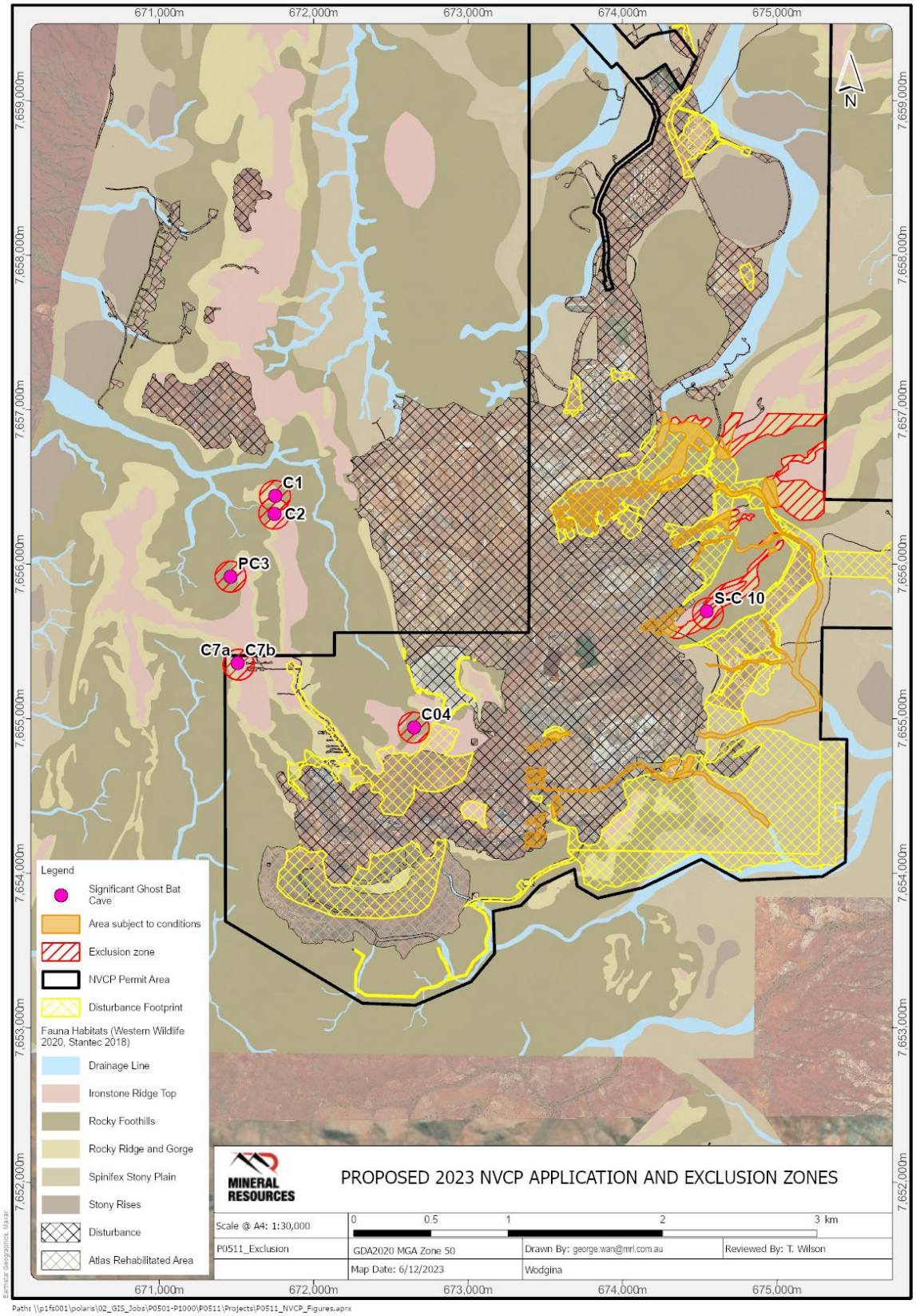


FIGURE 4: PROPOSED 2023 NVCP APPLICATION AND EXCLUSION ZONE

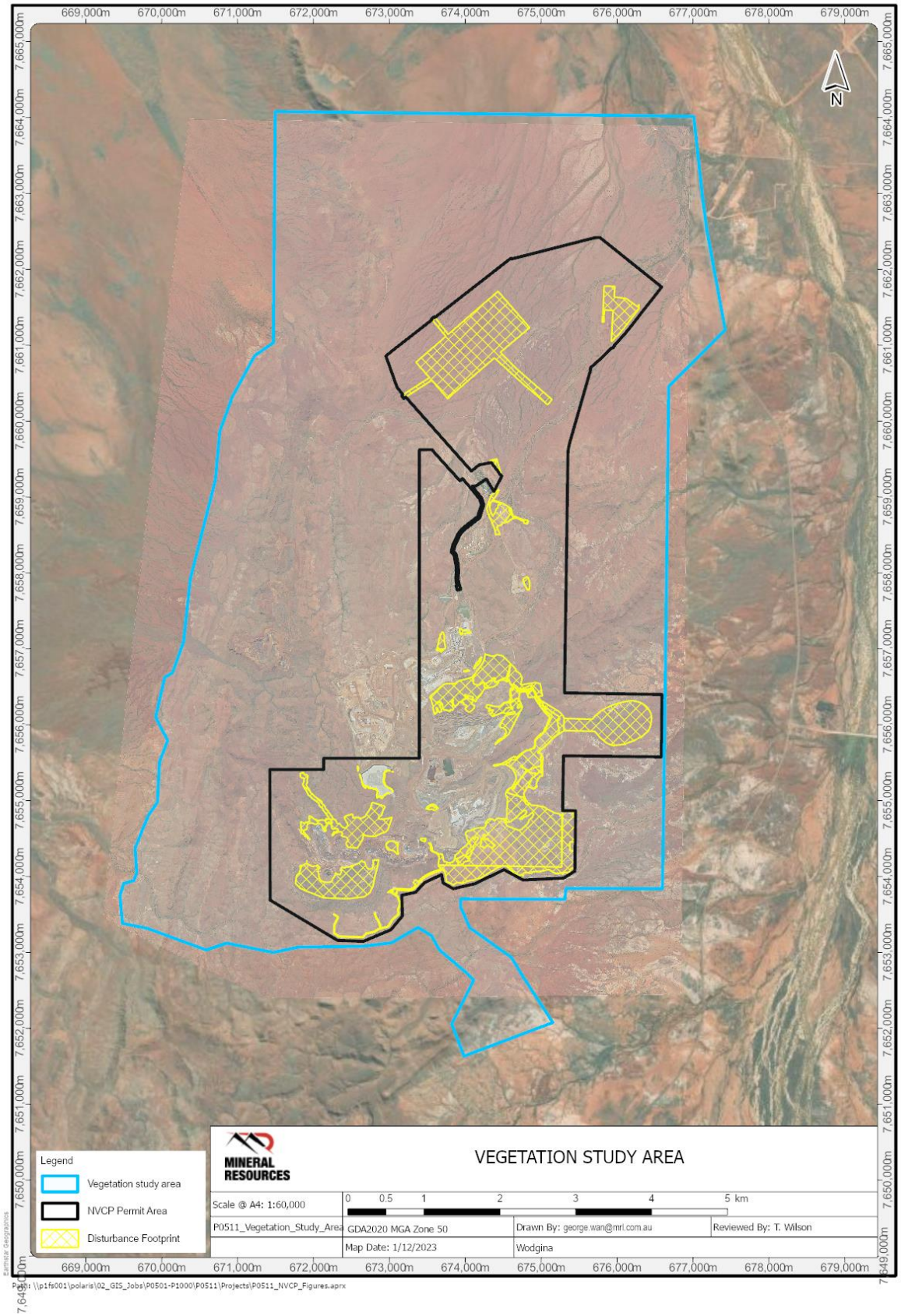


FIGURE 5: FLORA VEGETATION STUDY AREA EXTENT

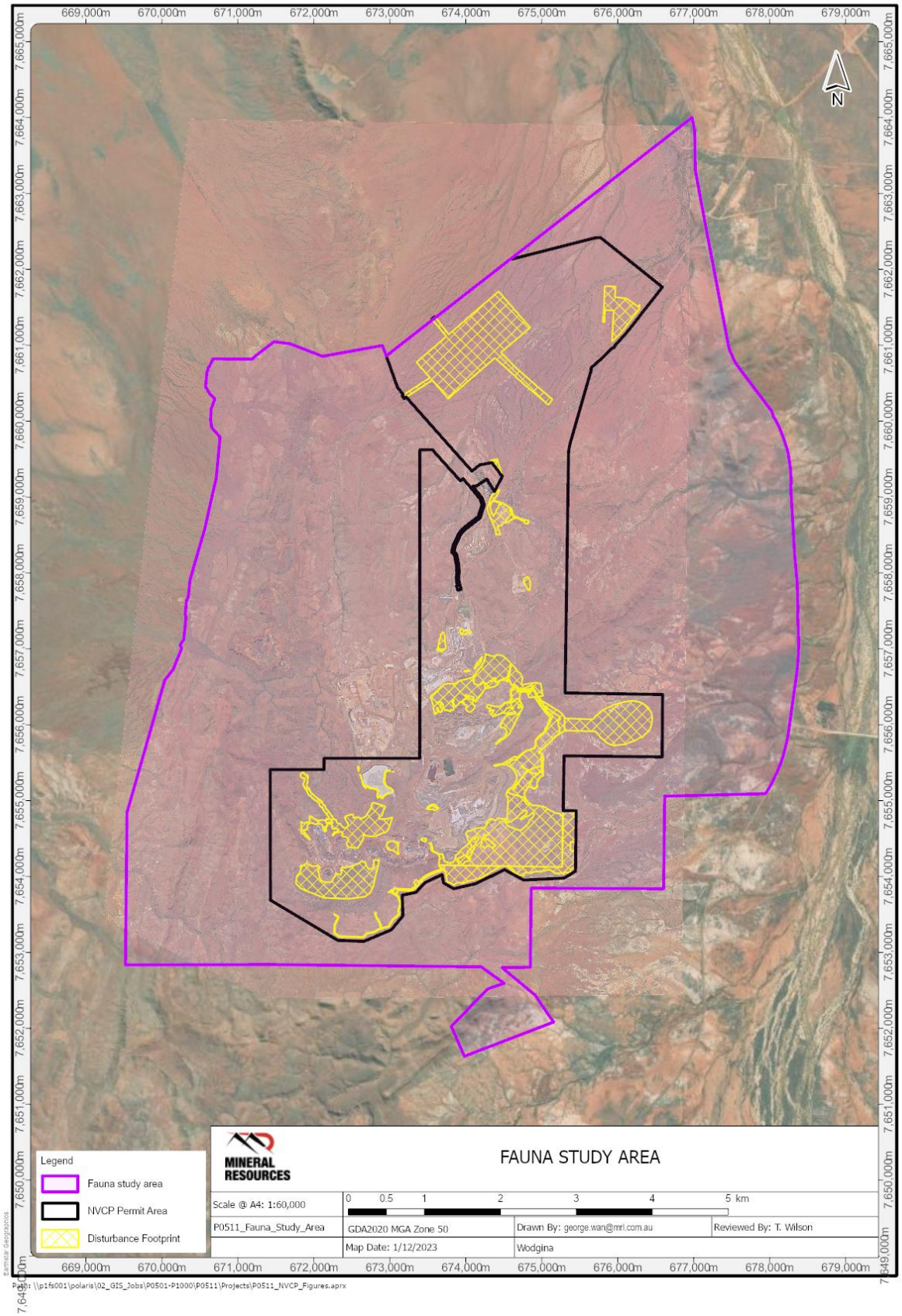


FIGURE 6: FAUNA STUDY AREA EXTENT

2. PROJECT BACKGROUND

2.1 LOCATION

The Project is located approximately 95 km south of Port Hedland in the Pilbara Region of Western Australia within the Town of Port Hedland local government area, as illustrated within **Figure 1**.

The Project is located on Kariyarra Country and the Traditional Owners of this area are the Kariyarra people. The main mining tenements are located on the Kangan Pastoral Lease, which is leased to the Aboriginal Prospecting Company and managed by the Yandeyarra Aboriginal Community. The Breccia borefield to the east is located on the Wallareenya (Tabba Tabba) Pastoral Lease, and the gas pipeline to the north is located on the Indee and Mundabullangana pastoral leases.

2.2 OWNERSHIP

The Project was acquired by MinRes in 2016 under the wholly owned subsidiary WLPL, from Global Advanced Metals Wodgina Pty Ltd (GAMW) while the Project was in Care and Maintenance. Exploration drilling programs targeting Lithium were undertaken and mining commenced in 2017. On 1 November 2019, MinRes completed a transaction with Albemarle for the partial sale of the Project and established the MARBL Joint Venture (MARBL JV) and the MARBL Lithium Operations Pty Ltd (MARBL). Refer to **Attachment 1** for the Australian Securities and Investments Commission (ASIC) Current Company Extract for MARBL.

2.3 TENEMENTS

The wider Project area extends over more than 30 tenements granted under the *Mining Act 1978* (Mining Act). The proposed NVCP Permit Area extends across 22 tenements as defined in **Table 6** and **Figure 7**. Nineteen (19) of the tenements are held by the MARBL JV partners (WLPL and Albemarle) and the remaining three (3) are held by the previous Wodgina owner operators (GAMW and Atlas).

Refer to **Attachment 2** for mining tenement summary reports demonstrating current holder details.

Refer to **Attachment 3** for access agreements with GAMW and Atlas.

TABLE 6: NVCP TENEMENTS

Tenement	Holder
G 45/290	Wodgina Lithium Pty Ltd, Albemarle Wodgina Pty Ltd
G 45/291	Wodgina Lithium Pty Ltd, Albemarle Wodgina Pty Ltd
G 45/321	Wodgina Lithium Pty Ltd, Albemarle Wodgina Pty Ltd
L 45/443	Wodgina Lithium Pty Ltd, Albemarle Wodgina Pty Ltd
M 45/254	Wodgina Lithium Pty Ltd, Albemarle Wodgina Pty Ltd
M45/49	Wodgina Lithium Pty Ltd, Albemarle Wodgina Pty Ltd
M 45/50i	Wodgina Lithium Pty Ltd, Albemarle Wodgina Pty Ltd
M 45/353	Wodgina Lithium Pty Ltd, Albemarle Wodgina Pty Ltd
M 45/365	Wodgina Lithium Pty Ltd, Albemarle Wodgina Pty Ltd
M 45/381	Wodgina Lithium Pty Ltd, Albemarle Wodgina Pty Ltd

Tenement	Holder
M 45/382	Wodgina Lithium Pty Ltd, Albemarle Wodgina Pty Ltd
M 45/383	Wodgina Lithium Pty Ltd, Albemarle Wodgina Pty Ltd
M 45/887	Wodgina Lithium Pty Ltd, Albemarle Wodgina Pty Ltd
M 45/888	Wodgina Lithium Pty Ltd, Albemarle Wodgina Pty Ltd
M 45/923	Global Advanced Metals Wodgina Pty Ltd
M 45/924	Wodgina Lithium Pty Ltd, Albemarle Wodgina Pty Ltd
M 45/925	Wodgina Lithium Pty Ltd, Albemarle Wodgina Pty Ltd
M 45/949	Wodgina Lithium Pty Ltd, Albemarle Wodgina Pty Ltd
M 45/950	Wodgina Lithium Pty Ltd, Albemarle Wodgina Pty Ltd
M 45/1188	Atlas Iron Pty Ltd
M 45/1252	Atlas Iron Pty Ltd

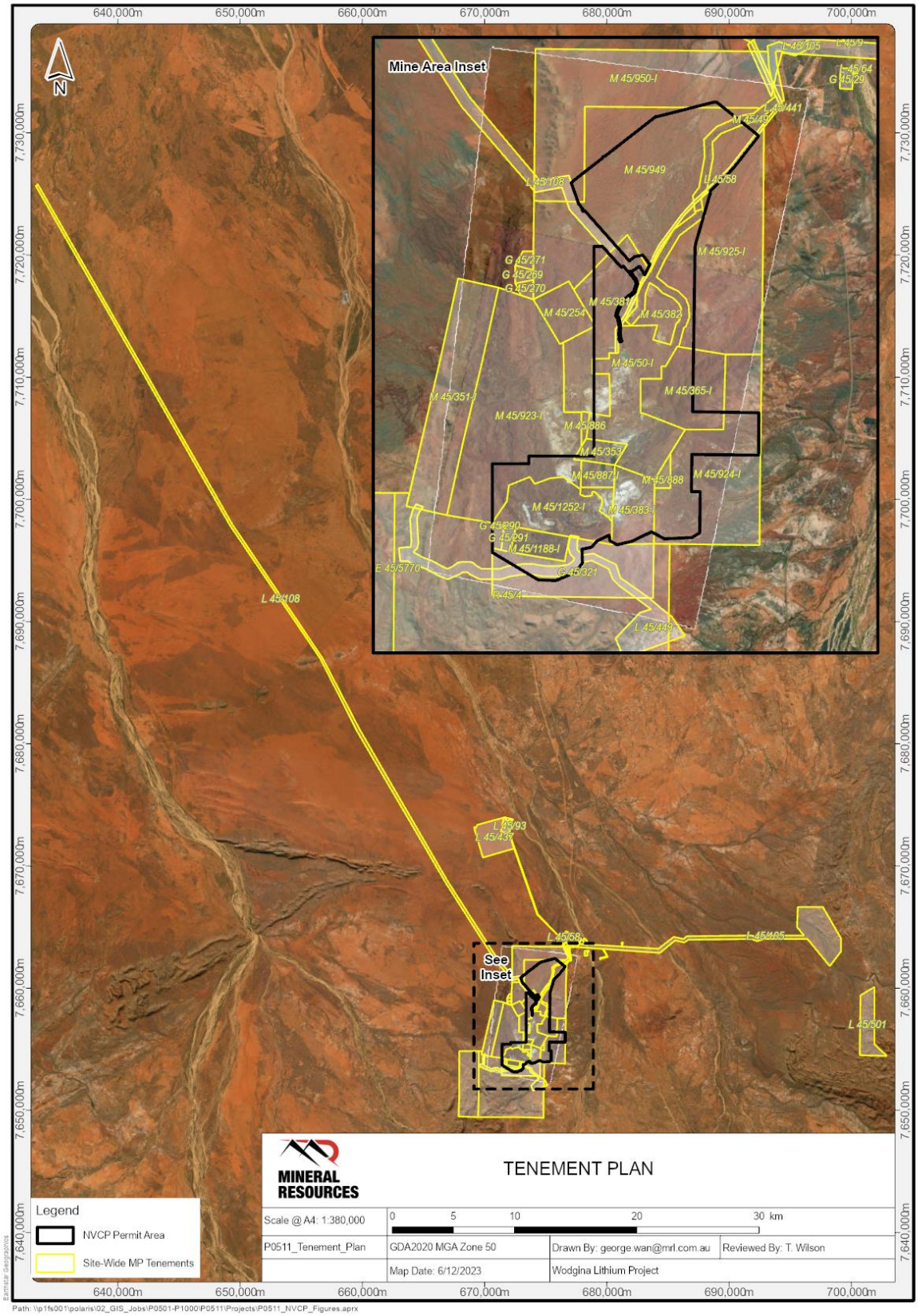


FIGURE 7: MINING TENEMENT AND TENEMENT OWNERS

2.4 HISTORY AND EXISTING FACILITIES

Wodgina was first discovered as an ore body in 1902 with mining commencing in 1904. Wodgina ore bodies have been mined for a range of commodities including Tin, Tantalum, Niobium, Beryllium, Iron Ore and Lithium by a number of companies and in a number of configurations. Since 1092 the Project has been tailored to a number of configurations depending on the target mineral. The Project has transitioned between Operation and Care and Maintenance several times in response to global mineral market trends and ownership transfers.

In 2016 the Project was acquired by MinRes and exploration activities were commenced. In 2017 mining commenced with production of a Direct Ship Ore (DSO) product. Several approvals were granted between 2017-2019 to expand operations and upgrade site infrastructure to produce a lithium ore concentrate. Ore extraction at Wodgina is undertaken using conventional open pit mining methods, drill and blast and load and haul activities.

A range of facilities and landforms are present at the Project and are summarised below:

- Active pit – Cassiterite Pit (Tinstone Pit falls within an extension of Cassiterite Pit);
- Inactive pit – Hercules North, Hercules South, Anson, Arvo, Dragon, and Constellation Pit;
- Active waste landform – Eastern Waste Landform;
- Inactive waste landform – Atlas, Top and Valley Waste Dumps;
- Active tailings storage facility (TSF) – TSF3 Extension;
- Inactive TSF – TSF1, 2 and 3;
- Borefields – Breccia, Old, North, and onsite Production Bores;
- Water reservoir and ponds – Wodgina Pit, Process Water Pond, and the Retention Pond;
- Seepage Bores and Monitoring Bores;
- Fixed and mobile crushing;
- Beneficiation Plant;
- Reverse Osmosis Plant;
- Stockyard Areas;
- Power Station;
- HME workshop including re-fuelling, stores, and a washbay;
- Offices, buildings, laydowns, and general infrastructure corridors (LV and HV roads, pipelines);
- Soil Stockpiles;
- Waste Water Treatment Facility;
- Landfill (Inert Waste Type 1, Putrescible Waste, Clean Fill ad Inert Waste Type 2 (tyres));
- Camp and overflow camp;
- Gas Pipeline (to Port Hedland); and
- Aerodrome.

3. LEGISLATION AND APPROVALS

A number of approvals have been granted to MARBL for the operation and expansion of the Project. In summary these include:

- Mining leases and tenure granted by *DMIRS under the Mining Act;*
- *Programme of Works granted by DMIRS under the Mining Act;*
- *Mining Proposals and Mine Closure Plans granted by DMIRS under the Mining Act;*
- Prescribed Premises Licence to Operate granted by DWER under Part V of the EP Act;
- Works Approval Licence to Construct granted by DWER under the Part V of the EP Act;
- Section 26D Licence to Construct or Alter Well granted by DWER under the *Rights in Water and Irrigation Act 1914* (RIWI Act)*; and*
- Section 5C Licence to Abstract granted by DWER under the RIWI Act.

Amendments to a number of the above approvals are currently under assessment, or amendments are being drafted, to support the Mine Plan expansion.

4. STAKEHOLDER ENGAGEMENT

MARBL recognises the importance of developing and maintaining relationships with stakeholders, through meaningful and effective stakeholder engagement and management**.**

4.1.1 DMIRS Engagement

On 14 July 2023, MARBL engaged with DMIRS to discuss the proposed expansion activities and seek guidance regarding an appropriate approach to consolidating a number of active and soon to expire clearing permits in effect across the broader site. DMIRS advised MARBL to submit a new NVCP application (this document) that captures the entire operational area for the future mine expansion activities, as well as the previously approved clearing area provided for by CPS 9911/1 (but excluding clearing under CPS9911/1 completed to date). It is understood that once formal approval for this application is granted, clearing approved under CPS 9911/1 will be captured in the new instrument and will be formally withdrawn.

DMIRS also indicated that cumulative impacts should be considered in the assessment. They recommended a similar approach to that presented in the 2022 NVCP submission (CPS 9911/1), where a comparison against the previous approved clearing was provided. A similar comparison has therefore been included in this application.

4.1.2 EPA Engagement – Part IV Approval

On 12 June 2018, the previous planned expansion (reflected in the larger NVCP CPS 8230/1 footprint) was presented to DWER and DMIRS. At this time the regulator advised that the impact of clearing activities, construction and mining operations could be adequately managed under Part V of the EP Act. The Project was therefore not referred under Part IV of the EP Act to the Environmental Protection Authority (EPA), and referral of the proposed works associated with CPS 9911/1 NVCP was also determined to not warrant formal referral in accordance with section 38 of the EP Act.

This 2023 NVCP application has therefore taken into consideration the previous feedback in terms of the potential impacts to the clearing of vegetation with significant environmental value, and included this information as part of the application.

4.1.3 DCCEEW (then DEE) Engagement - EPBC Act Federal Referral

On 8 May 2018, the previous planned expansion (reflected in the larger NVCP CPS 8230/1 footprint of 560 ha) was referred to the Department of Climate Change, Energy, the Environment and Water (DCCEEW), previously known as the Department of Environment and Energy (DEE), pursuant to the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The DEE issued a decision on 2 November 2018 advising that the Wodgina Lithium Project is **not a controlled action** (EPBC 2018/8194).

As part of this 2023 NVCP application, MARBL has considered the potential impacts of the proposed clearing of vegetation in relation to Matters of National Environmental Significance (MNES) and included this information as part of the application (see Section 1.3 and 9). While the proposed Disturbance Footprint extends beyond the area previously referred under the EPBC Act (**Figure 8**), the extent of disturbance to habitat for MNES proposed in this NVCP application is not significantly different from that addressed in the previous referral under the EPBC Act (see **Table 4**). As no significant increase in potential impacts to MNES is proposed, referral to the Commonwealth is not proposed.

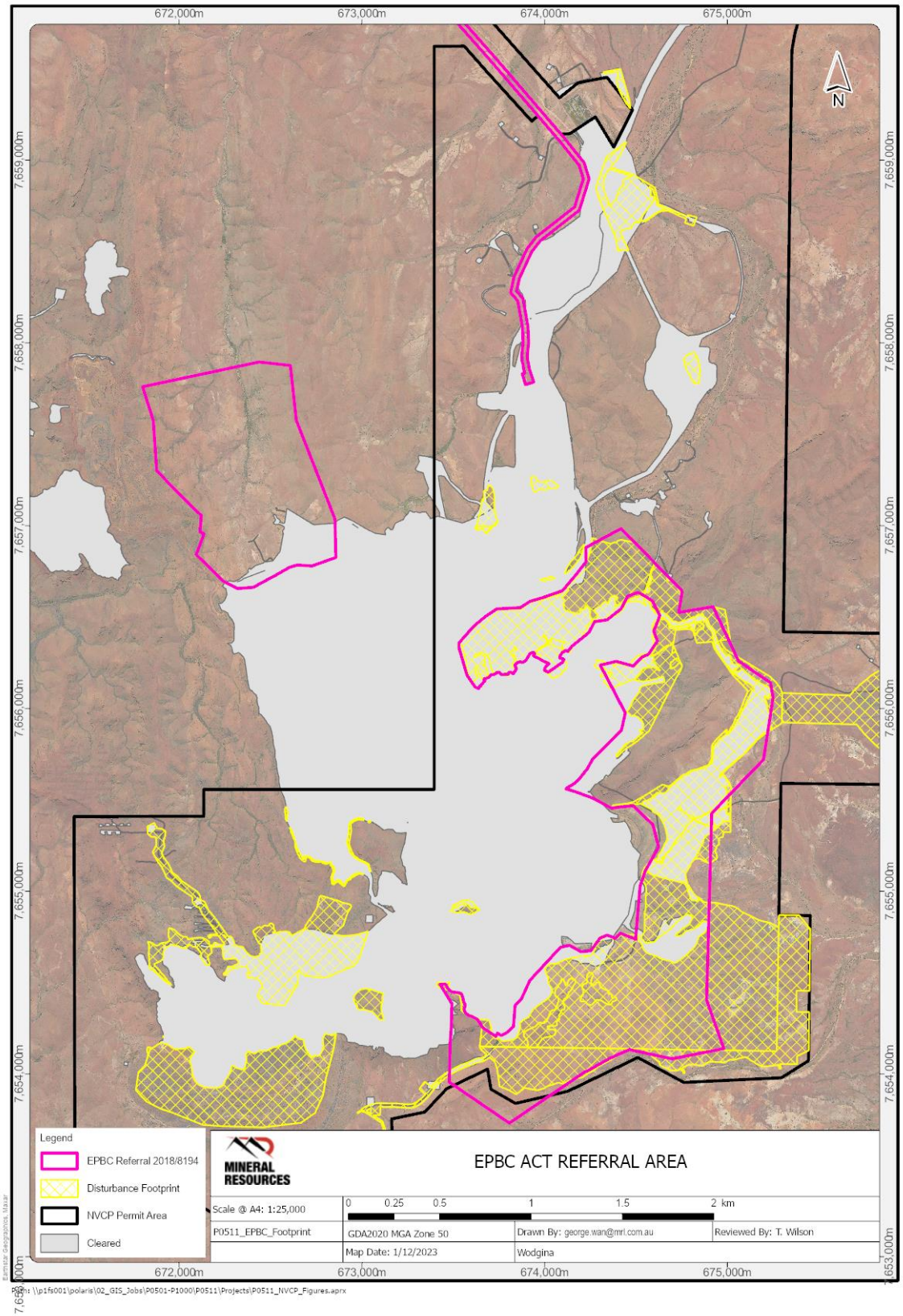


FIGURE 8: COMPARISON OF PREVIOUS EPBC ACT REFERRAL AREA WITH THIS NVCP DISTURBANCE AREA

5. ABORIGINAL HERITAGE AND CULTURAL VALUES

Between 1988 and 2019, a total of 13 heritage surveys were conducted across the Wodgina site and included participants from the Kariyarra Native Title Claim Group, Wamarranya Representatives and Yamatji Marlpa Aboriginal Corporation (YMAC). MinRes removed the Wodgina Project from Care & Maintenance status in 2022 and engagement with the Kariyarra Native Title Group has continued through 2022 and 2023 with regular heritage surveys and meetings. The consultation between MinRes and Kariyarra Aboriginal Corporation has included native title negotiations, heritage updates, regular project updates about the operations as well as proposed expansion to the operational footprint. During 2022 MinRes and Kariyarra Traditional Owners completed three ethnographic trips and eight archaeological trips.

So far, there have been a further four heritage trips conducted with the Kariyarra Traditional Owners, and a further three planned before the end of the year. The results of these surveys are and will continue to be used to guide mine planning team and infrastructure design. In addition, the survey results will be discussed and consulted upon with the Kariyarra in relation to developing an Aboriginal Cultural Heritage Management Plan (ACHMP), if required.

Any intersects between the proposed Disturbance Footprint and ACH (previously Registered Sites or Lodged Places) which applies to now mined areas and on land currently used for supporting infrastructure have been subject to Ministerial consent under Section 18 of the AHA. In addition, confirmation has been obtained from the Department of Planning, Lands and Heritage (DPLH) to verify that the proposed Disturbance Footprint does not encroach upon the Aboriginal Heritage or Cultural values located within the ACH place boundary. This advice has carried forward to this Application.

The proposed activities and infrastructure have been designed to avoid Aboriginal Cultural Heritage. MinRes do not require or plan to seek any Section 18 Approvals to support the activities, construction, and operations subject to this approval. MinRes are committed to the preservation and management of ACH under the ACH Act 2021 and future Heritage legislation. MinRes will continue to meet regularly with KAC to consult about ACHMP for the Wodgina area.

A search of the DPLH Aboriginal Cultural Heritage Inquiry System (AHIS) was undertaken on 3 August 2023 which found there to be seventeen (17) ACH places in the ACH Directory that relate to the proposed Footprint. The details of the seventeen ACH places, including eight (8) previous Registered Sites and nine (9) previous Lodged Places, are detailed in **Table 7** and shown in **Figure 9.**

TABLE 7: ABORIGINAL HERITAGE SITES

ID Number	Site Name	Tenure	Type	Restrictions	Legacy Status
6651	WODJINA HILLS	M45/923	Ceremonial, Mythological	No Gender / Initiation Restrictions	Registered Site
7116	MT YORK 1	L45/105	Artefacts / Scatter	No Gender / Initiation Restrictions	Registered Site
7135	TALKUWARRANA.	L45/105	Mythological, Camp	No Gender / Initiation Restrictions	Registered Site
9009	GULINDJINA YAMBARA	M45/50, M45/381, M45/383, M45/923, M45/254,	Ritual / Ceremonial; Creation / Dreaming Narrative	No Gender / Initiation Restrictions	Registered Site

ID Number	Site Name	Tenure	Type	Restrictions	Legacy Status
		M45/365, L45/58,			
21800	WP01	L45/108	Artefacts / Scatter, Grinding Patches / Grooves	No Gender Restrictions	Registered Site
22037	WodE#1 Malbarn Caves	M45/50, M45/353, M888, M45/887, M45/353, M45/923, M45/383, M45/924 and M45/365	Creation / Dreaming Narrative; Rock Shelter	No Gender / Initiation Restrictions	Lodged Place
22038	WodE#2 Law Ground Site Complex	L45/58, M45/949, M45/50, M45/382	Ceremonial, Mythological, Skeletal Material / Burial, Camp	Male Access Only	Registered Site
22039	WodE#3 Historical Tin Mining Camp	M45/50, M45/382	Camp, Historical	No Gender Restrictions	Registered Site
22040	WodE#4 Historical Tin Mining Camp	M45/924, M45/888	Camp, Historical, Water Source	No Gender Restrictions	Lodged Place
28890	W-08-03	M45/923	Artefacts / Scatter	No Gender / Initiation Restrictions	Lodged Place
32788	Jurtiya 03-12A	M45/923	Artefacts / Scatter; Quarry	No Gender / Initiation Restrictions	Registered Site
32793	Maramutingana 13-12E (part of Jurtiya complex)	M45/923 and M45/351	Creation / Dreaming Narrative; Historical; Water Source	No Gender / Initiation Restrictions	Registered Site
32794	Ngalawoi (part of Juurtiya complex)	M45/923	Creation / Dreaming Narrative; Landscape / Seascape Feature	No Gender / Initiation Restrictions	Lodged Place
36952	Djoolyia (KAR16-001)	M45/923 and M45/351	Ritual / Ceremonial; Creation / Dreaming Narrative		Lodged Place
37223	Women's Hill (Coodigulla)	L45/108	Place	Female Access Only	Lodged Place

In July 2023, MinRes adopted a new Land Activity Permitting (LAP) system, which allows for the management of all MinRes activities. MinRes are aware of the requirements, and our obligations under the ACH Act 2021 and the *Aboriginal Heritage Legislation Amendment and Repeal Bill 2023* (WA). MinRes's LAP system allows for the review, conditioning, and approval by internal departments.

MinRes's approach to the management of ACH includes the below and is in collaboration and ongoing consultation with the Kariyarra Traditional Owners.

- Avoidance of known heritage sites;
- Internal reviews and approvals prior to any new disturbance;

- Cultural awareness training and inclusion into site inductions;
- Demarcation of heritage sites in proximity to operational areas; and
- Investigation of any unauthorised tracks or disturbance.

In recognition of the length of time that has passed since some heritage places were recorded, from the beginning of 2022, MinRes has collaborated with Kariyarra native title holders and knowledge holders to conduct ethnographic and archaeological heritage surveys over the Project footprint to bring the historical heritage information up to current standards. In parallel, cultural heritage surveys are progressing over areas proposed for expansion to the Project footprint. In combination, these engagements have covered over 776 ha within and around the Project.

Once the survey program is complete, MinRes will engage further with Kariyarra native title holders and knowledge holders to determine cultural heritage management requirements for the identified cultural heritage places. This work will form the basis for the ACHMP referred to above, to document, manage and protect ACH in and around the Wodgina operational mine.

The design and construction of the infrastructure subject to this Proposal will be managed and achieved while avoiding ACH places, eliminating the need for any approvals to disturb ACH, this includes s18 approvals.

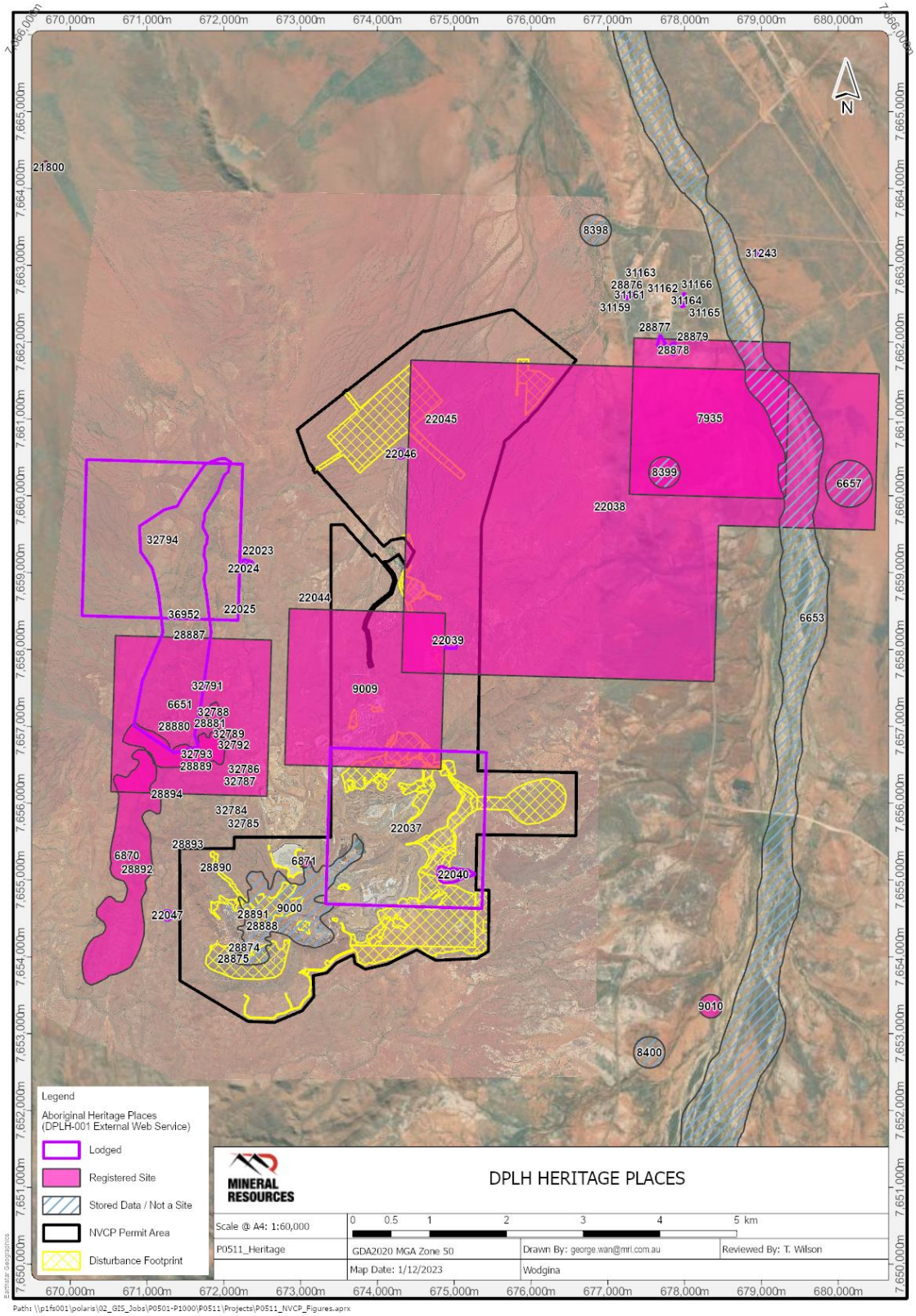


FIGURE 9: DPLH ABORIGINAL HERITAGE SITES

6. REGIONAL SETTING

6.1 BIOGEOGRAPHIC LOCATION

The proposed NVCP Permit Area is located within the Pilbara region and Chichester (PIL01) subregion of the Pilbara Bioregion (DAWE, 2012). The Chichester subregion has undulating Archaean granite and basalt plains including significant areas of basaltic ranges. Plains support a shrub steppe characterised by *Acacia pyrifolia* over *Triodia pungens* hummock grasslands, while *Eucalyptus leucophloia* tree steppes occur on the ranges (CALM, 2002).

The proposed NVCP Permit Area is located within the Fortescue Botanical District of the Eremaran Province (Environment Australia 2000). The vegetation of this District is described by Beard (1975) as 'tree and shrub-steppe communities, with Eucalyptus trees, *Acacia* shrubs, *Triodia pungens* and *Triodia wiseana*, with *Triodia* hummock grasslands, the characteristic vegetation type of the region'.

Two Vegetation System Associations (VSA), as defined by Shepherd et al. (2002) utilising vegetation mapping completed by Beard (1975), are mapped within the proposed NVCP Permit Area (Woodman Environmental, 2020). Both VSAs have over 99% of their pre-European undisturbed vegetation extent remaining (Woodman Environmental, 2020) and are defined in **Table 8.**

TABLE 8: VEGETATION ASSOCIATIONS WITHIN THE PROPOSED NVCP PERMIT AREA

Vegetation Association	Description
Abydos Plain - Chichester 93	Hummock grasslands, shrub steppe; kanji over soft spinifex
Abydos Plain - Chichester 626	Hummock grasslands, shrub-steppe, kanji over soft spinifex and *Triodia brizoides*

A total of 300 discrete vascular flora taxa (including 11 introduced taxa), three known hybrids and seven putative hybrids have been recorded in the Study Area. These taxa and hybrids represent 52 families and 138 genera. The most well-represented families were *Fabaceae* (55 taxa), three known hybrids and seven putative hybrids), *Poaceae* (51 taxa) and *Malvaceae* (26 taxa) (Woodman Environmental, 2020).

The topography of the Project area ranges from greater than 325 mRL at the top of the highest ridgeline (near the proposed Atlas Waste Dump) to less than 175 mRL in the valleys downstream of the proposed expansion prior to reaching the Turner River. The Project is located to the east of a large ridgeline running north to south and separating the Yule and Turner River Catchments. The Project itself lies on higher ground, with the exception of the proposed EWL expansion and Haul Road alignment, which reside in the lower valleys immediately downstream (AQ2, 2023b).

6.2 CLIMATE

Under the Köppen climate classification system, the inland Pilbara region is classified as an arid, hot, desert climate. Rainfall in the Pilbara mostly occurs because of tropical cyclone systems in the January to March months. Rainfall during May and June is generally a result of cold fronts moving across the south of the State, which occasionally extend into the Pilbara. Storms are typically infrequent, short duration and intense events, resulting in flash flooding, rapid infiltration and subject to limited evaporative losses.

The most representative long-term official Bureau of Meteorology (BoM) weather station near the Project area is at Marble Bar (Station Number 4106) (BoM, 2022), located approximately 110 km north-east of the Project. A summary of monthly averages for temperatures and rainfall recorded at Station 4106 is shown in **Figure 10.**

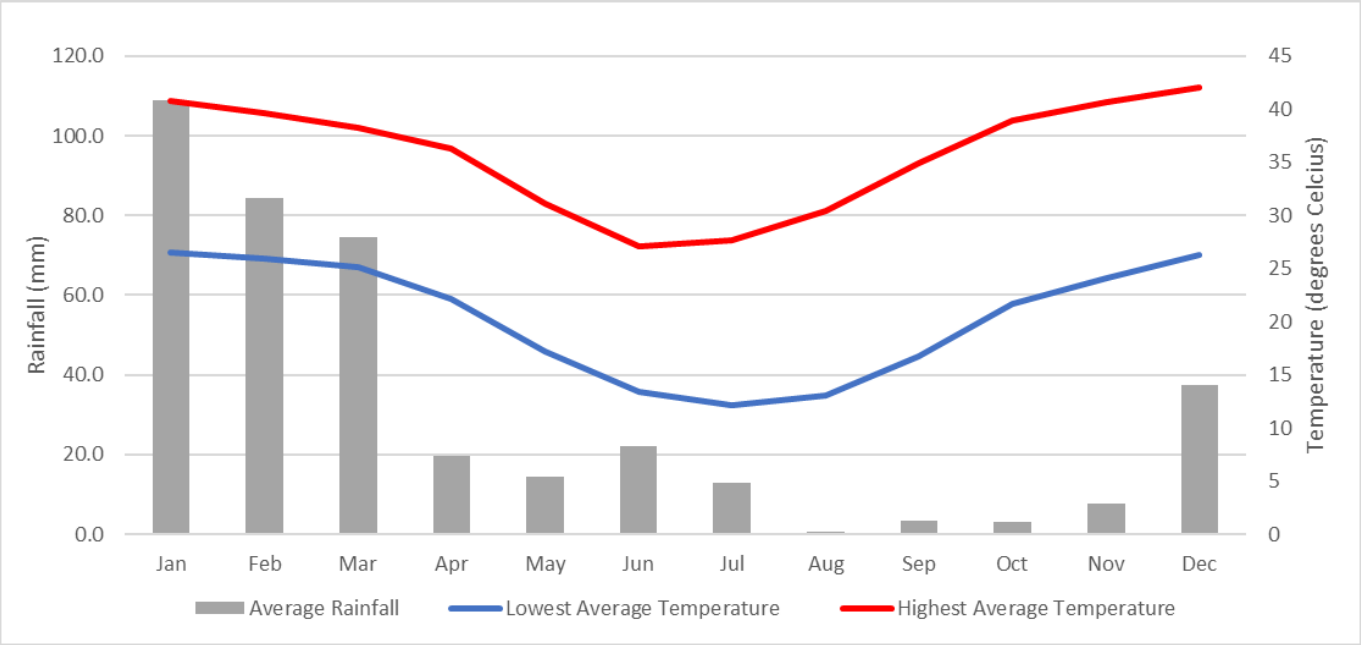


FIGURE 10: MONTHLY AVERAGE RAINFALL AND TEMPERATURE DATA FOR MARBLE BAR BOM STATION 4106

6.3 ENVIRONMENTALLY SENSITIVE AREAS

There are no Environmentally Sensitive Areas (ESAs) within, or in proximity to, the proposed NVCP Permit Area.

The closest DBCA managed Nature Reserve is the Mungaroona Range Natural Reserve (DWER, 2021). The Reserve is 'class A' and covers approximately 105,842 ha is located 50 km to the southwest of the NVCP Permit Area (DEC 2011).

6.4 SCHEDULE ONE AREAS

There are no Schedule 1 areas as defined by the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* within or in proximity to the proposed NVCP Permit Area.

The closest Schedule 1 area mapped by DWER is over 500 m to the west and correlates to a Downgraded Wild Rivers Catchment, refer to Section 6.6.2.

6.5 LANDFORM

6.5.1 Land Use

The proposed NVCP Permit Area is located within the Pilbara region of Western Australia which is dominated by Pastoral Stations, Aboriginal lands and reserves, Unallocated Crown land and Crown Reserves, Conservation Areas and mining activities (Kendrick & McKenzie, 2001). Pastoral Stations are detailed in Section 2.1 and **Figure 11**.

6.5.2 Landscape

The landscape within the region is variable and shaped by the structure of the underlying geology and imposed weathering processes (DAWE 2012). The Pilbara has moderately high relief with a number of ranges, river valleys and peneplains which, in the north, fall away to form a gently sloping coastal plain. The rangelands are generally rugged with prominent strike ridges and hills of outcropping rock separated by deep valleys in which thick sequences of infill have locally accumulated (DAWE 2012).

6.5.3 Land Systems

The proposed NVCP Permit Area is located within seven Land and Soil Systems defined by (DPIRD, 2022b) as shown in **Table 9** and **Figure 12.**

TABLE 9: LAND AND SOIL SYSTEMS OF THE PROPOSED NVCP PERMIT AREA

Land System	Description	Proposed NVCP Permit Area (ha)
Capricorn (280Cp)	Rugged sandstone hills, ridges, stony footslopes and interfluves supporting low acacia shrublands or hard spinifex grasslands with scattered shrubs. Stoniness confers resistance to erosion.	1,244.16
Platform (280Pl)	Dissected slopes and raised plains supporting shrubby hard spinifex grasslands. The system is not susceptible to erosion.	257.67
Boolgeeda (280Bg)	Stony lower slopes and plains below hill systems supporting hard and soft spinifex grasslands or mulga shrublands.	611.90
Rocklea (280 Rk)	Basalt hills, plateaux, lower slopes and minor stony plains supporting hard spinifex and occasionally soft spinifex grasslands with scattered shrubs.	101.28

6.5.4 Topography

The Pilbara region is characterised by a gently sloping coastal plain building up in the central region to moderately high relief ranges with prominent strike ridges and outcropping rocks with deep valleys and rivers (van Vreeswyk, et al., 2004). The North half of the proposed NVCP Permit Area is characterised by ridgelines reaching above 300 mRL running to the north east of outcropping bare rock and stony footslopes incised by drainage lines and valleys dipping to the 200 mRL. The south east area of the proposed NVCP boundary stretches out into a large floodplain across the granitic peneplain dipping to the 185 mRL with ephemeral creek lines (MBS, 2019).

6.5.5 Geology

The Project is located within the Pilbara Craton at the edge of the Mount Bruce Supergroup and consists of a thin cover of weathered Cenozoic sedimentary and metasedimentary regolith over the (northern) Carlindi and (southern) Yule granitoid complexes. These complexes consist of intrusive, sheared intrusive or tectonic contacts with surrounding metamorphic greenstones. The two are separated by the Wodgina Greenstone Belt. The granitic

rocks were subsequently intruded by younger veins and dykes of quartz and pegmatite, which form the resource body for the Wodgina mine (MBS, 2019).

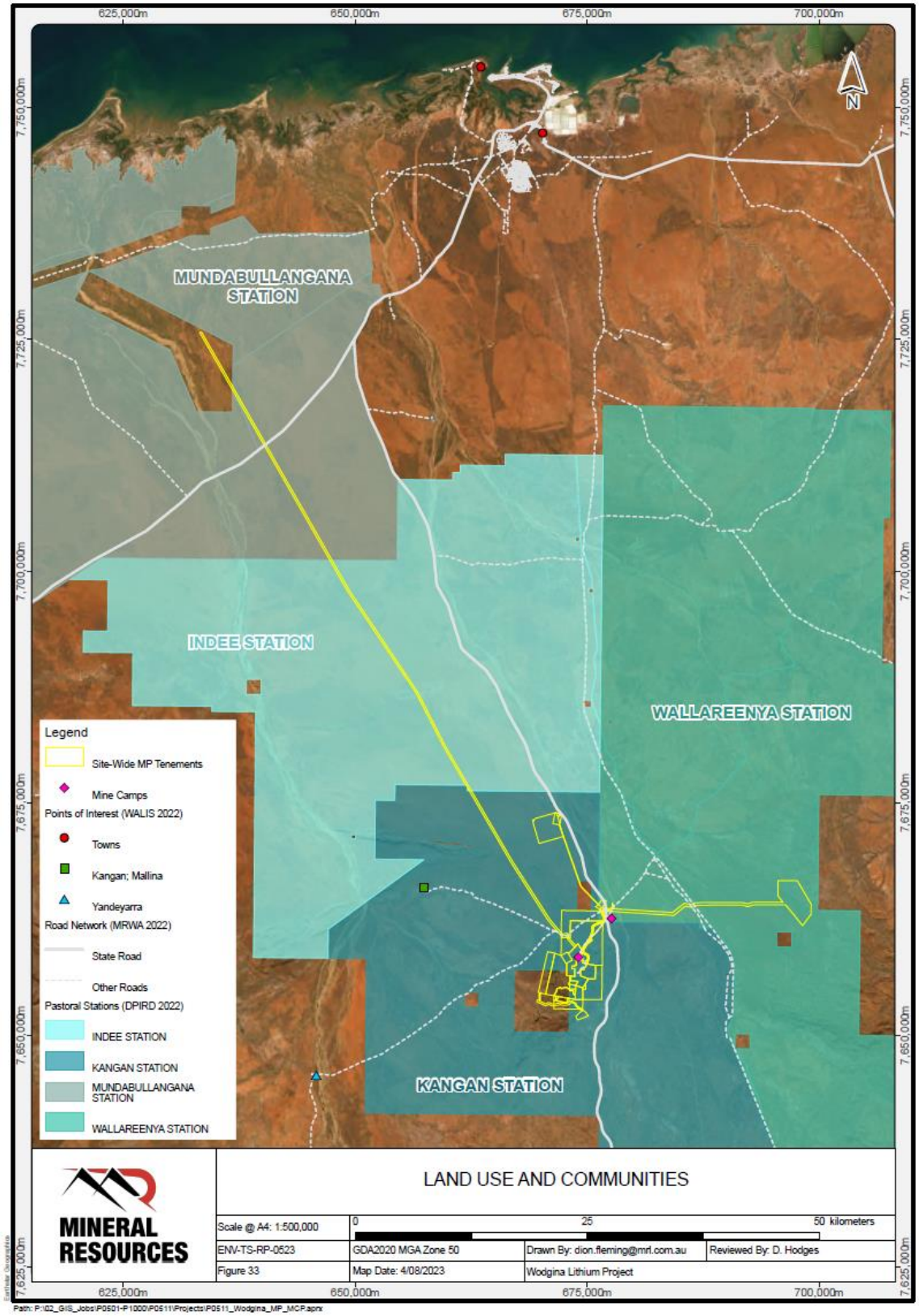


FIGURE 11: REGIONAL SETTING – LANDUSE AND COMMUNITIES

6.5.6 Soils

Soils within the proposed NVCP Permit Area were mapped by MBS in 2019. The south east corner of the proposed NVCP Permit Area was not originally mapped by MBS as it was outside the 2018 NVCP Permit Area. Soil mapping in this area has been extrapolated based on topography, landforms, and site reconnaissance.

The Project is dominated by loamy and stony calcareous soils associated with hills and ridges, red shallow loam duplex soils on extensive stony sheet washed alluvium plains and areas of bare rock outcrops (MBS, 2019). Areas of material were identified in areas of bare rock outcrop consisting of shallow pockets of loamy topsoil over competent rock suitable for armouring rehabilitation purposes.

MBS (2019) separated soil resources into three categories based on their potential dispersive characteristics. A summary of each soil type and characteristics test results from samples are provided:

- **Loamy Soils** – Soil Groups 507 and 521 – Soils characterised by darker colour and higher iron content with a thin layer of ferruginous gravel lag suitable for flat areas of rehabilitation.
- **Stony Soils** – Soil Group 202 - Predominantly calcareous and with a substantial layer of stony lag material suitable for stable rehabilitation outcomes, underlying weathered oxide bedrock (where suitable) could provide additional rehabilitation resources.
- **Hillslope / Rock Outcrop** – Soil Group 101 – Frequently bare rock outcrops with minimal true 'soil' material however suitable for rock armouring rehabilitation.

The proposed NVCP Permit Area includes areas of previous disturbance where soil resources remain *in-situ* and will be recovered during clearing activities (detailed in **Table 10**).

TABLE 10: SOIL TYPES AVAILABLE WITHIN THE PROPOSED NVCP PERMIT AREA AND TO BE RECOVERED

Soil Group	Soil Type and Description
Loamy Soil	
507	**Red / brown loamy duplex** • Occurs on flat low-lying areas • Shallow deep red / brown loam with minor fine ferruginous gravels (200 mm) over sub-rounded and sub-angular gravelly soil. • No defined organic (O) horizon. • Plant roots evident to 200 mm. • Compacted B1 horizon of siliceous and ferruginous (but not calcareous) gravel in a silty loam grading to gravelly loam matrix in the B2 horizon.
521	**Calcareous shallow loam** • Occurs on gently undulating slopes of up to 5 degrees • Grey / light brown loamy sand with large proportion of fines content. • Aggregated are loose within the soil profile and are friable by hand. • General absence of an organic (O) surface horizon and cryptogamic surface crusting. • Mixture of siliceous, calcareous, or ferruginous stony lag at surface. • Light brown surface topsoil layer up to 30 cm, with plant roots evident throughout.
Stony Soils	
202	**Calcareous Stony Soils** • Occurs on slopes of 2 to 5 degrees on mid-slopes. • White/grey cobbles throughout the soil profile. • Light to medium brown silty sand topsoil layer to approximately 20 cm with minimal coarse fragments. • Prominent stony lag scattered across the surface – mixture of siliceous and ferruginous lag.
Hillslope / Rock Outcrops	
101	**Bare Rock** • Occurs predominantly on hill slopes and small crests.

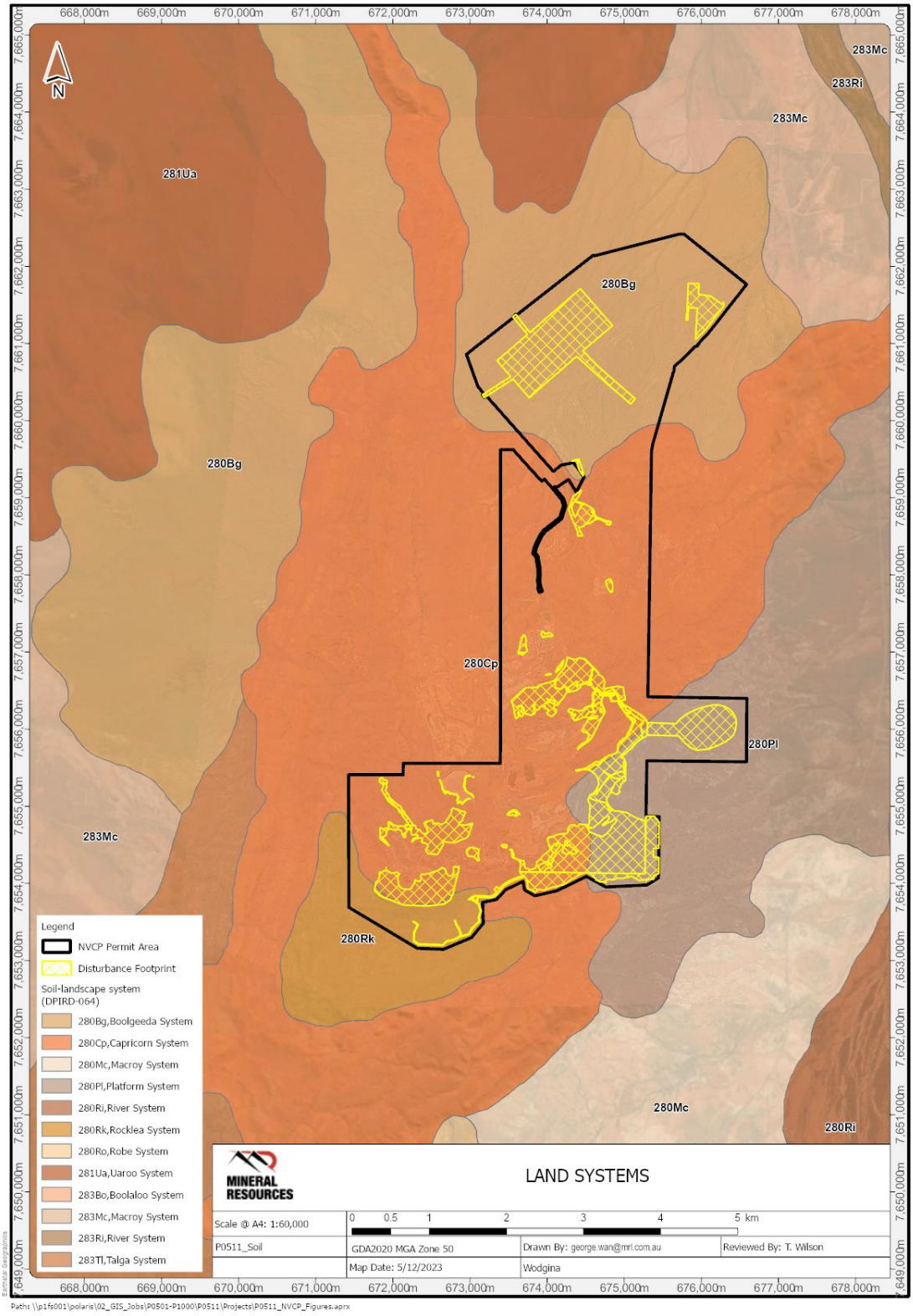


FIGURE 12: LAND SYSTEMS

6.6 SURFACE WATER

6.6.1 Regional Catchment Areas

The Project is located on the catchment divide of the Turner River catchment (to the east) and the Yule River catchment (to the west). The confluence of the Turner River West and greater Turner River is approximately 9 km downstream (to the north) of the Project (AQ2, 2022b).

6.6.2 Wild Rivers

The western side of the Project falls within the mapped Upper Yule River Wild River Catchment however has been downgraded due to anthropogenic development and impacts altering the pristine condition of the Catchment and is no longer identified as a Wild River Catchment (DWER, 2020).

6.6.3 Wetlands

There are no RAMSAR, EPA Redbook or nationally significant watercourses or wetlands within or in proximity to the proposed NVCP Permit Area. The closed significant wetland areas are Eighty Mile Beach (RAMSAR site) located over 170 km to the north east and Leslie (Port Hedland) Saltfields System (Directory of Important Wetlands in Australia) located 90 km to the North (DBCA 2017a, DBCA 2017b; DBCA 2018).

No wetland vegetation, in the form of swamps, marshes or ephemeral wetlands have been mapped within the proposed NVCP Permit Area (Woodman Environmental, 2020).

6.6.4 Surface Water

Hydrology studies conducted at Wodgina include:

- Wodgina Surface Water Baseline Study (AQ2, 2020);
- Surface Water Assessment. Wodgina Mine Site. Expansion of Cassiterite Pit, Eastern Waste Landform (EWL) and Atlas Waste Dumps (AQ2, 2022a); and
- Surface Water Assessment – Wodgina Mine Site - 5 Year Mine Plan (AQ2, 2022b) and Wodgina Surface Water Assessment 5YMP – EWL Redesign Addendum (AQ2, 2023b).

There are no perennial surface water systems in the Project area, although small semi-permanent pools may occur from time to time following heavy rainfall events (AQ2, 2022b). A number of semi-permanent pools have been identified within the Flora Study Area however none are identified within the proposed NVCP Permit Area.

The proposed NVCP Application does not involve interference with any bed or banks of a watercourse.

There are several ephemeral drainage lines within the proposed NVCP Permit Area running through the ridgeline valleys and down onto the peneplain (**Figure 13**). These drainage lines flow for short durations following large rainfall events predominantly occurring in the Pilbara wet season (AQ2, 2022b).

Highly ephemeral characteristics of stream and creek lines caused by sporadic rainfalls and the lack of natural permanent water features prevents the collection of reliable base line surface water characteristics. Surface water sampling conducted in 2018 and 2021 indicate quality in regional creek lines is generally fresh TDS < 500 mg/L) with a neutral to basic pH (7.8 to 9) (AQ2, 2022b).

6.6.5 Flooding

Surface water systems in the Pilbara generally only flow for a short duration immediately following larger rainfall events with extended periods of no flow through the dry season.

AQ2 (2022) has modelled the surface water environment around Wodgina and potential flood events to ensure adequate controls are implemented to maintain natural surface flows and reduce impacts during flood events. The proposed Mine Plan expansion will not significantly alter the current flood model with the exception of landform expansions reducing certain catchment areas and the proposed haul road requiring infrastructure controls to ensure surface water flows are maintained and controlled. Assessment and approval of proposed infrastructure and potential impacts to surface water will be obtained from DMIRS prior to any clearing works commencing.

The majority of the Project area drains to the Turner River via several main tributaries with the following infrastructure upstream:

- Tributary T1A – TSF3 embankment and Hercules Waste Dumps (east);
- Tributary T1B – Power Station and Wodgina Village;
- Tributary T1C - Mine Process Area and Stockyard; and
- Tributary T2 – EWL, Top Dump, Processing Area and Anson WRD.

The internally draining catchments primarily report to pit areas, including Wodgina Pit, that collects runoff from the Beneficiation Plant area. Key drainage lines have been identified in infrastructure areas, in particular drainage within the Crusher, Stockyard and Old Admin area plus culverts through the Power Station area (AQ2, 2023a).

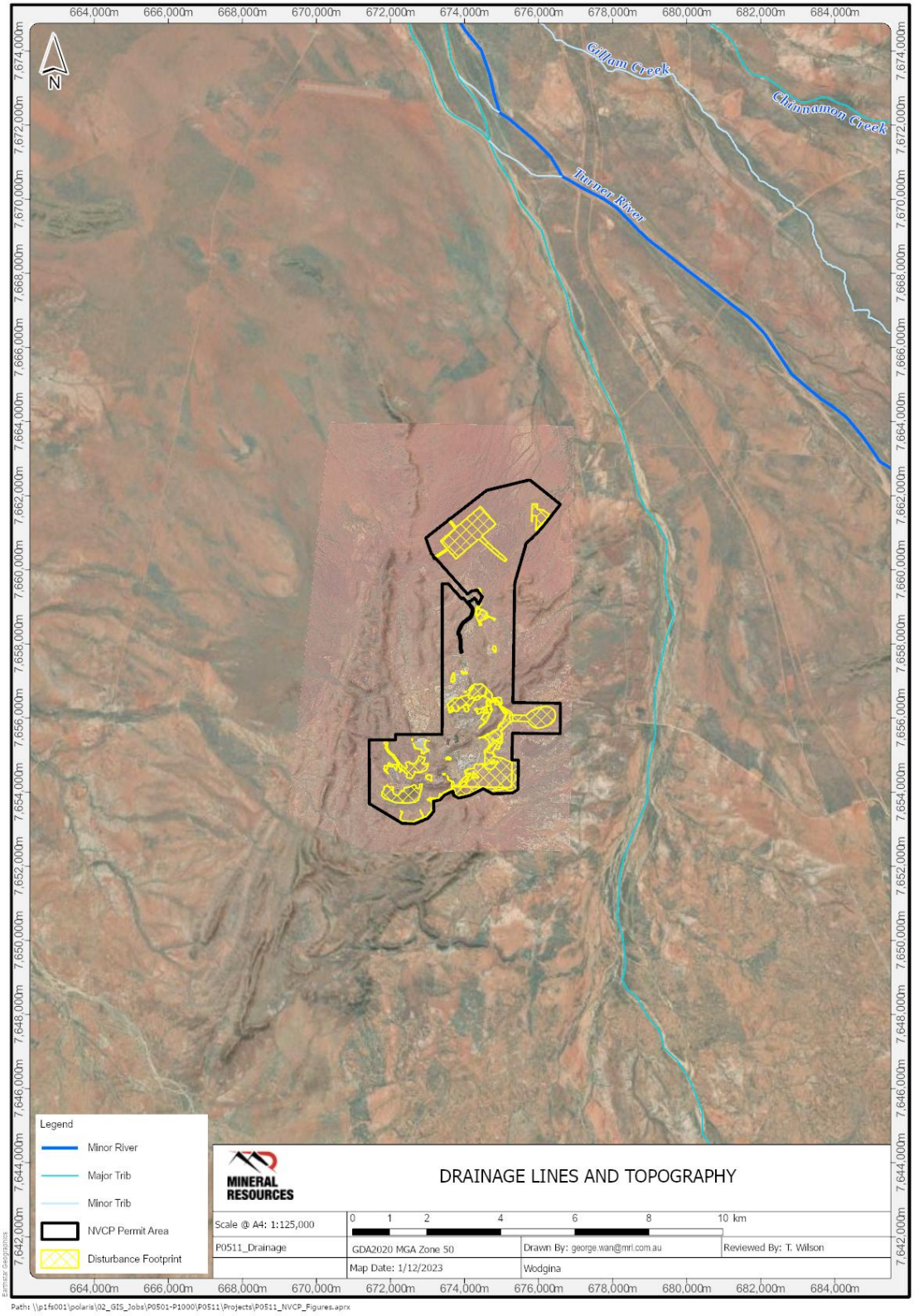


FIGURE 13: DRAINAGE LINES AND TOPOGRAPHY

6.6.6 Hydrogeology

The Cassiterite Pit is located within the silicified volcanics and metasediments of the Wodgina Greenstone Belt. These rocks are generally very tight (with low bulk permeability) but with some enhanced permeability along some faults (AQ2, 2022a). This supported by low yielding bore lifts and the lack of water egress into Cassiterite Pit while mining below groundwater level.

The Wodgina hydrogeological system is a fractured rock environment. Groundwater is associated with fracture zones along geological contacts of mafic and ultramafic greenstone rocks with pegmatite and quartz dykes. Zones of enhanced structural deformation, mineralisation and/or weathering within the basement are likely to provide higher permeability conduits for groundwater flow. Groundwater is found at shallow depths within the granitic peneplain owing to the thin weathering and colluvium cover. Groundwater is primarily encountered within fractures and weathered horizons of granite, pegmatite and quartz dykes (AQ2, 2022a).

6.7 GROUNDWATER

Hydrogeological studies completed at Wodgina include:

- Wodgina Lithium Project – Cassiterite Pit Dewatering and Post Closure Pit Lake Assessment (AQ2, 2022c);
- Wodgina Lithium Project – In-Pit TSF Seepage Assessment – Atlas Iron Pits (AQ2 Pty Ltd., 2022d); and
- Wodgina Lithium Project – Cassiterite Pit Dewatering and Post Closure Pit Lake Assessment – 5 Year Mine Plan (AQ2, 2023a).

6.7.1 Public Drinking Water Source Areas

The proposed NVCP Permit Area does not occur within a Public Drinking Water Source Area (PDWSA). The closest PDWSA is the Yule River Water Reserve (Protection Area P1) located approximately 40 km to the North (DWER 2022a).

6.7.2 Local Aquifer

The proposed NVCP Permit Area occurs within the proclaimed Groundwater Area – Pilbara, Groundwater Subarea East Pilbara. The target aquifer is the Pilbara – Fractured Rock Aquifer. The State's Groundwater Management Plan for the area was last updated in 2013 and documented in the Department of Water Pilbara groundwater allocation plan Report No. 055.

6.7.3 Groundwater Level and Flow

Groundwater levels above the ridgelines at the Project would have naturally followed the ridgelines however they have been influenced in areas by mining activities and tailings disposal. Groundwater levels measured recently in the proposed NVCP Permit Area vary in the range of 200 to 210 mRL around Cassiterite Pit and 185 to 188 mRL near the Eastern Waste Landform. The depth to groundwater surrounding the greenstone belt on the relatively flat granitic peneplain (including the northern evaporation pond location) is <10 m of the natural ground surface. Within the greenstone belt the depth to groundwater varies from very shallow, in low lying relief (<10 m) to >40 m below ground level (bgl) on the higher relief metasediment outcrop.

The mining of Cassiterite Pit has created a 'cone of depression' in the local water table resulting in groundwater flow converging towards Cassiterite Pit creating a groundwater sink, while other areas such as the Eastern Waste Landform flow towards the east (AQ2 2022a).

6.7.4 Groundwater Quality

The local groundwater quality around Cassiterite Pit is generally characterised as follows:

- Groundwater is marginal to brackish, with salinity around 3,500 mg/L TDS (i.e. EC of around 4,000 uS/cm);
- Groundwater is circum-neutral (i.e. pH ~6.5 to 7.5); and
- Groundwater is dominated by sodium, magnesium, and calcium (in roughly equal proportions) and sulphate. This water type is indicative of groundwater that has undergone ion-exchange during mixing process and is not dominated by recharge (AQ2 2022a).

Groundwater levels and sampling are regularly monitored to ensure compliance with various site approval instruments and to ensure groundwater quality is not being impacted by mining activities.

7. ENVIRONMENTAL VALUES

This section contains information about the environmental characteristics of the proposed Purpose Permit Area (within the context of the region), specifically relating to flora, vegetation and terrestrial fauna values, that may be relevant to this NVCP application.

Supporting biological surveys completed to support this application include:

1. Attachment 4 - Detailed Flora and Vegetation Assessment (Woodman, 2020)
2. Attachment 5 - Level 2 Vertebrate Fauna Survey April 2019 (Version 5) (Western Wildlife, 2020)
3. Attachment 6 - Memo Report: Wodgina – Targeted Significant Fauna Survey (Stantec, 2022)
4. Attachment 7 - Flora, Vegetation and Fauna Impact Assessment (Umwelt, October 2022).
5. Attachment 8 - Level 1 Fauna Survey Targeted Conservation Significant Fauna Survey & Desktop Assessment (Stantec, 2018b)

For each environmental value, these surveys are referred to and addressed across the previous, current and proposed NVCP applications.

The abovementioned biological surveys have been undertaken across the Study area, with a number of studies and impact assessments specific to the CPS 9911/1 application area. Where a study is specific to the CPS 9911/1 application area, it is identified in **Table 11** below.

TABLE 11: ENVIRONMENTAL SURVEYS AND IMPACT ASSESSMENT – SCOPE AND REGULATORY GUIDANCE

Title	Scope and Regulatory Guidance	Relevant Area	
		CPS 9911/1	Entire Permit Area
Wodgina Project Level 2 Vertebrate Fauna Survey April 2019 (Version 5) May 2020 Western Wildlife	The Survey Report supersedes Version 3 report and covers the Fauna Study Area and includes a literature review and survey information from Phase 2 of the 2019 Level 2 fauna survey. The fauna survey was undertaken in accordance with the: • Statement of environmental *principles, factors and objectives* (EPA) (2016c) • Environmental factor guideline – terrestrial fauna (EPA 2016b), • Technical guidance – terrestrial fauna surveys (EPA 2016c) • Technical Guide: terrestrial vertebrate fauna surveys for environmental impact assessment (EPA and DEC 2010) • Relevant State and Federal Guidelines on surveying conservation significant fauna Report attached in **Attachment 5.** IBSA Submission IBSASUB-20221007-09A5D94B.	X	X

Title	Scope and Regulatory Guidance	Relevant Area	
		CPS 9911/1	Entire Permit Area
Wodgina Lithium Project Detailed Flora and Vegetation Assessment April 2020 Woodman Environmental	The Assessment covers the Flora Study Area and includes a review and consolidation of previous flora and vegetation surveys/assessments plus results from a 2019 survey completed to focus on previously unsurveyed sections of Wodgina. As this Assessment includes all methods and findings from floristic surveys completed at Wodgina prior to 2020, all previous reports are no longer considered current. The survey and reporting works comply with the following documents: • Technical Guidance: – Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016d) • Environmental Factor Guideline – Flora and Vegetation (EPA 2016a) Report attached in **Attachment 4.** IBSA Submission IBSASUB-20221007-5D865C27.	X	X
Memo Report: Wodgina – Targeted Significant Fauna Survey June 2022 Stantec	Targeted fauna survey which focused on determining the presence of significant fauna within the Rocky Ridge and Gorge habitat of the Study Area (proposed Disturbance Footprint). The objectives and methods used in the survey were aligned with the following guidelines: • Technical Guidance: Terrestrial Fauna Surveys for Environmental Impact Assessment (EPA, 2020) • Environmental Factor Guideline – Terrestrial Fauna (EPA, 2016) • Referral Guideline for the Endangered Northern Quoll (DotE, 2016) • Survey Guidelines for Australia's Threatened Mammals (DSEWPaC, 2011) • Survey Guidelines for Australia's Threatened Bats (DEWHA, 2010) The report is attached in **Attachment 6.** IBSA Submission IBSASUB-20221007-4A8E0823.	X	

Title	Scope and Regulatory Guidance	Relevant Area	
		CPS 9911/1	Entire Permit Area
Flora, Vegetation and Fauna Impact Assessment October 2022 Umwelt	A collation of the above three documents with regards to key environmental characteristics and findings. The assessment of potential impacts of the proposed NVCP Application with regards to direct, indirect, local, regional, and cumulative impacts. Key aspects of the Impact Assessment include: • Quantification of direct impacts of the proposed Disturbance Footprint on vegetation units, conservation significant flora and critical habitat • Evaluation of indirect impact • Assessment of direct, indirect, and regional impacts, plus local, regional, and cumulative impacts • Investigation into historic clearing and the pre-disturbance environment The impact assessment is aligned with the following: • Matters of National Environmental Significance: Significant Impact Guidelines 1.1 (DoE 2013) • *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) referral guideline for the endangered northern quoll *Dasyurus hallucatus* (DoE 2016) • Conservation listing advice for *Macroderma gigas* Ghost Bat (TSSC 2016a) • Conservation listing advice for *Rhinonicteris aurantia* (Pilbara form) Pilbara leaf-nosed Bat' (TSSC 2016c) • A guide to the assessment of applications to clear native vegetation, under Part V Division 2 of the Environmental Protection Act (DER 2014) Impact Assessment attached in **Attachment 7.** **NOTE** - This Impact Assessment does not include the additional Fauna survey effort undertaken in October 2019 and reported in Western Wildlife 2020. However, the additional survey effort did not identify any significant changes to what had been identified in previous survey effort. The Proposed Disturbance Footprint and immediate surrounding areas, identified as the Indirect Impact Assessment Zone (IIAZ), are assessed in the Umwelt Impact Assessment and therefore ratings and impacts determined in the Assessment are directly related to this NVCP Application.	X	

Title	Scope and Regulatory Guidance	Relevant Area	
		CPS 9911/1	Entire Permit Area
Level 1 Fauna Survey Targeted Conservation Significant Fauna Survey & Desktop Assessment Stantec, 2018b	The objectives of the Level 1 fauna survey and desktop assessment were to define the environmental values of the Survey Area, the Mine Study Area and the Gas Pipeline and Aerodrome Study Area, and to assess the conservation significance of these areas in relation to the Project. The objectives and methods used in the survey were aligned with the following guidelines: • Technical Guidance: Terrestrial Fauna Surveys for Environmental Impact Assessment (EPA, 2020) • Environmental Factor Guideline – Terrestrial Fauna (EPA, 2016) • Referral Guideline for the Endangered Northern Quoll (DotE, 2016) • Survey Guidelines for Australia's Threatened Mammals (DSEWPaC, 2011) • Survey Guidelines for Australia's Threatened Bats (DEWHA, 2010) The report is attached in **Attachment 8.** IBSA Submission IBSASUB-20221007-4A8E0823.		X

7.1 FLORA AND VEGETATION

A desktop assessment, comprising database searches and a literature review, was undertaken prior to the Woodman 2020 flora and vegetation field survey to gather contextual information on the Study Area and to inform a likelihood of occurrence for significant flora and vegetation to occur within the Study Area. Database searches were completed in the Woodman 2020 study to generate a list of vascular flora and vegetation communities previously recorded within, and in the vicinity of, the Study Area, with an emphasis on species and communities of conservation significance and introduced species.

A total of 300 vascular flora species (including 11 introduced species) were recorded during the field surveys conducted by Woodman Environmental (2020) within the study area. The species represented 52 families and 138 genera with the most well represented families being *Fabaceae* (55 species), *Poaceae* (51 species) and *Malvaceae* (26 species) (Woodman Environmental, 2020). The environmental surveys identified:

- No Priority Ecological Communities (PECs) or Threatened Ecological Communities (TECs)
- No flora listed under the EPBC Act or gazetted as Threatened (formerly Declared Rare Flora (DRF)) under the BC Act (WC Act)
- 5 priority flora species were recorded in the Project area, including:
    - *Euphorbia clementii* (P3);
    - *Helitropium muticum* (P3);
    - *Terminalia supranitifolia* (P3);
    - *Triodia chichesterensis* (P3); and
    - *Vigna triodiophila* (P3).

7.1.1 Vegetation Units

A total of 15 vegetation units (VU) were defined and mapped across the Project. There are two vegetation units described in the Project area that contain riparian vegetation, however, are considered to be totally dependent on surface water flows for survival (Woodman Environmental, 2020):

- Vegetation Unit 11 recorded in minor drainage features including flats and small ephemeral creek lines. A total of 185.5 ha was mapped in the Project area; and
- Vegetation Unit 14 recorded in major ephemeral creek lines. A total of 209.31 ha was mapped in the Project area.

It is possible for some of the riparian species identified in the Project area to be dependent on groundwater provided their root systems can reach the water table (generally within 10 m of the surface). However available evidence indicates vegetation that is groundwater water dependent is not extensive throughout Wodgina. The depth to groundwater within elevated locations is generally at least 20 m from the surface and therefore not accessible to any occurrences of Vegetation Unit 14 in these areas (Woodman Environmental, 2020).

Based on the field observations and aerial photograph interpretation, all vegetation units are either known to, or considered likely to extend outside of the Project area. Vegetation units 12 and 13 are considered locally restricted, comprising less than 1% of the Project area, however this is considered to be due to only small amounts of the landforms they inhabit are intersected by the Project. Aerial photography investigations noted Vegetation units 12 are prevalent to the east of the Project while significant areas of Vegetation unit 13 occurs to the south of the Project (Woodman Environmental, 2020). Vegetation unit 15 occurs to the north of the project and is not located within the NVCP area for this application and will therefore not be considered further in this approval.

The vegetation units mapped as part of this assessment are shown in **Figure 14** and described in **Table 12**. The cumulative impacts are further described in Section 9.2.

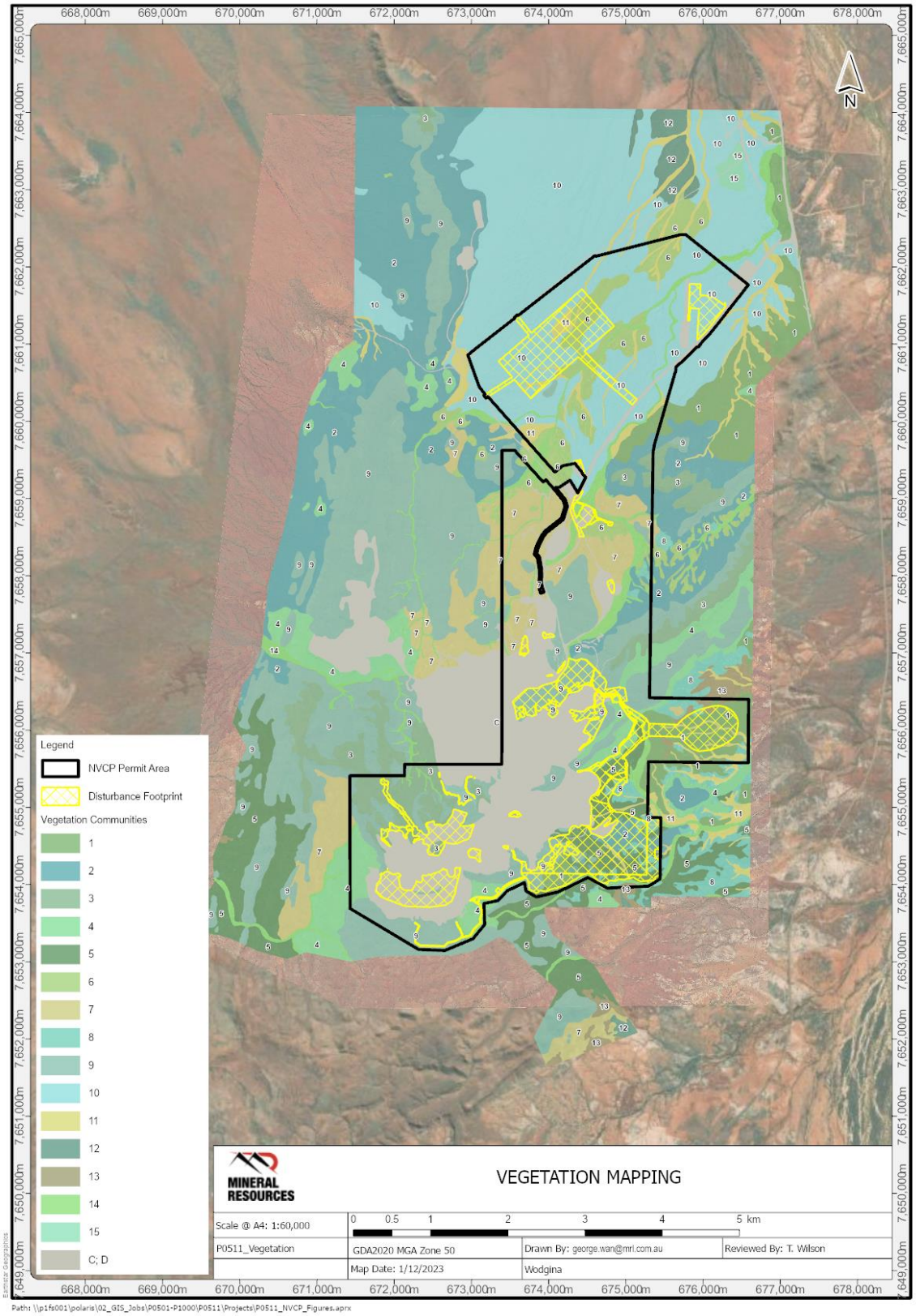


FIGURE 14: VEGETATION UNITS

Legend

Vegetation Communities

1: Tall open to sparse shrubland dominated by *Acacia orthocarpa*, *A. ancistrocarpa* and occasionally *A. acradenia* over low sparse shrubland of mixed species dominated by *A. stellaticeps* over low hummock grassland dominated by *Triodia lanigera* and occasionally *T. epactia* on red-brown clay loam with granite, quartz or ironstone stones on colluvial stone plains and low flat-topped rises.

2: Tall to mid sparse shrubland of mixed species dominated by *Acacia acradenia*, *A. inaequilatera*, *Grevillea wickhamii* subsp. *hispidula* and occasionally *A. tumida* var. *pilbarensis* and *A. ancistrocarpa* over low sparse shrubland of mixed species including *Indigofera monophylla* and *Goodenia stobbsiana* over low hummock grassland dominated by *Triodia epactia* and/or *T. brizoides* on red, brown or red-brown clay loam with metamorphic, ironstone, quartz and occasionally granite stones, occasionally with metamorphosed granite or granite outcropping, on lower slopes and colluvial outwashes of ranges and occasionally on low flat-topped rises.

3: Low open woodland to isolated trees of *Eucalyptus leucophloia* subsp. *leucophloia* and/or *Corymbia hamersleyana* over tall to mid sparse to open shrubland dominated by *Acacia acradenia*, *Grevillea wickhamii* subsp. *hispidula* and *A. tumida* var. *pilbarensis* over low sparse shrubland of mixed species including *Dampiera candicans*, *Indigofera monophylla*, *Goodenia stobbsiana* and *Triumfetta maconochieana* over low hummock grassland dominated by *Triodia epactia* and often *T. brizoides* or *T. wiseana* over low sparse tussock grassland dominated by *Eriachne mucronata* on red, brown or red brown clay loam with ironstone or metamorphosed granite stones over ironstone or metamorphosed granite outcropping on plateaus, crests and upper slopes of ranges.

4: Tall to mid sparse shrubland dominated by *Acacia inaequilatera*, *A. acradenia* and *Grevillea wickhamii* subsp. *hispidula* over low sparse shrubland of mixed species including *Corchorus parviflorus* and *Indigofera monophylla* over low hummock grassland dominated by *Triodia epactia* and/or *T. wiseana* , or occasionally *T. brizoides* and *T. chichesterensis* , on red, brown or red-brown clay loam with metamorphosed granite, dolerite and occasionally ironstone stones over metamorphosed granite or dolerite outcropping on mid and upper slopes of ranges, and low ridges and hills.

5: Tall to mid sparse shrubland of mixed species dominated by *Acacia acradenia*, *A. inaequilater* and *A. orthocarpa* over low sparse shrubland of mixed species dominated by *Acacia spondylophylla* over low hummock grassland dominated by a combination of *Triodia chichesterensis*, *T. wiseana*, *T. epactia* , *T. brizoides* and *T. lanigera* on red-brown clay loam with metamorphosed granite, ironstone, dolerite, quartz and calcrete stones, occasionally over metamorphosed granite and dolerite outcropping, on lower slopes and colluvial outwashes of ranges and low flat-topped rises.

6: Low open woodland to isolated trees of *Corymbia hamersleyana* over tall to mid sparse shrubland dominated by *Acacia inaequilatera*, *A. acradenia* and *Grevillea wickhamii* subsp. *hispidula* over low hummock grassland dominated by *Triodia chichesterensis* and/or *T. wiseana* on brown or occasionally red clay loam with calcrete, quartz and metamorphosed granite stones, occasionally over calcrete outcropping, on colluvial outwashes of ranges and colluvial stony plains.

7: Tall to mid sparse shrubland of mixed species including *Acacia inaequilatera*, *Grevillea pyramidalis* subsp. *leucadendron* and *A. orthocarpa* over low hummock grassland dominated by *Triodia chichesterensis* and/or *T. wiseana* on brown, red or red-brown clay loam with dolerite, calcrete and quartz stones, often with dolerite outcropping, on low hills.

8: Low isolated trees of *Corymbia hamersleyana* over tall to mid sparse shrubland dominated by *Acacia bivenosa* and *A. inaequilatera* over low hummock grassland dominated by *Triodia chichesterensis* and/or *T. wiseana* and *T. angusta* on brown, red-brown or grey-brown clay loam with dolerite, calcrete, ironstone and quartz stones on colluvial stony plains.

9: Low isolated trees of *Corymbia hamersleyana* over mid sparse shrubland to isolated shrubs dominated by *Acacia acradenia*, *A. inaequilatera* and *Grevillea wickhamii* subsp. *hispidula* over low hummock grassland dominated by *T. wiseana*, *T. epactia* and occasionally *T. brizoides* on red, brown or red-brown clay loam with ironstone, metamorphosed granite or occasionally dolerite or quartz stones over ironstone or metamorphosed granite outcropping on cliffs, ridges and crests and upper to mid slopes of ranges.

10: Low isolated trees of *Corymbia hamersleyana* and/or *Corymbia zygophylla* over tall to mid open to sparse shrubland dominated by *Acacia ancistrocarpa* and occasionally *A. tumida* var. *pilbarensis*, *A. inaequilatera* and *Grevillea wickhamii* subsp. *hispidula* over low sparse shrubland of mixed species dominated by *Bonamia erecta*, *Indigofera monophylla* and *Ptilotus astrolasius* over low hummock grassland dominated by *Triodia lanigera* and occasionally *T. schinzii* and/or *T. epactia* on red, brown or red-brown sandy or clay loam, often with quartz or ironstone stones, on plains.

11: Low isolated trees of *Corymbia hamersleyana* over tall open to sparse shrubland dominated by *A. tumida* var. *pilbarensis*, *A. ancistrocarpa* and *A. acradenia* over low open to sparse shrubland of mixed species including *Bonamia erecta*, *Isotropis atropurpurea* and *Corchorus parviflorus* over low hummock and tussock grassland dominated by *Chrysopogon fallax*, *Triodia epactia* and occasionally *T. lanigera* on red, brown or red-brown sandy or clay loam with colluvial stones in minor drainage features including flats and small creeks.

12: Low open woodland of *Corymbia hamersleyana* over tall sparse shrubland dominated by *Acacia inaequilatera* over mid sparse shrubland dominated by *Acacia bivenosa* and *Codonocarpus cotinifolius* over low sparse shrubland of mixed species dominated by *Corchorus parviflorus*, *Indigofera monophylla*, *Heliotropium chrysocarpum* and *Heliotropium pachyphyllum* over low hummock grassland dominated by *Triodia chichesterensis* and occasionally *T. epactia* or *T. angusta* on red, brown or grey-brown clay loam with calcrete or quartz stones on undulating plains.

13: Isolated low trees dominated by *Corymbia hamersleyana* over tall to mid sparse shrubland dominated by *Acacia orthocarpa*, *Grevillea wickhamii* subsp. *hispidula* and often *A. maitlandii* and *A. tumida* var. *pilbarensis* over low sparse shrubland of mixed species including *Corchorus parviflorus*, *Dampiera candicans*, *Goodenia stobbsiana*, *Indigofera monophylla* and *Scaevola browniana* subsp. *browniana* over low hummock grassland dominated by *Triodia epactia* and occasionally *T. brizoides* or *T. lanigera on* orange, brown or red-brown sandy or clay loam with granite and quartz stones over granite outcropping on undulating plains or low rises.

14: Low open woodland to isolated trees dominated by *Eucalyptus victrix* and/or *Corymbia hamersleyana* over tall open to sparse shrubland of mixed species dominated by *Acacia pyrifolia* var. *pyrifolia*, *A. tumida* var. *pilbarensis* and *Melaleuca linophylla* over mid to low open to sparse shrubland of mixed species including *Cajanus pubescens*, *Indigofera monophylla*,*Tephrosia rosea* var. *clementii*, *Corchorus parviflorus* and *Jasminum didymum* subsp. *lineare* over low tussock and hummock grassland to open tussock and hummock grassland of mixed species dominated by *Triodia epactia*, *Cenchrus ciliaris*, *Chrysopogon fallax*, *Cymbopogon ambiguus* and *Eriachne tenuiculmis* on red or brown clay or sandy loam, usually with colluvial stones, in major creeks.

15: Mid isolated shrubs of *Acacia synchronicia* over low isolated chenopod shrubs of *Maireana* sp. over low sparse forbland, tussock grassland and sedgeland of mixed species including *Portulaca oleracea*, *Ptilotus exaltatus*, *Cynodon prostratus*, *Sporobolus australasicus* and *Fimbristylis dichotoma* on red clay loam with colluvial stones on plains.

C: Cleared; D: Disturbed

MINERAL RESOURCES

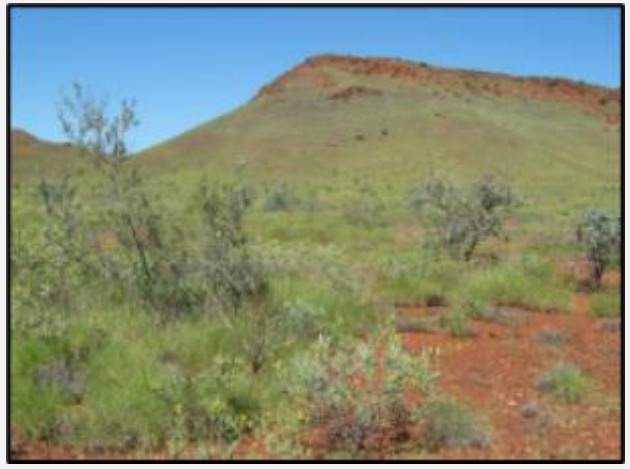
VEGETATION MAPPING LEGEND

P0511_VegetationLegend	GDA2020 MGA Zone 50	Drawn By: george.wan@mrl.com.au	Reviewed By: T. Wilson
Map Date: 4/12/2023	Wodgina		

Ramsay Geographics

Path: \\p1fs001\polaris\02_GIS_Jobs\P0501-P1000\P0511\Projects\P0511_NVCP_Figures.aprx

TABLE 12: VEGETATION COMMUNITY DESCRIPTION

Unit ID	Unit Description	Mapped Survey Extent (Ha)*	**Example Photo** (Woodman Environmental, 2020)
1	Tall open to sparse shrubland dominated by *Acacia orthocarpa, A. ancistrocarpa* and sporadically A. *acradenia* over low sparse shrubland of mixed species dominated by *A. stellaticeps* over low hummock grassland dominated by *Triodia lanigera* with patchy *T. epactia* on red-brown clay loam with granite, quartz or ironstone stones on colluvial stone plains and low flat-topped rises.	300.41	
2	Tall to mid sparse shrubland of mixed species dominated by *Acacia acradenia, A. inaequilatera, Grevillea wickhamii* subsp*. hispidula* and sporadically *A. tumida* var*. pilbarensis* and *A. ancistrocarpa* over low sparse shrubland of mixed species including *Indigofera monophylla* and *Goodenia stobbsiana* over low hummock grassland dominated *by Triodia epactia* and/or *T. brizoides* on red, brown or red-brown clay loam with metamorphic, ironstone, quartz and in places granite stones, scattered with metamorphosed granite or granite outcropping, on lower slopes and colluvial outwashes of ranges and occasionally on low flat-topped rises.	834.55	

Unit ID	Unit Description	Mapped Survey Extent (Ha)*	**Example Photo** (Woodman Environmental, 2020)
3	Low open woodland to isolated trees of *Eucalyptus leucophloia* subsp. *leucophloia* and/or *Corymbia hamersleyana* over tall to mid sparse to open shrubland dominated by *Acacia acradenia, Grevillea wickhamii* subsp. *hispidula* and *A. tumida* var. *pilbarensis* over low sparse shrubland of mixed species including *Dampiera candicans, Indigofera monophylla, Goodenia stobbsiana* and *Triumfetta maconochieana* over low hummock grassland dominated by *Triodia epa*ctia and often *T. brizoides* or *T. wiseana* over low sparse tussock grassland dominated by *Eriachne mucronata* on red, brown or red brown clay loam with ironstone or metamorphosed granite stones over ironstone or metamorphosed granite outcropping on plateaus, crests and upper slopes of ranges.	250.78	
4	Tall to mid sparse shrubland dominated by *Acacia inaequilatera, A. acradenia* and *Grevillea wickh*amii subsp. *hispidula* over low sparse shrubland of mixed species including *Corchorus parviflorus* and *Indigofera monophylla* over low hummock grassland dominated by *Triodia epactia* and/or *T. wiseana*, or sporadically *T. brizoides* and *T. chichesterensis*, on red, brown or red-brown clay loam with metamorphosed granite, dolerite and patchy ironstone stones over metamorphosed granite or dolerite outcropping on mid and upper slopes of ranges, and low ridges and hills.	324.33	

Unit ID	Unit Description	Mapped Survey Extent (Ha)*	**Example Photo** (Woodman Environmental, 2020)
5	Tall to mid sparse shrubland of mixed species dominated by *Acacia acradenia, A. inaequilatera* and *A. orthocarpa* over low sparse shrubland of mixed species dominated by *Acacia spondylophylla* over low hummock grassland dominated by a combination of *Triodia chichesterensis*, *T. wiseana, T. epactia, T brizoides* and *T. lanigera* on red-brown clay loam with metamorphosed granite, ironstone, dolerite, quartz and calcrete stones, sporadically over metamorphosed granite and dolerite outcropping, on lower slopes and colluvial outwashes of ranges and low flat-topped rises.	374.99	
6	Low open woodland to isolated trees of *Corymbia hamersleyana* over tall to mid sparse shrubland dominated by *Acacia inaequilatera*, *A. acradenia* and *Grevillea wickhamii* subsp. *hispidula* over low hummock grassland dominated by *Triodia chichesterensis* and/or *T. wiseana* on brown or occasionally red clay loam with calcrete, quartz and metamorphosed granite stones, in places over calcrete outcropping, on colluvial outwashes of ranges and colluvial stony plains.	208.5	

Unit ID	Unit Description	Mapped Survey Extent (Ha)*	**Example Photo** (Woodman Environmental, 2020)
7	Tall to mid sparse shrubland of mixed species including *Acacia inaequilatera*, *Grevillea pyramidalis* subsp. *leucadendron* and *A. orthocarpa* over low hummock grassland dominated by *Triodia chichesterensis* and/or *T. wiseana* on brown, red or red-brown clay loam with dolerite, calcrete and quartz stones, commonly with dolerite outcropping, on low hills.	369.86	
8	Low isolated trees of *Corymbia hamersleyana* over tall to mid sparse shrubland dominated by *Acacia bivenosa* and *A. inaequilatera* over low hummock grassland dominated by *Triodia chichesterensis* and/or *T. wiseana* and *T. angusta* on brown, red-brown or grey-brown clay loam with dolerite, calcrete, ironstone and quartz stones on colluvial stony plains.	134.14	

Unit ID	Unit Description	Mapped Survey Extent (Ha)*	**Example Photo** (Woodman Environmental, 2020)
9	Low isolated trees of *Corymbia hamersleyana* over mid sparse shrubland to isolated shrubs dominated by *Acacia acradenia, A. inaequilatera* and *Grevillea wickhamii* subsp. *hispidula* over low hummock grassland dominated by *Triodia wiseana, T. epactia* and sporadically *T. brizoides* on red, brown or red-brown clay loam with ironstone, metamorphosed granite or in some places dolerite or quartz stones over ironstone or metamorphosed granite outcropping on cliffs, ridges and crests and upper to mid slopes of ranges.	1388.77	
10	Low isolated trees of *Corymbia hamersleyana* and/or *Corymbia zygophylla* over tall to mid open to sparse shrubland dominated by *Acacia ancistrocarpa* and sporadically *A. tumida var. pilbarensis, A. inaequilatera* and *Grevillea wickhamii* subsp. hispidula over low sparse shrubland of mixed species dominated by *Bonamia erecta, Indigofera monophylla* and *Ptilotus astrolasius* over low hummock grassland dominated by *Triodia lanigera* and *sporadically T. schinzii* and/or *T. epactia* on red, brown or red-brown sandy or clay loam, often with quartz or ironstone stones, on plains.	1240.41	

Unit ID	Unit Description	Mapped Survey Extent (Ha)*	**Example Photo** (Woodman Environmental, 2020)
11	Low isolated trees of *Corymbia hamersleyana* over tall open to sparse shrubland dominated by *Acacia tumida* var. *pilbarensis, A. ancistrocarpa* and *A. acradenia* over low open to sparse shrubland of mixed species including *Bonamia erecta, Isotropis atropurpurea* and *Corchorus parviflorus* over low hummock and tussock grassland dominated by *Chrysopogon fallax, Triodia epactia* and occasionally *T. lanigera* on red, brown or red-brown sandy or clay loam with colluvial stones in minor drainage features including flats and small creeks.	185.53	
12	Low open woodland of *Corymbia hamersleyana* over tall sparse shrubland dominated by *Acacia inaequilatera* over mid sparse shrubland dominated by *A. bivenosa* and *Codonocarpus cotinifolius* over low sparse shrubland of mixed species dominated by *Corchorus parviflorus, Indigofera monophylla, Heliotropium chrysocarpum* and *Heliotropium pachyphyllum* over low hummock grassland dominated by *Triodia chichesterensis* and sporadically *T. epactia* or *T. angusta* on red, brown or grey-brown clay loam with calcrete or quartz stones on undulating plains.	59.67	

Unit ID	Unit Description	Mapped Survey Extent (Ha)*	**Example Photo** (Woodman Environmental, 2020)
13	Isolated low trees dominated by *Corymbia hamersleyana* over tall to mid sparse shrubland dominated by *Acacia orthocarpa, Grevillea wickhamii* subsp. *hispidula* and commonly *A. maitlandii and A. tumida* var. *pilbarensis* over low sparse shrubland of mixed species including *Corchorus parviflorus, Dampiera candicans, Goodenia stobbsiana, Indigofera monophylla* and *Scaevola browniana* subsp. *browniana* over low hummock grassland dominated by *Triodia epactia* and sporadically *T. brizoides* or *T. lanigera* on orange, brown or red-brown sandy or clay loam with granite and quartz stones over granite outcropping on undulating plains or low rises.	57.20	
14	Low open woodland to isolated trees dominated by *Eucalyptus victrix* and/or *Corymbia hamersleyana* over tall open to sparse shrubland of mixed species dominated by *Acacia pyrifolia* var. *pyrifolia, A. tumida var. pilbarensis* and *Melaleuca linophylla* over mid to low open to sparse shrubland of mixed species including *Cajanus pubescens, Indigofera monophylla, Tephrosia rosea* var. *clementii, Corchorus parviflorus* and *Jasminum didymum* subsp*. lineare* over low tussock and hummock grassland to open tussock and hummock grassland of mixed species dominated by *Triodia epactia, Cenchrus ciliaris, Chrysopogon fallax, Cymbopogon ambiguus* and *Eriachne tenuiculmis* on red or brown clay or sandy loam, usually with colluvial stones, in major creeks.	209.30	

Unit ID	Unit Description	Mapped Survey Extent (Ha)*	**Example Photo** (Woodman Environmental, 2020)
15	Mid isolated shrubs of *Acacia synchronicia* over low isolated *Chenopod* shrubs of *Maireana* sp. over low sparse forbland, tussock grassland and sedgeland of mixed species including Portulaca oleracea, *Ptilotus exaltatus, Cynodon prostratus, Sporobolus australasicus* and *Fimbristylis dichotoma* on red clay loam with colluvial stones on plains.	15.61	
Cleared / disturbed		781.69	

** minor differences occur between the extent of mapped vegetation units compared to total Study Area as a result of small inconsistencies in spatial mapping.*

7.1.2 Vegetation Association

Two vegetation associations are mapped within the proposed NVCP Permit Area and will be directly impacted by clearing activities. The Project Area lies predominantly within the Abydos Plains within the Chichester sub-region, which is characterised by folded and undulating Archaean granite and basalt plains and ranges. The basalt plains are characterised by hummock grasslands, shrub-steppe, kanji over soft spinifex and *Triodia brizoides.*

The percentage of the pre-European extent of the Vegetation Associations after impact is presented in **Table 13**. The proposed NVCP Permit Area will not reduce the extent of regional Vegetation Associations to below the 30% pre-European extent threshold (EPA, 2008).

TABLE 13: DIRECT AND REGIONAL IMPACTS – VEGETATION ASSOCIATIONS

Vegetation Association	Pre-European Extent	Current Extent Area	NVCP Permit Area	NVCP Permit Footprint	Percentage of pre-European Extent Remaining
	Hectares	Hectares	Hectares	Hectares	%
Abydos Plain - Chichester 93: Hummock grasslands, shrub steppe; kanji over soft spinifex	3,044,310.60	3,044,310.60	846.45	460.37	99.98
Abydos Plain - Chichester 626: Hummock grasslands, shrub-steppe, kanji over soft spinifex and *Triodia brizoides*	117,724.4	117,724.68	1,598.36	176.75	99.99

7.1.3 Vegetation Condition

Vegetation of the Flora Study Area has been mapped for vegetation condition as per the Vegetation Condition Scale adapted from Keighery 1994 and Trudgen 1988 (EPA, 2016a). Majority of the proposed NVCP Permit Area is mapped as Excellent condition (Woodman Environmental, 2020). Evidence of grazing and cattle trampling, mechanical and mining disturbance, and/or the presence of weeds have reduced the condition rating in some VUs to “Good” or “Poor” (Woodman Environmental 2020).

Vegetation condition over the Vegetation Study Area is presented in **Figure 15** and summarised in **Table 14**. The majority of the mapped vegetation in the Vegetation Study Area was rated as ‘Excellent’.

TABLE 14: VEGETATION CONDITION WITHIN THE VEGETATION STUDY AREA*

Condition Category*	Vegetation Survey Extent (ha)**	Extent Mapped in NVCP Permit Area (ha)	2023 New Native Vegetation Clearing (Proposed Disturbance Footprint) (ha)
Excellent	5,770.67	1,581.16	367.67
Excellent / Very Good	15.88	6.52	0.11
Very Good	49.83	21.63	5.62
Good	83.2	70.62	3.39
Good/Poor	21.84	3.95	0
Poor	19.60	10.01	1.86
Total Vegetation (Excellent to Poor)	5,961.02	1,693.89	378.65
Cleared ***	784.09	520.86	69.71
Total Area	6,745.11	2,214.75	448.36

** Vegetation description provided for in Woodman (2020)*

***Data sourced from Umwelt Woodman (2020)*

**** Includes Completely Degraded, Degraded and areas under Rehabilitation*

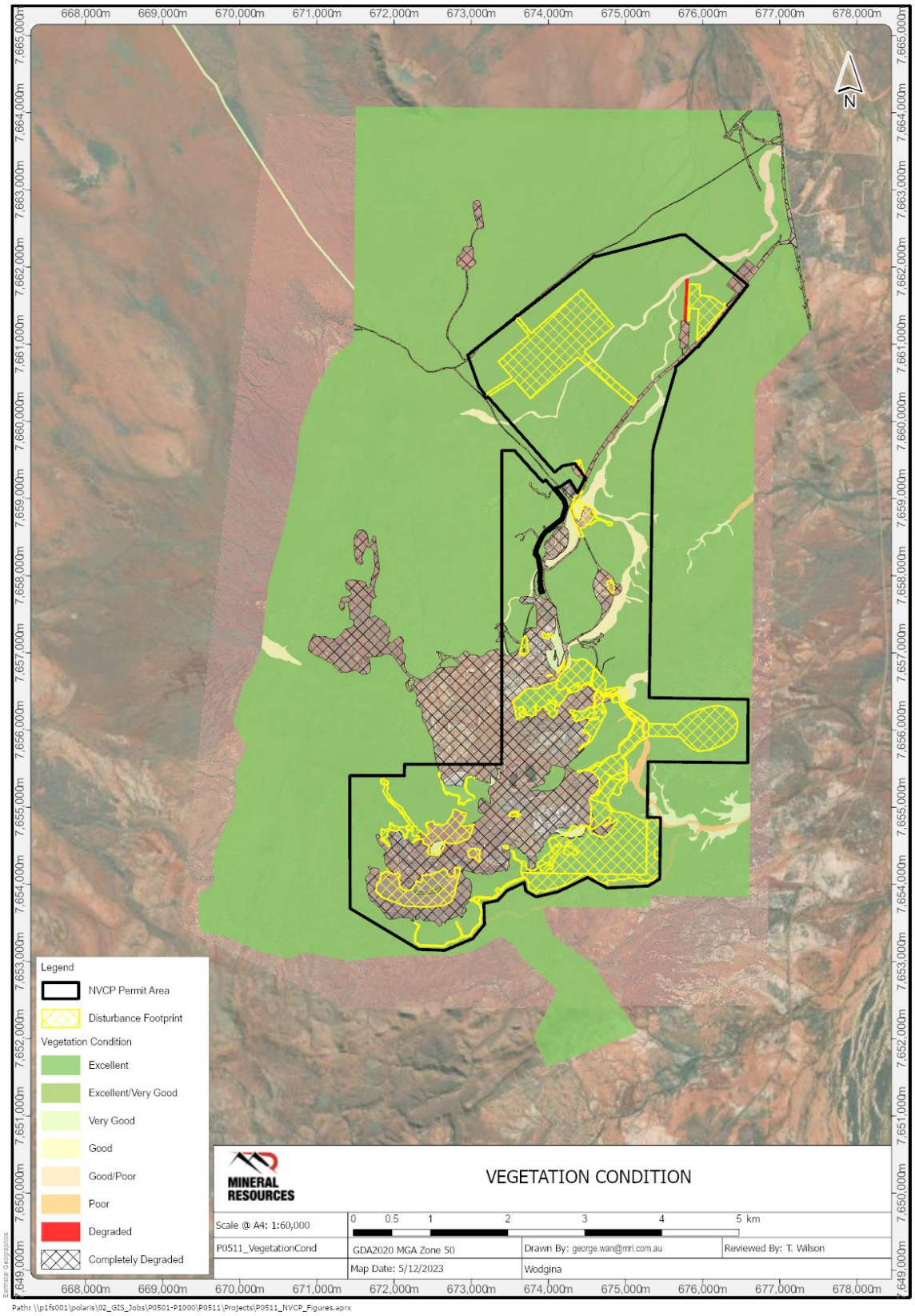


FIGURE 15: VEGETATION CONDITION

7.1.4 Conservation Significant Flora

No threatened flora species were recorded in the Project area. Woodman (2020) identified a total of six conservation significant flora species in the Project area, including five Priority species and one species considered significant for other reasons.

A further two taxa (*Abutilon aff. Hannii* (P3)*, Heliotropium muticum* (P3)) have been recorded in the wider Flora Study Area (Woodman Environmental 2020) but were not recorded in the proposed NVCP Permit Area despite intensive survey effort.

Suitable habitat occurs in the proposed NVCP Permit Area for a further three significant taxa (*Eragrostis crateriformis* (P3), *Gomphrena leptophylla* (P3) and *Goodenia nuda* (P4)); however, these taxa have not been recorded at Wodgina, despite targeted survey over multiple survey events (Woodman Environmental, 2020).

The priority species that are likely to be impacted from the proposed clearing, include:

- *Euphorbia clementii* (P3);
- *Terminalia supranitifolia* (P3);
- *Triodia chichesterensis* (P3); and
- *Vigna triodiophila* (P3).

These species are described in **Table 15** and locations shown in **FIGURE 16**.

TABLE 15: RECORDED PRIORITY FLORA RECORDED IN THE PROPOSED NVCP PERMIT AREA

Scientific Name	Status	Species Information
Euphorbia clementii	P3	• *Euphorbia clementii* is an erect herb growing to 0.6 m high, occurs on gravelly hillsides and stony ground, and is a fire responder. • There are 32 location records of this taxon in Western Australia representing approximately 16 broad localities. • The taxon was recorded in high numbers within the original Hercules Study Area in 2011. • As a typical fire responder, the taxon is relatively short lived. More recent surveys have recorded very low numbers of the taxon within the Study Area; no individuals were recorded during the targeted flora survey in 2019.
Terminalia supranitifolia	P3	• *Terminalia supranitifolia* is a spreading tangled shrub or tree growing up to 3 m high occurring on rock outcrops, cliffs and breakaways (WA Herbarium, 2018). • This taxon is endemic to Western Australia occurring over a range of approximately 275 km from Kangan Station in the east to near Pannawonica in the west (DBCA, 2007).
Triodia chichesterensis	P3	• *Triodia chichesterensis* is a hummock grass growing up to 0.4 m high occurring on plains and low ridges. • This taxon is endemic to Western Australia occurring over a range of approximately 91 km from the north of Indee Station in the north to the east of Mungaroona Nature Reserve in the south (DBCA 2007).
Vigna triodiophila	P3	• *Vigna triodiophila* is known to be associated with rocky hills, slopes and outcrops among boulders.

Scientific Name	Status	Species Information
		• This taxon appears to be endemic to the northern Pilbara in Western Australia (ALA 2019), with current DBCA records indicating it has a range of approximately 60 km from Burrup Peninsula (north of Karratha) in the north to near Lake Poongkaliyarra (south of Roebourne) in the south (DBCA 2007) • There are 12 location records of this taxon in DBCA's databases, representing approximately six populations, with the Study Area representing an additional population.

**Designates preferred habitat, based on proportional location representation and landform/soils.*

TABLE 16: SIGNIFICANT FLORA KNOWN TO OCCUR WITHIN THE PROPOSED NVCP PERMIT AREA

Flora Species	Conservation Status[1]			Preferred Habitat VUs	Within the proposed NVCP Permit Area		Within the proposed NVCP Permit Footprint		% individuals remaining in survey area after proposed clearing
	EPBC Act	BC Act	DBCA Priority		# Locations	# Individuals	# Locations	# Individuals	
Euphorbia clementii			3	2, 9, 10, 11	6	40	0	0	100 %
Terminalia supranitifolia			3	4, 9	215	351	51	69	95.46 %
Triodia chichesterensis			3	4, 5, 6, 7, 8, 9, 12	634	477,929	144	101,215	94.07 %
Vigna triodiophila			3	2, 7, 9, 14	24	481	0	0	100%

Key to status: Cr = Critically Endangered, En = Endangered, Vu = Vulnerable, Mi = Migratory, OS = Other Specially Protected Fauna, Priority 1 – 4 (P1 – P4)

It is important to highlight that within the proposed Permit Footprint, there are no additional occurrences of *Euphorbia clementii* and *Vigna triodiophila.* Notably, the proposed clearing will not affect 94.3% of the individuals surveyed in the area, signifying a minimal impact on the surveyed population compared to the broader survey area.

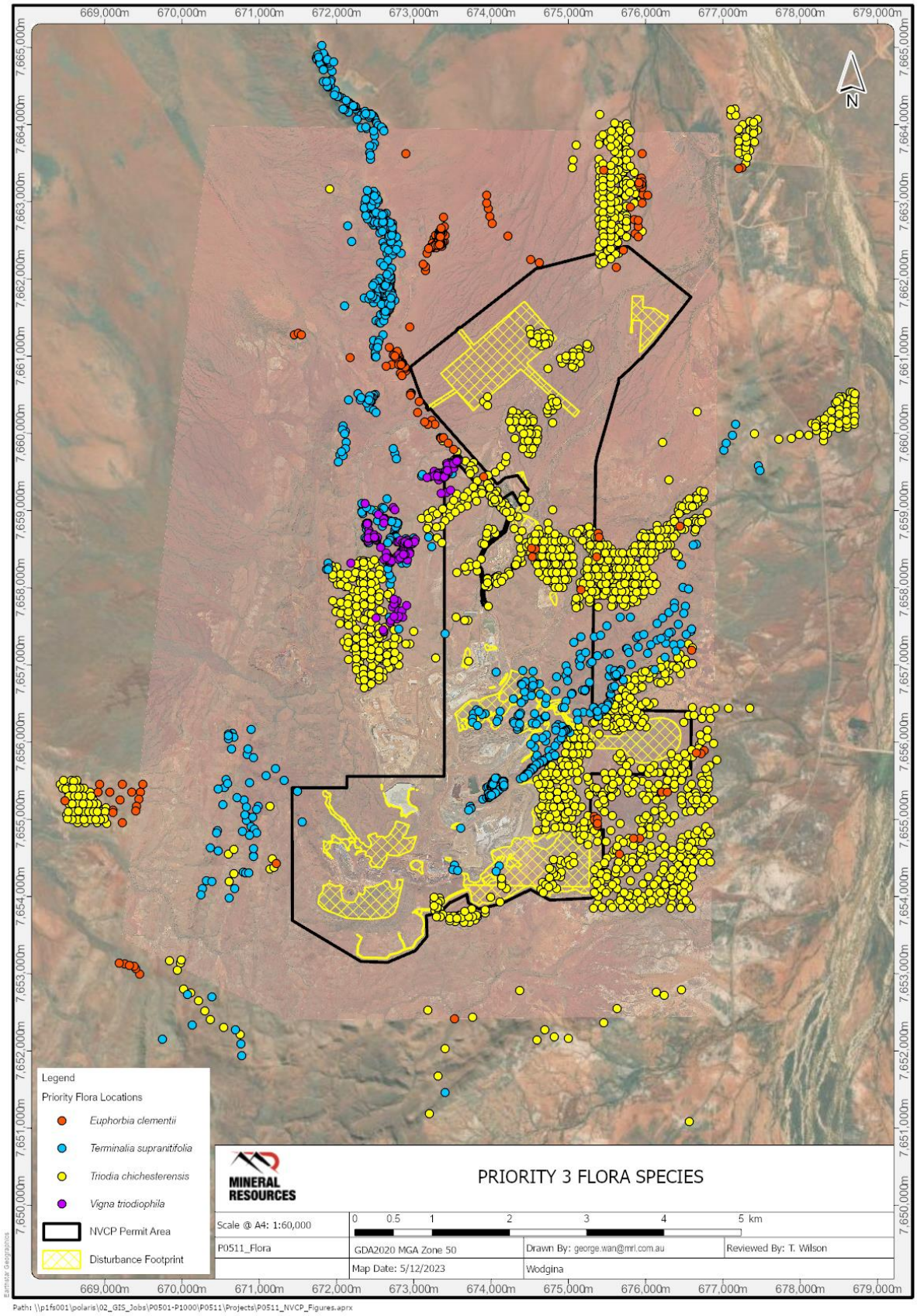


FIGURE 16: PRIORITY 3 FLORA SPECIES

7.1.5 Introduced Flora

A total of 11 introduced flora species have been identified during flora surveys undertaken at Wodgina (Woodman Environmental, 2020) . The species include:

- *Aerva javanica* (Kapok Bush)*;*
- *Calotropis procera* (Calotrope)*;*
- *Cenchrus ciliaris* (Buffel Grass)*;*
- *Cenchrus setiger* (Birdwood Grass)*;*
- *Chloris barbata* (Purpletop Chloris)*;*
- *Cynodon dactylon* (Couch)*;*
- *Eragrostis minor* (Smaller Stickgrass)*;*
- *Flaveria trinervia* (Speedy Weed)*;*
- *Passiflora foetida var. hispida* (Stinking Passion Flower)*;*
- *Physalis angulata* (Wild Gooseberry)*;* and
- *Trianthema portulacastrum* (Giant Pigweed).

Only one of these species, *Calotropis procera* (Calotrope), is considered a Declared Pest under the *Biosecurity and Agriculture Management Act 2007*. *Opuntia stricta* (Common Prickly Pear) is a Declared Pest and listed as a Weed of National Significance (WoNS), and although has not been recorded in the Project area, does occur in the region (Woodman Environmental, 2020).

7.1.6 Riparian Vegetation

No riparian vegetation associated with permanent water courses or permanent pools, such as the Turner River, has been identified in proximity to, or within the proposed NVCP Permit Area (Umwelt, 2022).

7.1.7 Groundwater Dependent Vegetation

Two VUs mapped within the wider Flora Study Area have been identified as containing Groundwater Dependent Vegetation (GDV) based on the presence of one of several phreatophytic species in the (VU 11 and VU 14).

The potential facultative phreatophyte *Melaleuca glomerata* is also known to occur at three locations in VU 14, while both *Eucalyptus victrix* (considered to be a vadophyte) and *Melaleuca linophylla* (potential facultative phreatophyte) are common in this VU. However, available evidence indicates that vegetation that is groundwater dependent is not extensive in the Study Area; it should be noted that depth to groundwater within elevated parts of Wodgina (main range) is generally at least 20 m from the surface (Golder, 2018), and therefore would not be accessible to any occurrences of VU 14 in these areas (Woodman Environmental, 2020).

No phreatophytic flora taxa or GDV have been identified within the proposed NVCP Permit Area (Woodman Environmental 2020).

The Wodgina Project has a GDV annual monitoring program to identify potential impacts of groundwater drawdown, as approved on GWL154570(20).

No impacts are anticipated to riparian vegetation or GDV and therefore are not discussed further in the impact assessment.

7.2 TERRESTRIAL FAUNA

Database searches were completed to generate a list of terrestrial fauna previously recorded within, and in the vicinity of, the Study Area, with an emphasis on species and communities of conservation significance and introduced species.

A literature review considered four publicly available survey reports of relevance to the Study Area, comprising two flora and fauna, one biodiversity and one fauna survey. Desktop database searches for the Permit Area included an EPBC Act PMST and a WA NatureMap Tool search. A search of the DBCAs Threatened and Priority Fauna Database was also undertaken.

Western Wildlife were commissioned by MARBL in 2019 to undertake a Level 2 Vertebrate Fauna Survey over the Project area. The study assessed previous surveys with additional field work and assessment in areas not previously surveyed. The results of this study, provided Attachment 5, are summarised below.

A total of ten amphibians, 108 reptiles, 140 birds, 33 native mammals and eight introduced mammals have the potential to occur in the Project area. The field surveys undertaken across the Project have so far identified five frogs, 71 reptiles, 89 birds, 25 native mammals and six introduced mammals (Western Wildlife, 2020). The survey work has identified the following aspects within the proposal area:

- five conservation-significant fauna species listed under EPBC Act and BC Act were recorded during the survey work, including:
    - Pilbara Leaf-nosed Bat (*Rhinonicteris aurantia*) (Vulnerable, Schedule 3);
    - Fork-tailed Swift (*Apus pacificus*) (Migratory, Schedule 5);
    - Western Pebble-mound Mouse (*Pseudomys chapm*ani) (P4);
    - Ghost Bat (*Macroderma gigas*) (Vulnerable); and
    - Northern Quoll (*Dasyurus hallucatus*) (Endangered, Schedule 2).
- A further two were considered likely to occur, including:
    - Grey Falcon (*Falco hypoleucos*) (Vulnerable, Schedule 3); and
    - Peregrine Falcon (*Falco peregrinus*) (Schedule 7).

7.2.1 Fauna Habitat

A total of eight fauna habitats have been recorded over the Project area as described in **Table 17** and displayed in **Figure 17**. All habitats are considered widespread in the region with the exception of Ironstone Ridgetop and Rocky Ridge and Gorge habitats with both considered to be limited in extent (Western Wildlife, 2020).

The Rocky Ridge and Gorge habitat is considered the most important habitat within the Project area, as it provides denning, breeding, roosting and foraging habitat for several protected fauna species, including the Northern Quoll, Pilbara Leaf-nosed Bat and Ghost Bat, and is limited in extent in the region compared with other habitat types. The Rocky Ridge and Gorge Habitat is associated with the Abydos Plain - Chichester 626 land system which extends northward in the landscape.

Biological survey work undertaken over the Project area has identified a number of roost habitat within the Rocky Ridge and Gorge Habitat that support the local population of Ghost Bats (

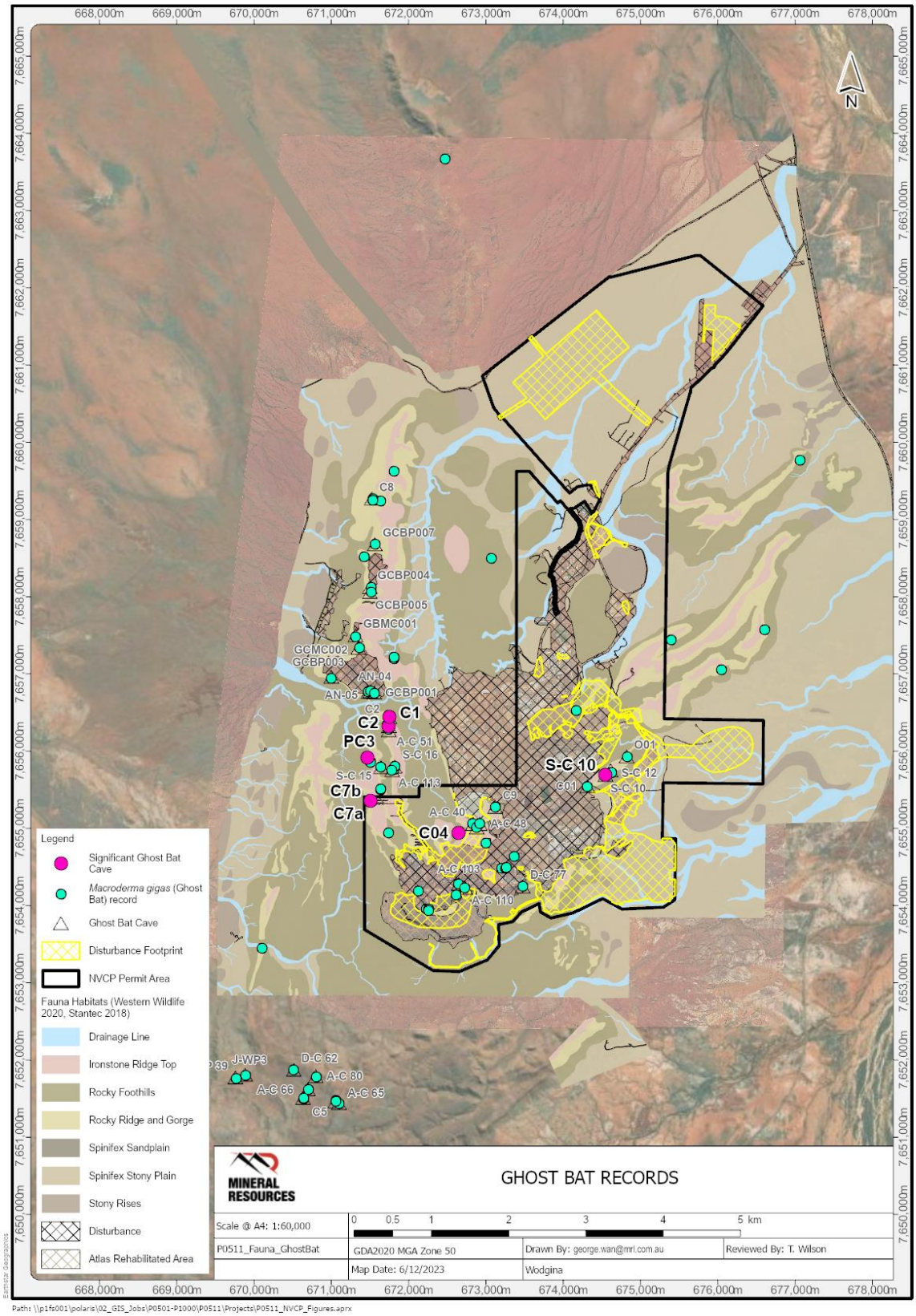


Figure 23) which are all located outside of the proposed permit area, including:

- Cave C1 - Potential Maternity roost located outside of the Permit Area;

- Cave C2 - Regionally significant diurnal roost located outside of the Permit Area;
- Cave PC3 - Potential Maternity roost located outside of the Permit Area;
- Cave C7A - Potential Maternity roost located outside of the Permit Area; and
- Cave C7B - Potential Maternity roost located outside of the Permit Area.

Cave S-C10 - Diurnal roost, located within the existing approved CPS 9911/1 Permit Area, is protected with a 100 m buffer area.

In addition to the information provided above, the following caves serve as both diurnal roosting and nocturnal foraging habitats for local populations of Pilbara Leaf-Nosed Bats (refer to **Figure 21**):

- Cave C1;
- Cave C2;
- Cave C3; and
- Cave PC3.

It's crucial to acknowledge that, within the context of this clearing permit application, the proposed operations will occur no closer to these caves than is permitted by current approvals. Consequently, there is no increase in potential impacts as a result of the proposed clearing activities in the application.

Regionally significant diurnal roosts supporting the PLNB population are known to occur within broader region, with the closest being the Yule River Roost (25 km from the Project area) (

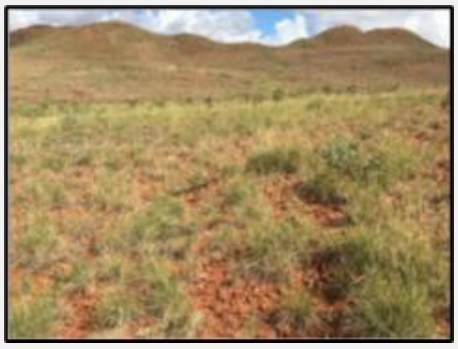
Figure 22). The Yule River roost is the closest permanent diurnal roost to the Project area however, the exact location of the roost has never been confirmed, with all records based on the triangulation of first calls after dark from other surveys in the region (DAWE, 2021).

Caves that specifically support Pilbara Leaf-nosed Bats (PLNB) colonies are important for breeding activities are generally deep humid caves with water sources, none of which have been identified in the proposed NVCP Permit Area. The Yule River roost is one of three known permanent diurnal Pilbara leaf-nosed bat roosts in the area that occur within the dispersal range of the species, with the other two being the Glacier Valley roost (approximately 30 km east from the project area) and the East Turner River roost (approximately 40 km north-east from the project area).

The Drainage Line habitat is also an important habitat however more widespread throughout the broader region. The habitat provides important ecological functions to several fauna species and support a diverse faunal assemblage. Drainage lines act as dispersal corridors between other habitat types. The presence of water, both permanent and semi-permanent, encourage foraging and hunting for a number of species (Umwelt, 2022). No semi-permanent or permanent pools existing within the proposed NVCP Permit Area (Western Wildlife 2020). The habitat also has the potential to support the Pilbara Olive Python; however, the species has not been identified during surveys (Umwelt, 2022).

Extensive survey effort across the wider Project footprint has identified a number of key habitat elements and the potential activity of conservation significant species, these are listed in **Table 17**.

TABLE 17: FAUNA HABITAT TYPES

Habitat	Key Habitat Elements	Total Area (Ha)	Example Photo
Ironstone Ridgetop	Small stones suitable for Western Pebble-mound Mouse	351.78	
Rocky Ridge and Gorge	Outcropping rocky areas, fallen boulders, caves, overhangs and rock crevices.	447.99	
Rocky Foothills	Sporadic rocky outcrops	1808.48	

Habitat	Key Habitat Elements	Total Area (Ha)	Example Photo
Stony Rises	Sporadic rocky outcrops	277.21	
Spinifex Stony Plain	Many minor drainage lines (not mapped separately) providing shelter for fauna. Small stones suitable for Western Pebble-mound Mouse. Tree hollows.	2890.22	
Drainage Line	May function as a corridor for fauna movement. Permanent and semi-permanent pools. Tree hollows. Leaf litter accumulations.	492.84	
Rehabilitated Land	Rehabilitated areas adjacent to the Atlas pit.	64.98	
Disturbed Areas		546.55	
	Total	6,880.07	

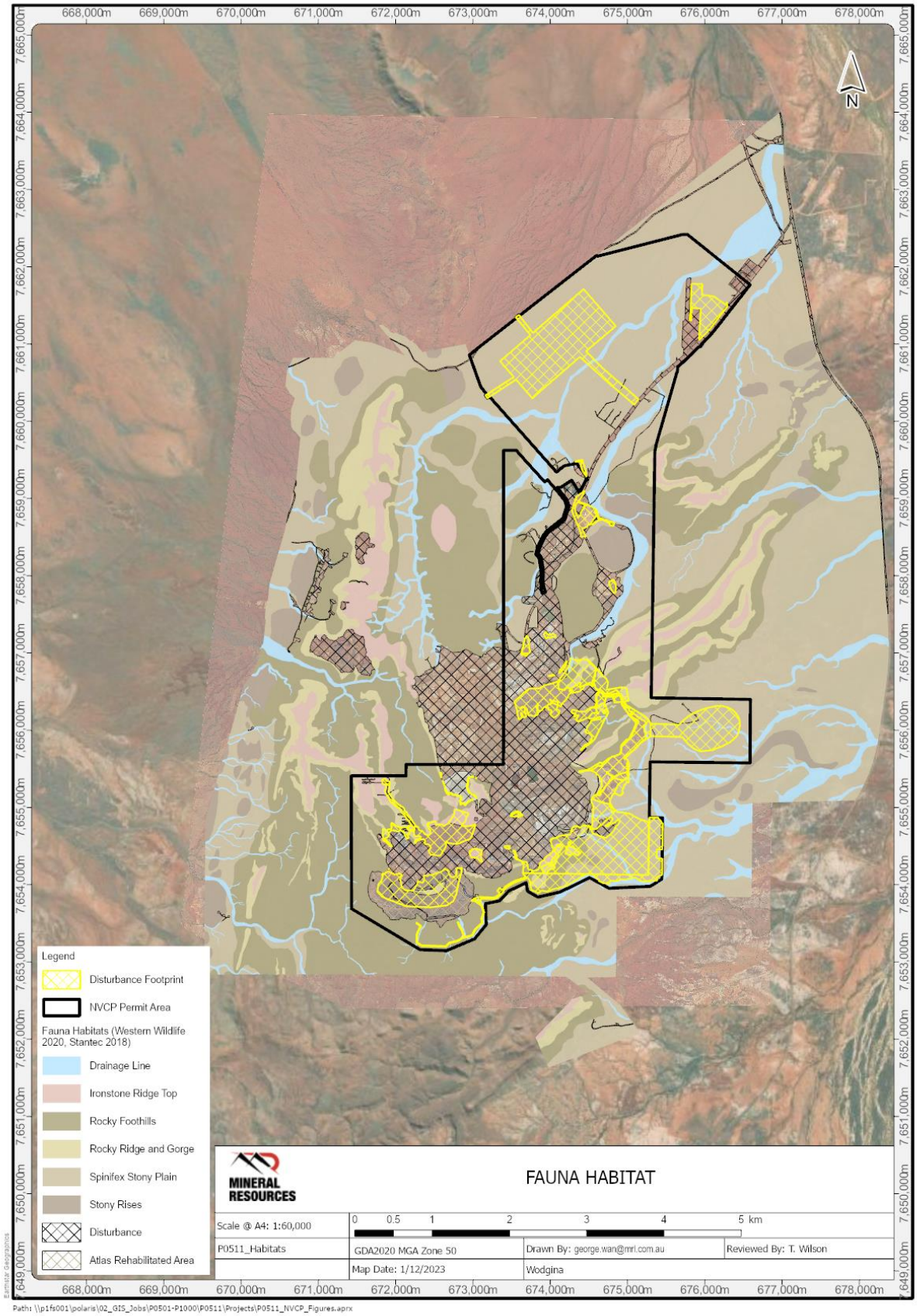


FIGURE 17: FAUNA HABITAT

7.2.2 Conservation Significant Species

The EPBC Act Protected Matters Search Tool identified seventeen (17) conservation significant species that are known to occur, or have the potential to occur, within or around the Wodgina Project. The Fauna Study Area has been extensively surveyed (Level 1, Level 2, and targeted surveys) and to date three (3) conservation significant species have been identified within the proposed NVCP Permit Area.

This section provides additional detail on conservation significant species known to occur in the wider Fauna Study Area or have a High likelihood of occurring (**Table 18**).

TABLE 18: SIGNIFICANT FAUNA WITHIN THE PROPOSED NVCP PERMIT AREA

Species	Conservation Status			Likelihood of Occurrence	Recorded in Projected Area	Comments on the potential presence of a species	Further Considered in the NVCP EIA
	EPBC Act	BC Act	DBCA Priority				
Dasyurus hallucatus Northern Quoll	En	En	-	Known to occur	Yes	• Has been recorded on fauna surveys between 2009 and 2019. • Shelter habitat in the Project area is primarily Rocky Ridge and Gorge habitat. • Drainage line habitat may also be important for foraging and dispersal. • Monitoring has occurred at eight sites since 2010 with a drop in numbers occurring post widespread bushfires in 2014 and 2016. • Monitoring surveys concluded that although the population had been affected by the fires, the local population has been increasing since 2017 indicating the species has not been negatively affected by mining operations at Wodgina. • Presence of females indicate Rocky Ridge and Gorge habitat within the Project area support a breeding population. • Records of Northern Quoll indicate their presence throughout the rocky range landform associated with the Abydos Plains land system, which extends northward from the Project area.	Yes
Rhinonicteris aurantia Pilbara Leaf-nosed Bat	Vu	Vu	-	Known to occur.	Yes	• Species has been recorded during detailed fauna surveys and targeted surveys. • Likely to forage in the Project area, particularly drainage line habitat. • No permanent diurnal roosts are present or likely to be present. Three permanent diurnal roosts are located 25 km from the Project area.	Yes

Species	Conservation Status			Likelihood of Occurrence	Recorded in Projected Area	Comments on the potential presence of a species	Further Considered in the NVCP EIA
	EPBC Act	BC Act	DBCA Priority				
						• Transitionary diurnal roost and nocturnal refuges have been recorded in the western part of the Study Area.	
Macroderma gigas Ghost Bat	Vu	Vu	-	Known to occur.	Yes	• Has been recorded during fauna surveys. • Likely to forage across the Project area. • Both diurnal roosts and potential maternity roosts recorded in the Project area and surrounds. • Significant numbers have been recorded on occasion representing a large proportion of the known population in the Chichester region.	Yes
Liasis olivaceus barroni Pilbara Olive Python	Vu	Vu		High	No	• Suitable habitats present within the Project area, however the Pilbara Olive Python has not been recorded during survey work undertaken to date.	Yes
Pezoporus occidentalis Night Parrot	En	Cr	-	Highly unlikely	No	• Species represented by very few records across the region. • Surveys conducted by Western Wildlife and Stantec failed to record Night Parrot across six separate sites. • Long-unburnt spinifex is present however is more heavily wooded than at known Night Parrot sites.	No
Falco hypoleucos Grey Falcon	-	Vu	-	Moderate	No	• Unlikely to breed in Project area due to the lack of suitable breeding habitat. • Potential breeding habitat nearby along the Turner River therefore is a potential foraging visitor.	No
Charadrius veredus Oriental Plover	Mi	Mi	-	Moderate (non-breeding only).	No	• Preferred habitat includes large inland waterbodies, as well as coastal foreshore habitats. None of these habitat types occur within the Project area. • Project area only likely to support low numbers of transiting individuals on an irregular basis. • Site is considered internationally significant when it supports 20,000 birds or 1% of the population.	No

Species	Conservation Status			Likelihood of Occurrence	Recorded in Projected Area	Comments on the potential presence of a species	Further Considered in the NVCP EIA
	EPBC Act	BC Act	DBCA Priority				
						• Site is considered nationally important when it supports 2,000 birds or 0.1% of the population.	
Tringa glareola Wood Sandpiper	Mi	Mi	-	Known to occur (non-breeding only).	Yes	• Habitat preference and consideration of significance is comparable to Oriental Plover. • One individual recorded in 2019 within the Project area. • Project area unlikely to provide important habitat.	No
Tringa hypoleucos Common Sandpiper	Mi	Mi	-	Known to occur (non-breeding only).	Yes	• Habitat preference and consideration of significance is comparable to Oriental Plover. • One individual recorded in 2019. • Project area unlikely to provide important habitat.	No
Apus pacificus Fork-tailed Swift	Mi	Mi	-	High	No	• Largely aerial species primarily observed foraging for insects in proximity to cyclonic weather. • Unlikely to be affected by changes to the Project area.	No
Falco peregrinus Peregrine Falcon	-	SP	-	High	No	• May breed on the Rock Ridge and Gorge habitat. • May forage in the remaining Project area if breeding nearby. • Project is not likely to be a significant impact on the species as it has a large population considered to be secure.	No
Ctenotus nigrilineatus Black-lined Ctenotus	-	-	P1	Moderate	No	• Species is data deficient and known from only few locations. • Habitats present may support the species.	No
Lagorchestes conspicillatus Spectacled Hare-wallaby	-	-	P4	Known to occur.	Yes	• A deceased individual was recorded in 2018. • Likely to occur in Spinifex Stony Plain. • Favours large long-unburnt spinifex hummock area to shelter.	No
Sminthopsis longicaudata Long-tailed Dunnart	-	-	P4	Known to occur	Yes	• Recorded in 2009 and likely restricted to rocky habitats. • Generally associated with breakaways and scree slopes, also occurring on gravel and stony plains.	No

Species	Conservation Status			Likelihood of Occurrence	Recorded in Projected Area	Comments on the potential presence of a species	Further Considered in the NVCP EIA
	EPBC Act	BC Act	DBCA Priority				
						• Likely to favour the Rocky Ridge and Gorge habitat, however may also occur in the Rocky Foothills, Stony Rise and Spinifex Stony Plain habitats throughout the Project area.	
Leggadina lakedownensis Lakeland Downs Mouse	-	-	P4	Moderate.		• Favours cracking and gilgaied clays however does occur in range of habitats including spinifex grasslands and stony ranges. • Not recorded in the Project area. • Recorded within 40 km of the Project and populations are known to fluctuate dramatically. • Potentially suitable habitats are present.	No
Pseudomys chapmani Western Pebble-mound Mouse	-	-	P4	Known to occur.	Yes	• Inhabits gentle stony slopes constructing pebble mounds, often situated near Acacia-lined minor drainages. • Both active and inactive mounds were recorded on spinifex stony plains. • Likely to occur Spinifex Stony Plains habitat that is well represented in the wider region.	No

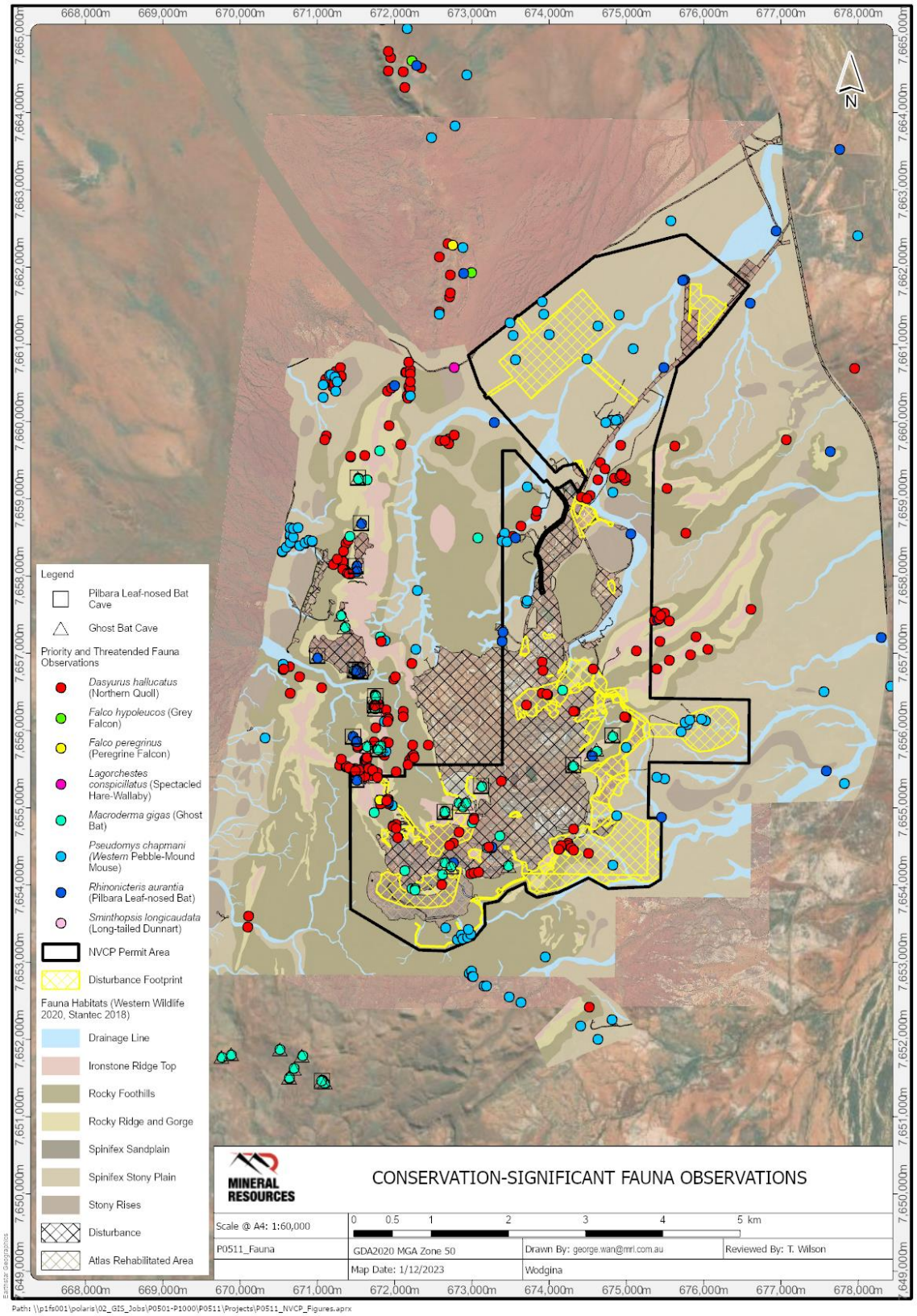


FIGURE 18: CONSERVATION SIGNIFICANT FAUNA OBSERVATIONS

Noting the species recorded and habitat types supporting them, the key conservation significant fauna species of concern that are the subject of the assessment include:

- Northern Quoll (*Dasyurus hallucatus*) (Endangered);
- Pilbara Leaf-nosed Bat (*Rhinonicteris aurantia*) (Vulnerable); and
- Ghost Bat (*Macroderma gigas*) (Vulnerable).
- Pilbara Olive Python (*Liasis olivaceus barroni*) – Vulnerable.

Northern Quoll (Dasyurus hallucatus) - Endangered

The Northern Quoll (*Dasyurus hallucatus*) is listed under the EPBC Act and BC Act as Endangered. The Northern Quoll preferred habitat includes Rocky Ridge and Gorge or Drainage Line Habitat.

Available survey records for the Northern Quoll start in 2008 with population sizes varying between years, most likely responding to environmental factors such as rainfall and fire events (Umwelt, 2022). Early survey records for the Northern Quoll suggested the species was locally abundant (11 female and three (3) male captures) with annual survey records dropping in 2014 and 2016 after widespread bushfires. Low capture rates continued in 2015 and 2016 with only one female trapped in 2017 and seven (7) individuals captured in 2018 (Western Wildlife, 2020). Combined survey effort in 2018 recorded the Northern Quoll on 24 occasions however a number of these may have been from the same animal (two motion cameras and 22 scat records) (Figure 13). Survey effort to date has not identified any denning sites within the proposed NVCP Permit Area (Western Wildlife, 2020).

Targeted survey effort within the proposed NVCP Permit Area in 2022 identified six (6) Northern Quoll records from ten (10) cameras over a survey detection rate of 72 trap nights (8.3%), as per the 2016 DoE guidelines, it's likely the population is currently at a low density (Stantec 2022). At the end of 2021 there was an extensive bushfire through the surrounding areas of the Project therefore it's possible the population is recovering from bushfire impacts (Umwelt, 2022).

The species is highly mobile and capable of dispersing up to 20 km in a night. The presence of females in the population indicates the potential for breeding within the Fauna Study Area. The Rocky Ridge and Gorge Habitat is associated with the Abydos Plain - Chichester 626 land system which extends northward in the landscape (**Figure 17**) is likely to provided denning and foraging habitat through the broader region. Supported by historic records of conservation significant fauna species, the Rocky Ridge and Gorge Habitat associated with the land system provides connectivity across the project area and surrounding environment, allowing for migration and dispersion of these key fauna species across the wider region. There will be some impact to a small percentage of the key habitats due to the footprint of the Project infrastructure, however, it is expected that the North Quoll will migrate to nearby suitable habitat during disturbance activities. Locations of Northern Quoll records are provided in **Figure 19**. An assessment of the scale and risk of impacts to the Northern Quoll is detailed in Section 9.3.

Fauna Species	Key Habitat Elements	
	Rocky Ridge and Gorge	Drainage Line
Northern Quoll (***Dasyurus hallucatus)***	• Breeding (no denning sites identified during survey efforts) • Foraging • Shelter • Dispersal	• Foraging • Dispersal

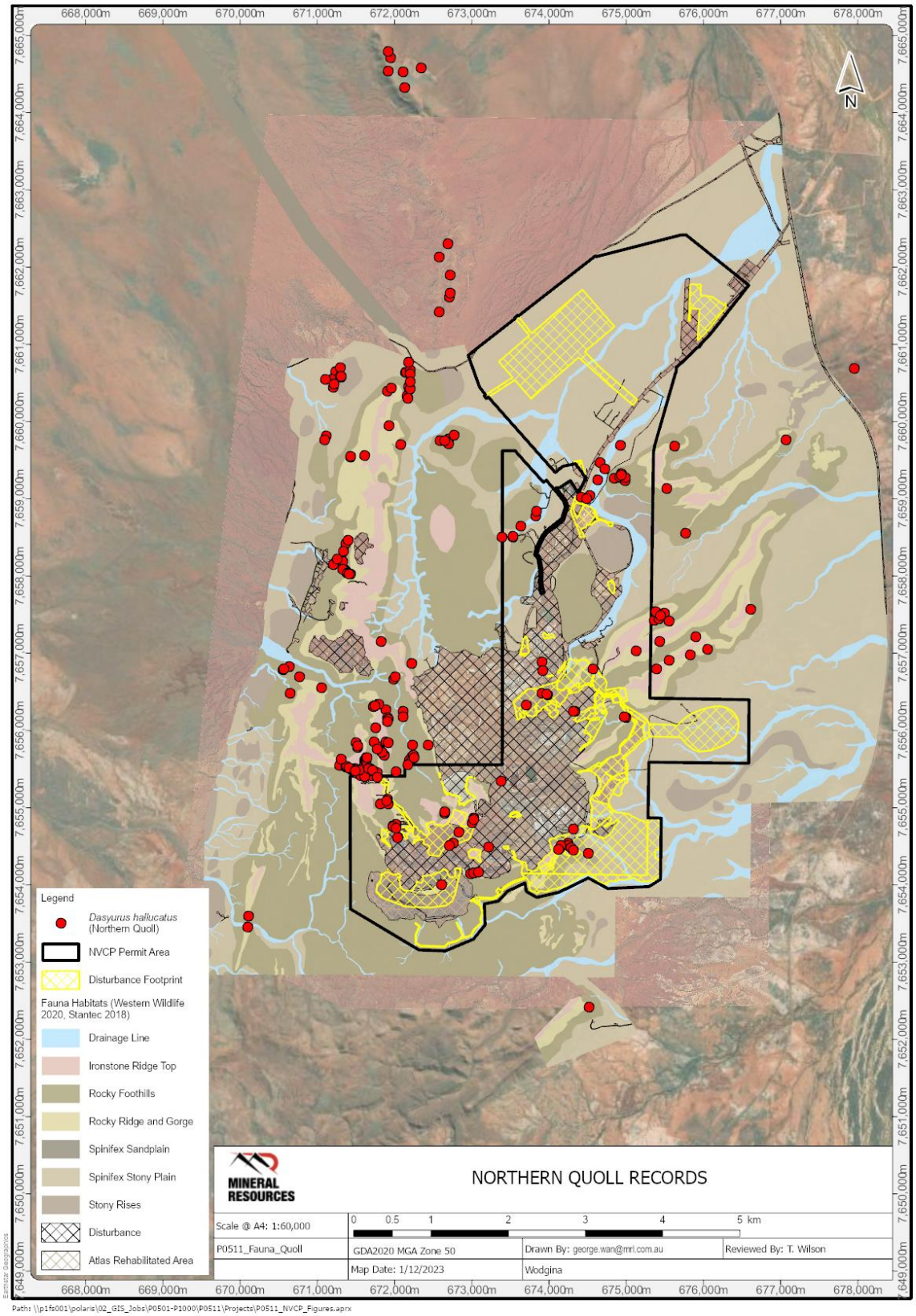


FIGURE 19: NORTHERN QUOLL RECORDS

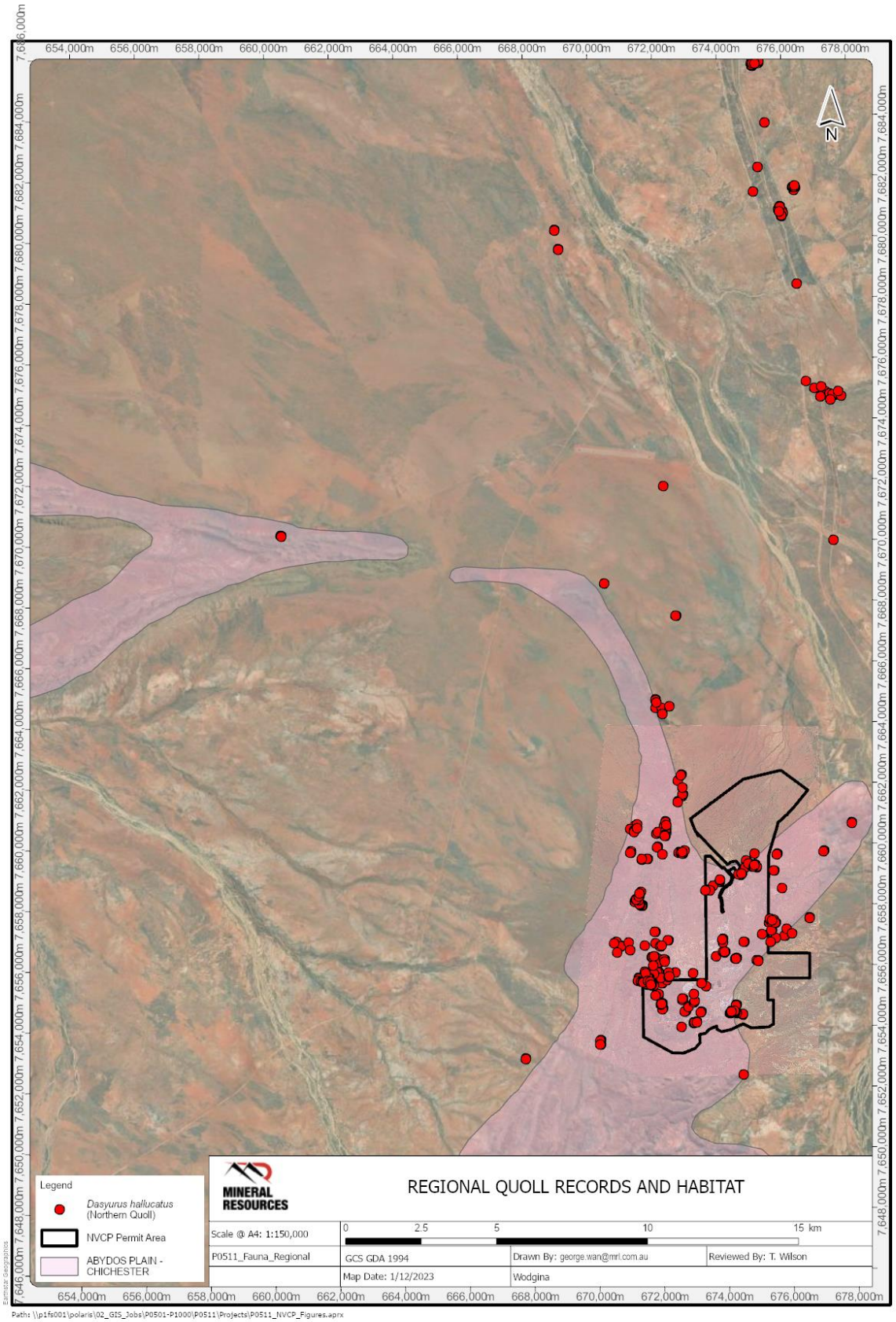


FIGURE 20: REGIONAL QUOLL RECORDS AND HABITAT

Pilbara Leaf-nosed Bat (*Rhinonicteris aurantia*) - Vulnerable

The Pilbara Leaf-nosed Bat (*Rhinonicteris aurantia*) is listed under the EPBC Act and BC Act as Vulnerable. The PLNB is a small, insectivorous cave roosting bat with orange, pale yellow, white, pale grey, or light brown fur. The PLNB Is endemic to Western Australia and is known to roost all year (Bat Call WA 2021). Survey effort since 2010 indicates that previous mining activities and current operations have not significantly impacted the use of local caves by bats where the cave is protected with a 100 m buffer (Stantec 2017, Biologic 2018b).

Targeted survey effort within the proposed NVCP Permit Area in 2022 recorded a number of PLNB bat calls over a 7-day period however echolocation recordings and cave assessments indicated low numbers of foraging PLNB (Stantec 2022). No breeding sites are known to occur however a single transitory diurnal roost and several nocturnal refuges have been recorded in the wider Fauna Study Area. Locations of PLNB are mapped in **Figure 21**.

The PLNB requires warm, humid daytime roosts sites, none of which have been identified in the wider Wodgina Project area. For permanent diurnal roosts the PLNB requires warm humid conditions all year round within deep caves with a water source (Western Wildlife 2020). No permanent diurnal roosts are known to occur in the Project area and one transitory diurnal roost (C2) has been identified along the western ridgeline (of the Fauna Study Area) and will not be impacted by the proposed NVCP Application (Figure 21). Such roosts are important for long-distance dispersal of the species. A number of nocturnal refuges have been identified across the Fauna Study Area, including within the proposed NVCP Permit Area. Nocturnal refuges are not critical habitat however are important for foraging at night and potentially as refuge or rest locations (Western Wildlife, 2020).

In the broader region, four (4) regionally significant diurnal PLNB roosts have been found, with three (3) being located within the dispersal/foraging range of the Project area. These regionally significant roosts with the nearest being the Yule River Roost located approximately 20 km north-west (

Figure 22). The Yule River roost is closed known permanent diurnal Pilbara leaf-nosed bat roosts in the area with the other two being the Glacier Valley roost (approximately 30 km east from the project area) and the East Turner River roost (approximately 40 km north-east from the project area) (see figure Project area). Noting that the PLNB dispersal and foraging range (distance that they fly nightly while foraging) has been recorded up to 30 km from their diurnal roost (DAWE, 2021), it is likely that the Wodgina population's key habitat is the Yule River Roost. Their

on-going presence and lack of suitable diurnal roosts in the Project area supports the likelihood that the Project area is foraging habitat for the species, or transitory route to other regional roosts. Foraging habitat for the species is available throughout the wider Wodgina Project Area across Drainage Line Habitats, gorges and over water pools (Umwelt, 2022).

Fauna Species	Key Habitat Elements	
	Rocky Ridge and Gorge	Drainage Line
Pilbara Leaf-nosed Bat ***(Rhinonicteris aurantia)***	• No permanent diurnal roosts • Transitory diurnal roost • Nocturnal refuges • Foraging	• Foraging

An assessment of the scale and risk of impacts to the PLNB is detailed in **Section 9.3.**

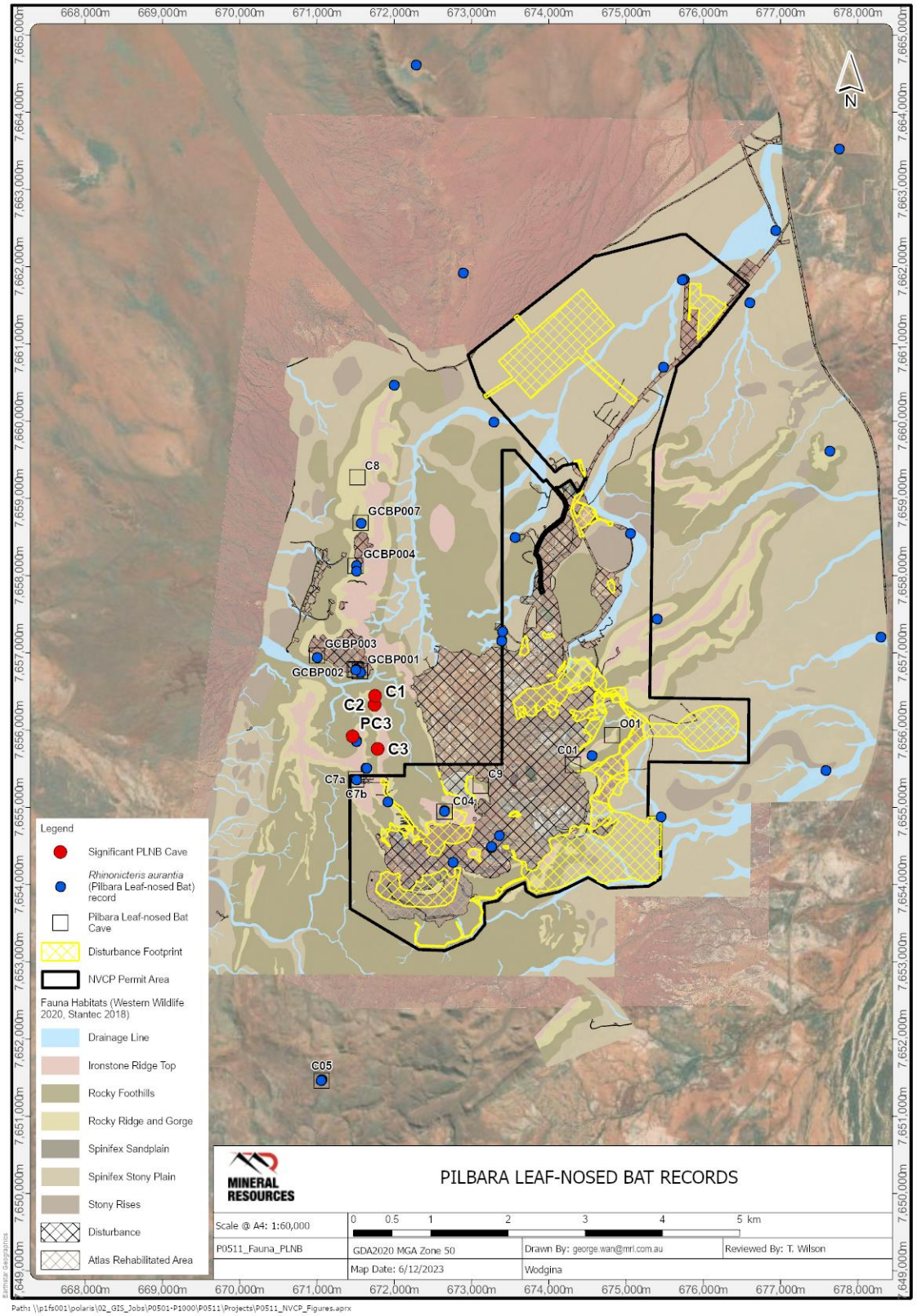


FIGURE 21: LOCAL PILBARA LEAF-NOSED BAT RECORDS AND ROOST HABITAT

FIGURE 22: REGIONALLY SIGNIFICANT PILBARA LEAF-NOSED BAT ROOSTS (INCLUDING DISPERSAL RANGE)

Ghost Bat (*Macroderma gigas*) - Vulnerable

The Ghost Bat (*Macroderma gigas*) is listed under the EPBC Act and BC Act as Vulnerable. The Ghost Bat uses the proposed NVCP Permit Area for roosting and foraging, with suitable habitat and known caves extending into the wider regional area and widespread in the Pilbara region.

The Ghost Bat has been previously recorded within the proposed NVCP Permit Area in 2009 and 2018 at a number of nocturnal refuge caves and one diurnal roost cave (

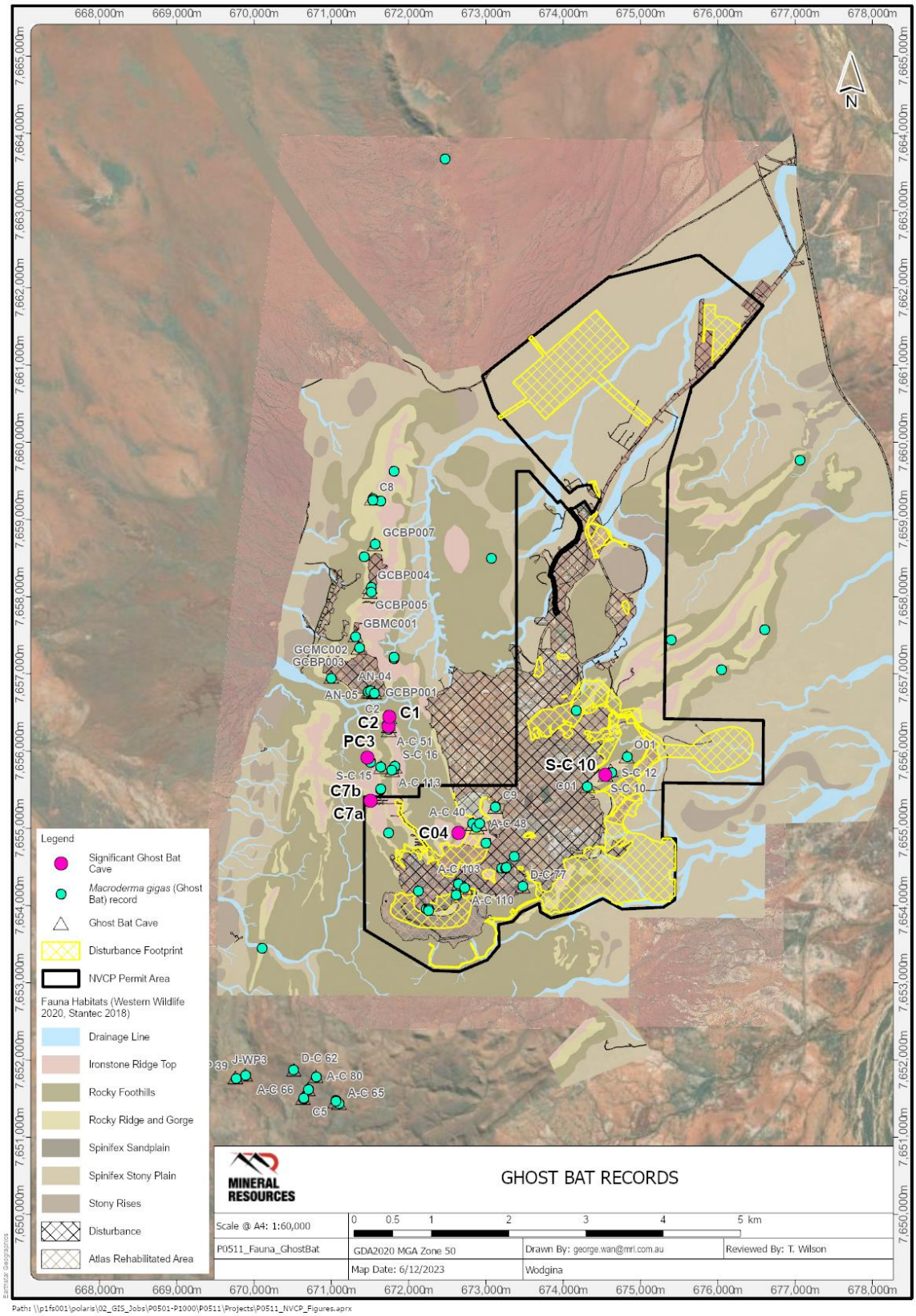
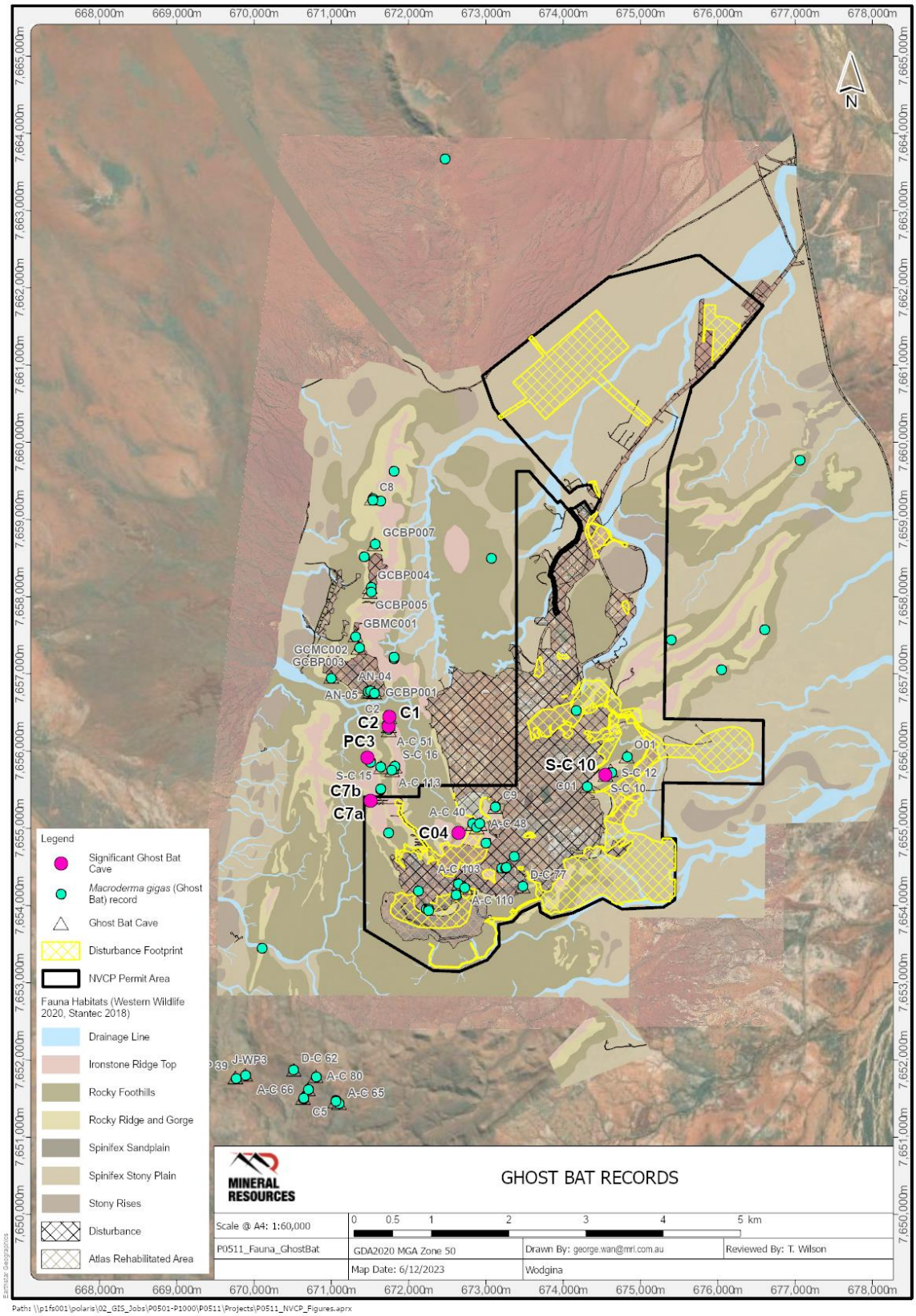


Figure 23) (Western Wildlife 2020). Targeted survey effort within the proposed NVCP Permit Area in 2022 recorded two (2) Ghost Bat calls over an 8 day period however echolocation recordings and cave assessments indicated low numbers of foraging Ghost Bat (Stantec, 2022).

At times the Ghost Bat has been recorded in significant numbers across the Fauna Study Area with diurnal Roost Caves and a potential maternity roost being identified outside of the proposed NVCP Permit Area. The Fauna Study Area has recorded three (3) potential maternity roosts, one (1) regionally significant diurnal roost, two (2) diurnal roosts and a number of nocturnal refuges. To the south of the Fauna Study Area a number of diurnal roosts and regionally significant diurnal roosts have been identified (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GCMC002
GCBP003
AN-04
AN-05
GCBP001
C2
C1
C2
PC3
A-C 51
S-C 16
S-C 15
A-C 113
C7b
C7a
C9
A-C 40
A-C 48
C04
A-C 103
D-C 77
A-C 110
S-C 10
O01
S-C 12
C01
S-C 10
J-WP3
D-C 62
A-C 80
A-C 66
A-C 65
C5
Legend
Significant Ghost Bat Cave
Macroderma gigas (Ghost Bat) record
Ghost Bat Cave
Disturbance Footprint
NVCP Permit Area
Fauna Habitats (Western Wildlife 2020; Stantec 2018)
Drainage Line
Ironstone Ridge Top
Rocky Foothills
Rocky Ridge and Gorge
Spinifex Sandplain
Spinifex Stony Plain
Stony Rises
Disturbance
Atlas Rehabilitated Area
MINERAL RESOURCES
GHOST BAT RECORDS
Scale @ A4: 1:60,000
0 0.5 1 2 3 4 5 km
P0511_Fauna_GhostBat
GDA2020 MGA Zone 50
Drawn By: george.wan@mrl.com.au
Reviewed By: T. Wilson
Map Date: 6/12/2023
Wodgina
Path: \\p1fs001\polaris\02_GIS_Jobs\P0501-P1000\P0511\Projects\P0511_NVCP_Figures.aprx

Figure 23).

Although not recorded on the October 2019 fauna survey and recorded in low numbers on occasion the Ghost Bat population is likely to move between caves within the Fauna Study Area and in the wider region (Western Wildlife, 2020). Roosts of such sizes represent a large proportion of the wider Chichester region population (Western Wildlife, 2020).

Ghost Bat populations have previously been recorded in numbers up to 65 bats in the identified regionally significant roost (outside the proposed NVCP Permit Area) and 60 bats in regional caves approximately 4 km south of the Fauna Study Area.

Survey effort since 2010 indicates that previous mining activities and current operations have not significantly impacted the use of local caves by bats where the cave is protected with a 100 m buffer (Stantec 2017, Biologic 2018b). The identified Diurnal roost within the proposed NVCP Permit Area is not within the proposed Disturbance Footprint and will be retained with a 100 m buffer.

Fauna Species	Key Habitat Elements	
	Rocky Ridge and Gorge	Drainage Line
Ghost Bat ***(Macroderma gigas)***	• Regionally significant diurnal roost • Potential maternity roost • Diurnal roosts • Nocturnal refuges • Foraging	• Foraging

An assessment of the scale and risk of impacts to the Ghost Bat is detailed in Section 9.3.

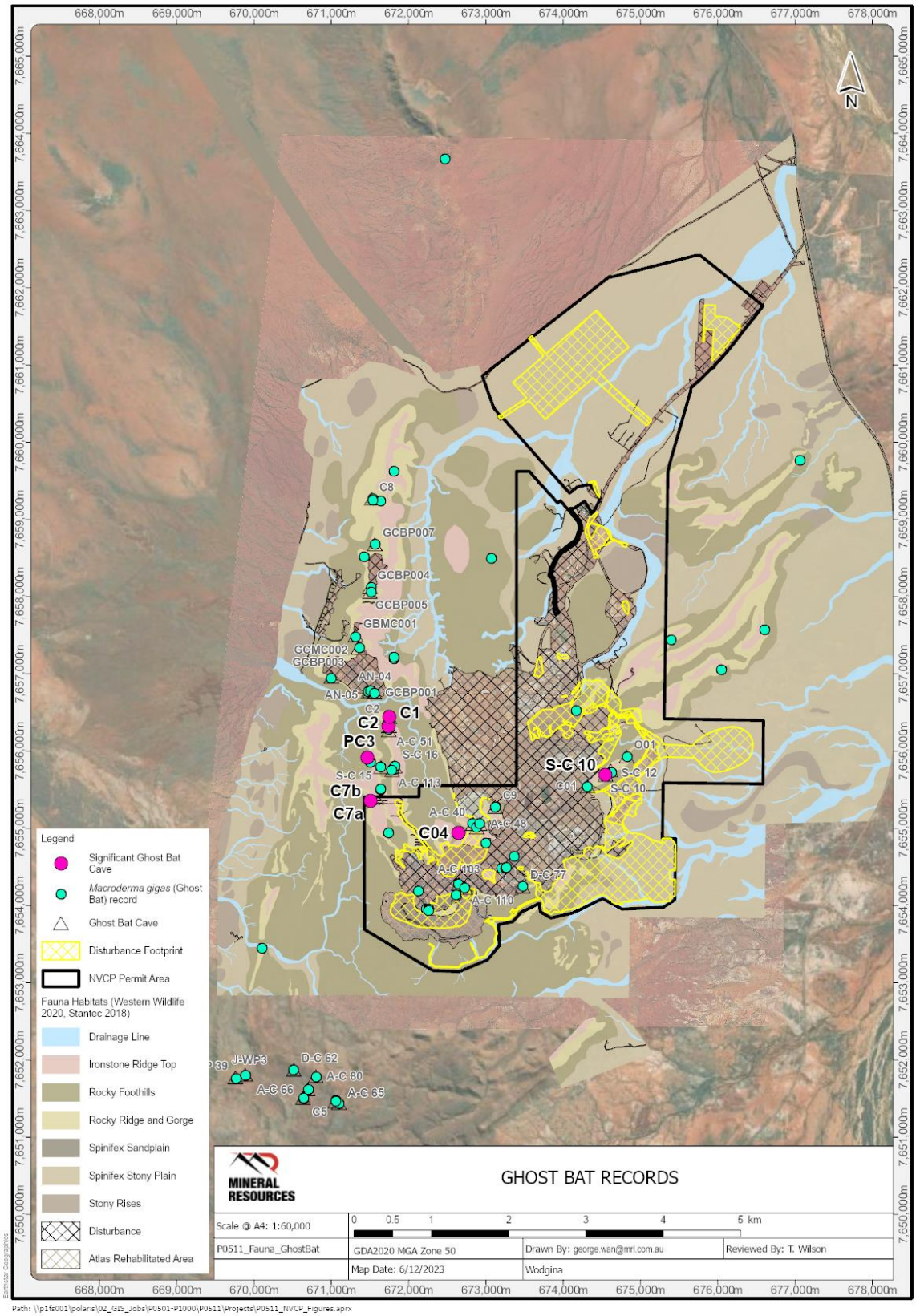


FIGURE 23: GHOST BAT RECORDS

Pilbara Olive Python - *Liasis olivaceus barroni*

The Pilbara Olive Python has not been previously recorded within the permit area (Western Wildlife, 2020). It is known to occur in other rocky ranges in the region and is considered likely to occur within habitat in the permit area (Umwelt, 2022). This species is strongly associated with rocky habitats, particularly areas with permanent or semi-permanent water. The rocky ridge and gorge habitat is considered to be critical habitat for this species with the drainage line habitat also considered to be important for dispersal and foraging (Umwelt, 2022). There are no semi-permanent or permanent water sources within the permit area.

7.2.3 Short Range Endemics

A number of Short Range Endemic (SRE) surveys have been conducted in the Fauna Study Area since 2008. No SRE of conservation significance has been identified at Wodgina during these surveys. SRE identified during the Outback Ecology 2018 survey were consistent with SRE species identified at other regional survey locations (i.e. Mt Dove). The proposed Disturbance Footprint is therefore unlikely to impact any potential SRE.

SREs have not been considered further in this application.

7.2.4 Subterranean Fauna

Stygofauna sampling in 2018 and 2019 identified a diverse stygofauna community across the Wodgina Project. A total of 37 species were identified, including 11 species of copepods, nine syncarids, seven oligochaete worms, five amphipods, three ostracods one isopod and at least one species of nematode worm (Bennelongia 2020). Majority of species were identified deep within the groundwater column from sample holes located in drainage lines on the surrounding peneplanes and therefore away from any potential pit void or drawdown impacts.

Assessments have been completed to assess the potential impacts of the Project and proposed mine expansion on Stygofauna. It's been determined that the risk of significant impact to Stygofauna species is considered to be Low (Bennelongia 2020, Bennelongia 2022).

Work was completed in 2010 to assess Troglofauna presence and potential impacts around Atlas pits. No Troglofauna species were identified during the 2010 works. Generally, prospective Troglofauna habitats include larger and more abundant voids and caves than what is currently available at the Project therefore the risk of significant impacts to Troglofauna is considered to be Negligible (Outback Ecology, 2011).

Subterranean fauna has not been considered further in this application.

7.2.5 Feral Animals

Six (6) invasive fauna species have been recorded across the wider Project footprint on surveys, these include the dog/dingo, fox, cat, horse, house mouse and the cow (to be expected from the overlapping pastoral lease) (Western Wildlife, 2019).

8. MITIGATION MEASURES

In accordance with *A guide to the assessment of applications to clear native vegetation* (DER, 2014), the impact mitigation sequence has been considered as part of the proposed clearing to ensure the environmental impact was kept to a minimum. Noting this, it is considered that the potential impacts associated with clearing of native vegetation and ground disturbance have been avoided and minimised to as low as practicable.

8.1 MEASURES TO AVOID

As described in Section 7, biological surveys identified a number of conservation significant flora and fauna species clustered within the Study Area and the original alignment of the Project's mining infrastructure footprint. MARBL has taken into consideration the mitigation hierarchy of avoid and minimise and have implemented a number of proponent-led modifications of design to avoid impacts to conservation significant species. These avoidance measures include:

- Conditional areas restricting clearing identified as buffer areas surrounding critical bat habitat that occur within the NVCP Application area for in close proximity including:
    - One (1) regionally significant diurnal roost will be retained with a 100 m buffer (Ghost Bat & PLNB) (C2)
    - One (1) diurnal roost will be retained with a 100 m buffer (for Ghost Bat) (S-C 10)
    - Four (4) Potential Maternity Roosts retained with a 100 m buffer (for both Ghost Bat & PLNB) (PC3, C7a, C1) & C7B (for PLNB);
    - One (1) transitionary diurnal roosts will be retained with a 100 m buffer (Ghost Bats) (C4).
- Where practicable avoid clearing of riparian vegetation, and where a watercourse or drainage line cannot be avoided, existing surface flow will maintained, or reinstated downstream into natural drainage lines.
- The original clearing permit area and footprint has been revised and reduced to avoid conservation significant habitat areas and therefore reducing the potential overall impact as a result of the proposed clearing.

It's crucial to acknowledge that, within the context of this clearing permit application, the operations will be located no closer to these caves than permitted under current approvals. Consequently, there is no incremental impact because of the proposed clearing activities.

8.2 MEASURES TO MINIMISE AND MANAGE

8.2.1 Measures to Minimise

In considering measures to minimise impacts to conservation significant fauna habitat, MARBL has modified the Project's conceptual footprint design to restrict the amount of clearing within Rocky Ridge and Gorge habitat to 20.02 ha and restrict the amount of clearing within Drainage Line habitat to 8.04 ha.

8.2.2 Environmental Management System

Potential environmental and social impacts will be managed through the implementation of the MinRes Environmental Management System (EMS). The EMS is consistent with the ISO 14001 EMS standard and is progressively reviewed to ensure operational risks are captured and potential impacts are managed and minimised. The EMS includes awareness training, plans, procedures and forms to avoid, minimise and ensure the effective management of environmental and heritage values.

The EMS includes a number of Management Plans and Procedures that are implemented to ensure onsite works are consistent with regulatory approvals and legislation. Below is a summary list of key EMS documents and environmental outcomes/conditions applicable to this NVCP.

The list of procedures applicable to exploration are provided in **Table 19**. These are considered sufficient to ensure the effective management of environmental and heritage risk by the proposal.

TABLE 19: WODGINA ENVIRONMENTAL MANAGEMENT PLAN (MRL,2019)

Document number	Document name
MRL-EN-PRO-0004	Land Clearing Procedure
MRL-EN-PRO-0003	Surface Water Management Procedures
MRL-EN-PRO-0005	Site Disturbance Procedure
MRL-EN-PRO-0001	Fauna Management Procedure
MRL-TS-WIN-0006	Clearing Work Instruction
MRL-EN-PRO-0007	Weed Hygiene and Control
MRL-EN-PRO-0009	Land Rehabilitation Procedure

Land Clearing Procedure and LAP Procedure

Strategies to avoid, minimise and manage environmental impacts have been built into the project's Land Access Permit (LAP) process. The LAP is a form completed specific to each project that involves ground disturbance, to ensure that relevant environmental and heritage obligations are understood, complied with and that the risks are effectively managed. MARBLE will ensure all clearing and ground disturbance is carried out in accordance with internal Land Clearing Procedures, which requires obtaining an approved Land Access Permit (LAP) from key internal stakeholders, including environment, heritage and land access teams, prior to any clearing activities commencing.

Specific conditions are placed on LAP to ensure the operational team understand compliance and EMS requirements associated with the work, and outline any specific limitations or requirements. The following management actions will be implemented to minimise and manage land disturbance impacts:

- Prior to clearing, an internal Land Access Permit will be completed and signed off by the Environment Department.
- The disturbance permit will identify any conditions that apply to the clearing area (including any protected areas / species to be avoided where practicable).
- The areas to be cleared must be clearly delineated on project drawings. In the field, the boundaries of the area to be cleared must be clearly demarcated using stakes and flagging, or other suitable method delineating the clearing area will be walked and marked with survey pegs and flagging tape to ensure only the surveyed area is cleared.
- All vehicles, plant and equipment are restricted to within the clearing limits. environmental awareness training is completed by personnel involved in clearing activities (including identification of flora of conservation significance).
- Observers and spotters will be used when working near sensitive sites or when boundaries may not be readily visible.

- No burning of vegetation spoil will occur on site.
- All cleared vegetation will be stockpiled for later use in rehabilitation activities.

These procedures also outline the recovery of soil resources for the purposes of stockpiling for progressive rehabilitation activities onsite. A minimum depth of 100 mm soil recovery is required across all disturbance footprints with the expectation that, where possible, deeper soil resources and/or stony lag resources will be recovered.

Surface Water Management

The purpose of Surface Water Management Procedure is to provide a framework management of surface water to prevent adverse impacts to surface water resources, either by contamination (including sediment and hydrocarbon/chemical contamination), controlled or uncontrolled discharges (including stormwater) or disturbance to natural drainage flows. Surface water resources include permanent or ephemeral drainage lines, rivers, creeks, lakes, wetlands and salt lakes.

Waste Management Plan

The purpose of the Waste Management Procedure is to provide a framework for the management of waste in order to prevent unnecessary and unacceptable detrimental impacts to the environment, and covers landfill management, tyre management and disposal, controlled waste management as outlined in the Environmental Protection (Controlled Waste) Regulations 2004, and recycling. The following management actions will be implemented:

- Ensure waste management onsite is consistent with approvals and legislation (for example the Part V Operational Licence L4328/1989/10).
- Outline waste types onsite and approved disposal methods.
- Ensure departments have adequate bin types and resources with lids to reduce windblown waste and fauna interactions.

Weed Hygiene and Control

MARBL will aim to ensure that no new species of weed (including both declared weeds and environmental weeds) are introduced into the project area and that the cover of weeds in adjacent undisturbed areas does not exceed the weed cover present prior to commencement of the project. The Weed Hygiene and Control Procedures allows for:

- Framework for managing invasive flora species (weeds) at the Project to prevent the introduction of weeds and/or the spread of weeds onsite. Includes annual weed surveys and control activities.
- Process for ensuring ground engaging equipment and heavy vehicles are decontaminated of any weeds, soil and/or organic matter prior to exiting/entering site.

The following management actions will be implemented to minimise the risk of introduced flora within the Project area:

- All employees and contractors are required to participate in the site induction, which will provide an awareness of weeds, including risk species, and an overview of the weed hygiene process.
- Ensuring any vehicles or earthmoving equipment leaving a mine is cleaned down so that it is free of vegetation or dirt, and, following an inspection, a Weed Hygiene Certificate (WHC) is issued. all vehicles and equipment will be cleaned before mobilisation to the proposed Purpose Permit Area, to remove all dirt and vegetative materials.

Hydrocarbon and Chemical Management Plan

Ensuring that hydrocarbon and chemical storage, transport, use, and disposal is compliant with relevant approvals and relevant legislation.

- Correct segregation of hydrocarbons and chemicals.
- Adequate bunding available for hydrocarbon and chemical containers and tanks.
- Details for correct spill response and disposal of contaminated materials.

Cultural Heritage Controls

All identified heritage sites are managed and protected by MARBL in compliance with the AH Act and ACH Act with strict internal procedures and processes (refer to **Section 5)**. Measures implemented to reduce impacts on Aboriginal Heritage sites include, but are not limited to:

- Avoidance of known heritage sites;
- Internal reviews and approvals prior to any new disturbance;
- Cultural awareness training and inclusion into site inductions;
- Demarcation of heritage sites in proximity to operational areas;
- Investigation of any unauthorised tracks or disturbance;
- Ongoing engagement and heritage surveys; and
- Development of Cultural Heritage Management Plan(s).

Other Site Controls

Mine planning and maintenance schedules ensure that all mobile and fixed plant and equipment onsite is regularly serviced and any potential issues are immediately escalated and repaired. This ensures the necessary controls for noise, vibration and dust are operational and minimising emissions from the Project.

Controls in place to reduce the potential for bushfires from operational activities such as Permits and controls for Hot Works and designated smoking areas. An Emergency Response Team is also onsite and regularly training to respond to potential fires.

Traffic Management Plan and access controls (such as witches hats and positive communications) to ensure only approved tracks and areas are accessed by onsite staff. The Traffic Management Plan will also designate speed limits to reduce dust generation and potential fauna hits, as well as restrict personnel and vehicle access to mine areas.

8.2.3 Site Specific Management Measures

In addition to the standard management and mitigative measures included in the MinRes EMS (Section 8.2.2), MARBL propose to undertake additional controls specific to Wodgina and this application. These management measures are detailed below.

Habitat Protection

Areas identified as Diurnal roosting locations for Ghost bats and Pilbara Leaf-nosed bats (Section 7.2.2) will be protected from mining related operations. Avoiding and minimising habitat degradation surrounding the site will also be managed as per **Table 20**.

TABLE 20: HABITAT PROTECTION MANAGEMENT ACTIONS

Management Action	Details	Frequency
Buffer Exclusion zones	• A 100 m exclusion zone will be allocated surrounding all known diurnal bat roosting sites. • Dust, fly rock and vibrational impacts will be managed to prevent disruption within allocated buffer zones.	Ongoing
Demarcation	• All roost locations shall be recorded in a site database, be accessible to all personnel (including Resource Development and Exploration), have associated spatial data, and be mapped on mine plans. • All known diurnal bat roosting sites will be recorded as environmentally sensitive areas and exclusion zones established. • Access shall be restricted unless authorised by the WLPL Project Manager, in consultation with the operations Environmental Advisor. • Potential new bat roosts will be reported to the Environmental Advisor and demarcated as required. • Demarcation of areas will not utilise barbed-wire or other fence structures that could cause bat entanglements.	Ongoing
Clearing	• Fauna clearance surveys shall be completed by a qualified fauna specialist when clearing of Rocky Ridge and Gorge habitat is undertaken, as well as undertake clearing in these habitat types via slow, progressive one-directional clearing to allow terrestrial fauna to move into adjacent habitat ahead of the clearing activity.	As required
Education	• All site personal will be informed of the exclusion zones and the site rules regarding access and protection.	Ongoing
Dust suppression	• Water cart for dust suppression.	Ongoing
Vehicle movement	• Vehicles will be prohibited to leave the designated project area footprint without an approved Land Access Permit. Existing disturbed area and tracks will be utilised where possible.	Ongoing

Surveys and Inspections

A summary of the proposed survey and inspection actions are presented in **Table 21**.

TABLE 21: SURVEY AND INSPECTION ACTIONS

Management Action	Details	Frequency
Pre-clearance surveys	Pre-clearance surveys shall occur prior to any clearing of identified Conservation Significant Species (CSS) habitat. • Where potential burrows, dens, nests or roosts are identified as 'active', CSS individuals will be, captured and relocated to suitable habitat. • Pre-clearance activities will be undertaken a maximum of two weeks and a minimum of three days prior to commencement of clearing activities and will focus on identifying Northern quoll habitat and presence. • To be conducted by a qualified Fauna Specialist. • Complete assessment of Study Area for potential Northern quoll dens or bat roosts. • Identify any active dens or roosts by walking through the Study Area and inspecting potential habitat areas. • If active dens or roosts are found, relocation shall occur (see Table 22). • Survey records shall be kept detailing the following: - Area surveyed. - Date. - Activity of any 'active' dens or roosts identified. - Details of any individual specimens recorded (species, health, etc).	A minimum of three days and a maximum of two weeks prior to clearing of identified CSS habitat
Trench inspections	In the event of open trenches, inspections shall occur as a minimum, on a twice daily basis to identify any entrapped animals. Fauna handlers shall undertake trench inspections within the following time periods: • All open trenches shall be inspected two hours after sunrise and two hours before sunset and immediately before backfilling. • Any entrapped fauna will be retrieved and released according to measures and procedures. • Weather conditions, particularly high rainfall and/or extreme temperature events need to be monitored regularly. If significant rainfall events are predicted and the trench cannot be backfilled in time, additional fauna inspections are to be undertaken to minimise the risk of fauna deaths due to drowning.	Daily
Fauna specialist requirements	• Pre-clearance surveys and relocation of CSS's, shall be conducted by a Fauna Specialist. The Fauna Specialist will meet requirements of applicable clearing permit, and shall have the following qualifications: • A tertiary qualification specialising in environmental science or equivalent. • A minimum of 2 years work experience in fauna identification and surveys of fauna native to the region being inspected or surveyed. • A valid fauna licence issued under the WC Act or BC Act.	N/A

Management Action	Details	Frequency
Fauna handler requirements	Trench inspections and fauna relocations shall be conducted by a Fauna Handler. The Fauna Handler shall have the following qualifications: • A valid fauna licence issued under the WC Act or the BC Act, if required. • WLPL approved snake handlers course certification.	N/A

Relocation

Only a qualified Fauna Handler or Specialist is permitted to undertake fauna relocations. **Table 22** details the specific management actions for relocation activities.

TABLE 22: FAUNA RELOCATION MANAGEMENT ACTIONS

Management Action	Details	Frequency
Clearing Relocation	• Potential and active dens or roosts will be identified for the proposed disturbance area. • Relocation method is to be determined by the Fauna Specialist or Handler, taking into account conditions. • Any SCC's captured will be relocated, where practicable, to suitable habitat (and under vegetation cover) at least 500 m away within 1 hour or suitably housed until sunset and then released at least 500 m away. • Records shall be kept in a register managed by the Environmental Advisor.	As required
Trench Relocation	• If fauna encountered, fauna shall be encouraged to exit the trench via a ramp, if appropriate. • If fauna unable to exit trench, appropriate traps shall be set or reptile catching techniques used.	As required
Fauna specific handling	• Where appropriate, gloves should be worn if handling animals. • Nocturnal animals should be temporarily held and released at night to avoid predation or released into suitably dense vegetation or rocky cover. • Refer to DBCA SOP: Hand Capture of Wildlife and DBCA SOP: Hand Restraint of Wildlife.	As required

Management Action	Details	Frequency
Relocation methods	• Relocation should be as soon as practicable, unless fauna is injured. • Relocation shall be conducted in a manner that minimises stress to fauna and risk of injury to fauna and handler. • Relocation sites can be identified by Fauna Handler prior to disturbance activities and where possible identified in the licence to take fauna. • Relocation shall be to a suitable habitat at an appropriate distance from the disturbance site (dependent on species and habitat) determined by the Fauna Handler: - Small species with small home ranges or specific home ranges should be relocated within this home range, which may be close. - Species from rocky habitats should be released within rocky habitats, even if within close proximity. - Large species with large home ranges can be released over 500 m from disturbance areas. • Fauna shall be placed under cover when relocated to provide protection until ready to move away. • Refer to DBCA SOP: Hand Capture of Wildlife and DBCA SOP: Hand Restraint of Wildlife.	
Record keeping	• Following details shall be kept in a site register: - Species. - Caught location (GPS) and time/date. - Number of individuals. - Individual condition (health/age/injuries). - Outcome (treatment/release/euthanisation). - Fauna handler / fauna specialist name. - Operations Supervisor name.	As required
Reporting	• All records, including fauna relocations, and injuries / fatalities to be retained onsite.	Ongoing

9. IMPACT ASSESSMENT

As part of the previous CPS 9911 NVCP application, DMIRS requested an assessment to be undertaken to compare the assessed impacts of the 2018 NVCP CPS 8230/1 submission with the CPS 9911 submission. This assessment is summarised with the environmental impacts of the proposed vegetation clearing in the following section.

Direct and Indirect Impacts

The impact assessment has considered for the following direct and indirect impacts associated with proposed clearing of native vegetation across the Permit Area:

- **Direct impacts** are defined as those impacts on environmental values occurring as a result of direct removal of significant flora, vegetation, fauna and fauna habitat components by the Proposal e.g. impacts arising from clearing of native vegetation or removal of fauna habitat such as caves.
- **Indirect impacts** are defined as those impacts on environmental values through indirect pathways as a result of the Proposal, and include causes such as dust emissions, altered hydrological regimes (groundwater drawdown and/or creation of drainage shadow), fragmentation of habitat and/or populations, increased predation and weed introduction.

Cumulative Impacts

The potential impacts associated with incremental loss of habitats supporting native flora, vegetation and fauna from the proposed clearing, when considering previous clearing associated with the project, as well as clearing undertaken within the local and broader region setting, presents a potential cumulative impact and threat to key the environmental values at the site and surrounding environment.

In the context noted above, cumulative impacts associated with the proposed clearing and ground disturbance activities have the potential result in the below impacts, and have been taken into consideration in assessing the scale and significance of the impacts:

- **Cumulative impacts** are defined as those impacts on significant flora, vegetation and fauna values as a combination of the Proposal and impacts through historical clearing, as far as they can be assessed.

To inform the Cumulative Impact Assessment for this NVCP application historical clearing data and habitat extents have been sourced from previous Impact Assessment reports prepared for CPS 9911/1 (Umwelt, 2022) and CPS 8230/1 (Woodman, 2019). Although the Impact Assessment reports are specific to the NVCP boundaries and associated clearing, the historic impact[1] relates to the broader local area and considered appropriate to inform the cumulative impact assessment for this NVCP Application.

A summary of historical clearing is included in Section 5.1 of Umwelt (2022) (Attachment 7).

9.1 FLORA

9.1.1 Loss of Conservation Significant Flora

Land clearing is recognised as a key threatening process and may result in the permanent loss of native flora species and vegetation. An assessment of key impacts from the proposed NVCP Application on conservation significant flora and vegetation values are presented below.

[1] Add footnote: The cumulative impact of the proposed Disturbance Footprint and existing Wodgina Disturbance are based on data available from Pre-Atlas DSO Project surveys in 2009. Prior to this there is no survey data to indicate impacts prior to 2009.

The direct impact clearing associated with this NVCP Application will have on Conservation Significant Flora is the removal of individuals and habitat through disturbance activities. The number of locations and individuals of each of the priority species within both the clearing area and footprint are provided in **Table 16.** **Table 23** further extrapolates these numbers as percentages.

TABLE 23: DIRECT IMPACTS – PRIORITY 3 FLORA INDIVIDUALS

Priority Flora Species	Total Number of Individuals Recorded	Total Number of Individuals Recorded 2023 NVCP Permit area		Proposed Disturbance Footprint	
		#	%	#	%
Euphorbia clementii	54,331	40	0.07	0	-
Terminalia supranitifolia	1,519	351	24.21	69	4.54
Triodia chichesterensis	1,707,667	477,929	29.75	101,215	5.93
Vigna triodiophila	2,480	481	19.39	0	-

It is important to highlight that within the proposed permit footprint, there are no additional occurrences of *Euphorbia clementii* and *Vigna triodiophila* and therefore these species will not be directly impacted as a result of this approval. The direct impact on the remaining two priority species, will be minimal when compared to the broader survey area, specifically:

- *Terminalia supranitifolia* (P3): 95.46 % of individuals will not be directly impacted as a result of the proposed clearing, when compared to the known population in the Flora Survey Extent.
- *Triodia chichesterensis* (P3): 94.07 % of individuals will not be directly impacted as a result of the proposed clearing, when compared to the known population in the Flora Survey Extent.

TABLE 24: DIRECT IMPACTS - PRIORITY 3 WITHIN VEGETATION UNITS (VU)

Priority Flora Species	Associated Vegetation Units	Wodgina Veg Study Area Extant of VU	2023 NVCP Application NVCP Permit area		Proposed Disturbance Footprint	
		Ha	Ha	%	Ha	%
Euphorbia clementii	2, 9, 10, 11	3649.27	882.28	24.18	201.68	5.53
Terminalia supranitifolia	4, 9	1713.11	407.65	23.8	84.8	4.95
Triodia chichesterensis	4, 5, 6, 7, 8, 9, 12	2867.2	824.54	28.76	190.7	6.65
Vigna triodiophila	2, 7, 9, 14	2802.5	563.96	20.12	100.72	3.59

Whilst **Table 23** infers what the potential impact is on identified individual priority species, the potential exists for those individuals to exist within associated vegetation units. **Table 24** therefore identifies the associated vegetation units for which these species are known to occur and summarises the potential direct impact for these individuals within each of the surveyed vegetation units, as they are related to the NVCP permit area and footprint. This information therefore indicates the following:

- *Euphorbia clementii* (P3): 94.47 % of the vegetation unit for which this species is associated will not be directly impacted as a result of the proposed clearing, when compared to the known population in the Flora Survey Extent.
- *Triodia chichesterensis* (P3): 95.05 % of the vegetation unit for which this species is associated will not be directly impacted as a result of the proposed clearing, when compared to the known population in the Flora Survey Extent.
- *Terminalia supranitifolia* (P3): 93.35 % of the vegetation unit for which this species is associated will not be directly impacted as a result of the proposed clearing, when compared to the known population in the Flora Survey Extent.
- *Triodia chichesterensis* (P3): 96.01 % of the vegetation unit for which this species is associated will not be directly impacted as a result of the proposed clearing, when compared to the known population in the Flora Survey Extent.

9.1.2 Cumulative Impacts

Due to the proposed Disturbance Footprint being delineated to avoid individuals of *Euphorbia clementii* and *Vigna triodiophila*, as well as the limited proposed clearing of these species associated vegetation units, which are widespread in the wider region, only impacts to *T. supranitifolia* and *T. chichesterensis* are considered further in this section and against the clearing principles.

Table 25 presents the number of historically recorded locations and individuals recorded for significant taxa that occur on areas that have previously been cleared. Historical clearing of *Terminalia supranitifolia* (P3) is considered worst case scenario; with this assessment undertaken purely using GIS and assuming impact on a number of individuals on the edge of ridges and on cliff faces, and assumes the inspection of such locations revealing these to be existent.

The historical impact on *Triodia chichesterensis* (P3) is relatively unknown due to the uncertainty of the distribution of this taxon in these areas, with only 16 known locations likely to have been cleared. Further historical impacts were likely, however are unable to be quantified (Umwelt, 2022).

TABLE 25: HISTORICALLY CLEARED SIGNIFICANT FLORA TAXA LOCATIONS AND INDIVIDUALS

Significant Taxon	Number of Locations[1]	Number of Individuals[1]
Terminalia supranitifolia	96	179
Triodia chichesterensis	16	17,012

1 Based on available data: Some cleared areas were never surveyed (Umwelt, 2022)

TABLE 26: CUMULATIVE IMPACT ON SIGNIFICANT FLORA - INDIVIDUALS

Significant Taxon	Total Number of Individuals Recorded in the survey area	Historical Impact[1]	Proposed Impact	Total Cumulative Impact	Total Cumulative Impact (%)
Terminalia supranitifolia	1,519	179	69	248	16.32
Triodia chichesterensis	1,707,667	17,012	101,215	118,227	6.92

1 Based on available data: Some cleared areas were never surveyed (Umwelt, 2022)

As presented in **Table 26**, the wors case scenario for the potential cumulative impacts to priority flora species (based on the assumptions listed above) include:

- *Terminalia supranitifolia* (P3): 16.32 % of individuals known to occur in the Flora Survey Extent; and
- *Triodia chichesterensis* (P3): 6.92 % of individuals known to occur in the Flora Survey Extent.

9.1.3 Scale and Significance of Impacts

Overall, there is considered to be a low likelihood of significantly impacting the local populations of flora taxa *Terminalia supranitifolia* (P3) and *Triodia chichesterensis* (P3) by clearing proposed, even prior to the implementation of any mitigation strategies.

Potential impacts to conservation signification flora (P3 species) and the likely significance of impact at different scales is summarised in **Table 27**. Refer to **Attachment 7** for full details on the methodology implemented and assessment process. Overall, the potential significance of impact to P3 Flora species is considered Low.

TABLE 27: SCALE OF IMPACTS ON CONSERVATION SIGNIFICANT FLORA

Species	Scale	Impact Assessment
Terminalia supranitifolia	Local	Proposed Disturbance Footprint will impact 4.54 % of individuals recorded in Flora Study Area and 4.95 % of preferred VU that is recorded in the Flora Study Area.
	Regional	*Terminalia supranitifolia* has a wide distribution with some populations in conservation estate. It's restricted to certain landforms (rocky mesas and escarpments). This P3 is long lived with few seedlings observed and re-sprouting after fire events. The Wodgina population is 190 km from other populations and not held in conservation. Moderate regional significance however the anticipated impacts are Low.
	Cumulative	Proposed Disturbance Footprint will impact 16.32 % of individuals recorded in Flora Study Area. Cumulative impacts to *Terminalia supranitifolia* will impact an Eastern subpopulation within the Flora Study Area that was potentially impacted by historical mining in nearby areas, however *Terminalia supranitifolia* has a wide distribution with some populations in conservation estate. Although the cumulative impact is elevated for this species, it is considered that impacts to 16.32 % of the known individuals are unlikely to result in a local or regional decline in abundance or population size, impact the local and regional viability or threaten the conservation status of the species.
Triodia chichesterensis	Local	Proposed Disturbance Footprint will impact 5.93 % of individuals recorded in Flora Study Area and 6.65 % of preferred VU, that is recorded within the Flora Study Area.
	Regional	*Triodia chichesterensis* is currently restricted to four known broad localities over a ~91 km range within the central Chichester region. Data suggests that the Wodgina population is the largest population however data suggests the P3 is dominant and grows densely where it grows. Moderate regional significance. Although the regional significance of the local populations at Wodgina is ranked as 'Moderate', this taxon is relatively widespread through the Wodgina Flora Study Area, with further records identified by Woodman Environmental to the west, south and east of the Study Area.
	Cumulative	Proposed Disturbance Footprint will impact 6.92 % of individuals recorded in Flora Study Area. Proposed Disturbance Footprint combined with historic impacts will not be significant due to the widespread populations, number of known records and suitable habitat available. Cumulative local impacts to locations, individuals and habitat are ranked Low.

Based on the above impact assessment, although the proposed clearing may result in local impacts to priority flora species and further increase fragmentation of the populations, these species are well represented locally outside of the application area. Provided that the numbers of individuals and habitat impacted is restricted to the amounts identified, the proposed clearing is not likely to have a significant impact on the long-term viability of the local populations. Therefore, it can be considered that the overall potential significance of impact to P3 Flora species is Low.

9.2 VEGETATION

9.2.1 Clearing of Native Vegetation

No TECs, PECs or significant vegetation were recorded in the project area. Two vegetation systems are mapped within the proposed NVCP Permit Area and will be directly impacted by clearing activities. The percentage of the pre-European extent after impact is presented in **Table 13** of Section 7.1.2. As demonstrated in this table, 99.98% of vegetation associated with Abydos Plain (93) and 99.99% of Abydos Plain (626) vegetation will not be impacted as a result if the proposed clearing footprint. The proposed NVCP Permit footprint will not reduce the extent of regional Vegetation Systems Associations to below the 30% pre-European extent threshold (EPA, 2008).

An assessment of direct impacts from the proposed NVCP Permit footprint for vegetation condition is provided in **Table 14.**

The proposed Disturbance Footprint will remove 6.98 % of native vegetation mapped as Excellent within the wider Flora Study Area, equating to 5.27 % of the total study area, including areas that are completely degraded, degraded and under rehabilitation.

9.2.2 Cumulative Impacts

The regional analysis on the impacts of clearing of vegetation units is limited by the lack of a comprehensive Pilbara vegetation dataset. Given that no vegetation in the permit boundary constitutes TECs or PECs, and in a regional setting the closest adjacent mining project is located 25 km eastward, the significance of the impacts in a cumulative context can be considered negligible at both local and regional scales. The extent of proposed footprint impact by areas and percentage of mapped extent of VUs within the Wodgina Flora Study Area are provided in **Table 28,** and explained in context in Section 7.1.1. Overall, the significance of local, regional and cumulative impact on vegetation units are considered minimal.

TABLE 28: DIRECT IMPACTS - VEGETATION UNITS

VU #	Flora Study Area	Proposed NVCP Permit Area		Proposed Disturbance Footprint	
	Hectares	Hectares	%	Hectares	% Known Extent
1	300.41	103.25	34.37	46.66	15.2
2	834.55	77.63	9.3	21.35	2.56
3	250.78	97.85	39.02	9.03	3.60
4	324.33	84.35	26.01	10.69	3.3
5	374.99	83.93	22.38	66.26	17.67
6	208.5	131.93	63.28	66.26	10.33

VU #	Flora Study Area	Proposed NVCP Permit Area		Proposed Disturbance Footprint	
	Hectares	Hectares	%	Hectares	% Known Extent
7	369.86	161.97	43.79	1.39	0.38
8	134.14	38.00	28.32	15.65	11.66
9	1388.77	323.30	23.28	74.1	5.34
10	1240.41	422.88	34.09	86.78	7.00
11	185.53	58.47	31.51	19.45	10.48
12	59.67	1.06	1.78	1.06	1.78
13	57.2	9.69	16.93	1.81	3.16
14	209.3	99.58	47.58	3.88	1.85
15	15.61	0	0	0	0

9.2.3 Scale and Significance of Impacts

Impacts to vegetation and significance and impact at different scales are not considered significant and have been summarised in **Table 29**.

TABLE 29: SUMMARY OF IMPACTS AND SIGNIFICANCE OF IMPACT – VEGETATION UNITS

Scale	Summary of Impacts
Local	No flora species are listed as Declared Rare or part of a TEC or PEC. The local direct impacts to VUs have been determined as negligible due to <18% of the mapped VU being impacted by the proposed Disturbance Footprint within the Flora Study Area proposed. Some VUs will not be impacted by the proposed Disturbance Footprint.
Regional	The impact predictions to quantify a regional analysis on vegetation units is limited by the lack of a comprehensive Pilbara vegetation dataset. However, given that no vegetation in the permit boundary constitutes TECs or PECs, the significance of local impact is considered negligible and therefore the regional impact on vegetation units are considered insignificant by default.
Cumulative	The cumulative impacts to all VUs have been determined as negligible due to <18% of the mapped VU being impacted by the proposed Disturbance Footprint within the Flora Study Area proposed. Assessment of the cumulative impacts and VUs conservation significance is also Low. Full historical cumulative assessments are not possible for VUs due to the lack of flora studies prior to older areas of the mine being developed. The potential for significant cumulative impact on mapped VUs has been ranked Low or Nil. There are no TECs or PECs within the proposed NVCP Permit Area therefore the significance of local impact is Low, and the regional impact will also be Low.

Based on the above impact assessment, and considering no vegetation unit mapped in the NVCP boundary area at Wodgina comprises conservation significant vegetation as defined by the EPA (EPA, 2016a; b). The impact of the footprint on all VUs is considered negligible, including cumulative impact on all VUs.

9.3 TERRESTRIAL FAUNA

This section provides a review of the key impacts relating to terrestrial fauna and habitat associated with the proposed clearing and ground disturbance. The key impact pathway from vegetation clearing has been identified as loss of fauna habitat.

9.3.1 Loss of Fauna Habitat

Fauna habitat types mapped as Rocky Ridge and Gorge habitat and Drainage Habitat are considered the most important habitat within the Project area as it provides denning, roosting and foraging habitat for several Threatened and Priority fauna species, including the Northern Quoll, Pilbara Leaf-nosed Bat and Ghost Bat.

The proposed clearing will resulting the removal of 20.2 ha of Rocky Ridge and Gorge habitat and 8.04 ha of Drainage Line habitat. Whilst the clearing of this habitat will result in a reduction of these fauna habitat types within the proposed footprint, it is unlikely to impact on the local population of these or any species, as sufficient habitat area remains in the Fauna Study Area outside the disturbance footprint, and in the remainder of the rocky range outside the Wodgina Fauna Study Area.

Northern Quoll

The preservation of the Rocky Ridge and Gorge habitat is vital for the survival of the Northern Quoll, as it serves as crucial shelter and breeding grounds, along with significant foraging habitat. Whilst the proposed clearing involves the clearing of 20.02 ha of Rocky Ridge and Gorge habitat, the Fauna Study Area encompasses over 400 ha of suitable habitat outside the disturbance footprint and extends northward into the wider bioregion (refer to **Figure 17**).

Historic records of North Quoll along the northern extent of the Rocky Ridge and Gorge habitat type indicate the connectivity of this habitat type, and noting that Northen Quoll are highly mobile and capable of dispersing over long distances in a night, it's likely that full extent of the habitat type supports the local presence. It is expected that the North Quoll will migrate to nearby suitable habitat during disturbance activities, therefore minimising the potential impact to the Northern Quoll local population.

Table 30 provides a quantitative assessment of the clearing of significant habitat supporting the species.

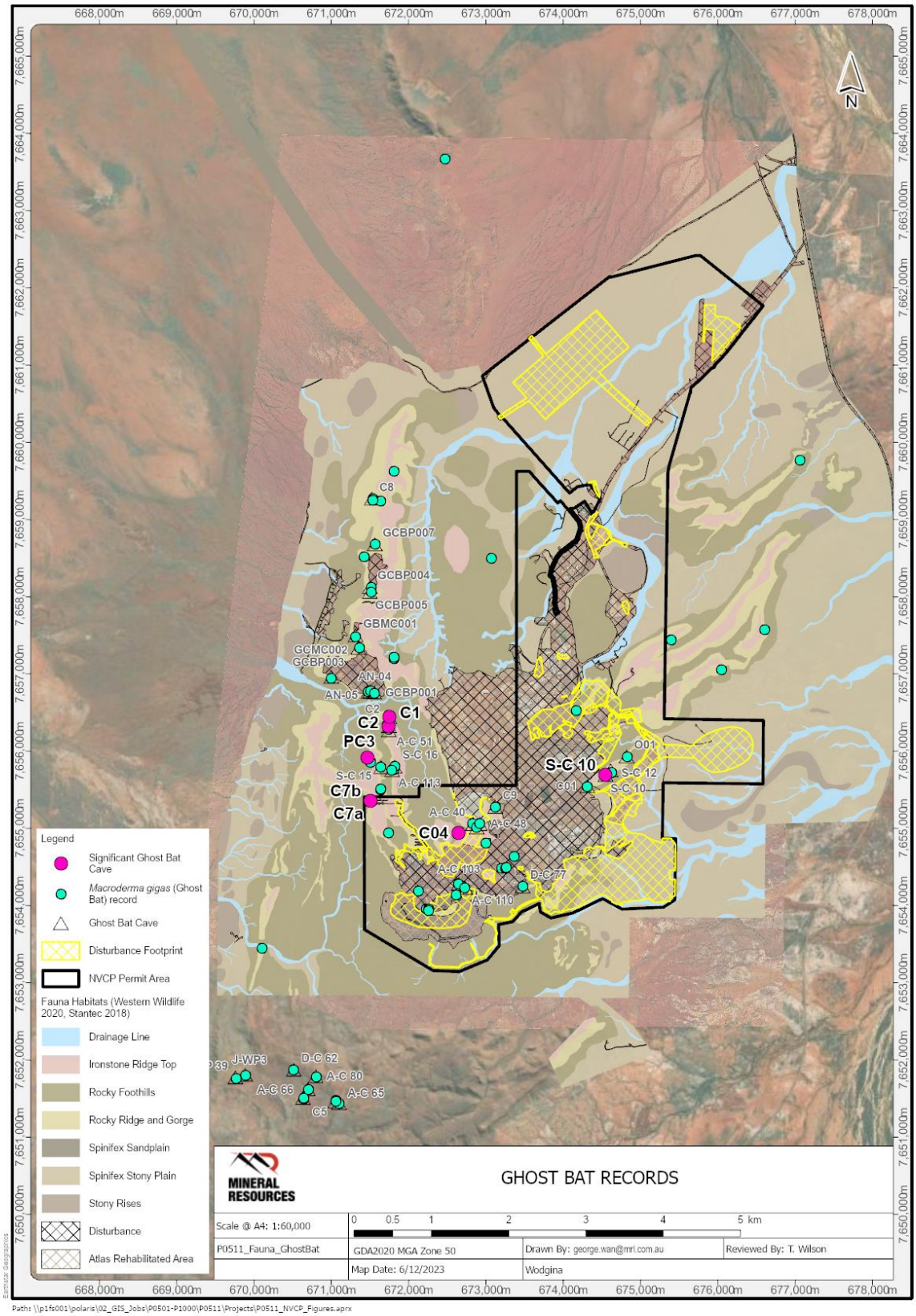
TABLE 30: NORTHERN QUOLL HABITAT IMPACT AND HABITAT REMAINING

Significant Fauna Habitat	Fauna Survey Habitat Extent (ha)	NVCP Proposed Clearing (Total incl. 9911/1)		Cumulative Impact		Habitat Remaining Extent	
		Ha	% (Mapped Extent)	Ha (Clearing including Historic and Proposed)	% (Mapped Extent)	Ha	%
Rocky Ridge and Gorge habitat Foraging and Denning Habitat	447.99	20.02	4.47	67.19	15.0	380.8	85.0
Drainage Lines Foraging	492.84	8.04	1.63	20.75	4.21	472.09	95.79

Ghost Bat

The Ghost Bat inhabits the proposed NVCP Permit Area for roosting and foraging, with similar suitable habitat and known caves extending into the wider regional area and widespread in the Pilbara region.

Ghost Bat populations have previously been recorded in numbers up to 65 bats in the identified regionally significant roost (outside the proposed NVCP Permit Area) and 60 bats in regional caves approximately 4 km south of the Fauna Study Area (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C7b
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A-C 40
A-C 48
C04
A-C 103
D-C 77
A-C 110
S-C 10
O01
S-C 12
C01
S-C 10
J-WP3
D-C 62
A-C 80
A-C 66
A-C 65
C5
Legend
Significant Ghost Bat Cave
Macroderma gigas (Ghost Bat) record
Ghost Bat Cave
Disturbance Footprint
NVCP Permit Area
Fauna Habitats (Western Wildlife 2020; Stantec 2018)
Drainage Line
Ironstone Ridge Top
Rocky Foothills
Rocky Ridge and Gorge
Spinifex Sandplain
Spinifex Stony Plain
Stony Rises
Disturbance
Atlas Rehabilitated Area
MINERAL RESOURCES
GHOST BAT RECORDS
Scale @ A4: 1:60,000
0 0.5 1 2 3 4 5 km
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GDA2020 MGA Zone 50
Drawn By: george.wan@mrl.com.au
Reviewed By: T. Wilson
Map Date: 6/12/2023
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Figure 23).

An exclusion zone surrounding the diurnal roosts is proposed as a mitigation measure for the species. Survey effort since 2010 indicates that previous mining activities and current operations have not significantly impacted the use of local caves by bats where the cave is protected with a 100 m buffer (Stantec 2017, Biologic 2018b). The identified Diurnal roost within the proposed NVCP Permit Area is not within the proposed Disturbance Footprint and will be retained with a 100 m buffer.

Table 31 provides a quantitative assessment of the clearing of significant habitat supporting the species.

TABLE 31: GHOST BAT HABITAT IMPACT AND HABITAT REMAINING

Significant Fauna Habitat	Fauna Survey Habitat Extent Hectares (# Roost Sites)	NVCP Proposed Clearing (Total incl. 9911/1)		Cumulative Impact		Habitat Remaining Extent	
		Ha (# Roost Sites)	% (Mapped Extent)	Ha (Cleared /Impacted including Historic and Proposed)	% (Mapped Extent)	Ha (# Roost Sites)	%
Rocky Ridge and Gorge habitat Foraging and Roost Habitat	447.99 (4)	20.02 (0)	4.47	67.19 (0)	15.0	380.8 (4)	85.0
Drainage Lines Foraging	492.84	8.04	1.63	20.75	4.21	472.09	95.79

Pilbara Leaf-nosed Bat

No significant diurnal roosts are known to occur and a single transitory diurnal roost and several nocturnal refuges have been recorded in the wider Fauna Study Area. A number of nocturnal refuges have been identified across the Fauna Study Area, including within the proposed NVCP Permit Area. Nocturnal refuges are not critical habitat however are important for foraging at night and potentially as refuge or rest locations (Western Wildlife 2020). These roost sites are proposed to be avoided and protected with a 100 m buffer.

PLNB on-going presence and lack of suitable diurnal roosts in the Project area supports the likelihood that the Project area is foraging habitat for the species, or transitory route to surrounding regional roosts. Foraging habitat for the species is available throughout the wider Wodgina Project Area across Drainage Line Habitats, gorges and over water pools (Umwelt, 2022).

Table 32 provides a quantitative assessment of the clearing of significant habitat supporting the species.

TABLE 32: PILBARA LEAF-NOSED BAT HABITAT EXTENT AND IMPACT

Significant Fauna Habitat		NVCP Proposed Clearing (Total incl. 9911/1)	Cumulative Impact	Habitat Remaining Extent

	Fauna Survey Habitat Extent Hectares (# Roost Sites)	Ha (# Roost Sites)	% (Mapped Extent)	Ha (Cleared /Impacted including Historic and Proposed)	% (Mapped Extent)	Ha	%
Rocky Ridge and Gorge habitat Foraging and Roost Habitat (number of roost sites)	447.99 (0)	20.02 (0)	4.47	67.19 (0)	15.0	380.8 (0)	85.0
Drainage Lines Foraging	492.84	8.04	1.63	20.75	4.21	472.09	95.79

9.3.2 Cumulative Impacts to Terrestrial Fauna

Rocky Ridge Habitat and Drainage Line Habitat are identified as being Critical and Important habitat to a number of conservation significant species (Umwelt, 2022).

The proposed Disturbance Footprint for this NVCP Application was assessed for cumulative impacts with the results of the Western Wildlife (2020) surveys for Rocky Ridge and Gorge and Drainage Line Habitats. The proposed clearing will involve the removal of 20.02 ha of Rocky Ridge and Gorge Habitat which equates to 4.47 % of the Fauna Study Area and 8.04 ha of Drainage Line habitat which equates to 1.63 % of the Fauna Study Area. When the impacts are considered in a cumulative context, taking into account the historic clearing at the site prior to 2022 and the new proposed disturbance, the cumulative assessment indicates that a total of 67.19 ha or 15 % of Rocky Ridge and Gorge habitat will be impacted as a result of undertaking the proposed clearing across the Project area. The cumulative assessment for total disturbance to Drainage Line habitat will be 20.75 ha or 4.21% of the pre-Atlas DSO 2009 habitat. Noting the above, the remaining extent of for these habitat types in the Project area and surrounding environment include:

- Rocky Ridge and Gorge habitat: 380.8 ha (85.0 %)
- Drainage Lines Habitat: 472.09 ha (95.79%)

Table 33 details the cumulative impact assessment's clearing impacts.

TABLE 33: DIRECT AND CUMULATIVE (PRE-2009 HABITAT) IMPACTS - HABITAT TYPES

Habitat	Fauna Study Area				Disturbed Post-Atlas DSO 2009-2022		Approved to be cleared in 9911/1	Cleared under 9911/1 to date	Remaining Approved to be cleared in 9911/1	Proposed NVCP Disturbance Footprint			
	Pre-Atlas DSO 2009		As at 2022							Proposed New Disturbance Total Hectares (Incl. remaining to be cleared 9911/1)		Cumulative Disturbance within Fauna Study Area	
	Hectares	%	Hectares	%	Hectares	%	Hectares	Hectares	Hectares	Hectares	%*	Hectares	%*
Ironstone Ridgetop	351.78	5.20%	218.68	3.20%	133.11	39.2	5.17	4.36	0.81	**10.78**	**3.07**	**148.25**	**42.14**
Rocky Ridge and Gorge	447.99	6.60%	410.21	6.10%	37.83	9.4	17.97	9.34	8.63	**20.02**	**4.47**	**67.19**	**15.00**
Rocky Foothills	1808.48	26.60%	1,679.32	24.80%	129.16	9.1	35.16	9.97	25.19	**50.00**	**2.76**	**179.16**	**9.91**
Stony Rise	277.21	4.00%	269.55	4.00%	10.81	0.5	0.11	0	0.11	**2.19**	**0.79**	**13.00**	**4.69**
Spinifex Stony Plain	2890.22	42.90%	2,824.54	41.80%	88.96	2.6	49.99	21.71	28.28	**239.06**	**8.27**	**260.77**	**9.02**
Drainage Line	492.84	7.00%	463.53	6.90%	10.21	3.1	5.6	2.5	3.1	**8.04**	**1.63**	**20.75**	**4.21**
Rehabilitated			64.98							**31.47**			
Disturbed										**86.74**			
						Total	114	47.88	66.12	**448.29**			

9.3.3 Scale and Significance of Impacts

In considering the scale and significance of the impacts to terrestrial fauna associated with this NVCP Application, it should be noted that, in 2018, an original project expansion scope was referred to the Commonwealth under the EPBC Act (EPBC 2018/8194) and was deemed **not a controlled action**. This proposal included a total proposed disturbance footprint of 560 hectares (ha) (320 ha within the mine site and 240 ha along the pipeline). The proposed clearing included 36.8 ha of Rocky Ridge and Gorge habitat and 26.4 ha of Drainage Line habitat. **Table 34** summarises the local, regional and cumulative impacts to conservation significant fauna.

TABLE 34: SCALE OF IMPACTS ON CONSERVATION SIGNIFICANT FAUNA

Species		Impact Assessment
Northern Quoll ***Dasyurus hallucatus***	**Local**	Although there will be a loss of a small percentage of the key habitats, with an additional 20.02 ha (4.47 %) of the pre-Atlas DSO 2009 Rocky Ridge and Gorge Habitat and 8.04 ha (1.63 %) of Drainage Line habitat, it is expected that the North Quoll will migrate to nearby suitable habitat during disturbance activities. The remaining extent of available Rocky Ridge and Gorge Habitat is 390.19 ha (95.12 %) and 455.49 ha (98.27 %) of Drainage Line Habitat, when compared to the remaining habitat within the fauna study area. The preservation of these habitat types is essential, with the complete restoration of these habitats posing challenges in being able to fully replicate the original form. Although there are potential indirect impacts on species individuals due to clearing activities, these can be effectively managed to ensure acceptable levels of impact and enable species to be able to migrate into the adjacent suitable habitat. Consequently, the likelihood of the proposed clearing causing a lasting decrease in the local species' size, fragmenting the population, or affecting vital ecological functions and breeding cycles is deemed highly improbable.
	Regional	The population is likely to extend throughout the rocky range surrounding the application area.
	Cumulative	When considering the level of cumulative impact, the remaining extent of suitable high value Rocky Ridge and Gorge Habitat is 372.17 ha (83.08 %) and 468.99 ha (95.16 %) of Drainage Line Habitat. Although there will be a direct impact to habitat critical to the survival of Northern Quoll, it is considered that reducing the amount of these habitat types are unlikely to result in a long-term decrease in size of the population, fragmentation or isolate the species, or impact the ecological function and viability of the local and/or regional population of Northern Quoll.
Pilbara Leaf-nosed Bat ***Rhinonicteris aurantia***	**Local**	Although there will be a loss of a small percentage of the key habitats, with an additional 20.02 ha (4.47 %) of the pre-Atlas DSO 2009 Rocky Ridge and Gorge Habitat and loss of 8.04 ha (1.63 %) of Drainage Line habitat, the Pilbara Leaf-nosed Bat population will not be directly impacted during disturbance activities. This area has been subject to targeted survey and no diurnal roosting caves were found or considered likely to occur inside the NVCP boundary area (Stantec 2018a). No habitat 'critical to the survival of the species' is recorded in the proposed NVCP Permit Area (TSSC 2016b). The nearest known transitory diurnal roost at cave C2 is located approximately 1.6 km to the west of the NVCP boundary area. Despite being located near the Wodgina DSO disturbance footprint, bat activity at this cave has been consistent during monitoring 2012 – 2018 (Biologic 2018b). Although the loss of Drainage Line foraging habitat may have a temporary impact on the local foraging population, the remaining extent of available Rocky Ridge and Gorge Habitat is 390.19 ha (95.12 %) and 455.49 ha (98.27 %) of Drainage Line Habitat, when compared to the remaining habitat within the fauna study area.

Species		Impact Assessment
	Regional	The population is likely to extend throughout the rocky range surrounding the application area. There are a number of regionally significant roost located in the broader environment including the Yule River Roost, which are known to support significant regional populations of PLNB. The Yule River Roost is located within the transitory range of the PLNB and will not be impacted by this application, with the local and regional population likely to be supported by this roost.
	Cumulative	When considering the scale of cumulative impact, the remaining extent of suitable high value Rocky Ridge and Gorge Habitat is 372.17 ha (83.08 %) and 468.99 ha (95.16 %) of Drainage Line Habitat. Although there will be a direct impact to foraging habitat, it is considered that reducing the amount of these habitat types are unlikely to result in a long-term decrease in size of the population, fragmentation or isolating the species, or impact the ecological function and viability of the local and/or regional population of PLNB.
Ghost Bat ***Macroderma gigas***	**Local**	This clearing application will result in the loss of an additional 20.02 ha (4.47 %) of the pre-Atlas DSO 2009 Rocky Ridge and Gorge Habitat and loss of 8.04 ha (1.63 %) of Drainage Line habitat. Although there will be a direct impact on this habitat, the remaining extent of available Rocky Ridge and Gorge Habitat is 390.19 ha (95.12 %) and 455.49 ha (98.27 %) of Drainage Line Habitat, when compared to the remaining habitat within the fauna study area. No known diurnal roost sites will be impacted by this application and a buffer area around transitory roost sites and nocturnal refuges will ensure the protection of the key habitat critical to the survival of the species. The closest diurnal roost, where two bats were recorded in 2009, is located 100 m from the disturbance footprint (Figure 5.4).
	Regional	The population is likely to extend throughout the rocky range surrounding the application area.
	Cumulative	When considering the scale of cumulative impact, the remaining extent of suitable high value Rocky Ridge and Gorge Habitat is 372.17 ha (83.08 %) and 468.99 ha (95.16 %) of Drainage Line Habitat. Or impacts will occur to regionally significant diurnal roosts. Although there will be a direct impact to foraging habitat, it is considered that reducing the amount of these habitat types are unlikely to result in a long-term decrease in size of the population, fragmentation or isolating the species, or impact the ecological function and viability of the local and/or regional population of Ghost Bats.

Based on the above impact assessment, it is considered that the potential impacts associated with clearing of native vegetation can be adequately managed to acceptable levels and therefore, it is considered highly unlikely that the proposed clearing will lead to a long-term decrease in the size of a species at a local or regional level, fragment the population or impact critical ecological functions and breeding cycles in the local or regional environments.

9.4 LAND DEGRADATION

Land degradation caused by land clearing and associated activities can cause changes in soil health and landscape functionality including salinity, erosion, acidification, and contamination. This has the potential to ultimately alter the fundamental ability of the land to support biodiversity, ecological processes, conservation significant species, as well as cultural values, anthropogenic uses, and economic growth (EPA, 2007). The land characteristics are summarised below:

- The land proposed to be cleared under this NVCP Application has a very high capability to be utilised for the final land use of mining and associated activities with a low risk to land degradation.

- The proposed Disturbance Footprint is optimised and restricted to areas required for the Mine Plan expansion. Staged clearing will ensure open areas are minimised.
- The physical and chemical characteristics of soils and shallow geology across the proposed NVCP Permit Area identified in **Section 6.5** indicates the following:
    - Soil characteristics provide stability against wind and water erosion and have a reduced water storage capacity.
    - Hard geology close to surface provides stability and reduces the risk of deep soil compaction and/or water logging.
    - Soil samples indicated on average natural levels of soil acidity, alkalinity, and salinity.
- Specific recommendations and rehabilitation targets for different soil types will ensure the most successful revegetation outcomes. Areas that are cleared will be undertaken in a staged approach to ensure development of the area occurs immediately reducing the potential for any wind or water erosion impacts. Due to cleared areas being completed developed and utilised there will be no open soil resources to potentially lead to areas of acidification or salinity.
- Surface water flood modelling has been undertaken to ensure that ephemeral streams through the NVCP Permit Area can be maintained. Drainage controls will be implemented as required.

The likelihood of a significant impact to the existing land condition from the proposed works is low.

9.5 HYDROLOGICAL

Clearing can alter the local hydrological regime of an area through direct and indirect impacts. Disturbance to existing water courses or wetlands can significantly reduce the biodiversity and ecological functions of the landscape while triggered changes to groundwater levels and potential impacts to vegetation dependent on groundwater levels. The hydrological environment is summarised below:

- The very tight geology and low permeability in the geology at the Project, and the depth to groundwater in the ridgeline areas, indicate that small influences such as clearing will not impact the groundwater environment. Clearing is not anticipated to cause fluctuations in the water table level. Refer to Section 6.6.6 for additional information on the hydrological environment of the proposed NVCP Application.
- There are several ephemeral drainage lines running through the proposed Permit Area and in areas these will be cleared and developed. Surface water flood modelling has been undertaken to ensure that ephemeral streams through the NVCP Permit Area can be maintained. Drainage controls will be implemented as required.
- There are no wetlands, water courses or riparian vegetation within, or in proximity to the proposed NVCP Permit Area.

The likelihood of a significant impact to the existing hydrological landscape from the proposed works is low.

10.ASSESSMENT AGAINST THE TEN CLEARING PRINCIPLES

An assessment has been completed against the Ten Clearing Principles (*EP Act 1986,* Schedule 5) to determine if there is a likely significant environmental impact as a result of the clearing native vegetation for the purposes of this project, within the proposed application area.

Each principle was assessed in accordance with Department of Environmental Regulation's (DER) *"A Guide to the Assessment of Applications to Clear Native Vegetation*" (DER, 2014).

In summary, the proposed NVCP Application is not at variance or not likely to be at variance (green) with all Clearing Principles. A full assessment of the proposed NVCP Application against Clearing Principles is shown in **Table 35**.

TABLE 35: ASSESSMENT OF VARIANCE WITH CLEARING PRINCIPLES

Clearing Principle	Impact Category	Assessment of Clearing Principle
(a) Native vegetation should not be cleared if it comprises a high level of biological diversity	Green – Not likely to be or not at variance	Summary of key information submitted in this NVCP Application to support the assessment against Clearing Principle A: • There are no Environmentally Sensitive Areas (ESAs) or DBCA managed reserves or conservation areas within the proposed NVCP Permit Area or in proximity to the Wodgina Project. The closed DBCA managed Nature Reserve is the Mungaroona Range Natural Reserve (DWER, 2021). The Reserve is 'Class A' and covers approximately 105,842 ha is located 50 km to the South West of the Project (DEC 2011). • No Threatened Ecological Communities (TEC) or Priority Ecological Communities (PEC) have been identified within the proposed NVCP Permit Area or wider Wodgina area. • No Declared Rare Flora has been identified within the proposed NVCP Permit Area or wider Wodgina area. • No Wild Rivers or Wetlands of conservation significance (locally or nationally) are within the proposed NVCP Area or in proximity to the Wodgina Project. • No GDV or riparian vegetation occur within the NVCP Permit Area. • Extensive survey effort has been undertaken across the proposed Disturbance Footprint to identify potential conservation significant species. • Two (2) P3 species are located within the proposed NVCP Disturbance Footprint, however they are also mapped extensively in the wider Flora Study Area (*Terminalia supranitifolia*, and *Triodia chichesterensis*). • 14 VUs are mapped within the proposed NVCP Area, none represent State or Commonwealth listed significant vegetation. • A total of 300 discrete vascular flora taxa (including 11 introduced taxa), three known hybrids and seven putative hybrids have been recorded in the Study Area. These taxa and hybrids represent 52 families and 138 genera. The most well-represented

Clearing Principle	Impact Category	Assessment of Clearing Principle
		families were Fabaceae (55 taxa), three known hybrids and seven putative hybrids), Poaceae (51 taxa) and Malvaceae (26 taxa) (Woodman Environmental 2020). • Vegetation condition mapping indicates 1,581.16 ha of vegetation within the proposed NVCP Permit Area is Excellent, followed by 6.52 ha of Excellent/Very Good, 21.63 ha of Very Good, 70.62 ha of Good Vegetation Condition. • Vegetation condition mapping indicates 367.67 ha of vegetation within the proposed NVCP Permit Footprint is Excellent, followed by 0.11 ha of Excellent/Very Good, 5.62 ha of Very Good, 3.39 ha of Good Vegetation Condition. • Five (5) weed species have been identified in the proposed NVCP Permit Area including Declared Weed *Calotropis procera*. • The fauna assemblage as likely to be diverse as the Study Area contains a range of habitats, though many of the species that occur are widely distributed through arid Australia. The predicted faunal assemblage includes up to ten frogs, 108 reptiles, 140 birds and 33 native mammals and eight introduced mammals. The observed assemblage thus far includes five frogs, 71 reptiles, 89 birds and 25 native mammals and six introduced mammals (Western Wildlife 2020). • No anticipated impacts to stygofauna, troglofauna or SRE. • Twelve (12) conservation significant fauna species are known to occur within the wider Fauna Study Area or are Highly likely to occur. Three (3) of which are known to occur within the proposed NVCP Permit Area and one (1) is highly likely to occur. Refer to Principle (b) for more information. • No significant impacts are anticipated on conservation significant fauna species. Given the above information, and management measures outlined in Section 9 the proposed NVCP Application is expected to be of minimal risk to biodiversity values and therefore is not likely to be at variance to this Principle.
(b) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary	Green – Not likely to be or not at variance	Summary of key information submitted in this NVCP Application to support the assessment against Clearing Principle B:

Clearing Principle	Impact Category	Assessment of Clearing Principle
for the maintenance of, a significant habitat for fauna indigenous to Western Australia.		• Twelve (12) conservation significant fauna species are known to occur within the wider Fauna Study Area or are Highly likely to occur. Three (3) of which are known to occur within the proposed NVCP Permit Area and one (1) is highly likely to occur, including: ○ Pilbara Leaf-nosed Bat (*Rhinonicteris aurantia*) – the potential impact to the PLNB is considered Low although the population is potentially "Important" due to gene flow in the region. No permanent diurnal roosts or transitory diurnal roosts have been identified within the proposed NVCP Permit Area, two nocturnal refuges have been identified however they are outside the proposed Disturbance Footprint and will be retained. No significant groundwater impacts are anticipated from the proposed activities therefore potential impacts to humid caves in the wider Project area are considered negligible. Recent survey effort (Stantec 2022) recorded PLNB a small number of bats utilising the area for foraging. Caves in the proposed Disturbance Footprint are not suitable for roosting. The proposed NVCP Permit Area and surrounding Fauna Study Area have a number of nocturnal refuges that will be retained for the PLNB. ○ Ghost Bat (*Macroderma gigas*) – the potential impact to the Ghost Bat is considered to be Low. Conditional areas restricting clearing identified as buffer areas surrounding critical bat habitat that occur within the NVCP Application area or in close proximity including: ▪ One (1) regionally significant diurnal roost will be retained with a 100 m buffer (Ghost Bat & PLNB) (C2) ▪ One (1) diurnal roost will be retained with a 100 m buffer (for Ghost Bat) (S-C 10) ▪ Four (4) Potential Maternity Roosts retained with a 100 m buffer (for both Ghost Bat & PLNB) (PC3, C7a, C1) & C7B (for PLNB); ▪ One (1) transitionary diurnal roosts will be retained with a 100 m buffer (Ghost Bats) (C4). No significant groundwater impacts are anticipated from the proposed activities therefore potential impacts to humid caves in the wider Project area are

Clearing Principle	Impact Category	Assessment of Clearing Principle
		considered negligible. One cave (S- C 10) in the proposed Disturbance Footprint is suitable as a diurnal roost and will be retained. The proposed NVCP Permit Area and surrounding Fauna Study Area have a number of maternity roosts, diurnal roosts, nocturnal refuges and one regionally significant diurnal roost that will be retained for the GB. Previous survey efforts have fluctuated with GB being recorded in high numbers during certain surveys and not recorded the following year. The identification of a number of diurnal and regionally significant roosts outside of the Fauna Study Area indicate the GB population moves around the region. Recent survey effort (Stantec 2022) recorded GB a small number of bats utilising the area for foraging. The proposed activities will be located no closer to identified bat caves than permitted under current approvals. Accordingly, there will be no additional impacts to the bat caves for the activities under this NVCP application. ○ Northern Quoll (*Dasyurus hallucatus*) - the potential impact to the Northern Quoll is assessed to be Moderate due to the presence of the population at the Project being defined as an 'Important population' by DoE guidelines (2016) regardless of low population numbers and/or the lack of denning evidence. Habitat for the Northern Quoll is the Rocky Ridge and Gorge Habitat which is "refuge-dense" and cane-toad free habitat. Such habitat is defined as 'habitat critical to the survival of the species' by DoE (2016) due to it containing rocky habitats, dispersal and foraging habitats. Supported by historic records of conservation significant fauna species, the Rocky Ridge and Gorge Habitat associated with the land system provides connectivity across the project area and surrounding environment, allowing for migration and dispersion of these key fauna species across the wider region. There will be some impact to a small percentage of the key habitats due to the footprint of the Project infrastructure, however, it is expected that the North Quoll will migrate to nearby suitable habitat during disturbance activities. ○ Pilbara Olive Python (*Liasis olivaceus barroni*) – the potential impact to the POP is considered Low as the species is yet to be recorded in the proposed NVCP Permit Area and due to the preference for habitat with pools. The proposed NVCP Permit Area does not include "Critical" habitat and the population is

Clearing Principle	Impact Category	Assessment of Clearing Principle
		unlikely to be an "Important" population. Potential of significant impacts to the POP are considered Unlikely. Given the above information, and management measures outlined in Section 8, the proposed NVCP Application is expected to be of minimal risk to significant habitat and therefore is not likely to be at variance to this Principle.
(c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.	Green – Not likely to be or not at variance	No Threatened or Declared Rare Flora listed under the BC Act have been identified within the proposed NVCP Permit Area or wider Study Area, or were considered to have potential to occur. Given the above information, and management measures outlined in Section 8, the proposed NVCP Application is expected to be of no risk to rare flora values and therefore is not at variance to this Principle.
d) Native vegetation should not be cleared if it comprises the whole or a part of or is necessary for the maintenance of a threatened ecological community.	Green – Not likely to be or not at variance	The proposed clearing area does not contain species representative of a TEC listed under the BC Act or EPBC Act. Given the above information, and management measures outlined in Section 8, the proposed NVCP Application is not at variance to this Principle.
(e) Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.	Green – Not likely to be or not at variance	The extent of the mapped vegetation type is over 99% at both a state and bioregional level. The vegetation proposed to be cleared is not considered to be part of a significant ecological linkage in the local area. Given the above information, and management measures outlined in Section 8, the proposed NVCP Application is not at variance to this Principle.
(f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.	Green – Not likely to be or not at variance	Summary of key information submitted in this NVCP Application to support the assessment against Clearing Principle F: • The proposed NVCP Permit Area, nor the wider Wodgina Project, does not fall within a RAMSAR or nationally significant mapped wetland. • The wider Wodgina Project does fall within the Wild River Catchment identified as the Upper Yule River however this catchment has been downgraded due to the catchment and waterway being assessed as not in near pristine condition.

Clearing Principle	Impact Category	Assessment of Clearing Principle
		• No riparian vegetation associated with permanent water courses or permanent pools such as the Turner River has been identified in proximity to, or within , the proposed NVCP Permit Area (Umwel,t 2022). • No phreatophytic flora taxa or Groundwater Dependent Vegetation (GDV) have been identified with in, or in close proximity to, the proposed NVCP Permit Area (Woodman Environmental, 2020). • The closest major river is the Turner River (over 4.5 km to the east) and is not anticipated to be impacted by this proposed NVCP Application. • Ephemeral water sources defined by the Drainage line habitat will be managed as required through surface water and flood modelling, and the implementation of adequate surface water controls. Given the above information, and management measures outlined in Section 8, the proposed NVCP Application is not at variance to this Principle.
(g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.	Green – Not likely to be or not at variance	Summary of key information submitted in this NVCP Application to support the assessment against Clearing Principle G: • The landscape of the proposed Disturbance Footprint is comprised by rocky outcrops, and soils characterised by stony lag cover and gravel components of the soil strata providing stability for future rehabilitation works. • Some dispersive material is identified within the proposed Disturbance Footprint and this material will be stockpiled to ensure minimal wind or water erosion. • Soils generally have a low water storage capacity reducing the changes of water logging. • Soils (on average) have natural levels of acidity, alkalinity, and salinity. • Flood modelling work across ephemeral drainage lines will indicate where surface water controls need to be implemented to reduce potential erosion.

Clearing Principle	Impact Category	Assessment of Clearing Principle
		• Proposed Disturbance Footprint is restricted to the smallest and optimised design to ensure no over clearing occurs. • Staged clearing will ensure open areas are developed into the final land use as soon as possible and reduce open areas. In summary, the mapped soils are not susceptible to erosion. The proposed clearing is not likely to have an appreciable impact on land degradation. Given the above information, and management measures outlined in Section 8, the proposed NVCP Application is not at variance to this Principle.
(h) Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.	Green – Not likely to be or not at variance	There are no Environmentally Sensitive Areas (ESAs) within or in proximity to the proposed NVCP Permit Area. The closest DBCA managed Nature Reserve is the Mungaroona Range Natural Reserve. The Reserve is 'class A' and covers approximately 105,842 ha is located 50 km to the South West of the Project. Given the above information, and management measures outlined in Section 9, the proposed NVCP Application is not at variance to this Principle.
(i) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.	Green – Not likely to be or not at variance	Summary of key information submitted in this NVCP Application to support the assessment against Clearing Principle I: • The proposed NVCP Permit Area does not occur within a PDWSA. • The proposed NVCP Permit Area does not intersect any significant or permanent watercourses. • The proposed NVCP Permit Area does not fall within any wetlands. • Erosion of the proposed Disturbance Footprint is not anticipated therefore risk of downstream sedimentation of ephemeral drainage line is low. • Any potential contamination from mining activities will be appropriately managed through spill response procedures and remediation (where required).

Clearing Principle	Impact Category	Assessment of Clearing Principle
		• Disturbance footprints for mining activities will be confined to the proposed Disturbance Footprint and delineated from areas native vegetation via windrows and other hard controls. • Groundwater quality is generally circum-neutral and of a marginal to brackish salinity. • Bedrock geology is very tight around the ridgeline bedrock and surrounding areas therefore potential impacts to groundwater systems is expected to be low due to reduced, and very slow, groundwater movement. • Surface water flows are ephemeral and only occur after periods of extended rainfall, generally in the wet season therefore potential for contamination is Low. • Flood modelling work across ephemeral drainage lines will indicate where surface water controls need to be implemented to reduce potential quality deterioration. Given the above information, and management measures outlined in Section 9, the proposed NVCP Application is not at variance to this Principle.
(j). Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.	Green – Not likely to be or not at variance	Summary of key information submitted in this NVCP Application to support the assessment against Clearing Principle J: • A portion of the proposed NVCP Application is located on a peneplain downstream from an extensive ridgeline with a number of ephemeral drainage lines. • Soil types are unlikely to become waterlogged. • Typically, flash flooding events after short intense rain events is matched by quick infiltration rates due to typical hot dry conditions and soil types. • Flood modelling work across ephemeral drainage lines will indicate where surface water controls need to be implemented to reduce potential quality deterioration. • Modelling of the 1% AEP demonstrate some expected ponding against landforms however no significant changes to natural flood modelling of the region.

Clearing Principle	Impact Category	Assessment of Clearing Principle
		There are several non-perennial watercourses within the application area and no permanent waterbodies. Temporary, localised flooding may occur briefly following heavy rainfall events, however, the proposed clearing is unlikely to increase the incidence or intensity of natural flooding.

Red – Likely to be at variance, Orange – May be at variance, Green – Not likely to be or not at variance

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ATTACHMENT 1 - MARBL LITHIUM OPERATIONS PTY LTD ASIC COMPANY EXTRACT

ATTACHMENT 2 - MINING TENEMENT SUMMARY REPORTS

ATTACHMENT 3 - ACCESS AGREEMENT WITH ATLAS IRON

ATTACHMENT 4 - WODGINA LITHIUM PROJECT DETAILED FLORA AND VEGETATION ASSESSMENT (WOODMAN ENVIRONMENTAL APRIL 2020)

ATTACHMENT 5 - WODGINA PROJECT LEVEL 2 VERTEBRATE FAUNA SURVEY APRIL 2019 (VERSION 5) (WESTERN WILDLIFE MAY 2020)

ATTACHMENT 6 - MEMO REPORT: WODGINA – TARGETED SIGNIFICANT FAUNA SURVEY (STANTEC JUNE 2022)

ATTACHMENT 7 - FLORA, VEGETATION AND FAUNA IMPACT ASSESSMENT (UMWELT OCTOBER 2022)

ATTACHMENT 8 - LEVEL 1 FAUNA TARGETED CONSERVATION SIGNIFICANT FAUNA SURVEY & DESKTOP ASSESSMENT (STANTEC, 2018)